

# Appendix G

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## Traffic and Transport Working Paper

# WestConnex Enabling Works – Airport East Precinct

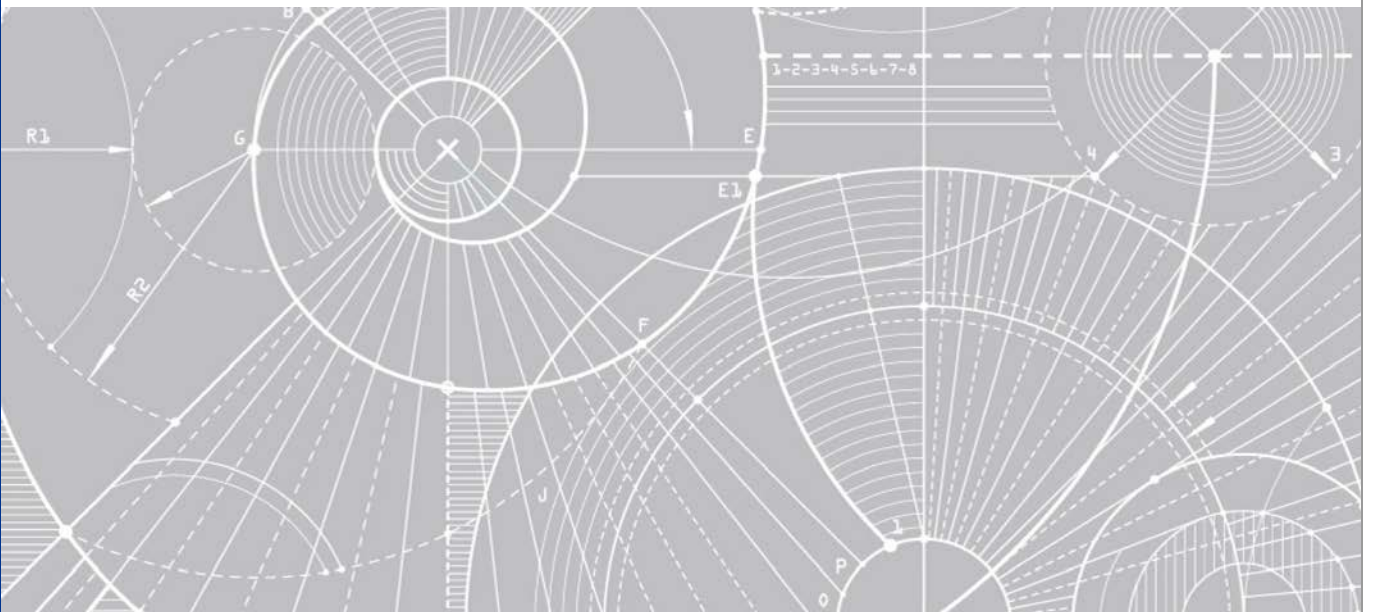
ROADS AND MARITIME SERVICES

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**Appendix A. Traffic model calibration and validation**

## List of Acronyms

Term	Meaning
ADT	Average daily traffic, expressed in vehicles per day
DoS	Degree of saturation
Dynameq	Mesoscopic modelling software for large network analysis
EIS	Environmental impact statement
EMME	Strategic travel modelling software
HCV	Heavy commercial vehicle
LCV	Light commercial vehicle
LGA	Local government area
Paramics	Micro-simulation modelling software for small network analysis
LoS	Level of Service – An index of the operational performance of traffic on a given traffic lane, carriageway or road when accommodating various traffic volumes under different combinations of operating conditions. It is usually defined in terms of the convenience of travel and safety performance.
PCU	Passenger car unit
REF	Review of Environmental Factors
RMS	(NSW) Roads and Maritime Services
SAMP	Sydney Airport Master Plan 2033
STM	Sydney Strategic Travel Model
TfNSW	Transport for NSW
TMC	Transport Management Centre
VoC	Volume over capacity
WDA	WestConnex Delivery Authority
WEW	WestConnex Enabling Works
WRTM	WestConnex Road Traffic Model

## Executive summary

### Background

This working paper considers the traffic and transport impacts of the WestConnex enabling works in the airport east precinct. The precinct is shown in **Figure A**. The analysis assessed existing traffic conditions and traffic conditions in 2018 with the proposal in place and under a “no build” scenario (i.e. traffic conditions in the absence of the WestConnex enabling works).



Figure A: Airport east precinct

### Current traffic and transport conditions

Eleven separate road links in the study area were identified and traffic data collected for these links. The road network in the precinct is heavily trafficked with most links having an average weekday daily traffic flow of 25,000 to 55,000 vehicles. There is an intensive bus network serving the area with over 700 scheduled bus trips on an average weekday. There is reasonable pedestrian access throughout the area, although facilities are poor or non-existent on roads without property frontages. No specific cycle routes or infrastructure have been identified within the study area.

Heavy vehicles (including buses) comprise 6 per cent to 11 per cent of the traffic flow. Scheduled buses represent approximately 2.5 per cent of traffic on Botany Road so the remainder – mostly heavy goods vehicles – accounts for up to 9 per cent of traffic on this road.

The busiest day of the week is Friday with 16.4 per cent of the weekly traffic total. The quietest day is Sunday with 10.9 per cent of the weekly total (refer to **Figure B**). The weekday traffic profile shows a typical urban pattern with AM and PM commuter peaks at 8am to 9am and 5pm to 6pm (refer to **Figure C**). Some links, especially the route from Southern Cross Drive to the airport have a more pronounced, and earlier, AM peak.

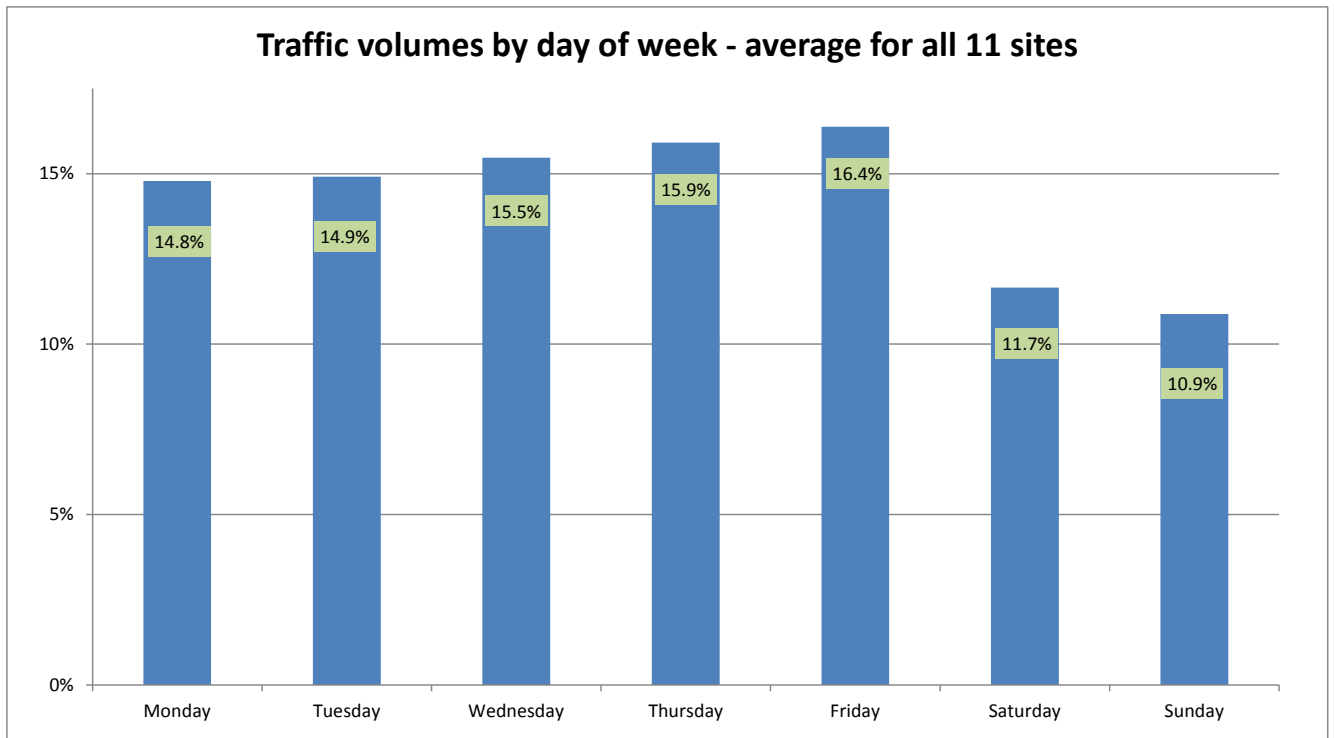


Figure B: Weekly traffic profile

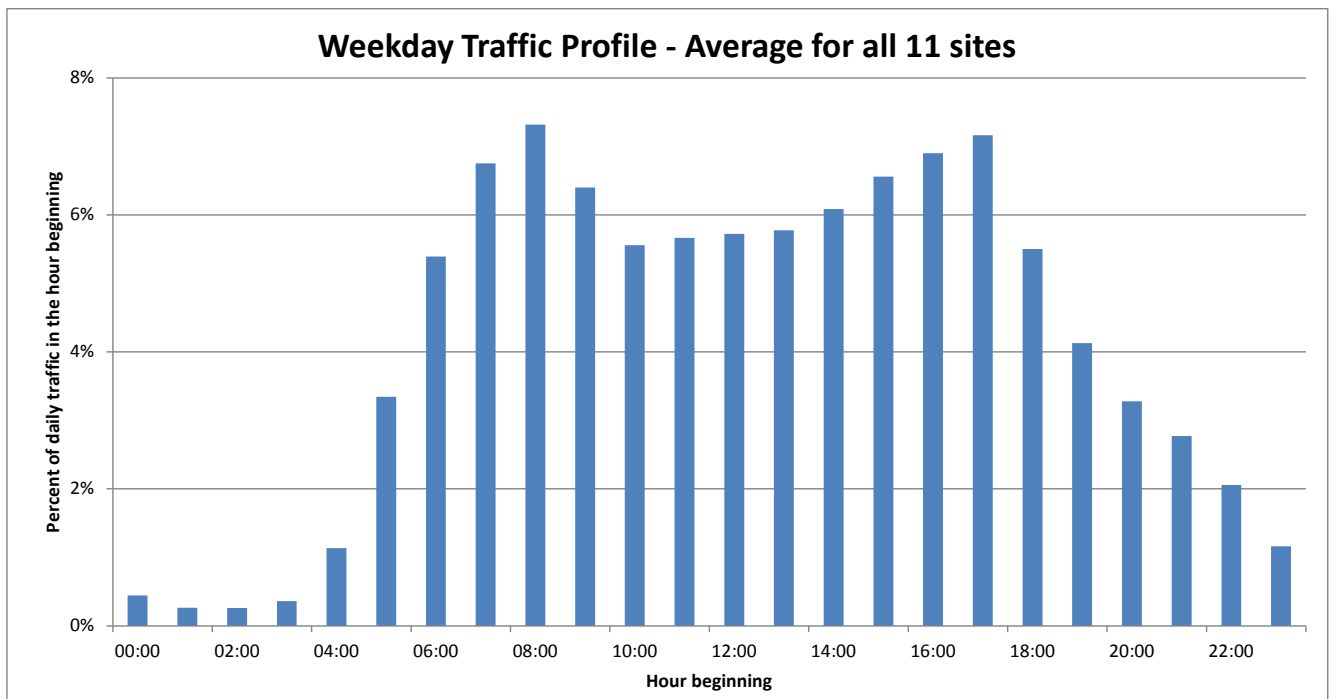


Figure C: Average weekday traffic profile

Most links in the network have road accident performance at levels close to the expected levels for similar roads. The notable exception is Botany Road between Wentworth Avenue and Baxter Road with a relatively high number of crashes at the General Holmes Drive intersection.



## The WestConnex proposal

The primary components of the WestConnex enabling works in the airport east precinct are:

- Widening Joyce Drive and General Holmes Drive between O’Riordan Street and Mill Pond Road to three lanes in each direction.
- Replacing the General Holmes Drive rail level crossing with a road underpass that links General Holmes Drive, Botany Road and Wentworth Avenue.
- Improvements to pedestrian and cyclist facilities.
- Selected junction modifications to improve traffic flow and safety.

Figure D below shows the basic details of the WestConnex preferred option – the proposal.



Figure D: WestConnex preferred option – the proposal

## Conclusions

The analysis shows that, overall, the proposal will improve accessibility to and within the precinct for road vehicles (including buses) and for pedestrians and cyclists.

Traffic movements at the intersection of General Holmes Drive and Botany Road will be simplified by the closure of the through route to Joyce Drive. This intersection is the location of a significant number of vehicle crashes and the number of conflicting vehicle movements will be significantly reduced by the proposal.

Average traffic speeds are higher and travel times lower for most routes through the network with the proposal in place when compared with the “no build” scenario.

In summary, the proposal would improve access to and within the study area for road vehicles (including buses), pedestrians and cyclists. Improved access would be achieved via a road network with higher average traffic speeds, lower travel times, less congestion and less potential for gridlock.

## **1. Introduction**

### **1.1 Project background**

The Roads and Maritime Services (RMS) is planning to upgrade roads around the airport and remove the General Holmes Drive rail level crossing. Proposed road improvements in the airport east precinct will improve the movement of freight trains servicing Port Botany and improve traffic flow and access to the airport, Port Botany, and in the future, the WestConnex motorway. The NSW and Australian governments are jointly funding the Airport east precinct works.

The purpose of the proposal is to remove the rail level crossing and provide a feasible and cost effective road network improvement that would minimise traffic congestion on General Holmes Drive (between Mill Pond Road and Botany Road), Joyce Drive, and Mill Pond Road, and:

- Provide sufficient capacity to support increased taxi and bus volumes accessing the Sydney airport precinct.
- Allow for the future duplication of the Port Botany rail line and the separation of road and rail infrastructure to improve rail freight throughput.
- Enable development of the Sydney Airport proposed ground transport improvements within the T2 and T3 domestic terminals.

The objectives of the proposal are to:

- Reduce current levels of congestion and improve the flow of road and rail traffic.
- Maintain or improve road and rail safety.
- Provide a constructible design solution.
- Minimise environmental and work health and safety risks during road work.
- Minimise the social and environmental impacts of the development including minimising property acquisition, where possible.
- Maintain existing flood immunity.
- Provide a fit-for-purpose urban landscape outcome that complements the surrounding urban environment.
- Provide value for money.

### **1.2 Features of proposal**

Key features and benefits of the proposal are:

- Replace the General Holmes Drive rail level crossing with a road underpass that links General Holmes Drive, Botany Road and Wentworth Avenue to improve the movement of rail freight and improve access to the Airport, Mascot and the eastern suburbs.
- Widen Joyce Drive and General Holmes Drive between O'Riordan Street and Mill Pond Road to three lanes in each direction to improve traffic flow around the Airport and to Port Botany.
- Improvements to the Mill Pond Road intersections with General Holmes Drive and Botany Road to support future growth and access to the Airport.

### **1.3 Study scope context**

The RMS commenced assessment of the transport network for the airport and Port Botany precinct in April 2009. These assessments have formed part of the initial investigation into proposed options for replenishing the reduced road network capacity associated with the closure of the rail level crossing at General Holmes Drive. These included preliminary technical investigations of the road, traffic, geotechnical, utility and environmental characteristics of the area surrounding the rail level crossing.

Due to the complexity of the road network within the Sydney Airport and Port Botany precinct, a combined approach of assessing both the strategic network and the localised traffic impacts was expanded to include a mesoscopic network traffic model. This modelling approach seeks to investigate road congestion issues on the broader road network, from the southern edge of the Sydney Central Business District (CBD) to Botany Bay between Anzac Parade and Princes Highway.

Jacobs developed a Dynameq mesoscopic traffic model of the road network for Sydney's southern suburbs, including the airport precinct. The purpose of this traffic model was to identify the comparative network performance of various route options for the proposed WestConnex Enabling Works, airport east precinct proposal. The area covered by the Airport and Port Botany traffic model extends from Sans Souci where the Georges River enters Botany Bay, north to approximately Oxford Street in the Sydney CBD, and east to include Port Botany. The western and eastern boundaries are Princes Highway and Anzac Parade respectively.

**Figure 1-1** shows the road network in the Dynameq traffic model.

The stages of the traffic mesoscopic modelling and subsequent micro-simulation modelling assessment included are listed below:

- Stage 1: Standard Demand Analysis – Analysis of forecast growth data in road traffic demand, referenced from the Sydney Strategic Transport Model (RMS STM) and the Joint Study into Aviation Capacity in the Sydney region.
- Stage 2: Demand Adjustment Analysis – Development and application of a traffic demand forecasting process to progressively grow future demand synchronised with available capacity during the peak period.
- Stage 3: Options Analysis – Development of RMS recommended options in the model and network analysis.
- Stage 4: Additional Options Analysis – Development of RMS and Jacobs recommended options in the model and network analysis.
- Stage 5: WestConnex Enabling Works Traffic Modelling Assessment – Evaluation of intersection performance using LINSIG, to develop the design of Alternative proposal 1.
- Stage 6: Port Botany and Sydney Airport Network Constraints / Identifications – Identification of network constraints and their causes, under Base and Option 4 scenarios.
- Stage 7: Traffic Modelling Assessment – Development of base and future year Paramics models for additional alternative proposals to further investigate the impacts of infrastructure upgrades at Wentworth Avenue/Botany Road.

This report builds on the modelling analysis and presents a working paper to support the Review of Environmental Factors (REF) for the scheme. All the traffic modelling results will be based on the output from an earlier traffic assessment report "*WestConnex Enabling Works - Paramics Traffic Modelling Assessment*" (Jacobs, July 201).



Figure 1-1: Dynameq mesoscopic model study area

## 1.4 Purpose of this working paper

The purpose of this working paper is to present the traffic and transport impacts of the WestConnex enabling works in the airport east precinct. The working paper is an integral component of the overall REF for the WestConnex enabling works.

The objectives for this phase of the REF are:

- To establish the traffic and transport impacts of the proposed road network alterations in this precinct (closure of the level crossing and provision of a grade separated railway crossing to the south east of the current level crossing).
- To consider the impact on traffic and transport in the 2018 forecast year of the road network with and without the WestConnex enabling scheme in place.
- To identify measures which can be taken to mitigate the identified traffic and transport impacts and the timeframe for implementation of the mitigation measures

## 1.5 Report structure

This report is structured as follows:

- **Section 1** Introduction (this section) – setting out the purpose and scope of the working paper.
- **Section 2** Existing traffic and transport environment – presenting a description of the road network, public transport network and other traffic, transport infrastructure in the study area, current usage of the network is described in terms of traffic volumes by time of day and day of week
- **Section 3** Existing road network performance – documenting the existing network performance, travel time and the road safety record for the network.
- **Section 4** Traffic model developments – documenting the development of the traffic base models and future network assumptions.
- **Section 5** Future network performance for the proposal and “no build” scenarios – describing the impact of the proposed road network alterations for the forecast 2018 traffic and transport network users.
- **Section 6** Summary and conclusions – summarising the detailed findings of the analysis.

## 2. Existing traffic and transport environment

### 2.1 Study area

The Airport East Precinct study area is bounded by O’Riordan Street and Botany Road in the East-West direction and extends from Robey Street to the Southern Cross Drive in the North- South direction. **Figure 2-1** illustrates the extent of the study area.



Source: Jacobs 2014

Figure 2-1: Study network

### 2.2 Network descriptions

#### 2.2.1 Local road network

The study area includes the following major roads:

- Southern Cross Drive
- Wentworth Avenue
- Mill Pond Road
- Botany Road
- Ross Smith Avenue
- Joyce Drive
- O’Riordan Street
- Qantas Drive (Airport Drive)

The Qantas Drive / Joyce Drive / General Holmes Drive road runs north-south in the study area, along the eastern perimeter of Sydney Airport. This road connects the M5 East Freeway, route A1 and Port Botany to Sydney Airport and the industrial areas to the north. General Holmes Drive is generally three lanes in each direction, reducing to two lanes in each direction along Joyce Drive and Qantas Drive, with a posted speed limit of 70km/h in the study area. At Joyce Drive, General Holmes Drive continues to Botany Road via a level crossing over the Botany goods line.

Botany Road runs north-south, connecting the Botany town centre to Mascot and the industrial areas to the north. It is generally two lanes in each direction with a posted speed limit of 60km/h in the study area.

Southern Cross Drive is a freeway forming part of the M1, it connects the southwest of Sydney to the CBD and the north. It is two to three lanes wide in each direction, with a posted speed limit of 70km/h to 80km/h. A northbound entry ramp and southbound exit ramp are provided at Mill Pond Road and Wentworth Avenue.

Mill Pond Road is a short road connecting General Holmes Drive to Botany Road and Southern Cross Drive, with a posted speed limit of 60km/h.

Wentworth Avenue runs east-west, connecting Botany Road to Southern Cross Drive and Eastgardens. It is two to three lanes wide in each direction, with a posted speed limit of 60km/h to 70km/h.

O’Riordan Street runs north-south, connecting Joyce Drive / Qantas Drive and the Domestic Terminal to industrial areas to the north. It is generally two lanes in each direction with a posted speed limit of 60km/h.

Robey Street is a local road running east-west, from Qantas Drive and O’Riordan Street to Botany Road. It is one lane in each direction with kerbside parking lanes, and the posted speed limit is 50km/h.

The remaining network of roads within the study area consists of local roads providing access to commercial and residential areas.

Time restricted kerbside car parking is provided along sections of Botany Road and Robey Street on both sides of the roads.

The railway level crossing on General Holmes Drive is located to the north of the study area between Botany Road to the east and Joyce Drive to the west. There are two lanes on either approach to the level crossing and there is a 60km/h posted speed limit.

The road network in the Airport East Precinct includes the motorway standard Southern Cross Drive and major access routes to Sydney Airport and Port Botany. There are also a number of local roads providing access to residential and commercial properties and linking with the arterial road network.

### 2.2.2 Speed environment

**Table 2-1** lists the existing speed limits within the study area. Speed limits range from 50km/h on local roads to 60km/h and 70km/h on arterial roads.

Table 2-1: Existing speed limits

Road	Existing speed limit (km/h)
General Holmes Drive	70
Southern Cross Drive, east of Mill Pond Road ramps	80
Southern Cross Drive, west of Mill Pond Road ramps	70
Mill Pond Road	60
Botany Road	60
Wentworth Avenue, east of Southern Cross Drive ramps	70
Wentworth Avenue, west of Southern Cross Drive ramps	60
Joyce Drive	70
O’Riordan Street	60
Robey Street	50

### 2.2.3 Parking and access

Limited parking is available within the proposal area, as the majority of the major roads within it are full time or part time clearways. Public parking opportunities within or close to the proposal area are located to the west of the freight rail line, on local streets and the Park n Fly parking station, located on General Holmes Drive.

Parking for private use is limited to parking at residences along Wentworth Avenue and Botany Road, as well as for businesses and light industry within the proposal area.

Most residences within the proposal area access Wentworth Avenue, Botany Road and adjoining local streets. Commercial business and light industry are located along Joyce Drive, Botany Road, Wentworth Avenue and General Holmes Drive. These businesses access the road network via these major streets and adjoining local roads.

## 2.3 Mode of travel

### 2.3.1 Public transport services

#### Buses

An extensive and intensive bus network operates throughout the precinct and peak period/peak direction bus priority lanes are in place on the busiest routes (Botany Road).

Nine bus routes listed in **Table 2-2**, operated by Sydney Buses, pass through the study area. **Table 2-3** lists bus routes within the study area, along with their AM and PM frequencies.

Table 2-2: Bus routes passing through the study area

Route no.	Route	Scheduled Trips per day		
		Monday to Friday	Saturday	Sunday
301	Eastgardens - City	80	58	48
303	Sans Souci - City	85	42	34
309	Port Botany - City	139	93	60
310	Eastgardens - City	103	74	52
400	Burwood - Bondi Junction	111	96	96
410	Rockdale - Bondi Junction	23	-	-
X10	Eastgardens - City	16	-	-
M20	Gore Hill - Botany	12	-	-
X09	(Express) Banksmeadow - City	8	-	-

Source: [www.transportnsw.info](http://www.transportnsw.info), current timetables July 2014

Table 2-3: Bus routes and peak frequencies

Bus no.	Bus route	AM peak frequency	PM peak frequency
301	Eastgardens - City	2-4 per hour	1 per hour
303	Sans Souci - City	2-6 per hour	1-2 per hour
309	Port Botany - City	4-7 per hour	4-8 per hour
310	Eastgardens - City	4 per hour	4-5 per hour
400	Burwood - Bondi	3-4 per hour	4 per hour
410	Rockdale - Bondi Junction	1-2 per hour	3 per hour
M20	Gore Hill - Botany	6-7 per hour	6 per hour
X09	Port Botany - City	4 per hour	2 per hour
X10	Eastgardens - City	3 per hour	2 per hour

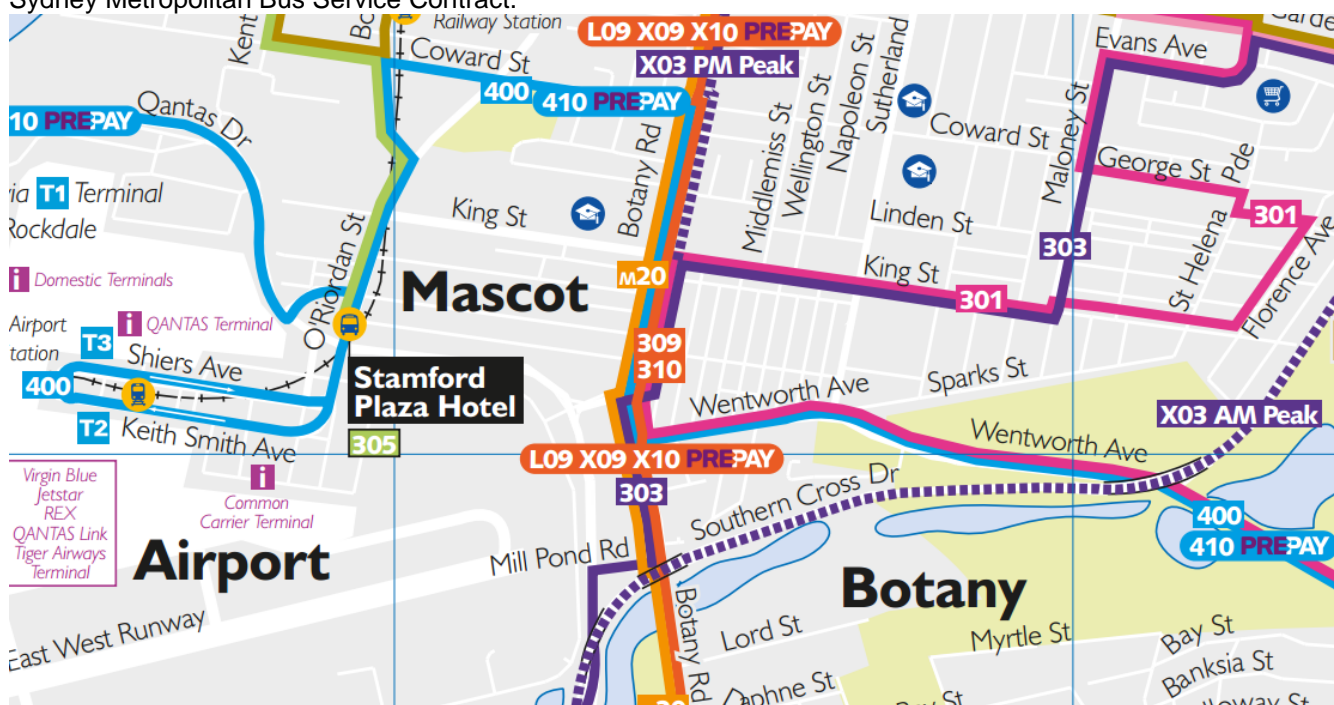
Source: [www.transportnsw.info](http://www.transportnsw.info), current timetables July 2014



Botany Road between Wentworth Avenue and King Street has the highest daily bus flows – 707 trips each weekday. Wentworth Avenue has 167 weekday scheduled bus trips, Qantas Drive has 132 and O’Riordan Street has 149 weekday scheduled bus trips.

A northbound bus lane is in place on Botany Road between Sutherland Street and High Street in the AM Peak. In the southbound direction a bus lane applies on Botany Road as far as the Hollingshed Street intersection in the PM Peak. South of the bus lane in PM Peak clearway applies.

The bus network is shown in **Figure 2-2**. The study area is served primarily by buses operated as part of Sydney Metropolitan Bus Service Contract.



Source: [www.sydneybuses.nsw.gov.au](http://www.sydneybuses.nsw.gov.au), Eastern Beaches and Inner South Eastern suburbs region guide

Figure 2-2: Bus network and rail stations in the study area

## Trains

The Sydney Trains Airport Line (T2) passes through the study area in tunnel below O’Riordan Street. The nearest stations are at Mascot (Bourke Street) and Domestic Airport. There are between 8 and 9 trains per hour in each direction servicing the Mascot and Domestic airport stations during the peak hours.

## Railway level crossing

The operational timing of the closure of the railway level crossing at General Holmes Drive was identified from the intersection count survey data and rail plan information. **Table 2-4** provides a summary of the closure times, which were used as input into the traffic models.

Table 2-4: Railway level crossing timetable

Period	Level crossing – closed	Level crossing – open	Duration (min.sec)
6.00am – 7.00am	6.20.17am	6.22.41am	2.24
7.00am – 8.00am	7.54.00am	7.56.34am	2.34
8.00am – 9.00am	8.42.10am	8.45.14am	3.04
3.00pm – 4.00pm	3.53.06pm	3.56.04pm	2.58

Period	Level crossing – closed	Level crossing – open	Duration (min.sec)
4.00pm – 5.00pm	4.13.44pm	4.16.40pm	2.58
	4.29.25pm	4.32.12pm	2.56
	4.50.10pm	4.52.42pm	2.47
5.00pm – 6.00pm	-	-	-

## Air

Sydney Airport is the main airport hub in NSW, with air transport connections to over 50 international airports. It is located about eight kilometres from the Sydney city centre and is used by over 35 million passengers annually. The airport has three runways, with one runway oriented east-west and two runways oriented north-south. The proposal is located directly to the east of the east-west runway

### 2.3.2 Pedestrians

Pedestrian facilities are reasonable on most major roads with adequate footpath width, signalised crossing points at major intersections equipped with ramps at pedestrian crossing points to facilitate wheelchairs and prams. The exceptions are:

- **Qantas Drive** which has a narrow footpath on the eastbound side only and this path extends only for about 500 metres west of Robey Street. There is no pedestrian crossing provision across Robey Street. Between Robey Street and O’Riordan Street there are footpaths on both sides of Qantas Drive and signalised pedestrian crossings at all stop lines at the junction with O’Riordan Street, Joyce Drive and Sir Reginald Ansett Way.
- Apart from a short section on the north western side of the road between the level crossing and Botany Road, **General Holmes Drive** has no footpaths on either side.
- **Ross Smith Drive** has limited footpaths for a short distance east of Sir Reginald Ansett Way.
- **Botany Road** has no pedestrian route across the intersection with Mill Pond Road (western side of Botany Road).
- **Wentworth Avenue** has footpaths with dropped kerbs at intersections on both sides of the road between Botany Road and Sutherland Street, but only on the southern side east of Sutherland Street.
- **Southern Cross Drive** is a motorway standard road and has no provision for pedestrians.

The Government’s strategy document, *Sydney’s Walking Future (2013)*, - developed from the *NSW Long Term Master Plan for Transport* - sets the framework for Transport for NSW to work with councils to build connected walking routes that will create accessible and sociable centres people want to live in and visit. The focus will be on maximising personal security, providing better online information about routes, simplifying wayfinding signage, and promoting the health and environmental benefits of walking.

### 2.3.3 Cyclists

*Sydney’s Cycling Future (2013)*, also developed following the *NSW Long Term Master Plan for Transport*, states that the NSW Government will work with the Australian Government, councils and the community to plan, prioritise and deliver better connected cycling infrastructure. A primary focus will be on the safety of cyclists.

No specific cycle routes or infrastructure have been identified within the study area. Botany Road, the Wentworth Avenue approaches to Southern Cross Drive and Southern Cross Drive north of Wentworth Avenue are identified as bicycle friendly roads. The residential roads within the study area can also be considered as bicycle friendly.

## 2.4 Traffic volumes and patterns

### 2.4.1 Midblock traffic counts

A detailed analysis of traffic count data has been undertaken at 11 midblock locations. This data was used to assess the existing traffic conditions within the study area, as discussed below. The data covers the period from 5 August 2013 to 11 August 2013.

**Table 2-5** shows midblock traffic volumes at selected locations. The highest average weekday daily traffic volume on General Holmes Drive was 26,848 vehicles northbound and 27,823 vehicles southbound, between Joyce Drive and Mill Pond Road. The highest average weekday daily traffic on Botany Road was 16,285 vehicles northbound and 16,699 vehicles southbound, between Robey Street and General Holmes Drive.

Table 2-5: Existing midblock traffic volumes

Site no.	Road	Location	Direction	Average weekday & weekend traffic (veh/day)	Average weekday traffic (veh/day)	AM peak hour (veh/hr)	PM peak hour (veh/hr)
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	Northbound	19,239	20,800	1,883	1,047
			Southbound	22,208	23,941	937	2,243
2	Botany Road	Between Mill Pond Road and Lord Street	Northbound	10,383	12,073	654	1,149
			Southbound	11,705	13,273	1,042	818
3	Southern Cross Drive	Off ramp to Mill Pond Road	Westbound	17,519	18,936	1,585	1,066
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	Northbound	24,704	26,848	2,188	1,466
			Southbound	25,786	27,823	1,241	2,032
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	Northbound	15,759	17,164	1,290	1,172
			Southbound	14,067	15,105	825	1,162
6	Wentworth Avenue	Between Botany Road and Sutherland Street	Eastbound	11,287	12,454	663	900
			Westbound	12,599	13,256	789	1,033
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	Northbound	11,876	12,945	919	898
			Southbound	12,026	12,926	729	880
8	General Holmes Drive	Between Joyce Drive and Botany Road	Eastbound	4,331	4,619	378	238
			Westbound	6,752	7,282	308	688
9	Botany Road	Between Robey Street and General Holmes Drive	Northbound	14,845	16,285	1,247	1,124
			Southbound	15,443	16,699	853	1,320
10	Joyce Drive	Between O'Riordan Street and General Holmes Drive	Eastbound	18,381	19,819	1,061	1,250
			Westbound	18,618	20,183	1,510	1,191
11	Mill Pond Road	Between General Holmes Drive and Botany Road	Eastbound	25,314	27,049	1,887	1,520
			Westbound	25,625	27,566	1,825	2,034

The traffic volume at Site 8 (General Holmes Drive between Joyce Drive and Botany Road) is significantly lower than traffic volumes observed on other links. This link includes the level crossing with the Port Botany rail line and delays can be experienced when the road is closed to allow a freight train to pass. Passing times for trains are typically two to three minutes per train movement.

## 2.4.2 Traffic distributions

**Table 2-6** illustrates the weekday traffic distribution in 15-hour day time (7.00am – 10.00pm) and 7-hour day time (10.00pm – 7.00am) in the study precinct.

Table 2-6: Existing traffic distributions

Site no.	Road	Location	Time Period	Vehicle Class	Weekday traffic (veh)	
					NB/EB	SB/WB
1	General Holmes Drive	Between Mill Pond Rd and Southern Cross Dr	15-hour Day time (7.00am to 10.00pm)	Light	15,829	19,370
				Heavy	1,525	1,714
				Total	17,354	21,084
			9-hour Night-time (10.00pm to 7.00am)	Light	3,143	2,624
				Heavy	303	232
				Total	3,446	2,857
2	Botany Road	Between Mill Pond Rd and Lord St	15-hour Day time (7.00am to 10.00pm)	Light	10,196	10,537
				Heavy	859	871
				Total	11,055	11,408
			9-hour Night-time (10.00pm to 7.00am)	Light	939	1,723
				Heavy	79	142
				Total	1,018	1,865
3	Southern Cross Drive	Off ramp to Mill Pond Rd	15-hour Day time (7.00am to 10.00pm)	Light	-	14,248
				Heavy	-	394
				Total	-	14,642
			9-hour Night-time (10.00pm to 7.00am)	Light	-	4,178
				Heavy	-	116
				Total	-	4,293
4	General Holmes Drive	Between Joyce Dr and Mill Pond Rd	15-hour Day time (7.00am to 10.00pm)	Light	19,922	22,990
				Heavy	1,455	1,512
				Total	21,377	24,502
			9-hour Night-time (10.00pm to 7.00am)	Light	5,099	3,116
				Heavy	372	205
				Total	5,471	3,321
5	Botany Road	Between Wentworth Ave and Southern Cross Dr	15-hour Day time (7.00am to 10.00pm)	Light	14,099	12,428
				Heavy	974	934
				Total	15,073	13,362
			9-hour Night-time (10.00pm to 7.00am)	Light	1,956	1,621
				Heavy	135	122
				Total	2,091	1,743
6	Wentworth Avenue	Between Botany Rd and Sutherland St	15-hour Day time (7.00am to 10.00pm)	Light	10,285	10,884
				Heavy	578	841
				Total	10,863	11,725
			9-hour Night-time	Light	1,507	1,421

Site no.	Road	Location	Time Period	Vehicle Class	Weekday traffic (veh)	
					NB/EB	SB/WB
			(10.00pm to 7.00am)	Heavy	85	110
				Total	1,591	1,531
7	Botany Road	Between General Holmes Dr and Wentworth Ave	15-hour Day time (7.00am to 10.00pm)	Light	10,052	10,076
				Heavy	1,242	1,136
				Total	11,293	11,211
			9-hour Night-time (10.00pm to 7.00am)	Light	1,470	1,541
				Heavy	182	174
				Total	1,652	1,715
8	General Holmes Drive	Between Joyce Dr and Botany Rd	15-hour Day time (7.00am to 10.00pm)	Light	3,687	5,809
				Heavy	218	455
				Total	3,905	6,264
			9-hour Night-time (10.00pm to 7.00am)	Light	675	944
				Heavy	40	74
				Total	715	1,018
9	Botany Road	Between Robey St and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	12,973	13,266
				Heavy	1,328	1,301
				Total	14,301	14,567
			9-hour Night-time (10.00pm to 7.00am)	Light	1,800	1,942
				Heavy	184	191
				Total	1,984	2,132
10	Joyce Drive	Between O'Riordan St and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	16,154	15,161
				Heavy	1,162	1,382
				Total	17,316	16,543
			9-hour Night-time (10.00pm to 7.00am)	Light	2,335	3,336
				Heavy	168	304
				Total	2,503	3,640
11	Mill Pond Road	Between Botany Rd and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	22,632	21,816
				Heavy	923	900
				Total	23,555	22,716
			9-hour Night-time (10.00pm to 7.00am)	Light	3,357	4,657
				Heavy	137	192
				Total	3,446	2,857

### 2.4.3 Traffic composition by vehicle type

**Table 2-7** shows the average number of heavy vehicles on a weekday over a 24 hour period. Heavy vehicle proportions were based on traffic counts undertaken in 2013. The highest proportion of heavy vehicles was recorded on Botany Road between General Holmes Drive and Wentworth Avenue.

Table 2-7: Average weekday daily heavy vehicle traffic

Site no.	Road	Location	Direction	Heavy vehicles	Heavy vehicles as % of total traffic
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	Northbound	1,828	9%
			Southbound	1,947	8%
2	Botany Road	Between Mill Pond Road and Lord Street	Northbound	938	8%
			Southbound	1,014	8%
3	Southern Cross Drive	Off ramp to Mill Pond Road	Westbound	510	3%
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	Northbound	1,827	7%
			Southbound	1,716	6%
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	Northbound	1,109	6%
			Southbound	1,056	7%
6	Wentworth Avenue	Between Botany Road and Sutherland Street	Eastbound	663	5%
			Westbound	951	7%
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	Northbound	1,423	11%
			Southbound	1,310	10%
8	General Holmes Drive	Between Joyce Drive and Botany Road	Eastbound	257	6%
			Westbound	529	7%
9	Botany Road	Between Robey Street and General Holmes Drive	Northbound	1,512	9%
			Southbound	1,492	9%
10	Joyce Drive	Between O'Riordan Street and General Holmes Drive	Eastbound	1,330	7%
			Westbound	1,686	8%
11	Mill Pond Road	Between General Holmes Drive and Botany Road	Eastbound	1,060	4%
			Westbound	1,092	4%

The lowest heavy vehicle flows in proportion to the general traffic flow are on the Southern Cross Drive exit ramp to Mill Pond Road and Mill Pond Road itself (sites 3 and 11, respectively). This route is the primary access route between the city and the airport domestic passenger terminals which would explain the high proportion of small passenger vehicles on these links. The actual volume of heavy vehicles on Mill Pond Road is similar to the volumes on most other links in the area.

On Botany Road, timetabled buses represent 1.5 per cent to 2.7 per cent of all vehicle movements on an average weekday. Buses are counted as heavy vehicles and timetabled buses in service on Botany Road make up 21 per cent to 26 per cent of the heavy vehicle movements.

#### 2.4.4 Directional distribution

**Table 2-8** below shows, for each of the selected links, the daily distribution of traffic by direction.

Table 2-8: Average weekday and weekend flows by direction of traffic

Site no.	Road	Location	Weekday			Weekend		
			Vehicles	NB / EB	Vehicles	NB / EB	Vehicles	NB / EB
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	44,741	46%	54%	33,212	46%	54%
2	Botany Road	Between Mill Pond Road and Lord Street	25,346	48%	52%	13,943	44%	56%
3	Southern Cross Drive	Off ramp to Mill Pond Road	18,936	-	100%	13,978	-	100%
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	54,671	49%	51%	40,037	48%	52%
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	32,269	53%	47%	23,722	52%	48%
6	Wentworth Avenue	Between Botany Road and Sutherland Street	25,710	48%	52%	19,327	43%	57%
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	25,872	50%	50%	18,979	48%	52%
8	General Holmes Drive	Between Joyce Drive and Botany Road	11,902	39%	61%	9,035	40%	60%
9	Botany Road	Between Robey Street and General Holmes Drive	32,984	49%	51%	23,545	48%	52%
10	Joyce Drive	Between O'Riordan Street and General Holmes Drive	40,001	50%	50%	29,493	50%	50%
11	Mill Pond Road	Between General Holmes Drive and Botany Road	54,614	50%	50%	41,752	50%	50%

Traffic volumes are generally well balanced by direction. The most significant variation is at site 8, General Holmes Drive crossing the railway level crossing between Botany Road and Joyce Drive. This link also has the smallest total number of vehicle movements so the numerical difference between the eastbound and westbound flows is relatively low.

**2.4.5 Weekly traffic profile**

The 2013 weekly traffic profile at each of the traffic count sites is shown in **Figure 2-3** below. The site numbers refer to the locations listed in the tables in the preceding sections of this report.

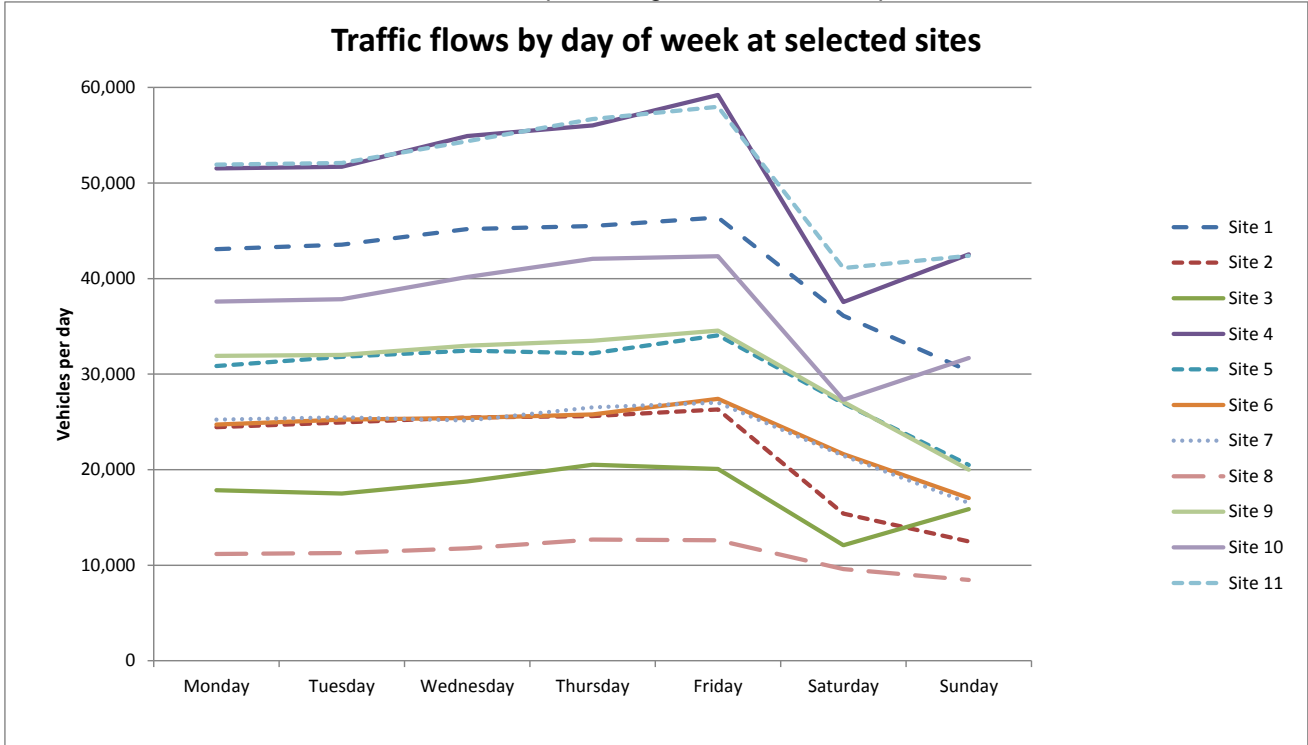


Figure 2-3: Traffic flows by day of week

**Figure 2-4** shows the average weekly profile across all 11 count sites in 2013. This figure shows the percentage of average weekly travel observed on each day.

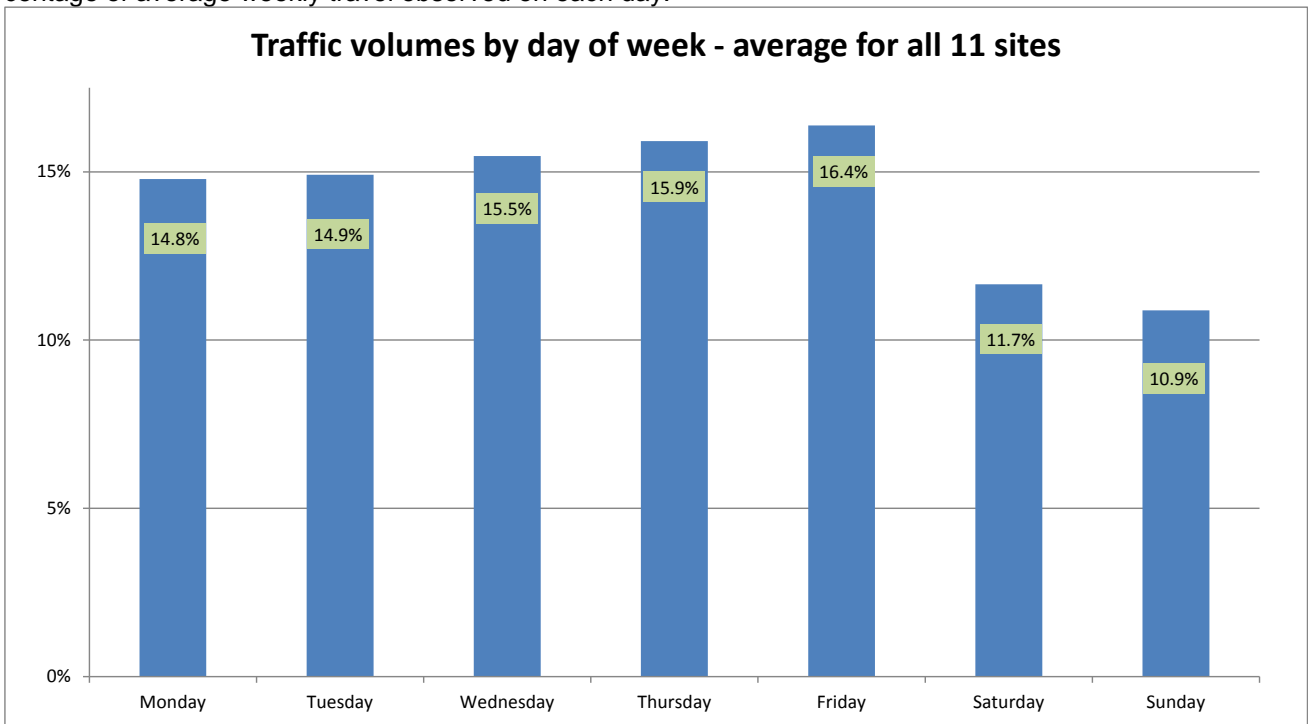


Figure 2-4: Weekly traffic profile



The daily profile indicates daily traffic volumes increasing as the week progresses from Monday to Friday then declining on Saturday and Sunday. Friday is the busiest day of the week with 16.4 per cent of the weekly vehicle movements while Sunday is the quietest day with 10.9 per cent of weekly vehicle movements. There are some variations in this pattern between the sites, in particular for the weekend traffic volumes where Sunday is a busier day than Saturday at the following sites:

- Site 3 (Southern Cross Drive off ramp to Mill Pond Road)
- Site 4 (General Holmes Drive, between Joyce Drive and Mill Pond Road)
- Site 10 (Joyce Drive, between O’Riordan Street and General Holmes Drive)
- Site 11 (Mill Pond Road, between General Holmes Drive and Botany Road)

These routes are the main airport access routes and the differences probably indicate the daily profile of airport passenger traffic.

### 2.4.6 Hourly traffic profile

The 2013 weekday hourly traffic profile at each of the traffic count sites is shown in **Figure 2-5** below. The site numbers refer to the locations listed in the tables in the preceding sections of this report.

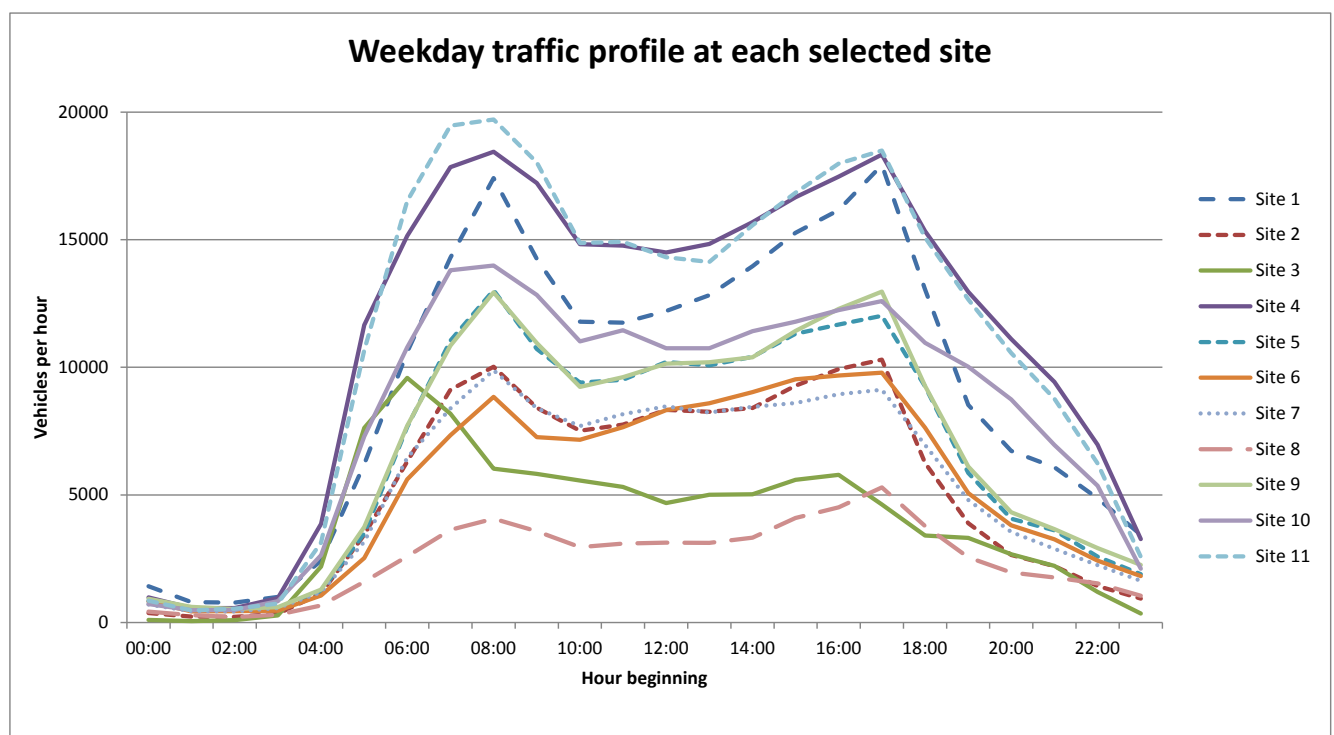


Figure 2-5: Weekday hourly traffic flows

**Figure 2-6** shows the average weekday hourly profile across all 11 count sites in 2013. This figure shows the per centage of average weekday travel observed in each hour of the day.

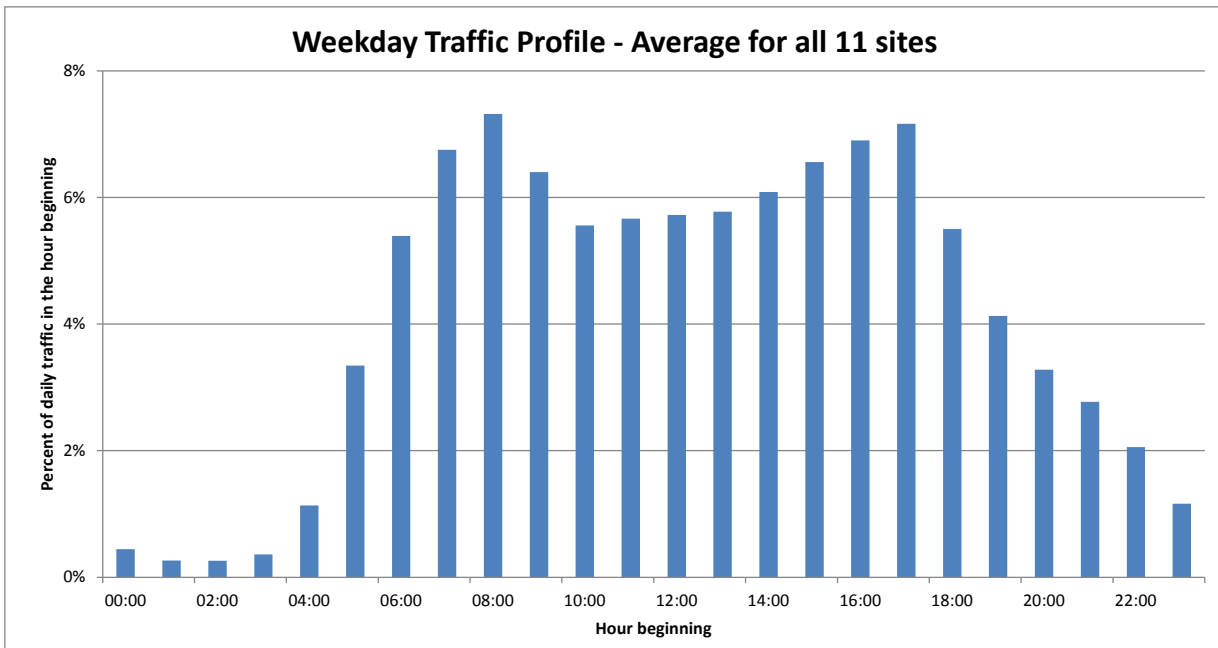


Figure 2-6: Daily traffic profile

The weekday hourly profile shows a typical urban weekday profile with clearly defined AM (8.00am to 9.00am) and PM (5.00pm to 6.00pm) peaks with broadly similar traffic volumes. The most significant variation from this average profile is Site 3 (Southern Cross Drive off ramp to Mill Pond Road) where the AM peak hour is 6.00am to 7.00am and the PM peak (4.00pm to 5.00pm) has 60 per cent of the volume observed in the AM peak hour. This site is one directional (southbound only) and the traffic volumes are likely to reflect the profile of airport passenger demand for air passengers accessing the airport by car or taxi.

Figure 2-7 to Figure 2-17 show the average hourly traffic profile on weekdays at the 11 site locations for each direction.

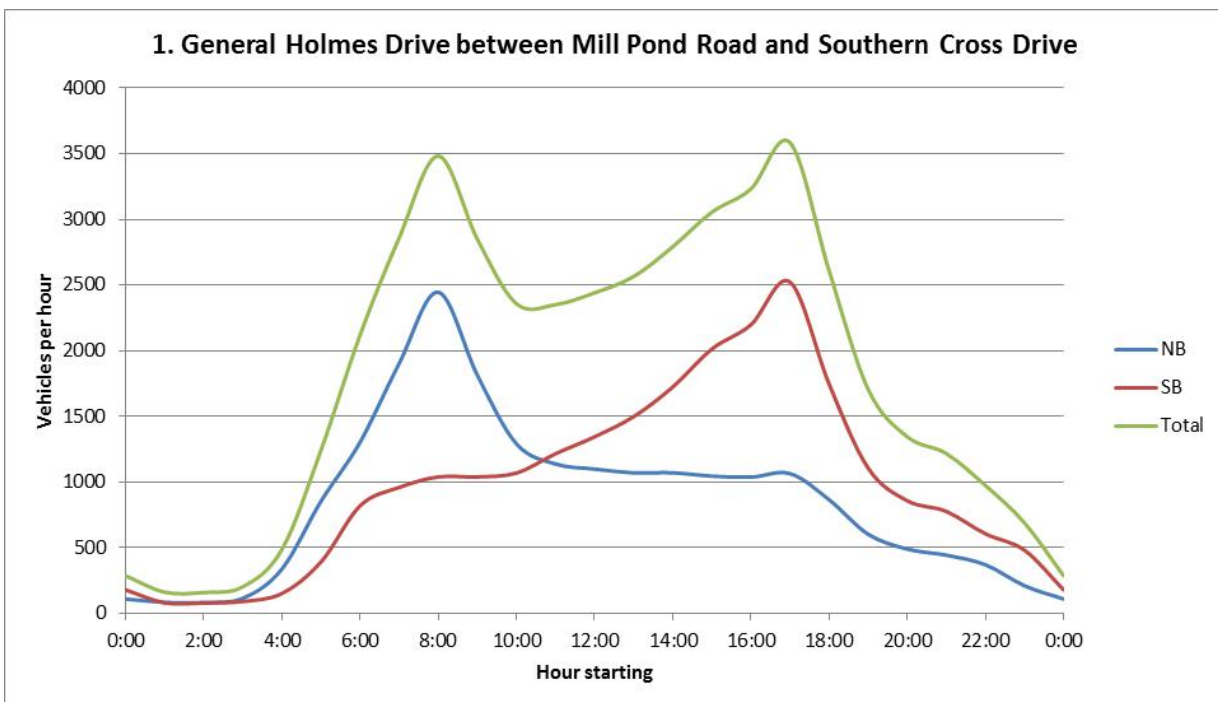


Figure 2-7: Hourly traffic profile

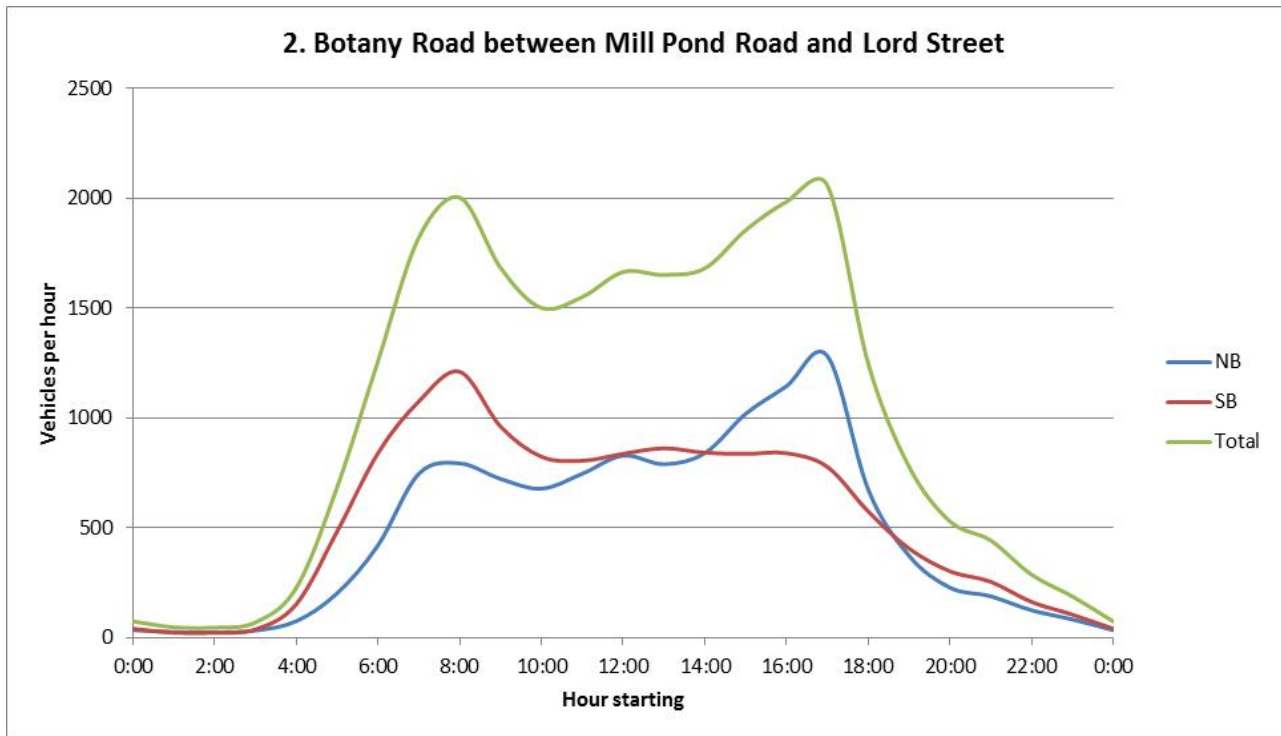


Figure 2-8: Hourly traffic profile

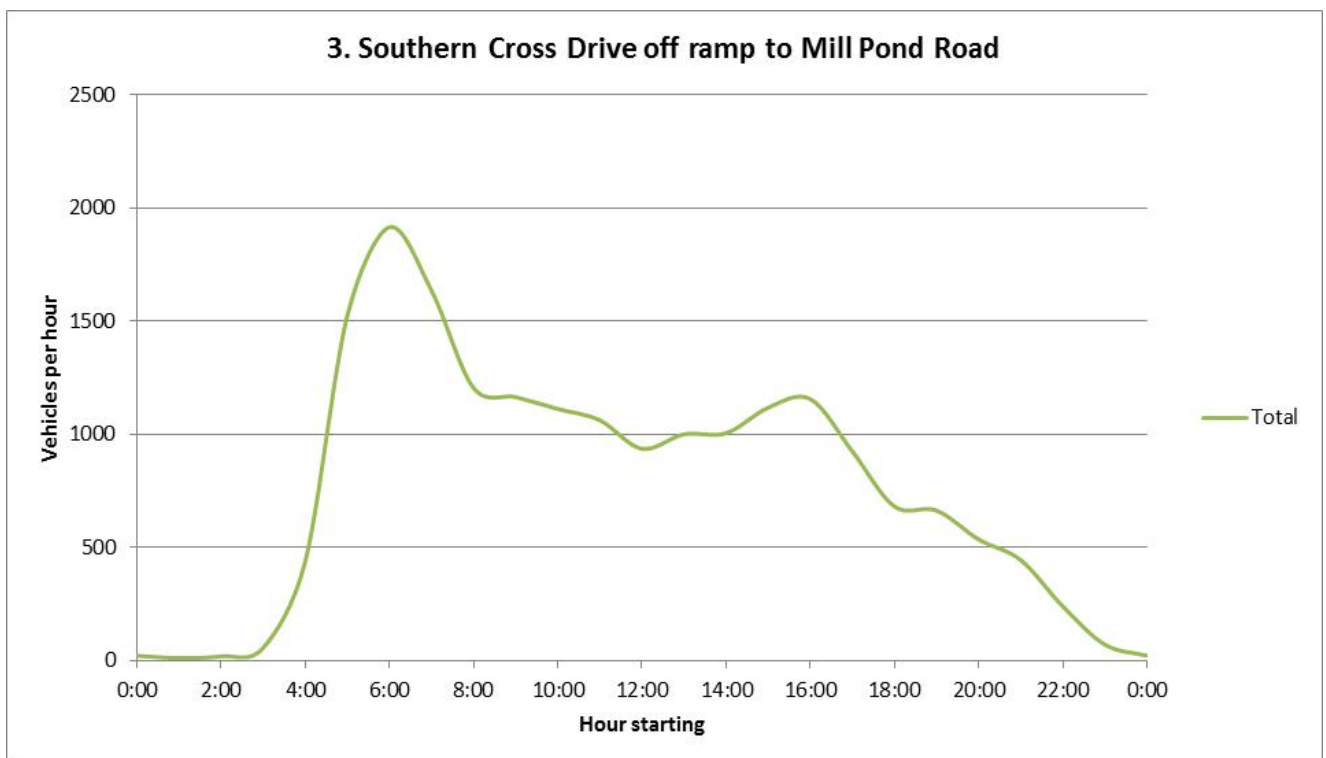


Figure 2-9: Hourly traffic profile

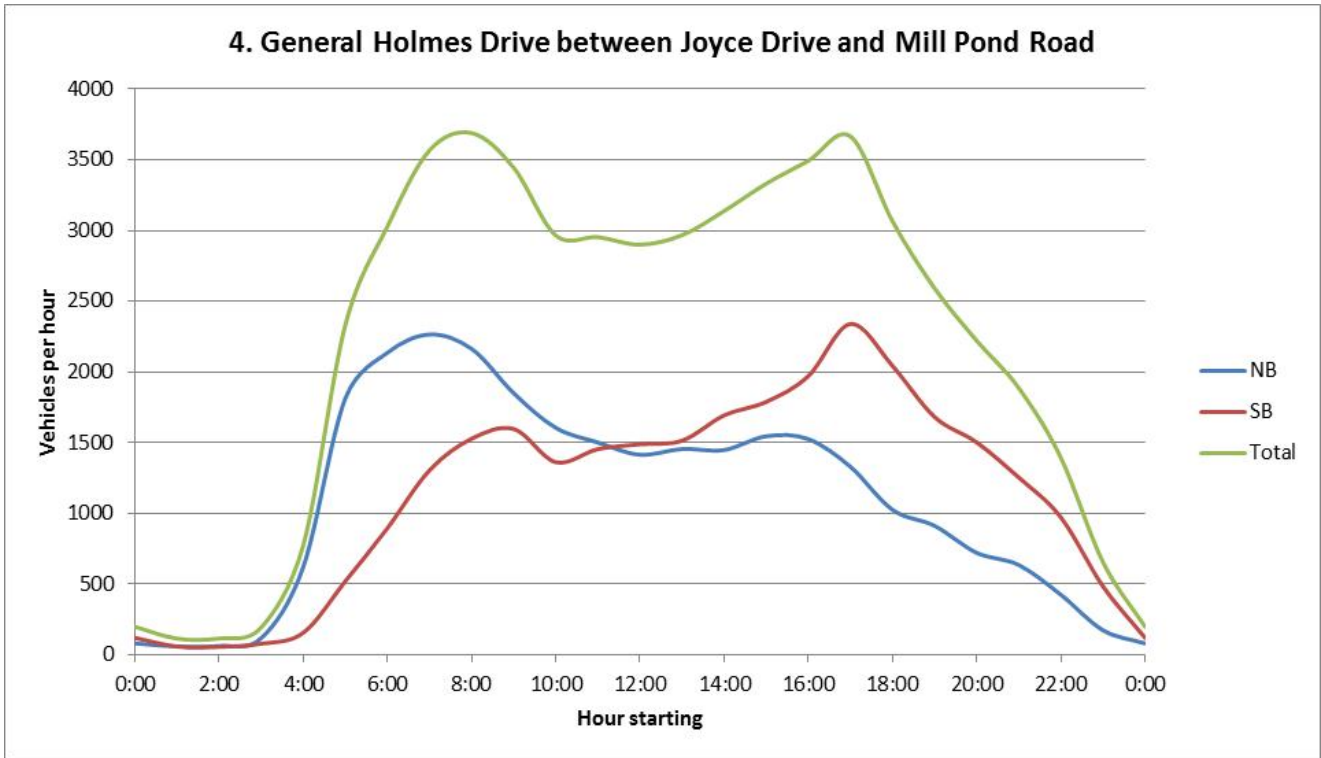


Figure 2-10: Hourly traffic profile



Figure 2-11: Hourly traffic profile

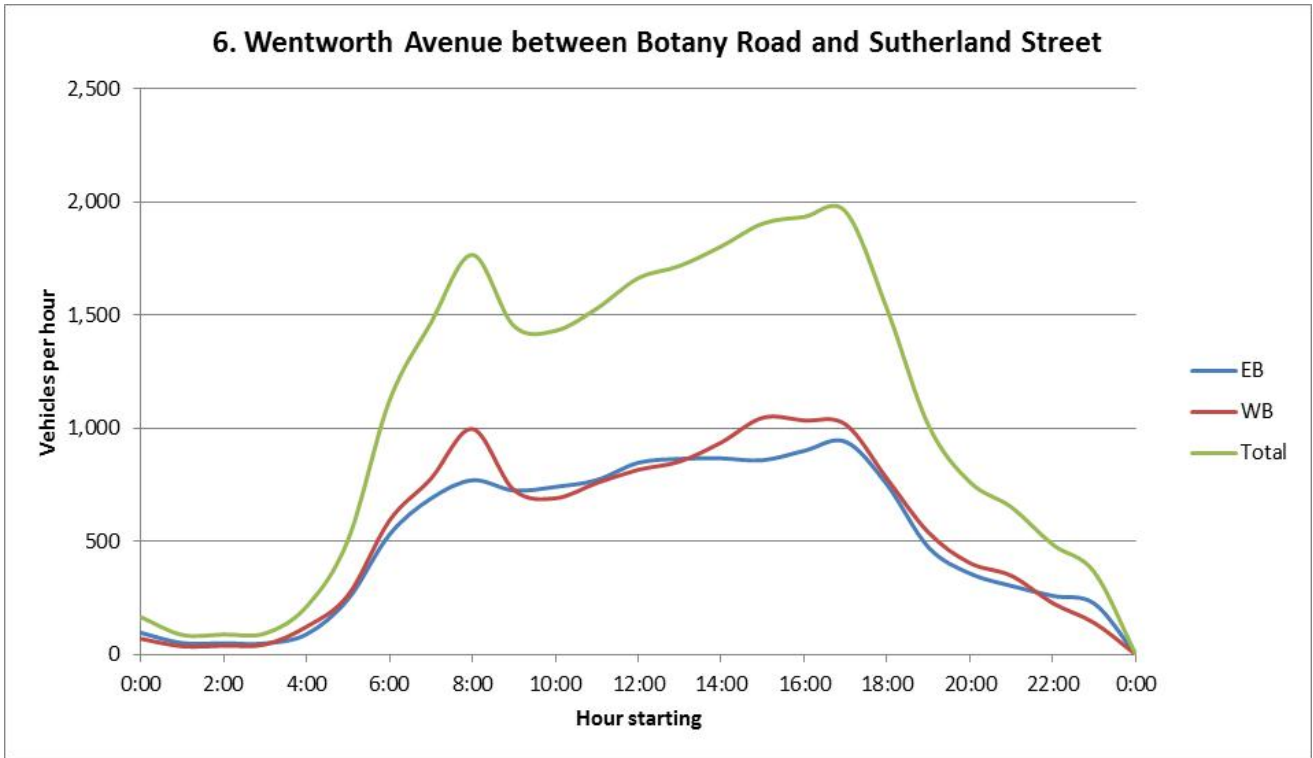


Figure 2-12: Hourly traffic profile

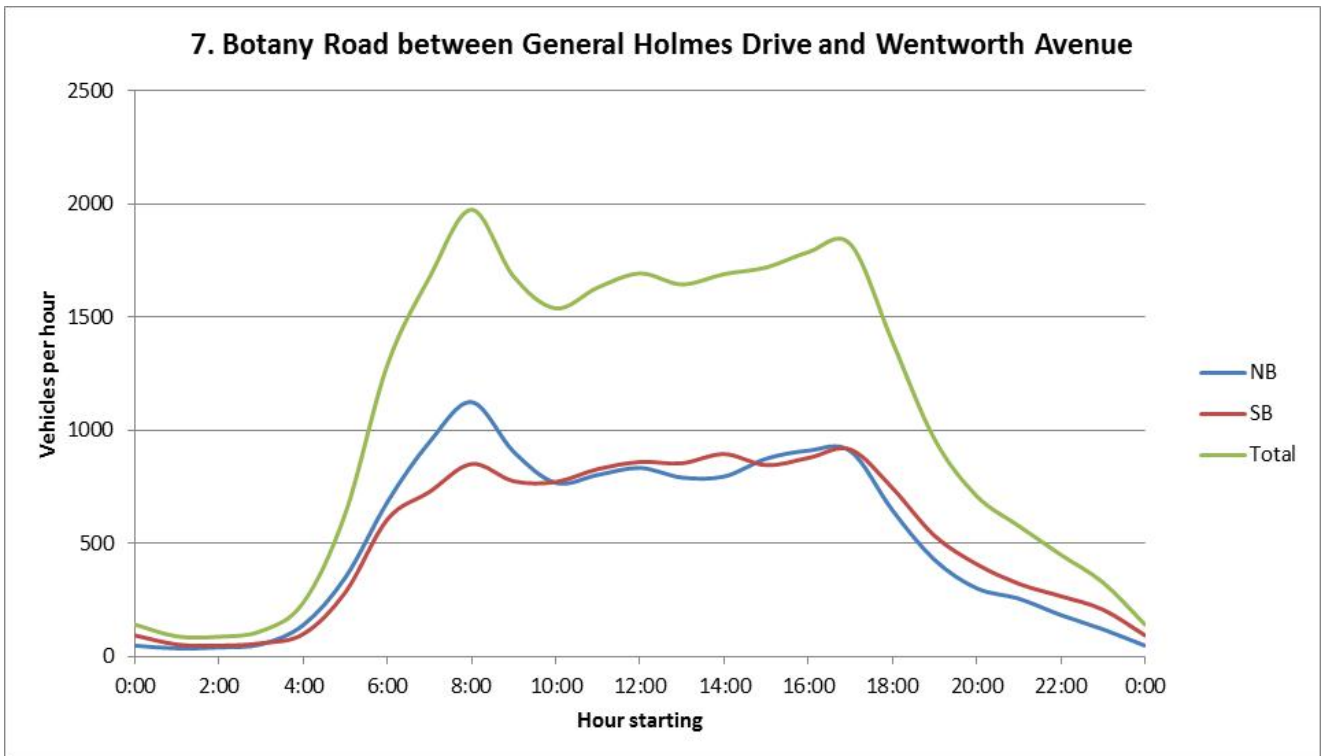


Figure 2-13: Hourly traffic profile

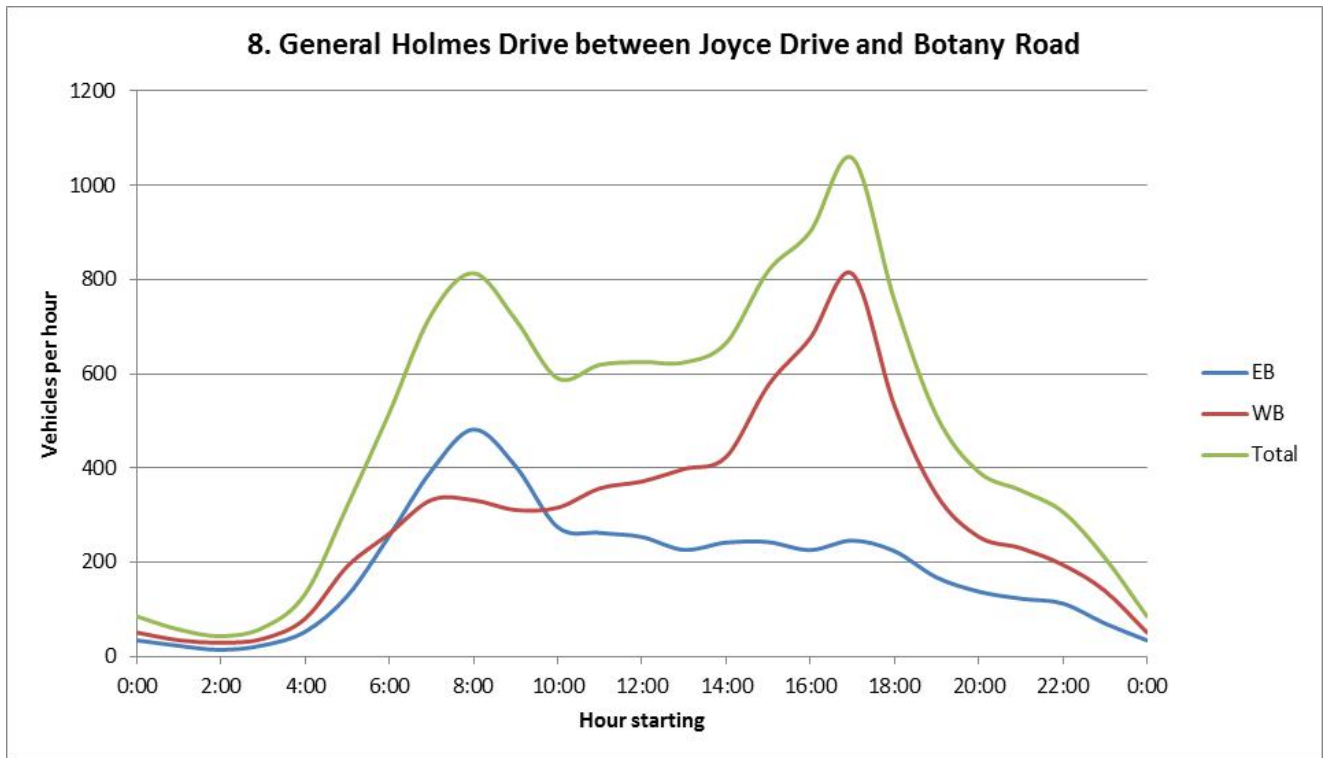


Figure 2-14: Hourly traffic profile

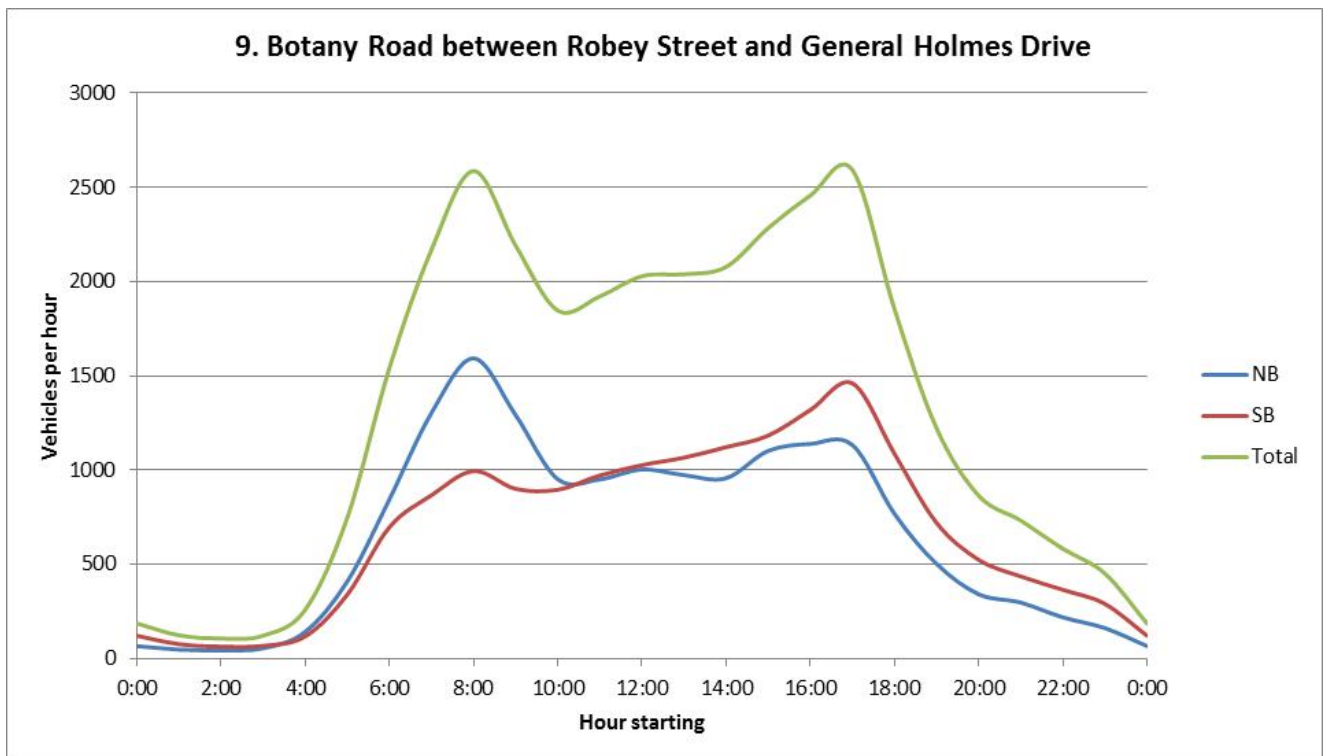


Figure 2-15: Hourly traffic profile

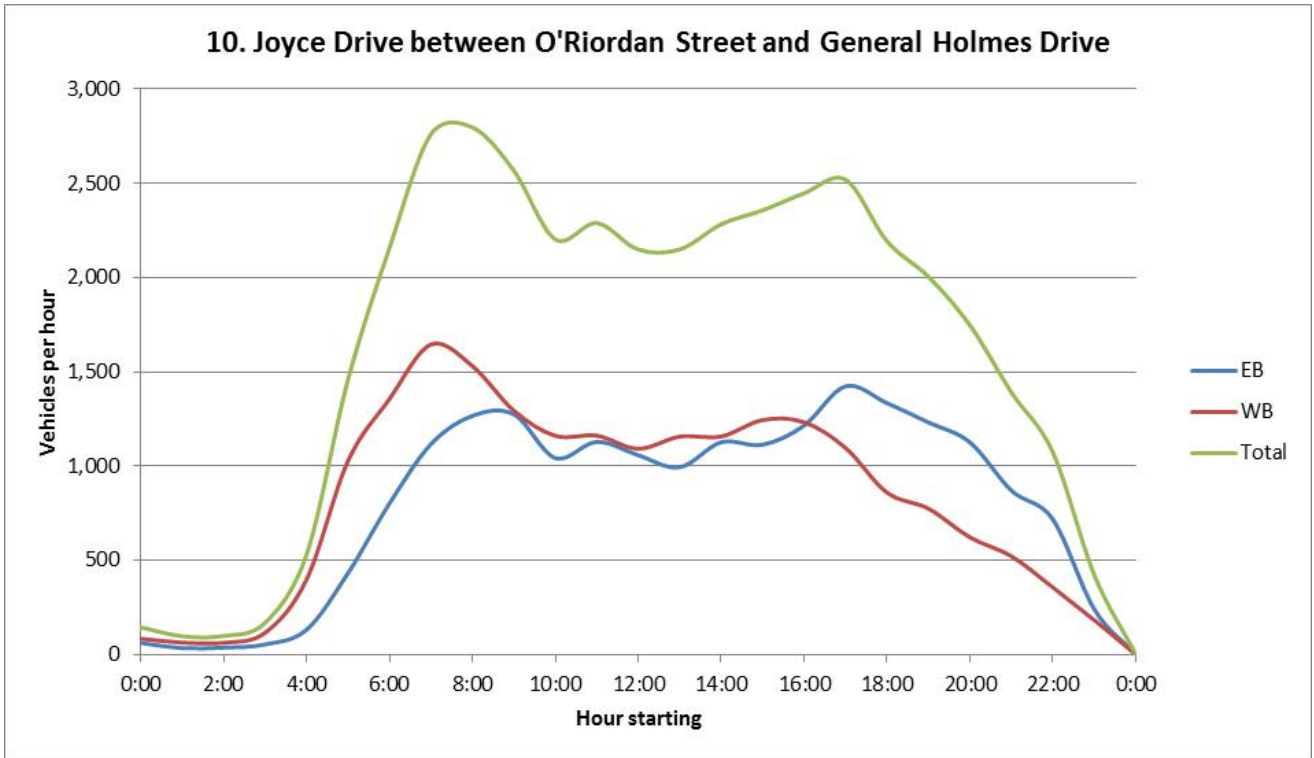


Figure 2-16: Hourly traffic profile

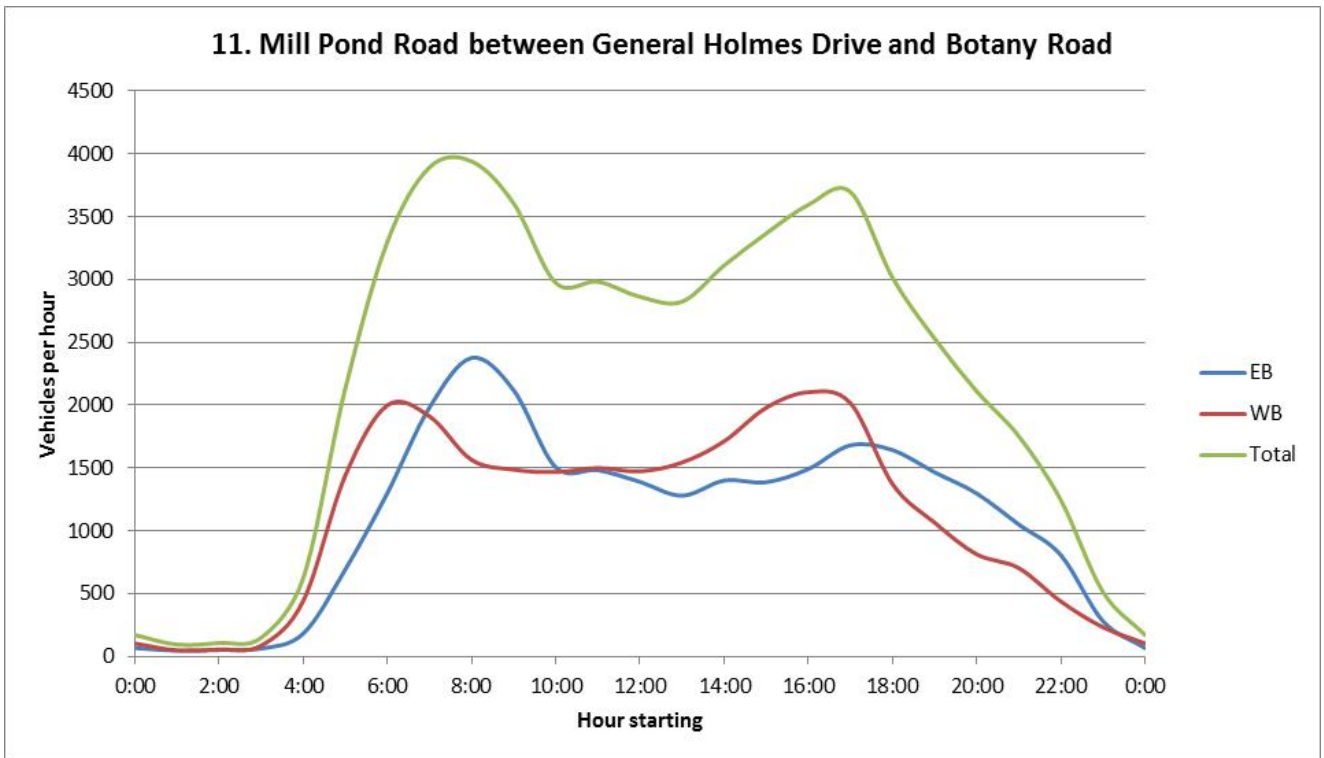


Figure 2-17: Hourly traffic profile

### 3. Existing road network performance

#### 3.1 Midblock performance

As traffic volumes increase on the Southern Cross Drive, General Holmes Drive and Botany Road, the roadways and traffic conditions become less than ideal. Drivers are increasingly affected by other vehicles on the road and form platoons and bunches in the traffic stream. Vehicles in these conditions experience delays because of the inability to overtake slower moving vehicles.

Traffic volumes (classified intersections counts) were collected in August 2013 for the two hours during the AM peak (6.00am to 9.00am) and PM peak (3.00pm to 6.00pm) at 11 key separate road links in the study area:

Midblock performance has been calculated by comparing the average modelled speed at a certain location with the posted free flow speed. The per centage of free flow speed achieved by modelled vehicles provides an insight into the midblock performance of the model at selected locations. Level of service categories were obtained from the Highway Capacity Manual (HCM) 2010 and are presented in **Table 3-1**.

Table 3-1: Midblock level of service (HCM)

Travel speed as a per centage of free flow speed	Level of service
>85%	A
>67%-85%	B
>50%-67%	C
>40%-50%	D
>30%-40%	E
<30%	F

**Table 3-2** outlines the existing midblock performance. Two locations operate at level of service 'E' or worse in the AM peak, the railway level crossing and Botany Road between General Holmes Drive and Wentworth Avenue. In the PM peak there are five locations operating at level of service 'E' or worse. These are again located around the level crossing and Botany Road. Additional capacity would be required to improve the road network performance on Botany Road.



Table 3-2: Existing midblock performance

Site no.	Road	Location	Direction	AM Peak		PM Peak	
				% of free flow	LOS	% of free flow	LOS
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	Northbound	50%	C	80%	B
			Southbound	80%	B	60%	C
2	Botany Road	Between Mill Pond Road and Lord Street	Northbound	50%	C	80%	B
			Southbound	100%	A	100%	A
3	Southern Cross Drive	Off ramp to Mill Pond Road	Eastbound	-	-	-	-
			Westbound	70%	C	50%	D
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	Northbound	70%	B	80%	B
			Southbound	80%	B	70%	B
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	Northbound	70%	B	80%	B
			Southbound	40%	D	20%	F
6	Wentworth Avenue	Between Botany Road and Sutherland Street	Eastbound	100%	A	110%	A
			Westbound	50%	C	40%	E
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	Northbound	60%	C	40%	E
			Southbound	20%	F	10%	F
8	General Holmes Drive	Between Joyce Drive and Botany Road	Eastbound	50%	D	30%	E
			Westbound	30%	F	70%	B
9	Botany Road	Between Robey Street and General Holmes Drive	Northbound	40%	D	50%	C
			Southbound	70%	C	50%	D
10	Joyce Drive	Between O’Riordan Street and General Holmes Drive	Eastbound	100%	A	100%	A
			Westbound	50%	D	70%	C

### 3.2 Travel time

The existing travel time survey for selected major routes are shown below in **Table 3-3** and **Table 3-4**.

Table 3-3: Existing AM travel time

Route no.						
A	Botany Road (north of Robey Street)	Botany Road (south of Mill Pond Road)	1,020	0:02:58	0:03:13	0:03:29
B	Botany Road (south of Mill Pond Road)	Botany Road (north of Robey Street)	895	0:02:30	0:03:43	0:03:36
C	Northbound of General Holmes Drive (south of Mill Pond Road)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	9,918	0:02:29	0:02:55	0:04:13
D	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Southbound of General Holmes Drive (south of Mill Pond Road)	6,952	0:02:29	0:02:44	0:02:07
E	Botany Road (north of Robey Street)	Southbound of General Holmes Drive (south of Mill Pond Road)	377	0:03:08	0:03:25	0:03:45

Route no.	From	To	Demand (veh)	6.00am – 7.00am	7.00am – 8.00am	8.00am – 9.00am
F	Northbound of General Holmes Drive (south of Mill Pond Road)	Botany Road (north of Robey Street)	1,320	0:03:08	0:03:43	0:05:25
G	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southbound of General Holmes Drive (south of Mill Pond Road)	141	0:03:36	0:03:13	0:03:53
H	Northbound of General Holmes Drive (south of Mill Pond Road)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	157	0:06:16	0:03:57	0:04:46
I	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	904	0:04:11	0:03:55	0:04:58
J	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	1,705	0:07:52	0:06:02	0:04:28

Table 3-4: Existing PM travel time

Route no.	From	To	Demand (veh)	6.00am – 7.00am	7.00am – 8.00am	8.00am – 9.00am
A	Botany Road (north of Robey Street)	Botany Road (south of Mill Pond Road)	1,018	0:02:22	0:02:44	0:02:51
B	Botany Road (south of Mill Pond Road)	Botany Road (north of Robey Street)	1,143	0:02:21	0:02:59	0:03:05
C	Northbound of General Holmes Drive (south of Mill Pond Road)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	11,945	0:02:06	0:02:52	0:04:13
D	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Southbound of General Holmes Drive (south of Mill Pond Road)	7,401	0:02:01	0:04:39	0:02:46
E	Botany Road (north of Robey Street)	Southbound of General Holmes Drive (south of Mill Pond Road)	1,847	0:03:02	0:05:14	0:03:48
F	Northbound of General Holmes Drive (south of Mill Pond Road)	Botany Road (north of Robey Street)	522	0:03:07	0:03:54	0:05:02
G	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southbound of General Holmes Drive (south of Mill Pond Road)	218	0:03:12	0:04:55	0:04:45
H	Northbound of General Holmes Drive (south of Mill Pond Road)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	179	0:03:14	0:03:30	0:04:30
I	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	1,511	0:04:30	0:04:38	0:05:29
J	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	1,456	0:04:38	0:04:17	0:05:22

### 3.3 Crash analysis

#### 3.3.1 Road safety history

RMS provided crash history data for the Airport East Precinct, within the limit of works defined in the proposal, for the period between July 2008 and June 2013. In total there were 169 crashes of which none were fatal, 62 were casualty crashes and 107 were non-casualty crashes.

Crash statistics recorded by RMS are confined to those crashes that conform to the national guidelines for reporting and classifying road vehicle crashes. The main criteria are:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Minor crashes where drivers exchange details are not required to be recorded and are not included in the crash data.

Figure 3-1 shows the location and type of crashes occurring within this precinct.



Source: RMS Network Optimisation Planning Sydney

Figure 3-1: Crashes occurring within Airport East Precinct between July 2008 to June 2013

Table 3-5 shows the number of crashes within the Airport East Precinct by year. Crashes remained relatively steady between 2008 and 2013, peaking in the period between 2010 and 2011.

**Table 3-5 : Number of crashes within the airport east precinct**

Year	Number of crashes
July 2008 to June 2009	24
July 2009 to June 2010	36
July 2010 to June 2011	44
July 2011 to June 2012	31
July 2012 to June 2013	34
Total	169

**Table 3-6** shows the types of crashes that have occurred within the airport east precinct during the period July 2008 to June 2013. Approximately 38 per cent of crashes were between vehicles travelling in opposing directions, and 30 per cent were rear-end crashes. Other significant causes of crashes included vehicles colliding from adjacent approaches at intersections, and from lane changes.

**Table 3-6 : Types of crashes within the airport east precinct**

Type of crash	Number of crashes
Opposing vehicles; turning	65
Rear-end	50
Intersection, adjacent approaches	21
Lane change	16
Off road on curve, hit object	3
Head-on (not overtaking)	2
Hit pedestrian	2
Off road on straight, hit object	2
Parallel lines; turning	1
Hit parked vehicle	1
Off road, on curve	1
Other crash type	5

**Table 3-7** shows the severity of crashes that occurred within the Airport East Precinct during the period July 2008 to June 2013. No fatal crashes were recorded. 37 per cent of crashes involved an injury, and others required towing only.

**Table 3-7: Severity of crashes within the airport east precinct**

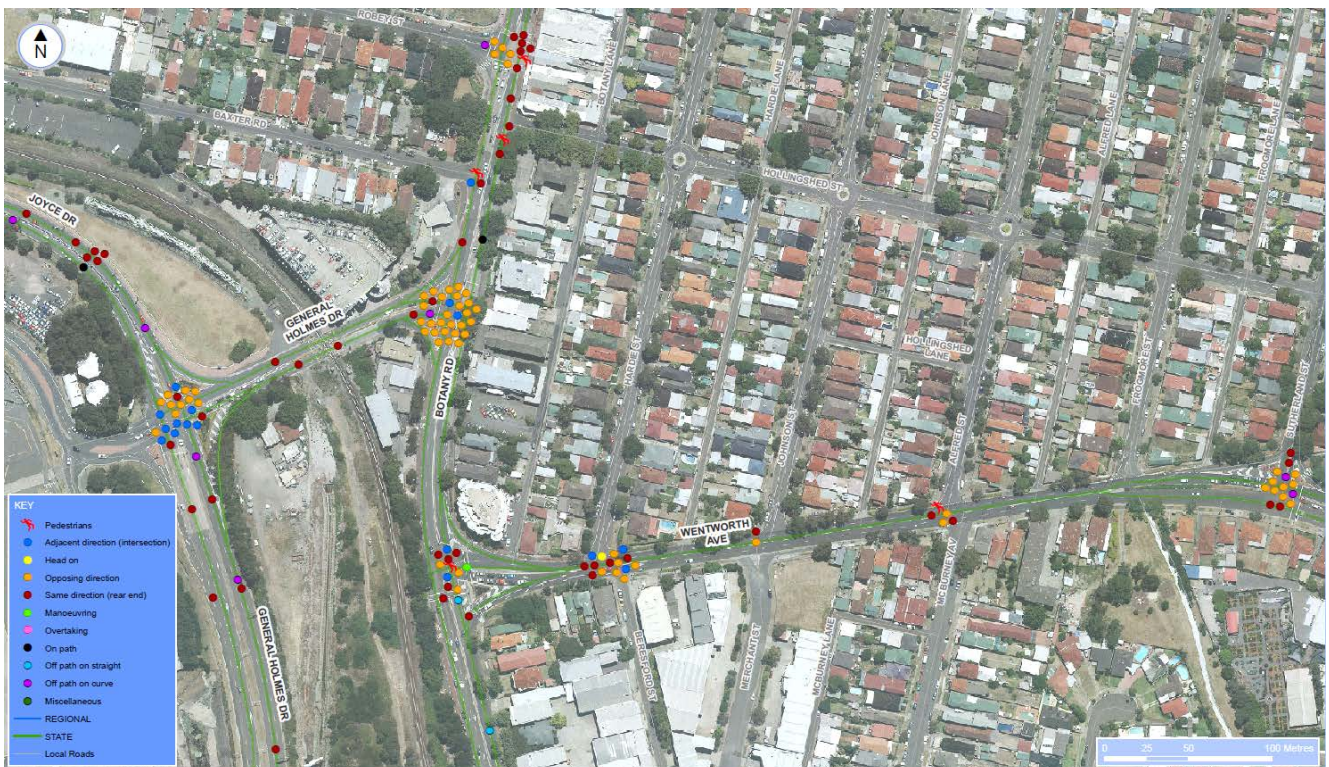
Severity of crash	Number of crashes
Fatal	0
Injury	62
Non-casualty (tow-away)	107

**Figure 3-2** to **Figure 3-4** show the location and nature of crashes recorded between July 2011 and June 2012.



Source: RMS Network Optimisation Planning Sydney

Figure 3-2: Road traffic accidents 2011-2012 (Joyce Drive from Robey Street to 500m east of O'Riordan Street)



Source: RMS Network Optimisation Planning Sydney

Figure 3-3: Road traffic accidents 2011-2012 (Sections of Joyce Drive, Botany Rd, Wentworth Ave and General Holmes Drive)



Source: RMS Network Optimisation Planning Sydney

Figure 3-4: Road traffic accidents 2011-2012 (Sections of Botany Road, Mill Pond Road and General Holmes Drive)

### 3.3.2 Crash rate analysis

Midblock traffic counts in 2013 were collected for 11 road sections within the airport precinct. Crash rates were calculated for the same 11 road sections for consistency. Road section 2 (Botany Rd between Mill Pond Road and Lord Street) was excluded from the calculation as this road section was beyond the limit of works, and hence no crash data was collected.

Crashes that were included for each road section include mid-block and intersection crashes. At intersections, crashes that were counted for each road section include crashes involving a traffic unit departing from the road section in question. Therefore, head-on and opposing direction crashes that involve two or more traffic units departing from adjacent legs of an intersection were counted under two separate road sections. For example, an intersection crash at General Holmes Drive and Botany Rd involving one vehicle travelling south on Botany Rd, turning right into General Holmes Drive, and the other vehicle travelling north on Botany Rd would be counted under road sections 7 and 9.

The crash rate for each road section was calculated and expressed in two terms using the following formulae:

$$(1) \text{ Crash rate per 100 million VKT} = \frac{\text{No. of crashes per road section (Jul08 to Jun13)}}{\sum \text{VK T (Jul08 to Jun13)}}$$

where VKT p.a. = AADT × 365 × Length of road section (km)

$$(2) \text{ Crash rate per km per year} = \frac{\text{No. of crashes per road section (Jul08 to Jun13)}}{\text{Length of road section} / \text{No. of years of crash data collection}}$$

**Table 3-6** below shows the road crash data for each of the identified road sections. The data uses total crash data for the 5 years from July 2008 to June 2013 to calculate the average crash rates for each section.

The short sections of Botany Road immediately north and south of the General Holmes Drive intersection have crash rates significantly higher than the Class average (2001-05) for casualty crashes per km per year (in accordance with *Table 4.3 of RMS Network and Corridor Planning Practice Notes*).

Table 3-6: Road crash data for the study area

Site No	Road	Location	Total crashes per 100M VKT	Total crashes per km per year	Casualty crashes per 100M VKT	Casualty crashes per km per year	Class average for casualty crashes per km per year (2001-05)	Preliminary Assessment	
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	106.77	17.44	52.86	8.21	3.95 to 5.79	Moderately above the average	
2	Botany Road	Between Mill Pond Road and Lord Street	Road section excluded from calculations as it is outside of the limit of works and therefore no crash data was collected						
3	Southern Cross Drive	Off ramp to Mill Pond Road	101.05	6.98	27.56	1.90	2.54 to 5.52	Below the average	
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	60.55	12.08	25.06	5.00	3.95	Slightly above the average	
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	111.71	13.16	40.22	4.74	5.79	Below the average	
6	Wentworth Avenue	Between Botany Road and Sutherland Street	173.47	16.28	59.48	5.58	5.52 to 5.79	Average	
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	386.21	36.47	137.04	12.94	5.52 to 5.79	Significantly above the average	
8	General Holmes Drive	Between Joyce Drive and Botany Road	273.74	11.89	149.31	6.49	3.54	Moderately above the average	
9	Botany Road	Between Robey Street and General Holmes Drive	724.91	87.27	211.43	25.45	5.79	Significantly above the average*	
10	Joyce Drive	Between O'Riordan Street and General Holmes Drive	79.03	11.54	36.88	5.38	3.95 to 5.79	Average	
11	Mill Pond Road	Between General Holmes Drive and Botany Road	85.28	17.00	20.07	4.00	3.95	Average	

**\*NOTE**

Contributing factors for the significantly high casualty crashes/km/year rate for road section 9 include (1) relatively short length of road section which includes a major intersection at Botany Rd / General Holmes Drive (2) the majority of crashes occur at the Botany Rd / General Holmes Drive intersection from cars turning right into General Holmes Drive -- this movement is included under this road section's crash data and accounts for all casualty crashes within road section 9.

Figure 3-2 and Figure 3-3 show the weekday and weekend crashes within the airport east precinct respectively.

**Weekday crashes within the Airport East Precinct - by time of day (Jul 08 to Jun 13)**

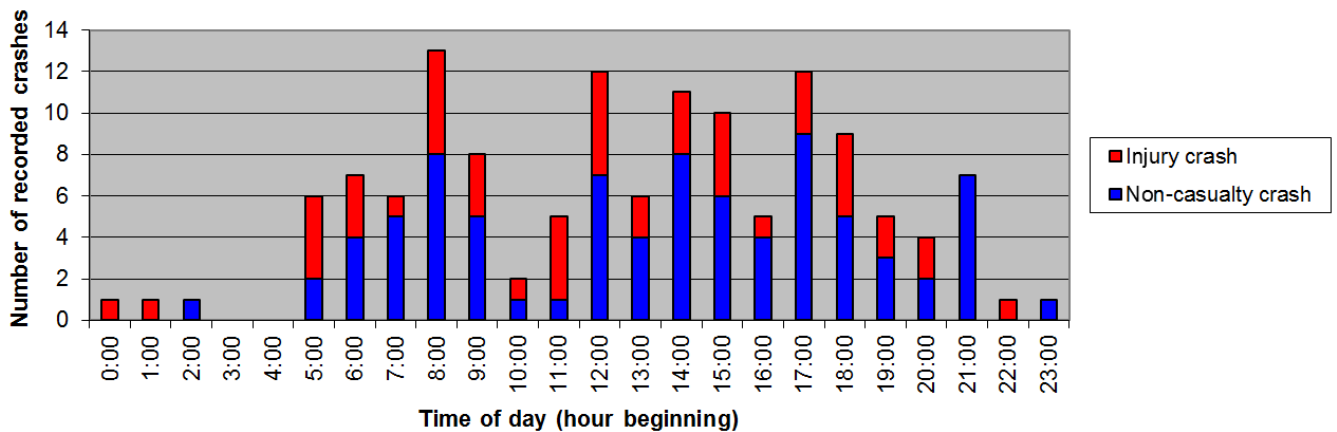


Table 3-2: Weekday crashes within the airport east precinct

**Weekend crashes within the Airport East Precinct - by time of day (Jul 08 to Jun 13)**

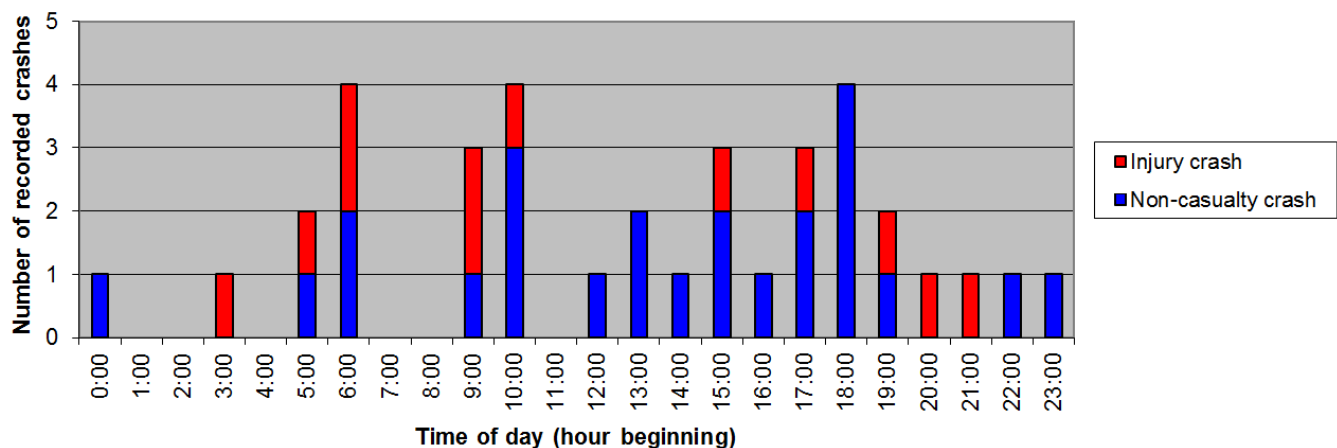


Table 3-3: Weekend crashes within the airport east precinct

In accordance with RMS practice notes<sup>1</sup>, each road section was assigned a class ranging from 1U to 6U (U for urban road networks). This classification system is dependent upon the AADT, average number of heavy vehicles per year, and the speed limit of the road in question.

Following this, figures for the average 'casualty crashes per kilometre per year (2001-05)' associated with each road class were taken from Table 4.3 of the practice notes. These figures were set as the benchmark in an aim to assess the current safety performance of each section.

Based on the preliminary assessment, the following sections are identified as having a higher-than-average crash rate for its road class:

- General Holmes Drive between Mill Pond Road and Southern Cross Drive

<sup>1</sup> Table 3.2 of the 'Network and corridor planning practice notes' (RMS, 2008).



- General Holmes Drive (railway level crossing) between Joyce Drive and Botany Road
- Botany Road between 30m south of Baxter Road and General Holmes Drive (railway level crossing)
- Botany Road between General Holmes Drive (railway level crossing) and Wentworth Avenue.

Contributing factors for the significantly high casualty crashes/kilometres/year rate for road section 9 include (1) relatively short length of road section which includes a major intersection at Botany Road / General Holmes Drive (2) majority of crashes occur at the Botany Road / General Holes Drive intersection from cars turning right into General Holes Drive. This movement is included under this Section's crash data and accounts for all casualty crashes within Section 9.

The crash category unit costs are sourced from Table 49 of TfNSW's '*Principles and Guidelines for Economic Appraisal of Transport Initiatives*' (Rev. Nov 2013) using the 'Willingness to pay' method for an urban road. These costs are indexed to Dec2012\$. The RUM (road user movement) code provided in the Detailed Crash Data was used to identify each crash type.

A custom 'reduction factor' was applied to each individual crash based on the midblock and intersection treatments proposed in Option 7D. These reduction factors are summarised in an email correspondence dated 16 May 2014 and were estimated based on a conservative approach by Project Development Managers Jim Campbell and Liam Sheridan.

Crash cost savings are calculated as follows:

$$\text{Crash cost savings for category } i = \text{crash rate} \times \text{CKT} \times \text{crash category } i \text{ unit cost}$$

The total crash savings estimated was \$3,527,660 for a 5-year period, and \$705,532 for a 1-year period.

## 4. Traffic model development

### 4.1 Paramics base model development

Jacobs developed the base year (2013) AM and PM calibrated Paramics models. These are documented in *NB10000.5\_WEW Traffic Model Calibration and Validation\_Rev B.pdf* and located in **Appendix A**. These models were submitted to Roads and Maritime and approved on 5 February 2014. RMS indicated that the AM and PM peak modelled queues closely reflected the observed queues and the methodology used in building the model had met the requirements of Roads and Maritime Paramics modelling guidelines. The calibration and validation of these Paramics models has been achieved to a level satisfactory for concept design testing.

### 4.2 Network structure

The extent of the Paramics model network coverage was agreed with RMS and is illustrated in **Figure 4-1**.

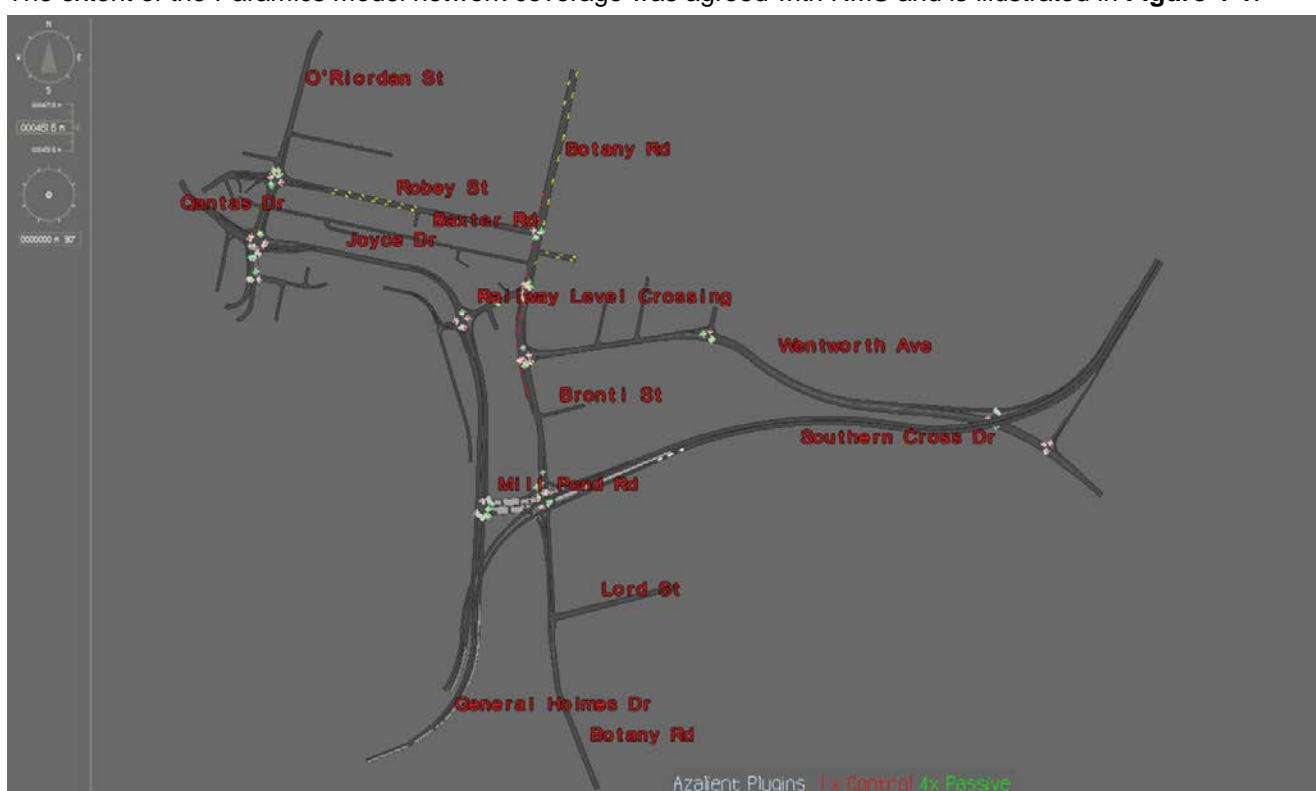


Figure 4-1: Paramics model extent

### 4.3 Zone system

A total of 14 zones were included in each model to accommodate all the surveyed traffic origin/destination pairs. The location of zones within the base models are detailed in **Table 4-1**.

Table 4-1: Zones descriptions

Zone	Description	Zone	Description
01	O'Riordan Street (north of Robey Street)	09	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)
02	Robey Street (west of Qantas Drive)	10	Wentworth Avenue (west of Page Street)

Zone	Description	Zone	Description
03	Airport Drive (west of O’Riordan Street)	11	Railway Level Crossing
04	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	12	Botany Road (north of Robey Street)
05	Ross Smith Avenue (west of General Holmes Drive)	13	Hollinshed Street, east of Botany Road
06	Southbound of General Holmes Drive (south of Mill Pond Road)	14	Ninth Street, south of Qantas Drive
07	Botany Road (south of Mill Pond Road)	15	Northbound of General Holmes Drive (south of Mill Pond Road)
08	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)		

## 4.4 Modelling periods

Separate models were developed for the AM and PM peaks. For each peak, a “warm-up” and “cool-down” period of one hour each was added, with overall modelled periods as follows:

AM Peak:

- Warm-up: 5.00am – 6.00am
- Modelled period: 6.00am – 9.00am
- Cool-down: 9.00am – 10.00am

PM Peak:

- Warm-up: 2.00pm – 3.00pm
- Modelled period: 3.00pm – 6.00pm
- Cool-down: 6.00pm – 7.00pm

The model was coded to allow each “one hour” period to be analysed individually. Periodic files were created such as separate demand files for each hour. The estimation, calibration and validation of the model were therefore processed separately for each modelled period.

## 4.5 Traffic signal

All signalised intersections were modelled as fixed time with average phase times based on Intersection Diagnostic Monitor (IDM) data extracted from the RMS SCATS system. The IDM data provided a statistical summary of how often different phases run over a time period and the maximum, minimum and average phase times that operate in a specific time period.

It is recognised practice to use the average phase and cycle times, derived from IDM data to replicate traffic signal operation. However, it is also acknowledged that the fixed time signal setup presents a number of limitations in terms of representing the signal timings controlled by the SCATS system. This is especially evident at locations with bus priority phases which are demanded infrequently.

The overall approach adopted for the development of the existing conditions model was to include all critical signal phases in the phase sequence. The remaining (less frequent) phases, such as demand dependant phases, were also included at critical locations with manual adjustment to phase time in order to compensate for

their infrequent operation. During the model calibration stage, minimal adjustments to the phase lengths were added as necessary to ensure that observed conditions were replicated accurately.

#### **4.6 Future network assumptions**

The future traffic demands were derived from the WestConnex Road Traffic Model (WRTM), which include the approved assumptions for the timing of the WestConnex Enabling Works model runs in mid February 2014. They include background road upgrade projects across the greater Sydney network as advised by RMS, and the “proposal” scenario includes all stages of the WestConnex reference design.

These networks include a connection of WestConnex to Qantas Drive near North Pond and widening of Qantas Drive west of O’Riordan Street, but no other works in the study area. In particular they do not include potential widening of O’Riordan Street, changes to Domestic Airport access, or creation of a one way couplet involving O’Riordan Street.

All ‘no build’ networks include turning penalties at the General Holmes Drive level crossing reflecting the average effect of peak period rail traffic in 2013.

#### **4.7 Future network demands**

2018 AM Paramics matrices were developed using the 2018 AM Dynameq mesoscopic traffic model for the road network for Sydney’s southern suburbs, including the airport precinct. The Dynameq model uses the WRTM as its demand input.

Cordon matrices were extracted from the 2018 AM Dynameq model, for each hour of the model. Separate heavy and light vehicle matrices were used throughout this process.

Travel patterns in the base year Paramics model and future year Dynameq model were different for heavy vehicles in some areas. For origin-destination (OD) pairs in which either the Paramics or Dynameq models had zero trips in a particular hour, half of the trips from the non-zero case were included in the 2018 AM peak Paramics matrices. The change rate for any OD pair between 2013 and 2018 was also capped to a maximum of 20 per cent per annum (up or down).

A set of 2018 PM Paramics matrices were developed from the 2013 AM and PM Paramics matrices and the derived 2018 Dynameq matrices.

It was found that in general the pattern of PM demands in 2013 was closer to the pattern of AM demands than to the transpose of AM demands. For most matrix cells, therefore, the 2018 PM volume was calculated by multiplying the same cell in the equivalent AM hour matrix by the 2013 AM to PM ratio for that cell.

Where the 2013 Paramics matrices for a particular hour included trips for an OD pair which had zero trips in the equivalent AM hour, transpose factoring was applied to both that movement and its opposite, where possible.

Where this was not possible, for example due to a lack of trips in the opposing movement in a particular hour, the ratio of the 2013 PM and equivalent 2013 AM hour Paramics matrix totals was applied to the 2018 Dynameq matrix cell.

In the same way as for the AM matrices, a change in any cell between 2013 and 2018 in the PM matrices was capped at plus or minus 20 per cent per annum, except where either the 2013 or the derived 2018 matrix had zero trips for a cell, in which case half of the trips from the non-zero case were retained in 2018.

This process was carried out using separate light vehicle and heavy vehicle matrices, where all three of the Paramics heavy vehicle classes were combined into the common heavy vehicle matrices. After the 2018 Paramics matrices for these two classes were complete, the heavy vehicle matrices were subdivided into the three Paramics heavy vehicle classes using the 2013 cell by cell proportions.

The final outcome of this process was a set of 2018 Paramics matrices, for each of the five AM and PM hours, for each of the four Paramics vehicle classes, with and without the WestConnex Enabling Works examined by this study. This study approach was discussed and approved by RMS at a workshop. The reported assessment following are the results of the application of the agreed method.

## 4.8 Examined scenarios

In considering the future, several scenarios need to be considered, reflecting the timeframe under which the proposal is likely to be delivered and the extent of other infrastructure developments. These have been explored through development of modelled scenarios, reflecting future travel demands.

Examined demand cases were represented by specific modelled forecast years:

- 2013 was adopted as the existing case to correlate with the calibrated base year.
- 2018 was adopted as the project opening case.

The forecast demand for 2018 reflects forecast land use and employment distribution changes across the study area. General growth was taken from the WRTM vehicle demand forecasts with an increase in vehicle demand to account for reasonable traffic demand growth in the airport east precinct (as described above in **Section 4.7**).

The modelled scenarios therefore were:

- Existing case: Represented by the calibrated base year 2013.
- Future 'no build': A future network including some new infrastructure that would be provided over time to improve capacity and cater for traffic growth. The Future 'do minimum' case is at 2018.
- The proposal: Development of the Wentworth Avenue extension by adding all stages of the scheme to the Future "do minimum" case.

## 4.9 Proposal description

The proposal includes the proposed upgrades in the vicinity of the Domestic Terminal as per Sydney Airport Corporation Limited's (SACL) masterplan and described in the previous stages of this project. The network is shown in **Figure 4-2** with the following features:

- Proposed upgrades in the vicinity of the Domestic Terminal as per Sydney Airport Corporation Limited's (SACL) masterplan.
- Proposed Wentworth Avenue extension, underpass and new intersection with General Holmes Drive are included in both models.
- The left turn from Mill Pond Road into Botany Road has been prohibited.
- The right turn from Botany Road into Mill Pond Road has been prohibited.
- Sir Reginald Ansett Drive/Ross Smith Avenue was converted to an unsignalised intersection.
- A double left slip lane from Joyce Drive into Sir Reginald Ansett Drive has been implemented in order to increase turning capacity and minimise associated delays on Joyce Drive.

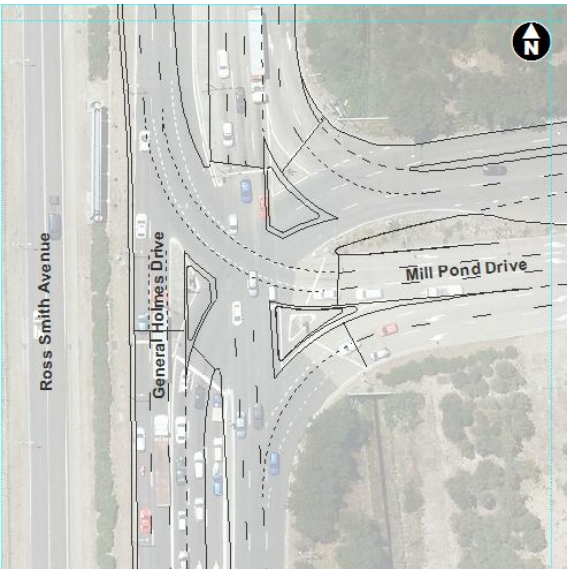


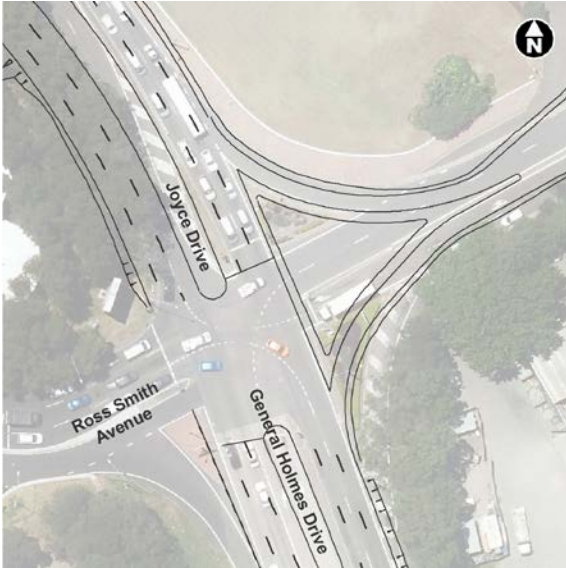
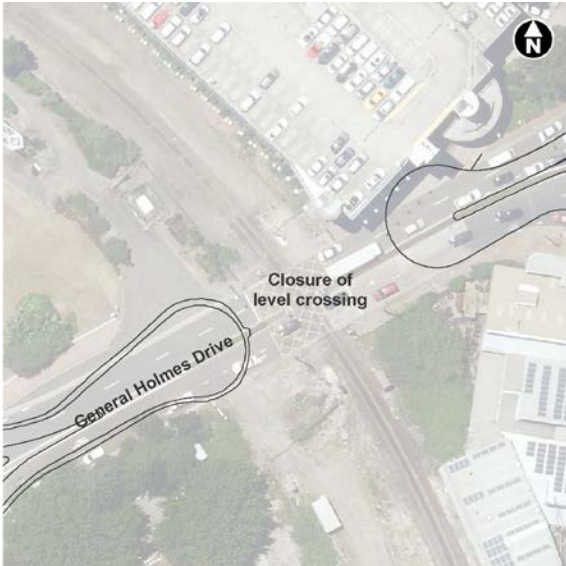
Figure 4-2: Proposal layout


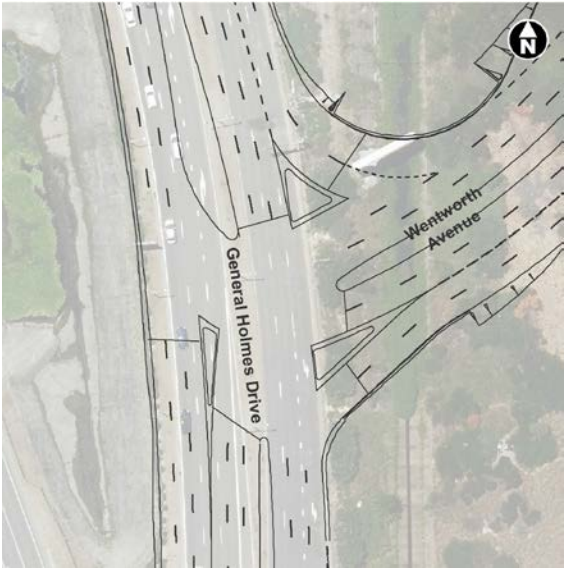
**Intersections**

Table 4-2 describes the intersection upgrades and adjustments associated with the proposal.

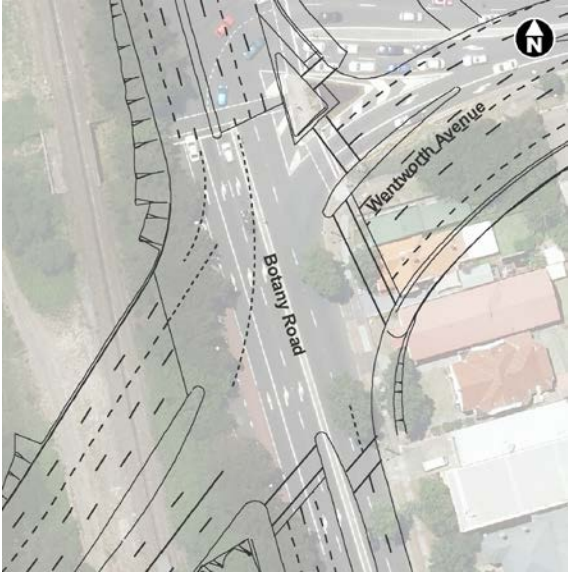
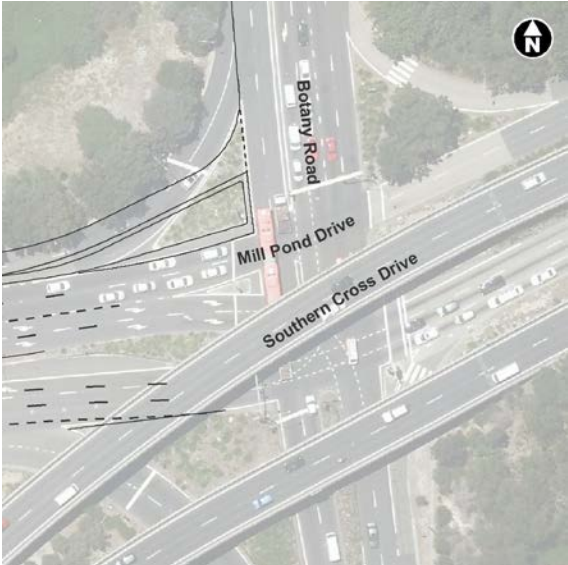
Table 4-2: Intersections upgrades and adjustments

Intersection upgrade	Description
<p>General Holmes Drive and Mill Pond Road</p> 	<p>Upgrade to intersection with:</p> <ul style="list-style-type: none"> <li>• Northern approach: 3 through lanes and 2 left lanes</li> <li>• Southern approach: 3 through lanes and 1 right turn</li> <li>• Eastern approach: 2 left turn lanes and 3 right turn lanes.</li> </ul>

Intersection upgrade	Description
<p data-bbox="159 327 719 383">General Holmes Drive, Joyce Drive and Ross Smith Avenue</p> 	<p data-bbox="810 327 1453 383">Adjustment to intersection by closing access for the eastern leg of General Holmes Drive to the traffic signals.</p> <p data-bbox="810 394 1465 488">Access to the eastern leg of General Holmes Drive would be provided via a left-in, left-out arrangement clear of the traffic lights.</p>
<p data-bbox="159 976 683 1003">General Holmes Drive and railway level crossing</p> 	<p data-bbox="810 976 1453 1084">Decommissioned, with General Holmes Drive to be closed with a cul-de-sac on both sides of the railway crossing. The eastbound section of General Holmes Drive will also be renamed after the level crossing is closed.</p>

Intersection upgrade	Description
<p data-bbox="159 331 595 360">General Holmes Drive and Botany Road</p> 	<p data-bbox="810 331 1126 360">Adjusting the intersection by:</p> <ul data-bbox="810 369 1460 481" style="list-style-type: none"> <li>• Removing traffic lights for motorists</li> <li>• Retaining crossing lights for pedestrians and cyclists.</li> <li>• Reducing to a single left turn and right turn into General Holmes Drive.</li> </ul>
<p data-bbox="159 949 659 978">General Holmes Drive and Wentworth Avenue</p> 	<p data-bbox="810 949 1460 1008">Wentworth Avenue would be extended, and the new intersection created with General Holmes Drive would have:</p> <ul data-bbox="810 1016 1460 1153" style="list-style-type: none"> <li>• Northern approach: 3 through lanes and 2 left turn lanes</li> <li>• Southern approach: 3 through lanes and 3 right turn lanes</li> <li>• Eastern approach: 2 left turn lanes and 2 right turn lanes.</li> </ul> <p data-bbox="810 1164 1428 1245">This intersection would have additional median islands to mount traffic signals to avoid breaching the obstacle limitation surface.</p>



Intersection upgrade	Description
<p data-bbox="161 331 560 360">Botany Road and Wentworth Avenue</p> 	<p data-bbox="812 331 1473 443">The Botany Road and Wentworth Avenue intersection would be relocated about 60 m to the south to align with the new road underpass. The intersection would also be lowered to align with the road underpass.</p> <p data-bbox="812 450 1321 479">This intersection would be upgraded to include:</p> <ul data-bbox="812 486 1473 685" style="list-style-type: none"> <li>• Northern approach: 2 through lanes and 2 right turn lanes</li> <li>• Southern approach: 2 through lanes, 1 right turn lane and no left turn</li> <li>• Eastern approach: 1 left turn lane, 3 through lanes and 2 right turn lanes</li> <li>• Western approach: 2 left turn lanes and 3 through lanes.</li> </ul>
<p data-bbox="161 954 520 983">Botany Road and Mill Pond Road</p> 	<p data-bbox="812 954 1123 983">Upgrade to intersection with:</p> <ul data-bbox="812 990 1473 1189" style="list-style-type: none"> <li>• Northern approach: 2 through lanes, 2 left turn lanes and no right turn permitted</li> <li>• Western approach: 2 right turn lanes, 2 through lanes and 1 restricted access left turn lane (accessible only for traffic from General Holmes Drive southbound)</li> <li>• Southern approach: 2 through lanes and 2 left turn lanes (as existing).</li> </ul>

**Road underpass**

The Wentworth Avenue road underpass would provide a minimum 4.7 metre bridge clearance, providing access for unrestricted heavy vehicle movements allowed in NSW without an over height vehicle permit. Wentworth Avenue would have nine lanes through the underpass, comprising five eastbound lanes and fourth westbound lanes.

## 5. Future network performance for the proposal and “no build” scenarios

This section outlines the results and analysis of the Paramics testing undertaken on the proposal and “no build” 2018 models. The models were developed to assess the comparative network performance and determine any operational traffic improvements. The network performance indicators are as follows:

- Network performance
- Midblock performance
- Travel time
- Average daily traffic

### 5.1 Network performance

The network performance has been measured in terms of the total number of Vehicle Kilometres Travelled (VKT) and Vehicle Hours Travelled (VHT) on the network during the peak periods.

VKT and VHT are commonly used measures of network performance. An increase in VKT indicates that vehicles are travelling longer distances and /or the number of vehicles passing through the network has increased. Increases in VHT indicate increased delays and congestion in the network and /or the number of vehicles passing through the network has increased. In combination, these parameters reflect the impact on the average speed for the network.

**Table 5-1** details the overall network performance results for the 2018 models. In the AM peak, the Preferred Option (“proposal”) results in significant improvement to network operations and performance when compared to the base (“no build”) model in that the average speeds have increase by 30 per cent in some hourly periods.

In the PM peak the proposal scenario results in significant improvement to network operations and performance when compared to the “no build” option. The increase in performance is however not as great as in the AM peak with average speed increases in the range of 10 t -15 per cent.

Both AM and PM models demonstrate a gradual decrease in average speed throughout the modelled period as congestion increases.

Table 5-1: 2018 network performance

Scenarios	6.00am – 7.00am			7.00am – 8.00am			8.00am – 9.00am		
	VKT (km)	VHT (hrs)	Average Speed (km/h)	VKT (km)	VHT (hrs)	Average Speed (km/h)	VKT (km)	VHT (hrs)	Average Speed (km/h)
No build	36,017	1,229	29.3	38,992	1,490	26.2	33,161	1,998	16.6
Proposal	36,212	1,127	32.1	39,636	1,144	34.6	33,569	1,480	22.7
Scenarios	3.00pm – 4.00pm			4.00pm – 5.00pm			5.00pm – 6.00pm		
	VKT (km)	VHT (hrs)	Average Speed (km/h)	VKT (km)	VHT (hrs)	Average Speed (km/h)	VKT (km)	VHT (hrs)	Average Speed (km/h)
No build	44,150	1,154	38.3	42,993	1,539	27.9	43,127	1,379	31.3
Proposal	44,435	1,008	44.1	43,230	1,283	33.7	43,351	1,236	35.1

## 5.2 Midblock performance

Midblock performance has been calculated by comparing the average modelled speed at a certain location with the posted free flow speed at that point. The per centage of free flow speed achieved by modelled vehicles provides an insight into the midblock performance of the model at the selected locations. Level of service categories were obtained from the Highway Capacity Manual (HCM) 2010 and are presented in **Table 3-1**.

The 2018 midblock performance is outlined in **Table 5-2**. The “no build” models demonstrate that without the project there is severe congestion with multiple locations throughout the study area experiencing level of service ‘E’ or ‘F’ in both peak periods. With the proposal the network performance improves indicated by an increase in travel speed as a proportion of free flow speed. There are eight locations in the AM “no build” model operating at level of service ‘E’ or ‘F’. This reduces to just two locations in the proposal models.

It is noted that performance at Site 4 (General Holmes Drive between Joyce Drive and Mill Pond Road) and Site 6 (Wentworth Avenue between Botany Road and Sutherland Street) decreases in the “proposal” compared to the “no build” scenario. This is due to the introduction of the signalised General Holmes Drive/Wentworth Avenue intersection in the proposal model. This intersection introduces some small localised delays at these locations. This is to be expected, as a signalised intersection attempts to evenly distribute vehicle delay across all traffic movements. These delays are however offset by the overall increase in performance throughout the remainder of the network. Vehicles experiencing localised delays at these locations in the “proposal” scenario would be likely to experience improved performance at other locations during their journey. The overall benefits to the broader network outweigh these localised negative impacts.

Table 5-2: 2018 midblock performance

Site no.	Road	Location	Direction	No build				Proposal			
				AM Peak		PM Peak		AM Peak		PM Peak	
				% of free flow	LOS	% of free flow	LOS	% of free flow	LOS	% of free flow	LOS
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	NB	20%	F	50%	D	40%	D	60%	C
			SB	90%	A	50%	D	90%	A	60%	C
2	Botany Road	Between Mill Pond Road and Lord Street	NB	40%	D	70%	B	100%	A	70%	B
			SB	100%	A	100%	A	100%	A	70%	B
3	Southern Cross Drive	Off ramp to Mill Pond Road	WB	-	-	-	-	-	-	-	-
			EB	30%	F	40%	E	50%	C	50%	C
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	NB	20%	F	70%	B	30%	E	20%	F
			SB	70%	B	50%	D	70%	B	30%	F
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	NB	40%	D	60%	C	40%	D	40%	E
			SB	60%	C	60%	C	90%	A	60%	C
6	Wentworth Avenue	Between Botany Road and Sutherland Street	EB	40%	D	100%	A	60%	C	50%	D
			WB	60%	C	30%	E	50%	D	10%	F
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	NB	40%	E	30%	F	80%	B	50%	D
			SB	10%	F	20%	F	10%	F	10%	F
8	General	Between Joyce	EB	20%	F	10%	F	-	-	-	-

Site no.	Road	Location	Direction	No build				Proposal			
				AM Peak		PM Peak		AM Peak		PM Peak	
				% of free flow	LOS	% of free flow	LOS	% of free flow	LOS	% of free flow	LOS
	Holmes Drive	Drive and Botany Road	WB	30%	F	20%	F	-	-	-	-
9	Botany Road	Between Robey Street and General Holmes Drive	NB	40%	D	50%	C	40%	D	40%	D
			SB	50%	C	10%	F	50%	C	10%	F
10	Joyce Drive	Between O’Riordan Street and General Holmes Drive	EB	70%	B	50%	D	100%	A	70%	B
			WB	60%	C	50%	D	80%	B	50%	D

### 5.3 Travel time

The 2018 travel times for the “no build” and proposal scenarios are shown in **Table 5-3** and **Table 5-4**. 2018 AM travel time results reveal that the proposal provides significant benefits for the majority of surveyed routes. Routes 7 to 10 all start or end at the airport and all experience significant travel time reductions. Vehicles travelling from Southern Cross Drive to the airport are greatly benefited with travel times reduced by around 40 per cent between 6.00am and 7.00am and more than 50 per cent after 7.00am. More than 5,000 vehicles would benefit from this travel time reduction in the AM peak for this route.

There are some routes which experience an increase in travel times in the “proposal” compared to the “no build” scenarios. These are generally routes which carry a smaller number of vehicles compared to the routes with travel time savings. This indicates that the net impact of the proposal remains positive, which is consistent with the network wide results presented in **Section 5.1**. Furthermore, the routes which experience increases do so because they travel through the new Botany Road/Wentworth Avenue intersection. The upgrade of this intersection to include the new underpass has resulted in an extra signal phase. This leads to slightly more delays, particularly to north-south vehicles on Botany Road. The travel time savings on a network wide basis remain significantly positive.

Table 5-3: 2018 AM travel time

Route no.	From	To	Demand (veh)	6.00am – 7.00am		7.00am – 8.00am		8.00am – 9.00am	
				No build	Proposal	No build	Proposal	No build	Proposal
A	Botany Road (north of Robey Street)	Botany Road (south of Mill Pond Road)	841	0:03:29	0:03:48	0:03:44	0:06:21	0:05:53	0:09:49
B	Botany Road (south of Mill Pond Road)	Botany Road (north of Robey Street)	1,119	0:02:31	0:04:00	0:05:21	0:05:23	0:07:41	0:04:40
C	Northbound of General Holmes Drive (south of Mill Pond Road)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	11,484	0:03:01	0:03:11	0:08:31	0:10:49	0:20:09	0:18:10
D	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Southbound of General Holmes Drive (south of Mill Pond Road)	6,252	0:05:28	0:03:59	0:12:28	0:09:57	0:19:23	0:08:16

Route no.	From	To	Demand (veh)	6.00am – 7.00am		7.00am – 8.00am		8.00am – 9.00am	
				No build	Proposal	No build	Proposal	No build	Proposal
E	Botany Road (north of Robey Street)	Southbound of General Holmes Drive (south of Mill Pond Road)	746	0:03:13	0:04:31	0:04:46	0:07:33	0:14:55	0:10:09
F	Northbound of General Holmes Drive (south of Mill Pond Road)	Botany Road (north of Robey Street)	2,453	0:05:54	0:04:11	0:12:51	0:11:50	0:26:59	0:23:31
G	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southbound of General Holmes Drive (south of Mill Pond Road)	234	0:06:56	0:04:46	0:07:24	0:05:04	0:10:25	0:04:00
H	Northbound of General Holmes Drive (south of Mill Pond Road)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	794	0:08:24	0:05:16	0:15:34	0:08:35	0:26:39	0:15:04
I	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	725	0:06:33	0:06:16	0:09:22	0:06:22	0:11:15	0:04:59
J	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	3,231	0:11:20	0:08:15	0:14:58	0:07:08	0:34:04	0:13:16

2018 PM travel time results demonstrate nearly every route experiencing a travel time reduction across all hourly periods. The major benefit is for the 10,602 vehicles using route 3 (Southern Cross Drive eastbound). This route experiences reductions in travel times of more than 50 per cent between 3.00pm and 5.00pm and more than 75 per cent after 5.00pm, indicating significant benefits for the overall network.

Table 5-4: 2018 PM travel time

Route no.	From	To	Demand (veh)	3.00pm – 4.00pm		4.00pm – 5.00pm		5.00pm – 6.00pm	
				No build	Proposal	No build	Proposal	No build	Proposal
A	Botany Road (north of Robey Street)	Botany Road (south of Mill Pond Road)	1,314	0:02:55	0:04:36	0:06:45	0:07:09	0:20:30	0:12:26
B	Botany Road (south of Mill Pond Road)	Botany Road (north of Robey Street)	946	0:04:04	0:02:45	0:04:39	0:03:16	0:13:39	0:05:11

Route no.	From	To	Demand (veh)	3.00pm – 4.00pm		4.00pm – 5.00pm		5.00pm – 6.00pm	
				No build	Proposal	No build	Proposal	No build	Proposal
C	Northbound of General Holmes Drive (south of Mill Pond Road)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	10,602	0:04:24	0:01:53	0:06:26	0:03:07	0:07:08	0:02:00
D	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Southbound of General Holmes Drive (south of Mill Pond Road)	8,567	0:02:15	0:03:13	0:05:17	0:01:34	0:09:41	0:07:06
E	Botany Road (north of Robey Street)	Southbound of General Holmes Drive (south of Mill Pond Road)	3,379	0:04:56	0:04:42	0:11:01	0:07:37	0:21:33	0:14:39
F	Northbound of General Holmes Drive (south of Mill Pond Road)	Botany Road (north of Robey Street)	892	0:06:09	0:03:56	0:06:48	0:05:09	0:07:14	0:05:26
G	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southbound of General Holmes Drive (south of Mill Pond Road)	417	0:06:05	0:03:25	0:09:09	0:02:51	0:08:31	0:03:40
H	Northbound of General Holmes Drive (south of Mill Pond Road)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	840	0:04:14	0:01:54	0:05:02	0:02:55	0:06:42	0:02:51
I	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)	1,261	0:05:55	0:04:39	0:09:41	0:04:07	0:06:57	0:04:42
J	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	3,627	0:03:46	0:03:26	0:06:02	0:04:47	0:13:12	0:08:21

## 5.4 Average daily traffic

Average Daily Traffic (ADT) figures have been calculated using the RMS supplied count data. Future ADT projections have been calculated using counts from the “no build” and proposal scenarios modelled in Paramics. The daily traffic profile is expected to remain the same and so counts from Paramics have been extrapolated to produce expected future ADT figures as shown in **Table 5-5**.

**Table 5-6** illustrates the future daily traffic distribution in 15-hour day time (7.00am – 10.00pm) and 7-hour day time (10.00pm – 7.00am) in the study precinct.

The overall trend observed is that the proposal allows for a larger number of vehicles to access the majority of key locations in the airport east precinct.

There is a large difference in ADT values in situations where the “no build” scenario has resulted in severe congestion and gridlock. It is likely that underlying demand at these locations remains relatively similar and the low ADT base case (no build) values are a result of vehicles in the WRTM rerouting around the study area.

Comparing ADT values between the “no build” and “proposal” scenarios, there is a noticeable decrease in values at Site 3 (Southern Cross Drive off ramp to Mill Pond) and a large increase in ADT values at Site 6 (Wentworth Avenue between Botany Road and Sutherland Street). This is partially attributed to the introduction of the Wentworth Avenue extension which provides an alternate route for airport bound traffic originating from the north eastern section of the study area. Analysis of the modelling results for both scenarios shows that approximately 20% of airport bound AM peak traffic diverts to Wentworth Avenue. 30% of traffic diverts in the PM peak. This is a major impact of the proposal and helps to relieve congestion at the intersections of Mill Pond Road with Botany Road and General Holmes Drive.

Table 5-5: 2018 Average daily traffic

Site no.	Road	Location	Direction	No build			Proposal		
				AM Peak (3-hr)	PM Peak (3-hr)	ADT	AM Peak (3-hr)	PM Peak (3-hr)	ADT
1	General Holmes Drive	Between Mill Pond Road and Southern Cross Drive	NB	4,455	2,061	16,006	4,061	2,434	15,785
			SB	2,950	5,020	19,348	2,515	6,970	20,823
			Total	7,405	7,081	35,355	6,576	9,404	36,608
2	Botany Road	Between Mill Pond Road and Lord Street	NB	1,785	2,097	8,609	2,437	2,793	12,604
			SB	1,936	1,975	9,366	2,563	2,314	11,309
			Total	3,721	4,072	17,975	5,000	5,107	23,913
3	Southern Cross Drive	Off ramp to Mill Pond Road	EB	-	-	-	-	-	-
			WB	3,822	3,969	18,545	4,417	2,979	17,605
			Total	3,822	3,969	18,545	4,417	2,979	17,605
4	General Holmes Drive	Between Joyce Drive and Mill Pond Road	NB	6,604	6,185	29,964	7,404	5,051	31,440
			SB	3,688	5,983	29,133	4,171	5,239	29,776
			Total	10,292	12,168	59,097	11,575	10,290	61,216
5	Botany Road	Between Wentworth Avenue and Southern Cross Drive	NB	3,048	2,752	12,949	1,587	2,024	9,671
			SB	1,643	2,312	10,296	1,182	1,548	6,526
			Total	4,691	5,064	23,245	2,769	3,572	16,198
6	Wentworth Avenue	Between Botany Road and Sutherland Street	EB	1,704	2,316	9,488	2,691	3,286	14,292
			WB	1,327	1,805	8,619	2,952	2,910	14,098
			Total	3,031	4,121	18,107	5,643	6,196	28,390

Site no.	Road	Location	Direction	No build			Proposal		
				AM Peak (3-hr)	PM Peak (3-hr)	ADT	AM Peak (3-hr)	PM Peak (3-hr)	ADT
7	Botany Road	Between General Holmes Drive and Wentworth Avenue	NB	3,188	2,667	12,866	3,831	3,164	16,560
			SB	1,390	2,365	11,332	1,955	4,161	16,453
			Total	4,578	5,032	24,198	5,786	7,325	33,013
8	General Holmes Drive	Between Joyce Drive and Botany Road	EB	1,283	1,090	5,633	-	-	-
			WB	1,055	2,261	8,366	-	-	-
			Total	2,338	3,351	13,999	-	-	-
9	Botany Road	Between Robey Street and General Holmes Drive	NB	3,136	2,925	14,347	3,803	3,470	16,302
			SB	2,105	4,153	15,457	2,780	4,170	18,174
			Total	5,241	7,078	29,805	6,583	7,640	34,476
10	Joyce Drive	Between O'Riordan Street and General Holmes Drive	EB	2,592	4,339	20,673	2,946	5,224	23,604
			WB	5,056	4,054	21,994	5,521	4,325	24,317
			Total	7,648	8,393	42,668	8,467	9,549	47,921
11	Mill Pond Road	Between General Holmes Drive and Botany Road	EB	6,595	5,208	30,658	6,940	6,133	31,176
			WB	5,667	6,955	30,538	7,018	5,179	33,081
			Total	12,262	12,163	61,196	13,958	11,312	64,257

Table 5-6: 2018 daily traffic distributions

Site no.	Road	Location	Time Period	Vehicle Class	No Build		Proposal	
					NB/EB	SB/WB	NB/EB	SB/WB
1	General Holmes Drive	Between Mill Pond Rd and Southern Cross Dr	15-hour Day time (7.00am to 10.00pm)	Light	11,722	14,811	11,907	16,776
				Heavy	1,129	1,311	1,147	1,485
				Total	12,851	16,122	13,054	18,261
			9-hour Night-time (10.00pm to 7.00am)	Light	2,878	2,964	2,491	2,353
				Heavy	277	262	240	208
				Total	3,155	3,226	2,731	2,561
2	Botany Road	Between Mill Pond Rd and Lord St	15-hour Day time (7.00am to 10.00pm)	Light	7,023	7,435	10,490	9,074
				Heavy	591	615	883	750
				Total	7,614	8,049	11,373	9,824
			9-hour Night-time (10.00pm to 7.00am)	Light	918	1,216	1,135	1,371
				Heavy	77	101	96	113
				Total	995	1,316	1,231	1,485
3	Southern Cross Drive	Off ramp to Mill Pond Rd	15-hour Day time (7.00am to 10.00pm)	Light	-	13,921	-	12,936
				Heavy	-	385	-	358
				Total	-	14,306	-	13,924
			9-hour Night-time (10.00pm to 7.00am)	Light	-	4,125	-	4,195
				Heavy	-	114	-	116
				Total	-	4,239	-	4,311



Site no.	Road	Location	Time Period	Vehicle Class	No Build		Proposal	
					NB/EB	SB/WB	NB/EB	SB/WB
			to 7.00am)	Total	-	4,239	-	4,311
4	General Holmes Drive	Between Joyce Dr and Mill Pond Rd	15-hour Day time (7.00am to 10.00pm)	Light	22,485	23,839	23,550	25,199
				Heavy	1,642	1,567	1,720	1,657
				Total	24,127	25,407	25,270	26,856
			9-hour Night-time (10.00pm to 7.00am)	Light	5,439	3,496	5,750	2,740
				Heavy	397	230	420	180
				Total	5,836	3,726	6,170	2,920
5	Botany Road	Between Wentworth Ave and Southern Cross Dr	15-hour Day time (7.00am to 10.00pm)	Light	10,341	8,320	8,317	8,979
				Heavy	714	625	574	675
				Total	11,055	8,945	8,891	9,654
			9-hour Night-time (10.00pm to 7.00am)	Light	1,771	1,256	917	812
				Heavy	122	94	63	61
				Total	1,894	1,350	980	873
6	Wentworth Avenue	Between Botany Rd and Sutherland St	15-hour Day time (7.00am to 10.00pm)	Light	7,773	6,976	12,211	11,939
				Heavy	437	539	686	923
				Total	8,210	7,516	12,897	12,862
			9-hour Night-time (10.00pm to 7.00am)	Light	1,210	1,024	1,320	1,147
				Heavy	68	79	74	89
				Total	1,278	1,103	1,394	1,236
7	Botany Road	Between General Holmes Dr and Wentworth Ave	15-hour Day time (7.00am to 10.00pm)	Light	9,588	8,835	12,804	13,104
				Heavy	1,184	996	1,582	1,477
				Total	10,772	9,831	14,386	14,581
			9-hour Night-time (10.00pm to 7.00am)	Light	1,863	1,349	1,934	1,682
				Heavy	230	152	239	190
				Total	2,094	1,501	2,173	1,872
8	General Holmes Drive	Between Joyce Dr and Botany Rd	15-hour Day time (7.00am to 10.00pm)	Light	4,450	6,569	-	-
				Heavy	263	515	-	-
				Total	4,712	7,084	-	-
			9-hour Night-time (10.00pm to 7.00am)	Light	869	1,189	-	-
				Heavy	51	93	-	-
				Total	920	1,282	-	-
9	Botany Road	Between Robey St and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	11,218	12,280	12,852	14,664
				Heavy	1,148	1,205	1,316	1,439
				Total	12,366	13,484	14,168	16,103
			9-hour Night-time (10.00pm to 7.00am)	Light	1,797	1,797	1,936	1,886
				Heavy	184	176	198	185
				Total	1,981	1,973	2,134	2,071

Site no.	Road	Location	Time Period	Vehicle Class	No Build		Proposal	
					NB/EB	SB/WB	NB/EB	SB/WB
10	Joyce Drive	Between O'Riordan St and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	16,794	16,048	19,441	17,883
				Heavy	1,208	1,462	1,399	1,630
				Total	18,002	17,510	20,840	19,512
			9-hour Night-time (10.00pm to 7.00am)	Light	2,492	4,110	2,579	4,403
				Heavy	179	375	186	401
				Total	2,671	4,484	2,765	4,804
11	Mill Pond Road	Between Botany Rd and General Holmes Dr	15-hour Day time (7.00am to 10.00pm)	Light	24,925	24,385	25,079	25,905
				Heavy	1,016	1,006	1,022	1,069
				Total	25,941	25,391	26,102	26,974
			9-hour Night-time (10.00pm to 7.00am)	Light	4,282	4,943	4,875	5,865
				Heavy	175	204	199	242
				Total	4,456	5,147	5,074	6,107

## 5.5 Access and routes

The proposal would change local and regional access for some users of the road network. The proposal would provide industrial and residential properties south of Wentworth Avenue eastbound access along Wentworth Avenue. This would be via a loop route using the new Wentworth Avenue road underpass and a restricted left turn at Mill Pond Road onto Botany Road (refer to **Figure 5-1**). The loop route as part of the proposal would be shorter than the existing loop route via the General Holmes Drive level crossing for residences and businesses south of Wentworth Avenue, as shown in **Figure 5-1**. This route, however, would result in a longer route for a small number of motorists wishing to travel east from the Central Foundry, on Botany Road.

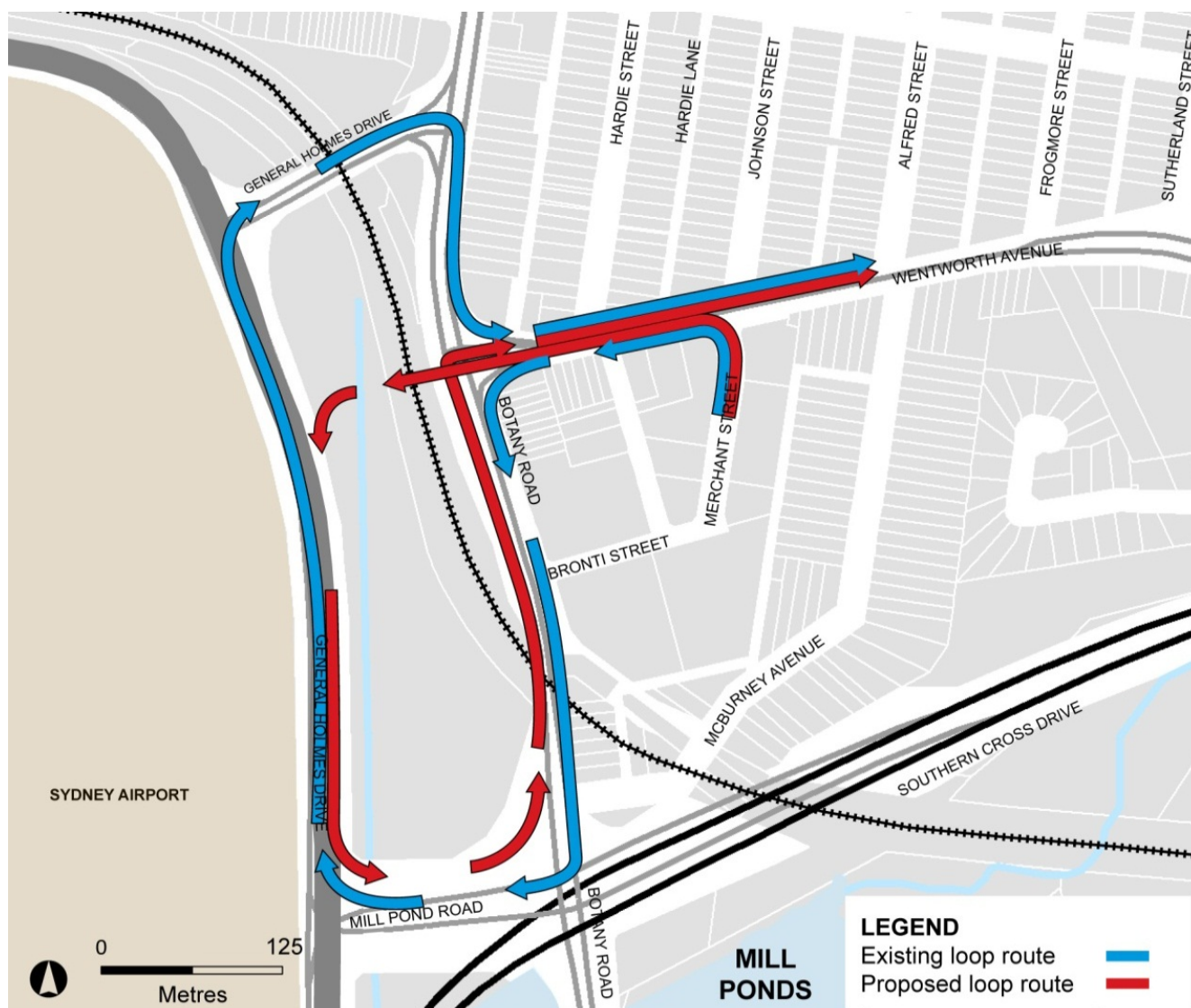


Figure 5-1: Existing and proposed loop route for residents and businesses south of Wentworth Avenue

## 5.6 Road user safety

The traffic modelling analysis incorporated signal controlled pedestrian crossings for all proposed intersections with traffic lights along the General Holmes Drive, Botany Road and Wentworth Avenue and the results have shown that pedestrian crossings would not be adversely impacted by the proposal. Consequently, the ability of pedestrians to cross the study would not be impacted by the increase in traffic volumes on the road. The proposal would not impact on local or arterial roads and their associated footpaths.

The safety of all road users including pedestrian, cyclist and motorists would be improved during the operation of the proposal.

The proposal includes safe segregated new pedestrian and cyclist routes on Botany Road and Wentworth Avenue.

The proposal would reduce the number of crashes and improve road safety in the study area with the removal of the level crossing. This is particularly the case at the intersection of General Holmes Drive and Botany Road where a substantial number of vehicle crashes currently occur.

## 6. Conclusion

### Background

This working paper considers the traffic and transport impacts of the WestConnex enabling works in the airport east precinct. The analysis assessed the operational performance of the network under existing 2013 traffic volumes. Traffic volumes in 2018 with the proposal in place and under a “no build” scenario (i.e. traffic conditions in the absence of the WestConnex enabling works) were also assessed

### Current traffic and transport conditions

The road network in the precinct is heavily trafficked with most links having an average weekday daily traffic flow of 25,000 to 55,000 vehicles per day. There is an intensive bus network serving the area with over 700 scheduled bus trips on an average weekday. There is reasonable pedestrian access in most of the area, although facilities are poor or non-existent on roads without property frontages. No specific cycle routes or infrastructure have been identified in the study area.

Heavy vehicles (including buses) comprise 6 per cent to 11 per cent of the traffic flow. Scheduled buses represent approximately 2.5 per cent of traffic on Botany Road so the balance – mostly heavy goods vehicles – accounts for up to 9 per cent of traffic on this thoroughfare.

The busiest day of the week is Friday with 16.4 per cent of the weekly traffic total. The quietest day is Sunday with 10.9 per cent of the weekly total. The weekday traffic profile shows a typical urban pattern with AM and PM commuter peaks at 8am to 9am and 5pm to 6pm. Some links, especially the route from Southern Cross Drive to the airport have a more pronounced, and earlier, AM peak.

The vehicle flows are generally well balanced by direction. The most significant variation is at site 8, General Holmes Drive crossing the railway level crossing between Botany Road and Joyce Drive. The Southern Cross off ramp exit to Mill Pond Road is a one-direction link.

With the exception of the uni-directional Southern Cross Drive off ramp to Mill Pond Road, the weekday hourly traffic profile is a typical urban traffic pattern with similar volumes in the AM and PM peaks.

Most links in the network have road accident performance at levels close to the expected levels for similar roads. The notable exception is Botany Road between Wentworth Avenue and Baxter Road with a relatively high number of crashes at the General Holmes Drive intersection.

Crash rates on this road network are reasonably close to the expected average values. The only exception is for Botany Road between Mill Pond Road and Baxter Street.

The road network in the Airport East Precinct includes the motorway standard Southern Cross Drive and major access routes to Sydney Airport and Port Botany. There is also a number of local roads providing access to residential and commercial properties and linking with the RMS managed network.

An extensive and intensive bus network operates throughout the precinct and peak period/peak direction bus priority lanes are in place on the busiest routes (Botany Road).

Pedestrian routes are available on most, but not all, of the RMS managed road network. These routes have dropped kerbs at main intersections and pedestrian crossing lights at most signalised junctions. Cycle routes and infrastructure are limited through the study area. The NSW Government strategies for walking and cycling envisage the Government working with local councils and others to promote safe and attractive walking and cycling routes between major centres.

## The WestConnex proposal

The primary components of the WestConnex enabling works in the airport east precinct are:

- Widening Joyce Drive and General Holmes Drive between O’Riordan Street and Mill Pond Road to three lanes in each direction;
- Replacing the General Holmes Drive rail level crossing with a road underpass that links General Holmes Drive, Botany Road and Wentworth Avenue;
- Improvements to pedestrian and cyclist facilities;
- Selected junction modifications to improve traffic flow and safety.

## Conclusions

The proposal will improve accessibility to and within the precinct for road vehicles (including buses) and for pedestrians and cyclists.

The proposal includes safe segregated new pedestrian and cyclist routes on Botany Road and Wentworth Avenue.

Traffic movements at the intersection of General Holmes Drive and Botany Road will be simplified by the closure of the through route to Joyce Drive. This intersection is the location of a significant number of vehicle crashes and the number of conflicting vehicle movements will be greatly reduced by the proposal.

Traffic modelling for 2018 traffic numbers indicates that the proposal would result in substantial improvement to network operations and performance when compared to the no-build scenario. Average speeds are predicted to increase by up to 30 per cent during the AM peak period and between 10 and 15 per cent during the PM peak period.

Traffic modelling indicates that if the proposal does not proceed (the no-build scenario) severe congestion would occur in the study area in 2018. Eight locations in the study area are predicted to experience LoS of ‘E’ or ‘F’ in AM and PM peak periods. The proposal would improve performance by increasing travel speed as a proportion of free flow speeds. Under the proposal, only two locations in the study area would experience LoS of ‘E’ or ‘F’ in AM and PM peak periods. Modelling also indicates that the proposal would improve connectivity within the study area, facilitating more vehicles accessing more locations within the study area.

The proposal would result in marked improvement in travel time for the majority of surveyed routes across all hourly periods. The greatest reductions in travel time would be experienced by routes that start or end at the airport. For instance during the AM peak, vehicles travelling from Southern Cross Drive to the airport would experience travel times reduced by 40 per cent between 6.00am and 7.00am and more than 50 per cent after 7.00am. More than 5,000 vehicles would benefit from this travel time reduction in the AM peak for this route. During the PM peak, the greatest benefit would be experienced by vehicles on the Southern Cross Drive eastbound route, with reductions in travel times of more than 50 per cent between 3:00pm and 5:00pm and more than 75 per cent after 5:00pm. More than 10,000 vehicles would benefit from this travel time reduction in the PM peak.

The proposal would reduce the number of crashes and improve road safety in the study area with the removal of the level crossing. This is particularly the case at the intersection of General Holmes Drive and Botany Road where a substantial number of vehicle crashes currently occur.

In summary, the proposal would improve access to and within the study area for road vehicles (including buses), pedestrians and cyclists. Improved access would be achieved via a road network with higher average traffic speeds, lower travel times, less congestion and less potential for gridlock.

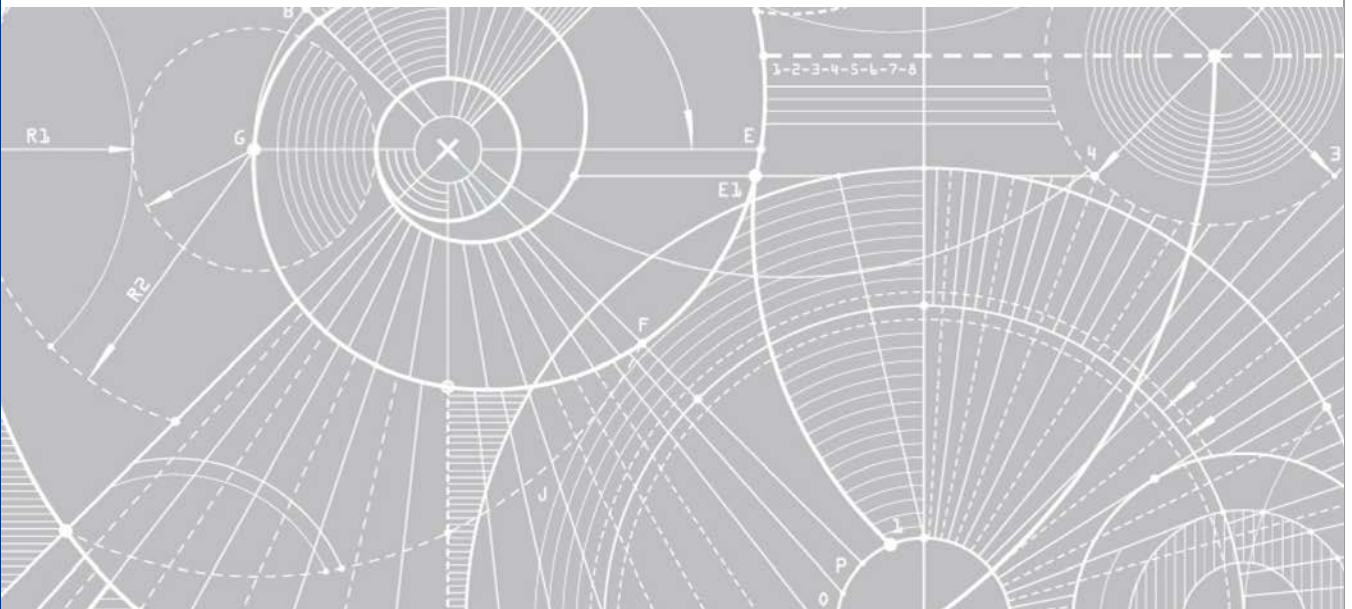
## **Appendix A. Traffic model calibration and validation**

WestConnex Enabling Works – Airport East Precinct  
ROADS AND MARITIME SERVICES (RMS)  
Traffic Model Calibration and Validation

NB10000.5 | Rev B

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24 April 2014



## WEW Airport East Precinct - Traffic Model Calibration and Validation

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Revision	Date	Description	Reviewed by	Approved by
Rev A	31 Jan 2014	Internal Technical Review	Jen Patterson	Scott Wilkinson
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Appendix A. Configuration file

Appendix B. Traffic flow diagram

Appendix C. AM peak calibration statistics

Appendix D. PM peak calibration statistics

## Glossary

Terms	Definitions
Micro-simulation	Paramics micro-simulation modelling is a computer software package that has the ability to individually model each vehicle, including buses, taxis, trains, trams, etc. within a road network. It enables a realistic representation of driver behaviour such as overtaking and lane changing and can also illustrate network performance. Paramics is a particularly useful tool in modelling congested road networks where over-saturation resulting in vehicle queuing impacts on upstream intersections. It also allows testing of the method of intersection control and allows signal timings be modified to enable more effective congestion management strategies to be designed and tested.
Headway factor	In Paramics, a scaling factor to modify the average spacing between vehicles desired by modelled drivers. Can apply to the whole model or to particular links where drivers are especially aggressive or cautious.
Reaction time factor	In Paramics, a scaling factor to modify the average reaction time of modelled drivers. Can apply to the whole model or to particular links where drivers are especially alert or inattentive.
Seed value	In Paramics, an integer input to the random number generator which varies a range of model inputs, such as individual vehicle and driver characteristics, individual vehicle arrival times at the network entries, and fluctuations in entering demand. Using the same seed value with the same model inputs will produce the same results each time the model is run. Using a different seed value will produce a different set of randomized inputs and therefore different results.
Warm up	Section of a micro-simulation model's run time after vehicles are first introduced to the network but before results are collected. Demand loaded in this period is normally set at a generic level to populate the model but not cause congestion. The purpose is to have vehicles distributed around the network at the start of the first time interval when results are recorded.

# 1. Introduction

## 1.1 Background

Jacobs SKM has previously developed mesoscopic Dynameq traffic models for the base case and concept design options for selected road upgrades in the Sydney CBD, Airport and Port Botany precinct to assess the operational performance of future networks. As part of the Review of Environmental Factors (REF) for the WestConnex Enabling Works, Jacobs SKM has been commissioned by the Roads and Maritime Services (RMS) to conduct a further traffic modelling study to assess the proposed upgrade of the Wentworth Avenue Extension to General Holmes Drive. Paramics modelling is to be used to provide a comprehensive traffic operation estimation tool.

The study approach for the base model development is illustrated in **Figure 1-1**.

Figure 1-1: Study approach



## 1.2 Purpose of this report

The purpose of this report is to document the calibration and validation of the Paramics peak models and confirm its 'fitness for purpose' as a basis for future assessments to be undertaken as part of WestConnex Enabling Works.

This report is set out as follows:

- Section 1 Introduction (this section) – setting out the purpose and scope of the report.
- Section 2 Project area – identifying the road network in the study area in the Paramics models.
- Section 3 Transport data – illustrating all supplied transport data.
- Section 4 Model development – basic characteristics of the model, the overall methodology applied and network inputs.
- Section 5 Model calibration and validation – process and results, comparing modelled traffic counts, travel time and onsite observations.
- Section 6 Summary – outcomes of the model validation and review processes and conclusion on the model's fitness for purpose.

## 2. Project area

The study area is bound by O’Riordan Street and Botany Road in the east-west direction and extends from Robey Street to the Southern Cross Drive in the North- South direction. **Figure 2-1** illustrates the extent of the model area.

Figure 2-1: Study network



(Sources: [Jacobs SKM Spatial Data Viewer](#))

The study area includes the following major roads:

- Southern Cross Drive
- Wentworth Avenue
- Mill Pond Road
- Botany Road
- Ross Smith Drive
- Joyce Drive
- O’Riordan Street
- Airport Drive

The remaining network of roads within the study area consists of local Council roads providing access to commercial areas.

Kerbside car parking is provided along sections of the Botany Road and Robey Street on both sides of the roads and is subject to time restrictions.

The railway level crossing on General Homes Drive is located to the north of the study area between Botany Road to the east and Joyce Drive to the west. There are two lanes on either approach to the level crossing and there is a 60km/h posted speed limit.

## 3. Transport data

### 3.1 Data collection

Different types of data were collated to accurately develop a Paramics micro-simulation model for the study area with the respective description and source are shown in **Table 3-1**

Table 3-1: Summary of transport data

Data Type	Source	Description
Intersection Counts	SkyHigh	November 2011
Origin-Destination Data (AM and PM Peak)	Austraffic	November 2011
Origin-Destination Data (PM Peak)	Austraffic	January 2012
Travel Time Data (AM and PM Peak)	Austraffic	November 2011
Travel Time Data (PM Peak)	Austraffic	January 2012
SCATS Data	RMS	August 2013
IDM Data	RMS	August 2013
LX Data	RMS	August 2013
Traffic Signal Design Plans	RMS	-
Traffic Hourly Count Data	RMS	August 2011
Halcrow traffic models	RMS	2011
Rail plan information (railway level crossing)	RMS	2013

### 3.2 Site inspection

In addition to the data mentioned above, a site inspection was also conducted during the model development stage to help understand traffic behaviour and several detailed network parameters. A site visit was undertaken on Wednesday 15<sup>th</sup> January 2014 by Jacobs SKM to confirm traffic conditions and intersection layout information extracted from the aerial photography. Travel time survey data was also collected along the major routes using the moving observer method.

It is worth to note that when comparing these observations to the model behaviour it must be remembered that due to the project timelines the site inspection had to be carried out in school holidays and more queuing would be likely school in term times.

#### 3.2.1 AM peak traffic conditions

##### Domestic Airport Precinct

Moderate congestion was observed in the early stages of the AM peak at the domestic airport entrance at the O'Riordan Street/Qantas Drive/Joyce Drive/Sir Reginald Ansett Drive intersection. Westbound vehicles on Joyce Drive attempting to turn left into Sir Reginald Ansett Drive were queued back towards General Holmes

Drive. This congestion cleared by approximately 7.30am. Traffic remained steady with no major congestion issues for the remainder of the AM peak in this area.

#### Botany Road and General Holmes Drive

Heavy northbound traffic was observed on both General Holmes Drive and Botany Road on their approaches to Mill Pond Road. Right turn bays on General Holmes Drive were usually fully utilised. The Southern Cross Drive off ramp at Mill Pond Road also experienced moderate queuing. Both Mill Pond Road intersections were however operating efficiently with the majority of queued cars able to clear the intersection within one traffic signal cycle.

Westbound traffic on Wentworth Avenue was occasionally queued approaching the Botany Road intersection. These queues generally extended approximately halfway between Botany Road and Sutherland Street.

### 3.2.2 PM peak traffic conditions

#### Domestic Airport Precinct

PM traffic conditions at the domestic airport were not as severe as the AM peak. Queues to enter the airport did not extend as far back down Joyce Drive and no major delays were observed.

#### Botany Road and General Holmes Drive

Conversely to the AM peak, southbound movements on both General Holmes Drive and Botany Road became the dominant feature of the PM peak. General Holmes Drive did not experience any significant congestion. Southbound vehicles on Botany Road were queued back from Mill Pond Road, normally as far back as Wentworth Avenue. This impacted the large number of westbound vehicles on Wentworth Avenue at the Botany Road intersection. Queues on Wentworth Avenue were observed to extend back to Sutherland Street.

The Southern Cross Drive off ramp was again busy however the majority of the queue was able to clear the intersection within one cycle.

### 3.3 SCATS count

Traffic signal counts were collected from 5<sup>th</sup> August 2013 to 11<sup>th</sup> August 2013 by RMS Traffic Management Centre. A total of 13 junctions were collected 24 hours a day and 7 days a week during non-school holidays. The Sydney Coordinated Adaptive Traffic System (SCATS) counts were used to develop the vehicle demand matrices and establish vehicle release profile. The release profiles are for 15 minute intervals that have been as per the survey count intervals. **Figure 3-1** shows the SCATS count locations.

Intersection classified counts including pedestrians were undertaken by SkyHigh in November 2011 for all the signalised intersections for the AM and PM peak period respectively. These classified counts are used to interpret the traffic split when SCATS counts cannot provide the detail.

**Appendix B** contains a diagram for each peak period, outlining the hourly volumes at each of the surveyed sites. These traffic volumes were used for the calibration of the Paramics base model. Due to the nature of the estimation process and zone placement, the volumes had to be “balanced”. Typically, this consisted of minor adjustments to specific turn movements to ensure that adjacent intersections had consistent upstream and downstream volumes. In reality, cars would turn into individual driveways or intermediate side streets, however this fine level of detail is not accommodated in the model. In general, the SCATS data was found to be

consistent. The volumes shown in **Appendix B** correspond to the “balanced volumes” used in the model calibration.

Figure 3-1: SCATS count locations

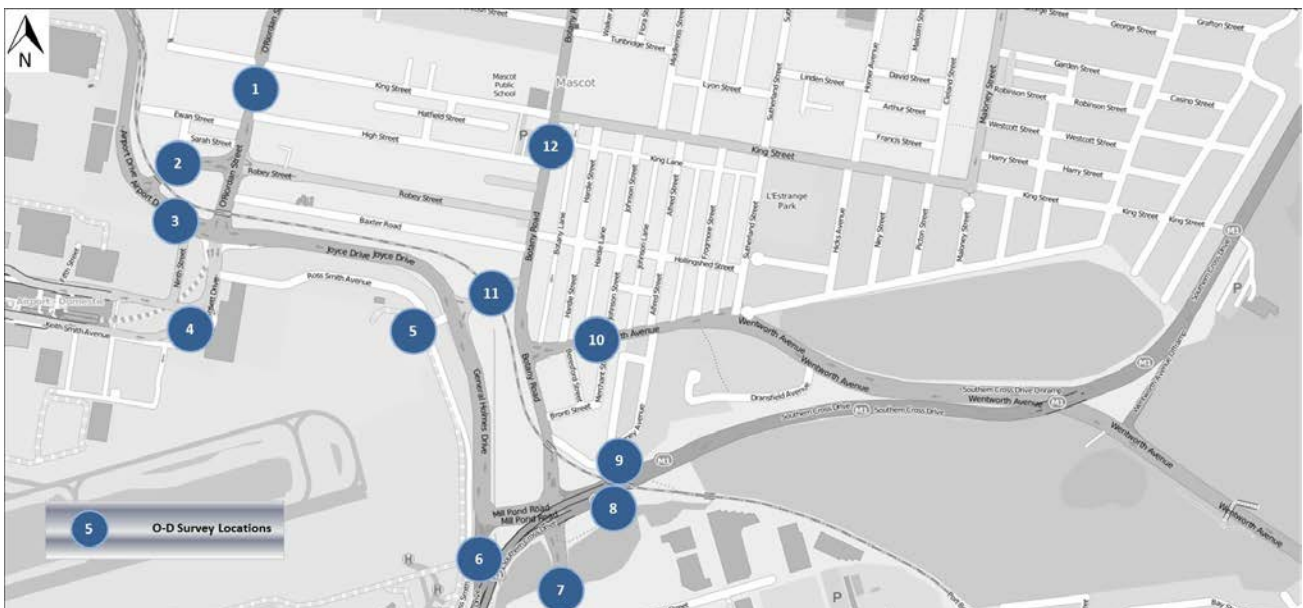


(Sources: [SKM Spatial Data Viewer](#))

### 3.4 Origin Destination surveys

An origin – destination survey consisting of 11 sites was conducted on November 2011 (AM and PM peak) and January 2012 (PM peak). The sites covered in the origin-destination survey are shown in **Figure 3-2**. The origin – destination data obtained by this survey was converted into a matrix format and used during the model demands estimation and also during the model validation stage.

Figure 3-2: Origin-Destination sites



(Sources: [SKM Spatial Data Viewer](#))



### 3.5 Travel time data

Austraffic undertook the travel time survey based on the OD information collected by time-stamping the matched vehicles between cordons. In addition, Jacobs SKM conducted travel times surveys on Wednesday 15<sup>th</sup> January 2014 during the AM and PM peak periods using the moving observer method. The surveys were carried out on two bidirectional routes. The description of each route is shown in **Table 3-2**.

Table 3-2: Travel time survey routes

Route No	Paramics Zones	Route Description
1	12→07 07→12	Botany Road (north of Robey Street) ↔ Botany Road (south of Mill Pond Road)
2	06→09 08→06	General Holmes Drive (south of Mill Pond Road) ↔ Southern Cross Drive (eastbound / westbound traffic, north of Wentworth Avenue)
3	12→06 06→12	Botany Road (north of Robey Street) ↔ General Holmes Drive (south of Mill Pond Road)
4	04→06 06→04	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive) ↔ General Holmes Drive (south of Mill Pond Road)
5	04→09 08→04	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive) ↔ Southern Cross Drive (eastbound / westbound traffic, north of Wentworth Avenue)

### 3.6 Signal phasing data

Traffic signals within the model area have been coded to reflect existing signal timings. **Table 3-3** provides a summary of the Traffic Control Signals (TCS) within the model.

Table 3-3: Signalised intersections within the model

Intersection	TCS Number
Botany Road / General Holmes Drive	TCS 589
Botany Road / Wentworth Avenue	TCS 574
Botany Road / Mill Pond Road / Southern Cross Drive	TCS 419
Botany Road / Robey Street	TCS 575
General Holmes Drive / Mill Pond Road	TCS 420
General Holmes Drive / Joyce Drive	TCS 590
Southern Cross Drive / Wentworth Avenue off ramp	TCS 593
Southern Cross Drive / Wentworth Avenue on ramp	TCS 1301
Sutherland Street / Wentworth Avenue	TCS 571
O'Riordan Street / Joyce Drive / Qantas Drive	TCS 3086
O'Riordan Street / Robey Street	TCS 591
Qantas Drive / Robey Street	TCS 720

The information ordered included:

- Intersection Diagnostic Monitors (IDMs) for these intersections
- The SCATS 'LX' file for the regional computer controlling this area
- Signal design plans for the above key intersections.

All signalised intersections within each intersection were modelled as fixed time with average phase times based on Intersection Diagnostic Monitor (IDM) data extracted from RMS SCATS system. The IDM data provided a statistical summary of how often different phases run over a time period and the maximum, minimum and average phase times that operate in a specific time period.

It is recognised practice to use the average phase and cycle times, derived from IDM data to replicate traffic signal operation. However, it is also acknowledged that the fixed time signal setup presents a number of limitations in terms of representing the signal timings controlled by the SCATS system.

The SCATS LX file was used to determine the relationships between the traffic signal intersections in the study area, including which intersections were the controlling intersections. A combination of IDM and LX data were used to determine the phase splits, while the phasing was recorded from on-site observations. The LX data were also used to determine the coordination offsets between intersections.

### 3.7 Railway level crossing

The operational timing for the railway level crossing at General Holmes Drive was identified from the intersection count survey data and rail plan information. **Table 3-4** provides a summary of the closure times, which were used as input into the models.

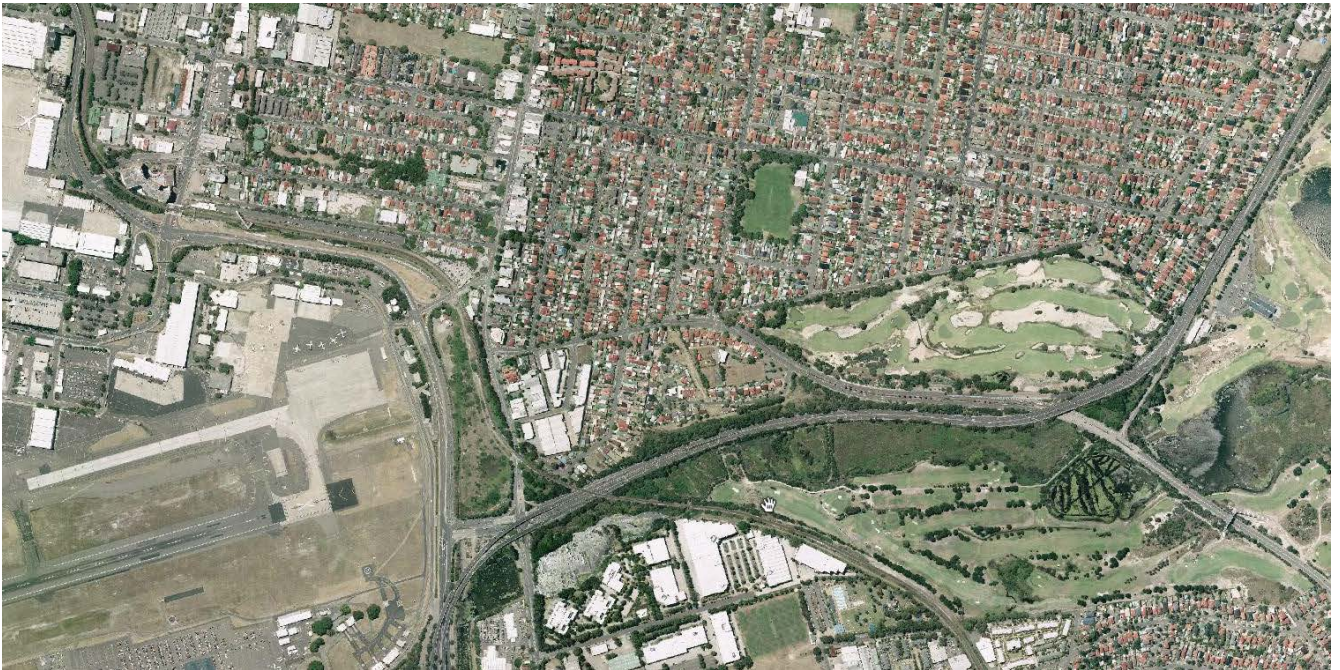
Table 3-4: Railway level crossing timetable

Period	Level Crossing – closed	Level Crossing – open	Duration (min.sec)
6.00am – 7.00am	6.20.17am	6.22.41am	2.24
7.00am – 8.00am	7.54.00am	7.56.34am	2.34
8.00am – 9.00am	8.42.10am	8.45.14am	3.04
3.00pm – 4.00pm	3.53.06pm	3.56.04pm	2.58
4.00pm – 5.00pm	4.13.44pm	4.16.40pm	2.58
	4.29.25pm	4.32.12pm	2.56
	4.50.10pm	4.52.42pm	2.47
5.00pm – 6.00pm	-	-	-

### 3.8 Aerial photography data

Recent aerial photography data was developed by SKM GIS team to assist in the model coding process. This data consists of ECW files that were imported to the model as necessary. **Figure 3-3** shows the aerial photography data.

Figure 3-3: Aerial photography data



(Sources: [Jacobs SKM Spatial Data Viewer](#))

## 4. Development of base model network

### 4.1 Previous Paramics model

RMS previously commissioned Halcrow to develop a 2011 AM and PM peaks Paramics model which represents road geometry, intersection control and demands within the study area. The models were provided to Jacobs SKM and they were used as the basis including network extension for the development of a 2013 calibrated and validated models for the AM and PM peak period.

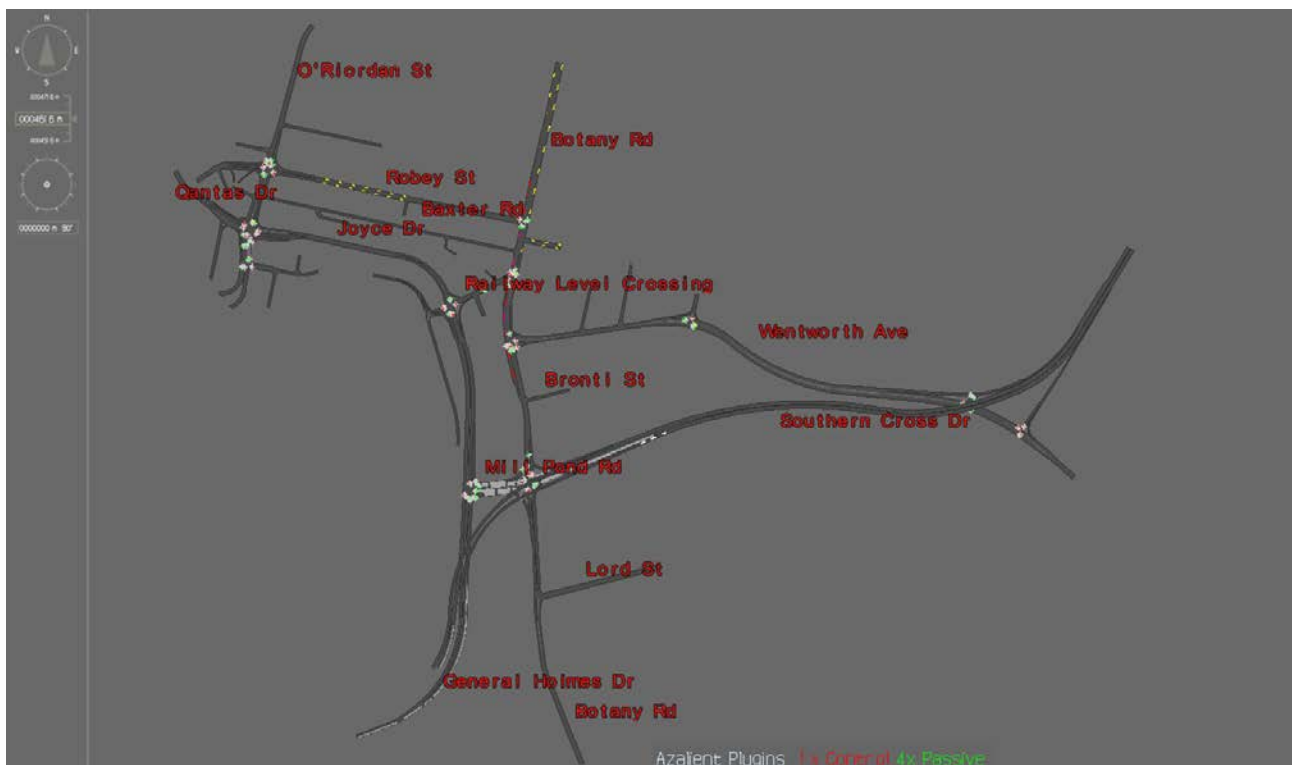
### 4.2 Software

The traffic assessment was undertaken using Q-Paramics micro-simulation modelling software (v6.8) with Azalient's Network Evaluation plug-in modelling software. This software models individual vehicle behaviour and their interaction with the network and other road users. Micro-simulation has its greatest strength in modelling congested road networks, due to its ability to simulate queuing conditions. This capability makes these types of models very useful for analysing traffic operations in urban areas and city centres, including interchanges, roundabouts, unsignalised and signalised intersections, signal coordinated corridors, and area networks.

### 4.3 Network structure

The extent of the Paramics model network coverage was agreed with RMS and is illustrated in **Figure 4-1**.

Figure 4-1: Paramics model extent



## 4.4 Overlay

The primary data source used for the development of the model road network structure was aerial photography from Jacobs SKM Spatial Data System for the network coding. This data was further supplemented with information obtained during site visits where stop line positions and lane markings were checked.

## 4.5 Zone system

A total of 14 zones were included in each model to accommodate all the surveyed traffic origin/destination pairs. The location of zones within the base models are detailed in **Table 4-1**.

Table 4-1: Zones descriptions

Zone	Description	Zone	Description
01	O’Riordan Street (north of Robey Street)	09	Southern Cross Drive (eastbound traffic, north of Wentworth Avenue)
02	Robey Street (west of Qantas Drive)	10	Wentworth Avenue (west of Page Street)
03	Airport Drive (west of O’Riordan Street)	11	Railway Level Crossing
04	Sir Reginald Ansett Drive / Shiers Avenue (South of Joyce Drive)	12	Botany Road (north of Robey Street)
05	Ross Smith Avenue (west of General Holmes Drive)	13	Hollinshed Street, east of Botany Road
06	Southbound of General Holmes Drive (south of Mill Pond Road)	14	Ninth Street, south of Qantas Drive
07	Botany Road (south of Mill Pond Road)	15	Northbound of General Holmes Drive (south of Mill Pond Road)
08	Southern Cross Drive (westbound traffic, north of Wentworth Avenue)		

## 4.6 Modelling periods

Separate models were developed for the AM and PM peaks. For each peak, a “warm-up” and “cool-down” period of 1 hour each was added, with overall modelled periods as follows:

AM Peak:

- Warm-up: 5.00am – 6.00am
- Modelled period: 6.00am – 9.00am
- Cool-down: 9.00am – 10.00am

PM Peak:

- Warm-up: 2.00pm – 3.00pm
- Modelled period: 3.00pm – 6.00pm
- Cool-down: 6.00pm – 7.00pm

The model was coded to allow each “1 hour” period to be analysed individually. Periodic files were created such as separate demand files for each hour. The estimation, calibration and validation of the model were therefore

processed separately for each hour resulting in five individual periods (three for the morning and evening peaks).

#### **4.7 RMS standard files**

An industry approved configuration file (NSW – RMS standard configuration file) was used.

The RMS standard vehicles file has been adopted for the modelling. Heavy vehicles have been accounted for in 3 separate matrices representing OGV, semi-trailers and B-doubles. Separate matrices allow fine tuning of heavy vehicle demands and specific routing restrictions, such as Semi-trailer and B-double restrictions in place along Botany Road south of Mill Pond Road.

A copy of the input configuration file used for the AM peak model is provided in **Appendix A**. The PM peak configuration file is consistent with the AM peak but has a different start time.

#### **4.8 Traffic signals**

Traffic signals within the model area have been coded to reflect existing signal timings. **Table 3-3** provides a summary of the Traffic Control Signals (TCS) within the model.

All signalised intersections within each intersection were modelled as fixed time with average phase times based on Intersection Diagnostic Monitor (IDM) data extracted from RMS SCATS system. The IDM data provided a statistical summary of how often different phases run over a time period and the maximum, minimum and average phase times that operate in a specific time period.

It is recognised practice to use the average phase and cycle times, derived from IDM data to replicate traffic signal operation. However, it is also acknowledged that the fixed time signal setup presents a number of limitations in terms of representing the signal timings controlled by the SCATS system. This is especially evident at locations with bus priority phases which are demanded infrequently.

The overall approach adopted for the development of the existing conditions model was to include all critical signal phases in the phase sequence. The remaining (less frequent) phases, such as demand dependant phases, were also included at critical locations with manual adjustment to phase time in order to compensate for their infrequent operation. During the model calibration stage, minimal adjustments to the phase lengths were added as necessary to ensure that observed conditions were mimicked accurately.

#### **4.9 Lane choice rules**

Based on on-site observations, lane choice rules were applied to certain links or turn movements where considered appropriate within the model in order to specify the preferred lanes that vehicles should utilise when travelling to/from the specified origins or destinations within the model.

#### **4.10 Matrix demand development**

Given the relatively small size of the network, the Paramics Estimator module use was not adopted in the development of the demand matrix. The demand matrix was developed using the available count and O-D data for the distribution of vehicles within the network and consideration was given to the relative volume of entering and exiting the network at each location. An iterative process (matrix furnishing) with small demand changes was used to check that the demands, when assigned to the network, represented the 2013 SCATS counts and surveyed turning volumes at the intersections.

Four matrix levels, Cars/ LGVs, OGV, semi-trailers and B-doubles were developed with the proportion of heavy vehicles estimated directly from the intersection turn counts. The hourly SCATS counts were distributed to each OD pairs based on the percentage of distribution obtained from the OD survey and classified intersection counts survey data. This would ensure a close correlation of heavy vehicle distribution between modelled and SCATS / surveyed information.

The intersection count data was arranged in a stickfigure so that traffic flow mismatches and discrepancies could be identified. Traffic flow stickfigures are presented in **Appendix B** of this report. Generally the data was found to be consistent, however small differences in traffic volumes between count locations in the traffic volumes could be accounted for by queue storage in the network or traffic feeding from on-road and on-site parking.

#### 4.11 Bus routes

The relevant bus routes were checked and updated into the models for this study with the bus frequencies derived from the relevant bus company (Sydney Buses) timetable and were presented in **Table 4-2**.

Table 4-2: Bus routes

Bus No	Bus Route
301	Eastgardens - City
303	Sans Souci - City
309	Port Botany - City
310	Eastgardens - City
400	Burwood - Bondi
410	Rockdale - Bondi Junction
M20	Gore Hill - Botany
X09	Port Botany - City
X10	Eastgardens - City

- Bus stops – The locations of the bus stops allocated in the model were based on our site visit surveys.
- Bus routes and times – were based on the transport NSW information and also checked against Jacobs SKM site visit surveys to ensure their accuracy.
- Bus lanes – Bus lanes were coded in the models and these were based on our site visit surveys and the RMS list of bus lanes, clearways and transit lanes for the Sydney region.

These services have been included in the simulation model. Where services use the same corridor and stop at the same bus stops within the model extents these services have been consolidated and represented as one route with a combined service frequency.

#### 4.12 Vehicle release profile

In order to ensure that the correct numbers of vehicles are released into the network within defined time slices, a demand profile was constructed. To accurately reflect traffic arrival patterns on the external links into the network within the modelled time period, temporal traffic profiles have been adopted on a zone by zone basis. These profiles from each zone are based on the traffic survey count data and have been developed for 15 minute periods across the modelled 5 hours in both AM and PM peak periods.

The base models also include one hour warm-up and one hour cool-down periods. The amount of traffic released during these periods is approximately 87% of the period traffic flow demands. The profiles for the warm-up period and the cool-down period increase and decrease respectively to ensure that the network operation conditions were as close as possible to those actually experienced at the start and end of the peak periods.

#### **4.13 Seed values**

RMS guidelines stipulate that models should be run for a minimum of five seed runs to investigate the robustness of the model and assess its operation under a variety of starting conditions. There is no reason to use one seed value or group of seed values in particular. They simply represent different vehicle release conditions for the same network and O-D matrix. However, the “Traffic Modelling Guidelines, RMS , February 2013” states that “the following ten seed values should be used to provide random variation of results: 560, 28, 7771, 86524, 2849, 5321, 137, 98812, 601027, 559”. To comply with that requirement, the first five seeds were selected to be used in the calibration process. In summary, the seed values used were:

- Seed 560
- Seed 28
- Seed 7771
- Seed 86524
- Seed 2849

#### **4.14 Traffic assignment method**

Paramics provides three types of traffic assignment methods: “all-or-nothing”, stochastic and dynamic. The “all-or-nothing” assignment method assumes that all drivers travelling between two zones choose the same route and it also assumes that link costs do not depend on link congestion levels. The stochastic assignment method accounts for the variability in travel costs (or driver’s perception of those costs). The dynamic feedback assignment method assumes that drivers who are familiar with the network will re-route if information on the present state of traffic conditions is fed back to the drivers. This is achieved by taking real time information from the Paramics model and using the data to update the routing calculations.

The key alternative route choices are between using Mill Pond Road or the level crossing on General Holmes Drive, so an “all-or-nothing” traffic assignment methodology has been used with no feedback or perturbation.



## 5. Model calibration and validation

### 5.1 Calibration and Validation process

The models were calibrated to ensure that they adequately reflected observed traffic conditions. The criteria used to validate the success of the calibration were the GEH statistic and flow difference criteria from the RMS Traffic Modelling Guidelines. The assessment criteria adopted were:

- 1) Difference in link flow within 100vph for flows < 700vph
  - 2) Difference in link flow within 15% for flows 700-2,700vph
  - 3) Difference in link flow within 400vph for flows >2,700vph
  - 4) GEH Statistic: less than 5 for greater than 85% of links
- } greater than 85% of links

*GEH Statistic is a modified Chi-Square empirical formula named after Geoffrey E. Harves, who invented it in 1970s to compare two sets of traffic volumes. The use of GEH as an acceptance criterion is widely recognised in the traffic forecasting and traffic/transport modelling practice areas. The formula is:*

$$GEH = \sqrt{\frac{2(M - C)^2}{M + C}}$$

*Where:*

*M is the traffic flow output from model; and  
C is the observed real-world traffic flow.*

*A GEH less than 5.0 is considered to be a good match between modelled and observed traffic volumes. According to the UK Highways Agency's Design Manual for Road and Bridges (DMRB), a more than 85% of model links should comprise 'GEH less than 5.0'. And a GEH value between 5.0 to 10.0 may warrant further investigation and GEH greater than 10.0 is not accepted and definitely requires further investigation.*

To ensure the robustness of the AM and PM peak models, five different seed values were run for calibration purposes. The seed values incorporated in the AM and PM peak models were 560, 28, 7771, 86524 and 2849.

The calibration process involves adjusting the model coding details to better reflect actual driver behaviour. The model elements that have been refined as part of this process are:

- Next Lanes – Forcing vehicles into the correct lanes and avoiding incorrect lanes which the vehicles should not move into.
- Force Merge / Across – Reflects the way drivers share priority when there are long delays
- Cost Factors – Prevents vehicles taking unrealistic route choices, particularly in congested networks.
- Headway Factor – Headway factors on Southern Cross Drive were adjusted
- Reaction Factor – Reaction factors along Southern Cross Drive were adjusted
  - *These factors reflect the observed high alertness and acceptance of smaller gaps on the Southern Cross Drive in peak conditions*
- Signposting – Increasing the signposting distance to reflect vehicles lane changing progressively.

The calibration process was carried out by taking the hourly flows of the modelled turning movement volumes and comparing this value to the hourly observed flows from the count data. The calibration results are detailed in **Appendix C** and **Appendix D**.

The GEH statistics were then analysed for each of the five seed runs. This confirmed that the GEH criteria was met by each of the five seed runs and further ensured the robustness of the models.

## 5.2 Model Calibration

The calibration statistics for both AM and PM peak models was based on a comparison of the modelled and surveyed traffic volumes at various locations in the network. This comparison has considered the model accuracy at an hourly resolution. To achieve a suitable level of accuracy within the model the following has been adjusted to improve the model calibration:

- Headway, reaction time factors and end speeds on individual links
- Matrix adjustments

### *Headway and reaction time adjustments*

On specific links within the model the link headway has been adjusted during calibration, the global factor remains at the default value of 1.0. This adjustment has been focussed on the most congested sections of the model where smaller gaps would be accepted by drivers. The locations where this factor has been changed are identified in this section.

The overall network headway factor remains 1.0, as specified in the RMS standard input files.

#### AM Peak

- Reduced headway factor 0.75 on outbound Southern Cross Drive
- Reduced reaction time factor 0.75 on outbound Southern Cross Drive and 0.85 on northbound approach to right turn of General Holmes Drive to Mill Pond Road
- Headway and cost factors removed from remaining links (Southern Cross Drive westbound approach to Botany Road)
- End speeds applied to Links 14:16, 3086a:22 and 22:24
- Headway and reaction time factors increased to Links 22:24, decreased 377:379, 379:380, 380:415, 415:422 and 422:419
- End speeds removed all 3 links, headway and time factors removed to Link 22:24 (southbound entering Airport)

#### PM Peak

- Reduced time and headway factors on Link 422:419
- End speeds applied to Links 341:1007z, 346:341, 420b:386, 386:346, 420:420b, 1007z:316, 11:12, 12:14, 12:3086, 12:15, 14:16, 15:35, 3086a:22, 393:11; reduced time and headway factors (0.75) on Link 62:56

### *Matrix adjustments*

The morning and evening peak matrices developed were adjusted during the calibration process to reflect SCATS and observed demands. Some care was exercised to generate appropriate levels of network congestion and to compensate for the temporal effects of traffic flow observed in the area.

#### 5.2.1 Link and turn flow results

##### AM Peak

The AM peak model was developed and calibrated using turning movement flows derived from supplied RMS SCATS data. The number of movements which satisfy the calibration criteria are detailed in **Table 5-1**. These

results show that the model is sufficiently calibrated. Movements with flow discrepancies do not fall below 85% of all movements. GEH values are less than 5 for more than 85% of movements.

Table 5-1: AM calibration turn flow results – Average of five seeds

Time Period	Total Links	Criteria 1 - No. of Links	Criteria 2 - No. of Links	Criteria 3 - No. of Links	% of Links	Criteria 4 (GEH < 5)	% of Links
6.00am - 7.00am	83	62	15	0	93%	77	93%
7.00am - 8.00am	83	62	21	0	100%	74	89%
8.00am - 9.00am	83	60	17	0	93%	73	88%

GEH values across all five seeds were also analysed in order to assess variation and instability in the model. These results are outlined in **Table 5-2** and demonstrate that the model remains stable across all five seeds.

Table 5-2: AM calibration GEH results

Seed Value	Time Period	Links with GEH stats <5		Links with GEH stats 5<x<10	
		Number of Links	% of Links	Number of Links	% of Links
560	6.00am - 7.00am	75	90%	8	10%
28		75	90%	8	10%
7771		73	88%	10	12%
2849		77	93%	6	7%
86524		75	89%	9	11%
560	7.00am - 8.00am	74	89%	9	11%
28		72	87%	11	13%
7771		74	89%	9	11%
2849		72	87%	11	13%
86524		74	88%	10	12%
560	8.00am - 9.00am	75	90%	8	10%
28		75	90%	8	10%
7771		75	90%	8	10%
2849		74	89%	9	11%
86524		76	90%	8	10%

PM Peak

The PM peak model was developed and calibrated using turning movement flows derived from supplied RMS SCATS data. The number of movements which satisfy the calibration criteria are detailed in **Table 5-3**. These results show that the model is sufficiently calibrated. Movements with flow discrepancies do not fall below 85% of all movements. GEH values are less than 5 for more than 85% of movements.

Table 5-3: PM calibration turn flow results – Average of five seeds

Time Period	Total Links	Criteria 1 - No. of Links	Criteria 2 - No. of Links	Criteria 3 - No. of Links	% of Links	Criteria 4 (GEH < 5)	% of Links
3.00pm - 4.00pm	83	63	13	0	92%	76	92%
4.00pm - 5.00pm	83	63	15	0	94%	75	90%
5.00pm - 6.00pm	83	61	14	0	90%	76	92%

GEH values across all five seeds were also analysed in order to assess variation and instability in the model. These results are outlined in **Table 5-4** and demonstrate that the model remains stable across all five seeds.

Table 5-4: PM calibration GEH results

Seed Value	Time Period	Links with GEH stats <5		Links with GEH stats 5<x<10	
		Number of Links	% of Links	Number of Links	% of Links
560	3.00pm - 4.00pm	76	92%	7	8%
28		77	93%	6	7%
7771		77	93%	6	7%
2849		76	92%	7	8%
86524		79	94%	5	6%
560	4.00pm - 5.00pm	75	90%	8	10%
28		72	87%	11	13%
7771		75	90%	8	10%
2849		73	88%	10	12%
86524		77	92%	7	8%
560	5.00pm - 6.00pm	74	89%	9	11%
28		72	87%	11	13%
7771		73	88%	10	12%
2849		75	90%	8	10%
86524		73	87%	11	13%

### 5.2.2 Scatter plots

The model calibration results show that from strategic modelling perspective an acceptable standard of matrix calibration has been achieved for the AM and PM peak modelled periods. The majority of the turning movements are less than GEH of 5, indicating strong correlation between the modelled volumes and observed counts. These results are confirmed scatter plots with high  $R^2$  ( $>0.95$ ) which show the calibrated matrices reproduced observed traffic volume, as shown in **Figure 5-1** to **Figure 5-6**.

Figure 5-1: Scatter plot - AM Peak (6.00am – 7.00am)

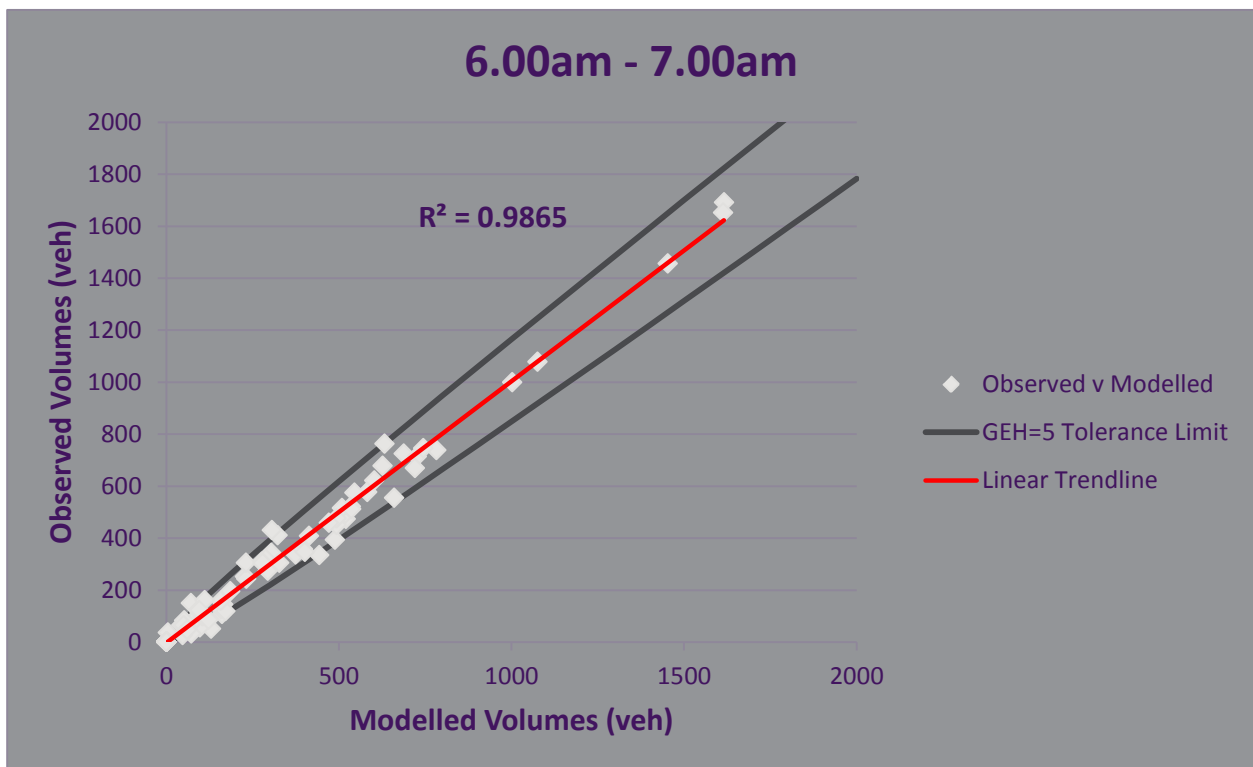


Figure 5-2: Scatter plot - AM Peak (7.00am – 8.00am)

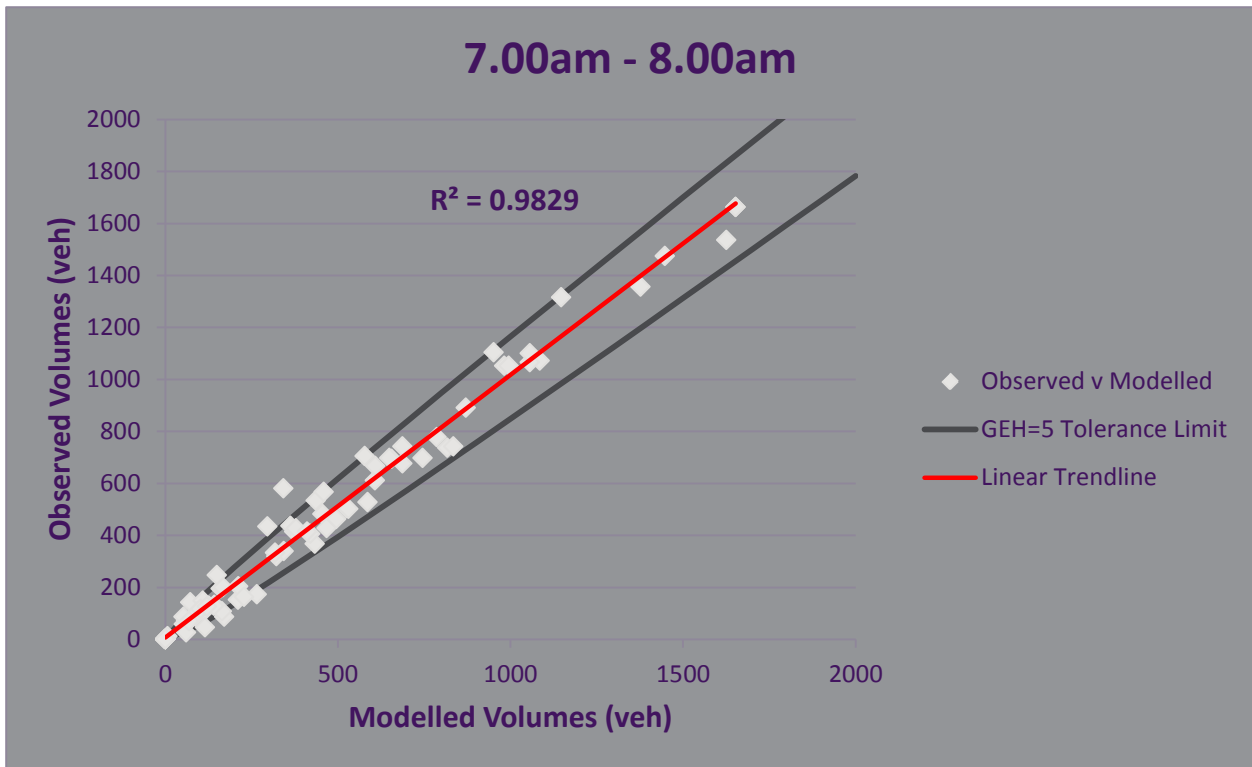


Figure 5-3: Scatter plot - AM Peak (8.00am – 9.00am)

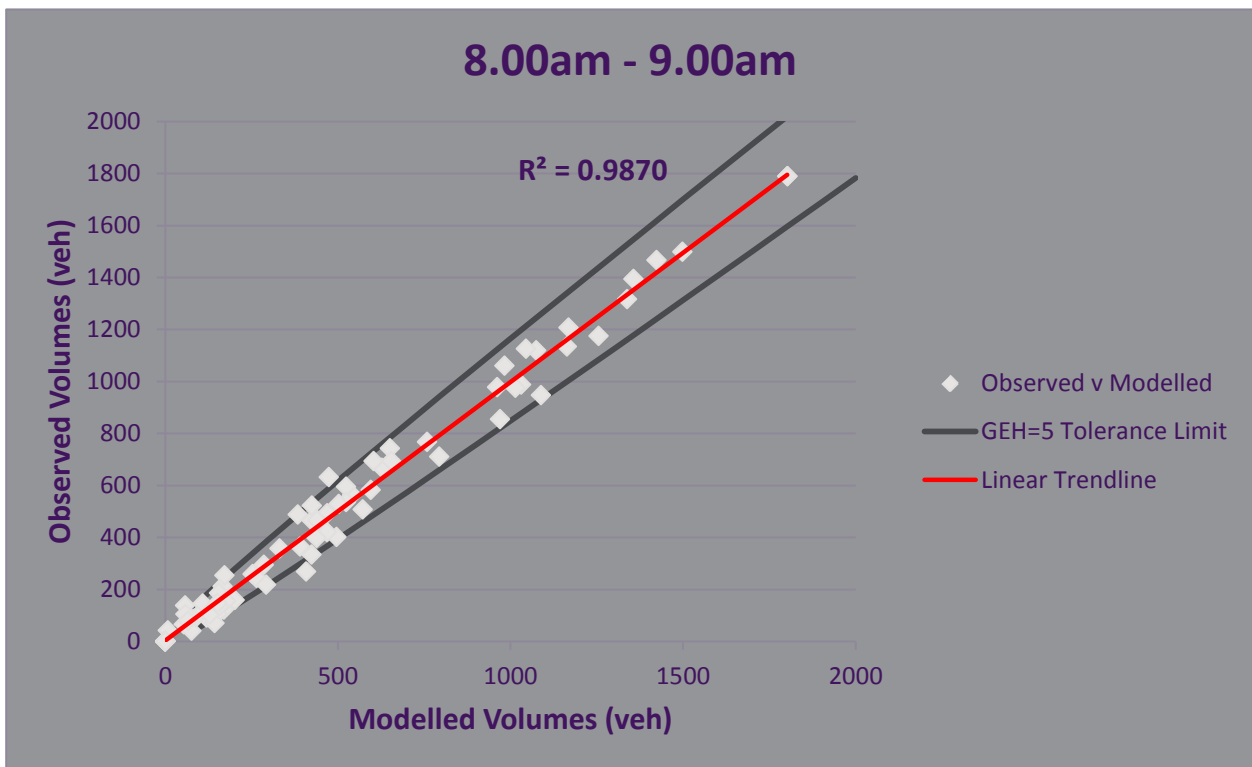


Figure 5-4: Scatter plot - PM Peak (3.00pm – 4.00pm)

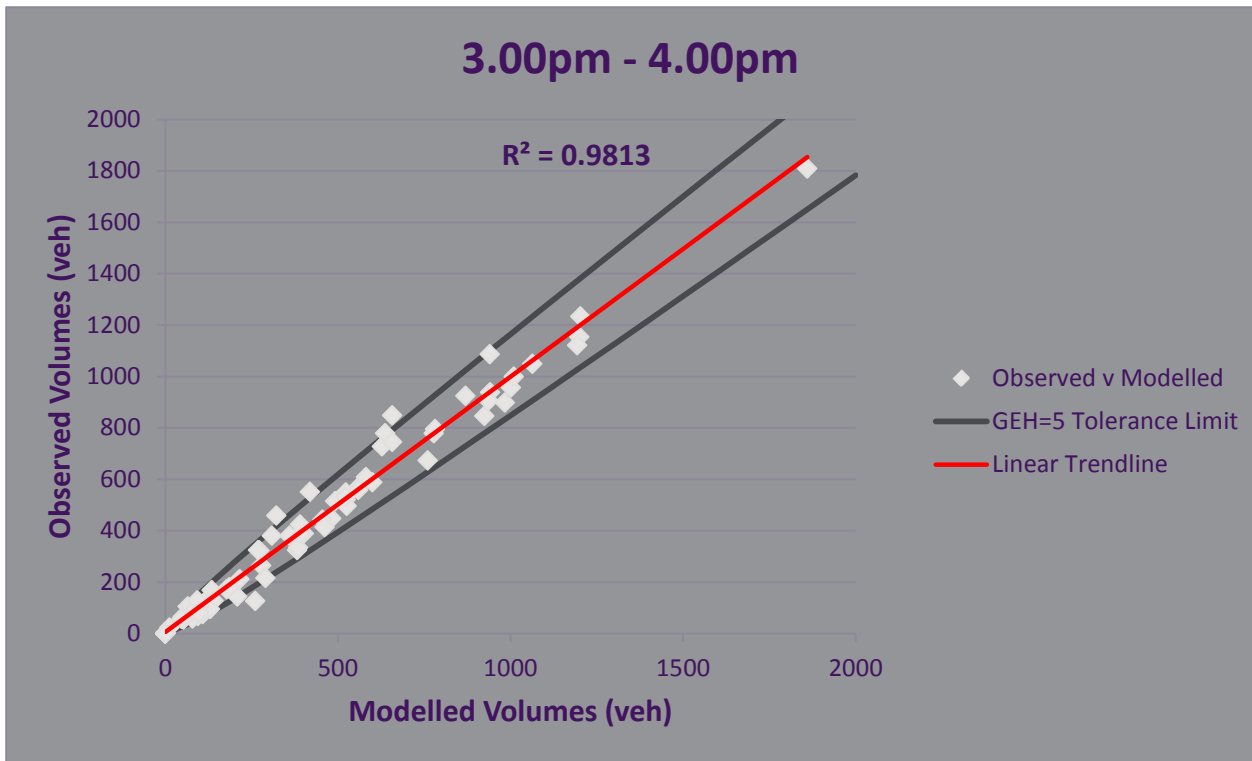


Figure 5-5: Scatter plot - PM Peak (4.00pm – 5.00pm)

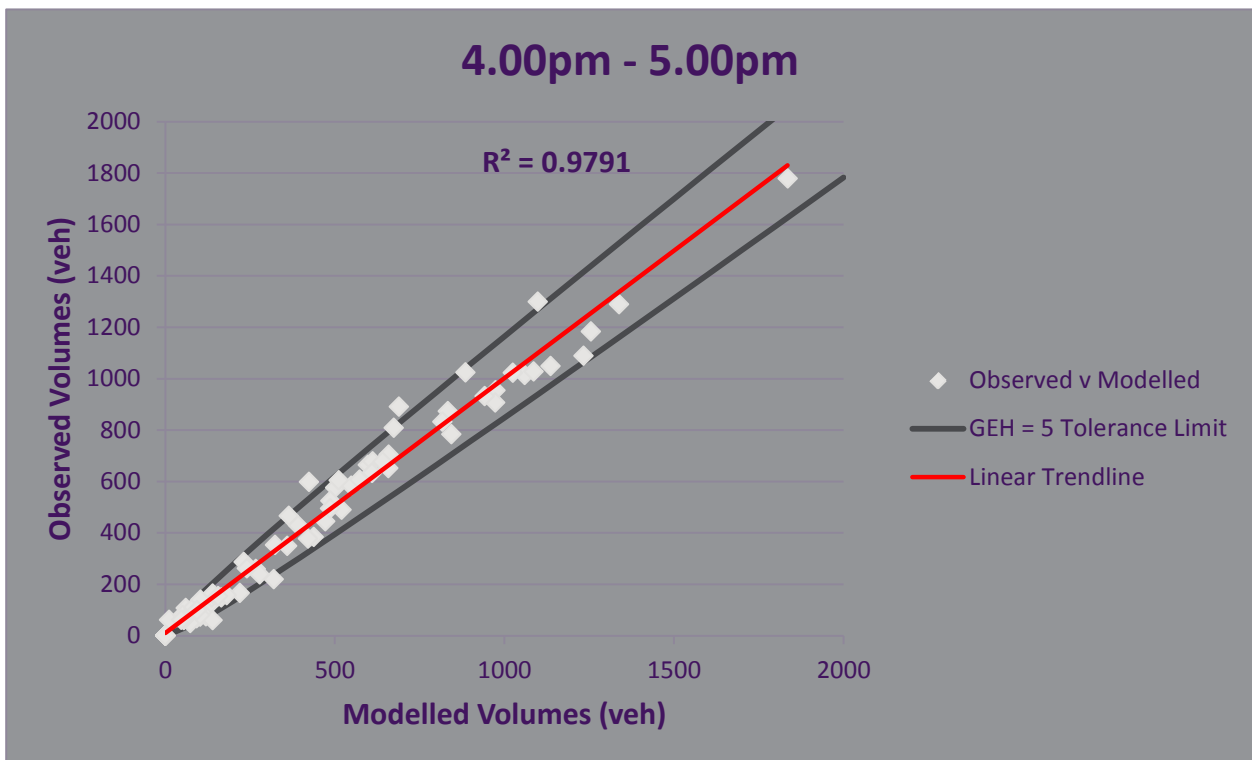
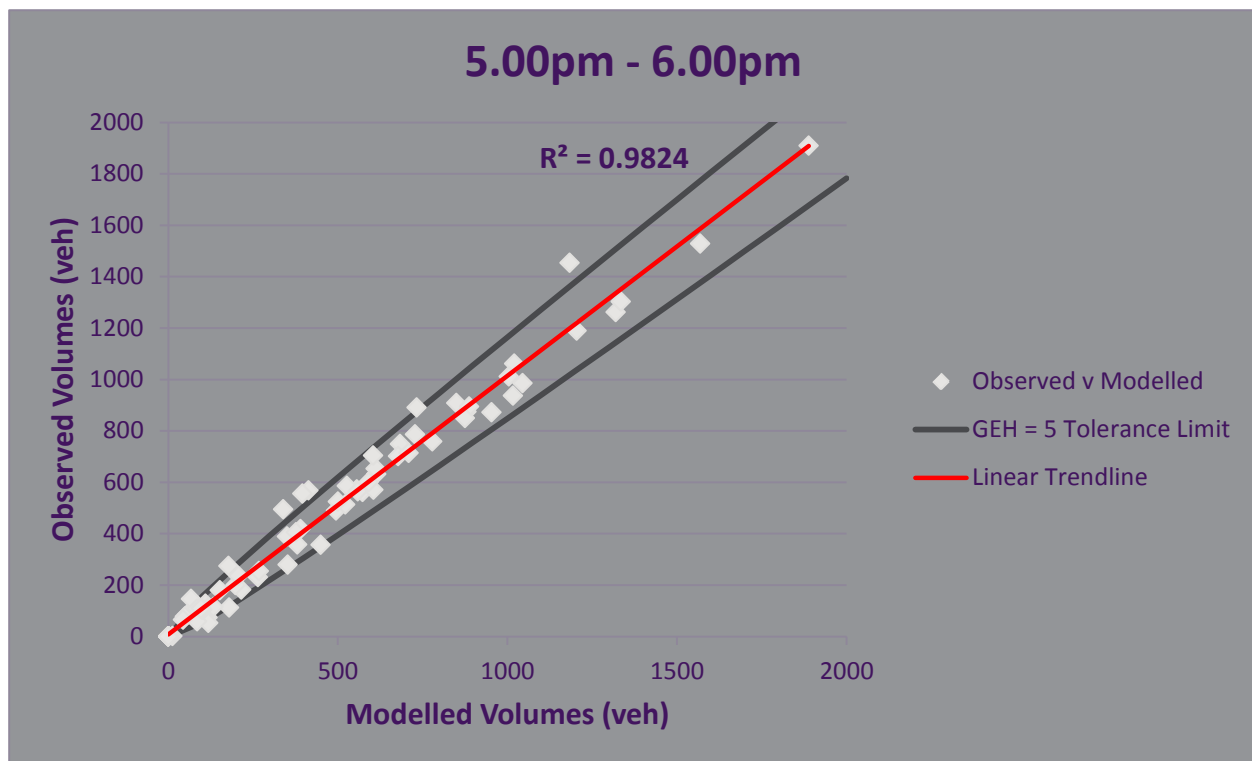


Figure 5-6: Scatter plot - PM Peak (5.00pm – 6.00pm)



### 5.3 Model Validation

Model validation has been undertaken in accordance with the RMS Paramics guidelines to confirm the model's credibility. It requires comparing the model results with independent observations recorded during surveys. The base model is validated on the following aspects:

- Travel time
- Hotspots

#### 5.3.1 Travel time

As described in Section 3.5, travel time surveys were completed by Jacobs SKM staff on 15<sup>th</sup> January 2014. As part of the survey, an average of two sets of travel time data was captured for each hour for each route. These were then converted to average allow for an easier comparison with modelled travel times.

The travel times from Austraffic completed on November 2011 (AM and PM peak) and January 2012 (PM peak) have also been included. Please note that no Austraffic travel time to/from Southern Cross Drive (eastbound / westbound traffic, north of Wentworth Avenue) is supplied and therefore no comparison for this location.

There is a strong overall correlation between most of the travel times. Routes where all three data sources are available show a close correlation.

Discrepancies are noted in routes which originate at zone 15 in the PM model. This accounts for all trips travelling southbound on Southern Cross Drive. Merging issues in the model are observed prior to the Mill Pond Road off ramp which was not observed during the site inspection.



**Table 5-5** and **Table 5-6** provides a summary of the AM and PM peak models ability to reflect observed and supplied travel time data and shows that all locations reach the desired level of accuracy for model validation.

Table 5.5: AM peak travel times comparison

Zones	6.00am - 7.00am				7.00am - 8.00am				8.00am - 9.00am			
	Observed	Austraffic	Modelled	Diff	Observed	Austraffic	Modelled	Diff	Observed	Austraffic	Modelled	Diff
12:7	0:03:05	0:02:40	0:02:58	-4%	0:03:11	0:02:49	0:03:13	1%	0:03:19	0:03:05	0:03:29	5%
7:12	0:02:49	0:02:30	0:02:30	-12%	0:04:49	0:03:12	0:03:43	-29%	0:02:46	0:03:49	0:03:36	23%
6:9	0:02:49	-	0:02:29	-13%	0:02:49	-	0:02:55	4%	0:03:32	-	0:04:13	16%
8:6	0:04:14	-	0:02:29	-70%	0:03:57	-	0:02:44	-45%	0:05:02	-	0:02:07	-137%
12:6	0:03:01	0:02:25	0:03:08	4%	0:04:00	0:02:40	0:03:25	-17%	0:03:29	0:02:53	0:03:45	7%
6:12	0:04:02	0:02:25	0:03:08	-29%	0:04:06	0:02:58	0:03:43	-10%	0:03:02	0:04:08	0:05:25	44%
4:6	0:03:11	0:03:31	0:03:36	12%	0:05:08	0:03:50	0:03:13	-60%	0:03:56	0:03:58	0:03:53	-1%
6:4	0:06:01	0:05:31	0:06:16	4%	0:04:35	0:03:12	0:03:57	-16%	0:05:26	0:03:40	0:04:46	-14%
4:9	0:04:41	-	0:04:11	-12%	0:04:15	-	0:03:55	-8%	0:04:21	-	0:04:58	12%
8:4	0:06:25	-	0:07:52	18%	0:05:59	-	0:06:02	1%	0:04:46	-	0:04:28	-7%

Table 5-6: PM peak travel times comparison

Zones	3.00pm - 4.00pm				4.00pm - 5.00pm				5.00pm - 6.00pm			
	Observed	Austraffic	Modelled	Diff	Observed	Austraffic	Modelled	Diff	Observed	Austraffic	Modelled	Diff
12:7	0:02:56	0:02:10	0:02:22	-24%	0:03:35	0:02:19	0:02:44	-31%	0:02:35	0:02:10	0:02:51	9%
7:12	0:02:11	0:02:55	0:02:21	7%	0:03:32	0:03:30	0:02:59	-18%	0:02:58	0:02:59	0:03:05	4%
6:9	0:02:59	-	0:02:06	-43%	0:03:39	-	0:02:52	-27%	0:03:27	-	0:04:13	18%
8:6	0:02:18	-	0:02:01	-14%	0:04:59	-	0:04:39	-7%	0:03:34	-	0:02:46	-29%
12:6	0:03:51	0:02:30	0:03:02	-27%	0:04:29	0:04:16	0:05:14	14%	0:03:09	0:02:51	0:03:48	17%
6:12	0:03:43	0:03:55	0:03:07	-19%	0:04:12	0:05:10	0:03:54	-8%	0:04:17	0:03:43	0:05:02	15%
4:6	0:03:23	0:03:45	0:03:12	-6%	0:03:55	0:08:33	0:04:55	20%	0:03:48	0:04:25	0:04:45	20%
6:4	0:04:43	0:03:50	0:03:14	-46%	0:04:29	0:05:50	0:03:30	-28%	0:03:48	0:04:13	0:04:30	16%
4:9	0:05:11	-	0:04:30	-15%	0:05:42	-	0:04:38	-23%	0:05:15	-	0:05:29	4%
8:4	0:05:12	-	0:04:38	-12%	0:04:07	-	0:04:17	4%	0:05:44	-	0:05:22	-7%

It is noted that some sections are above 20% of the observed travel time but majority are still within one and half minutes, and given that there is a limited number of travel times recorded for this route, it is considered appropriate. Overall travel time results demonstrate that both AM and PM base models accurately represent observed travel times.

### 5.3.2 Hot Spots

The Hotspot feature of Paramics provides a graphical representation of any significant queues which are forming throughout the simulation period. A comparison of these hotspots with observed conditions during the site inspection allows the model to be further validated across each hourly period.

#### AM Peak

Hotspots in the AM peak demonstrate that congestion in the AM model is consistent with observed conditions. Initial congestion between 6.00am–7.00am is observed on Joyce Drive as large vehicle volumes approach the domestic airport.

After this initial congestion it is observed that the major movement becomes northbound vehicles on General Holmes Drive turning right onto Mill Pond Road. Congestion remains consistent at this location for the entire AM period. Mild congestion is also observed on Wentworth Avenue from 7.00am onwards. This closely matches observations made during the site inspection.

Merging issues for westbound vehicles on Southern Cross Drive are observed throughout the AM model, particularly in the 7.00am–8.00am period.

The overall performance of the AM model closely resembles observed conditions in the study area.

Figure 5-7: Hotspots 6.00am - 7.00am



Figure 5-8: Hotspots 7.00am - 8.00am



Figure 5-9: Hotspots 8.00am - 9.00am



### PM Peak

Hotspots in the PM peak model closely resemble observed conditions in the study area. The major cause of delay in the network was observed to be large queues for southbound vehicles on Botany Road attempting to turn right into Mill Pond Road. These delays are also observed in the model for all 3 hourly periods. Between 4.00pm–5.00pm these delays are severe enough to cause delays on Wentworth Avenue for westbound vehicles.

In the last hourly period this congestion is not as severe although the other approaches to the Mill Pond Road/Botany Road/Southern Cross Drive intersection become slightly more congested.

Overall, the PM model is not as congested as the AM model which is consistent with observations made during the site inspection.

Figure 5-10: Hotspots 3.00pm - 4.00pm



Figure 5-11: Hotspots 4.00pm - 5.00pm



Figure 5-12: Hotspots 5.00pm - 6.00pm



## 5.4 Model stability

To test the stability and sensitivity of the model five different seed values have been run in the morning and evening peak. The results of the five seed values have been compared to understand the sensitivity of the model behaviour to changes in traffic volumes.

The RMS guide to Paramics micro-simulation modelling recommends that to test variability the seed values of 560, 28, 7771, 86524 and 2849 be used. These values have been adopted for this project.

The number of vehicles in the network across all time periods, for five seeds, was assessed and the results are displayed in **Figure 5-13** and **Figure 5-14**. The vehicle load during AM and PM peak models are consistent across different seed values, this implies that one seed value for the model run can be the representative of the general model run. On this basis, the peak hour models are considered stable and show the model remains robust under varying conditions, such that results from any one seed run are likely to be representative of the model in general.

Figure 5-13: AM stability check

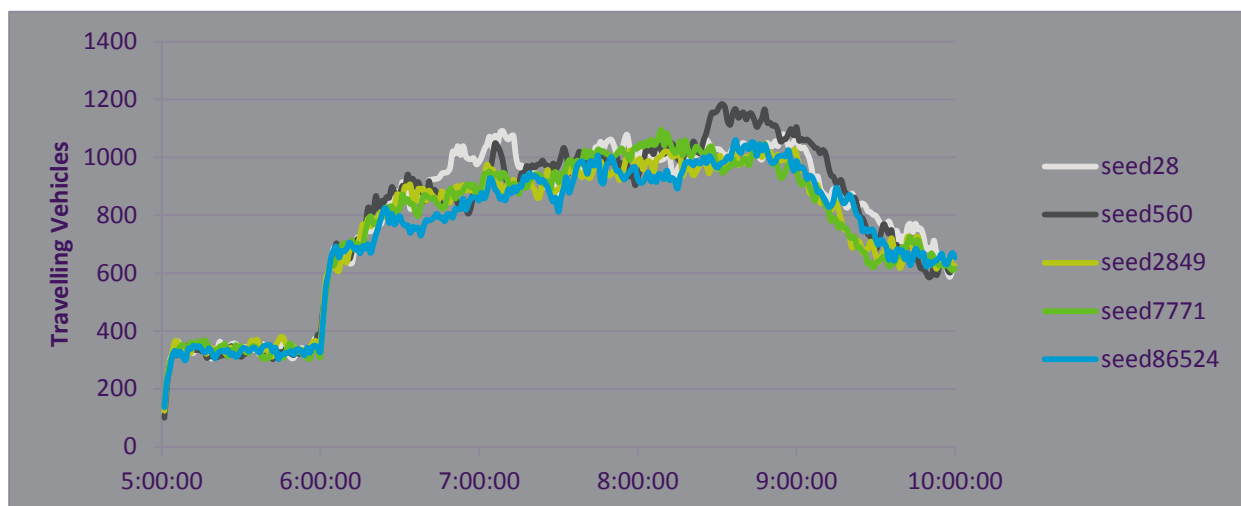
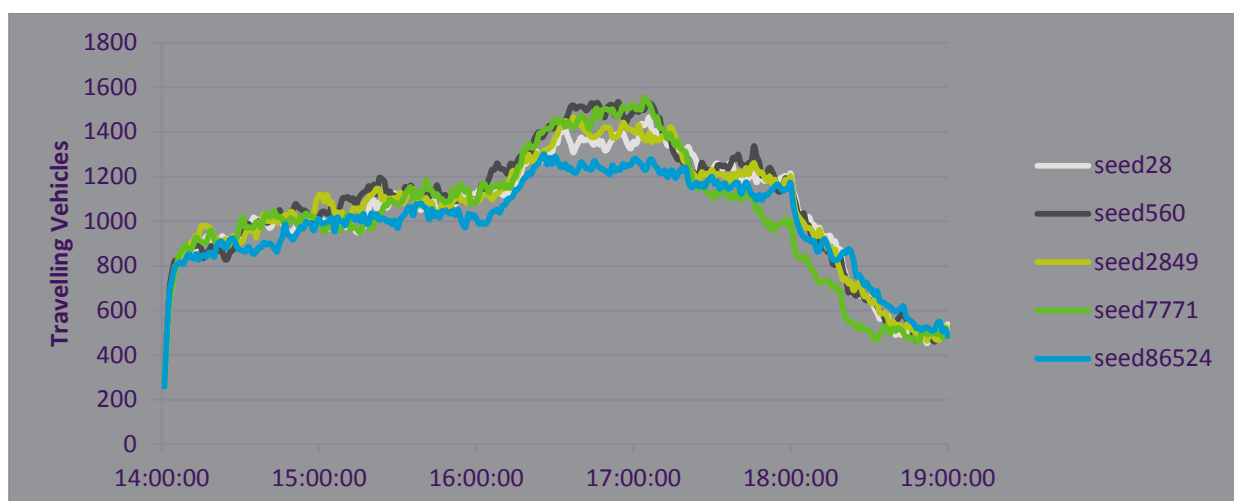


Figure 5-14: PM stability check



### 5.4.1 Demand release

Demand release is a validation indicator of the base model. **Table 5-7** presents the demand release percentages for both morning and evening peak periods.

Table 5-7: Percentage of unreleased vehicles in AM and PM peak base models

Seed Value	AM Peak (6.00am - 9.00am)			PM Peak (3.00pm - 6.00pm)		
	Total Released	Blocked	% Release Blocked	Total Released	Blocked	% Release Blocked
28	50,606	345	0.68%	53,355	738	1.36%
560	50,681	213	0.42%	53,469	595	1.10%
2849	50,529	360	0.71%	53,588	542	1.00%
7771	50,466	174	0.34%	53,468	560	1.04%
86524	50,290	137	0.27%	53,508	635	1.17%
<b>Average</b>	50,514	246	0.49%	53,478	614	1.15%

In both peak hour models, 0.5% in AM peak and 1.2% in PM peak were blocked and therefore, the demand releases are acceptable.

## 6. Conclusion

The key outcomes of the model development process, as documented in this report, are:

- The turn counts comparison meets the model calibration criteria specified by the RMS Traffic Modelling Guidelines in both AM and PM peaks.
- There is a strong overall correlation between most of the travel times. Routes where all three data sources are available show a particularly close correlation.
- Hotspots in both AM and PM peak demonstrate that congestion in the AM model is consistent with observed conditions.
- Model stability checks have shown that the level of congestion occurring at the airport precinct in both AM and PM peak periods are sensitive to changes in traffic behaviour. While the calibration and validation results demonstrate that the model reflects existing behaviour, this variability indicates a need for multiple seed value runs for future scenarios in order to test the reliability of the performance of each model.

Overall, it is concluded that the model appropriately reflects base year conditions and does provide a suitable basis for the development of future year models for performance assessment and staging testing.



## Appendix A. Configuration file

start time 05:00:00  
simulation time 05:00:00  
demand weight 100.0  
seed 560  
demand matrix tuning level 0  
generator 0  
loop length 4.500 m  
speed memory 3  
closest origin carpark disabled  
closest destination carpark disabled  
file time "-"  
curve speed factor 1.000  
amber time 4.000  
red time 5.000  
speed drift 1  
maximum diversion 300  
left hand drive  
units metric  
timestep detail 2  
mean headway 1.000  
mean reaction time 1.000  
gap 2.000 m  
cost coefficients 0.467, 0.283 mins per km, 0.417  
queue speed 7.200 kph  
queue distance 10.000 m  
weight heavy 3.000 tonne  
feedback 00:00:00  
feedback smoothing factor 0.500  
feedback decay factor 0.995  
perturbation enabled  
algorithm percentage  
base agent speed 1.300 mps  
base speed deviation 0.250 mps  
obstacle angle step 15  
obstacle max search angle 110  
agent demand factor 100.0  
scanarea factor 0.35

option 47  
option 48  
option 104  
option 107  
option 121

## **Appendix B. Traffic flow diagram**

# 2013 Turning Flows 6am-7am

TCS 591 O'Riordan St / Robey St

O'Riordan St (N)			Robey St (W)			O'Riordan St (S)			Robey St (E)		
L	T	R	L	T	R	L	T	R	L	T	R
60	603	279	627	122		50	1002		48	95	

TCS 575 Botany Rd / Robey St

Botany Rd (N)			Robey St (W)			Botany Rd (S)		
L	T	R	L	T	R	L	T	R
545	172	76	61	73	726			

TCS 3086 O'Riordan St / Joyce Dr / Qantas Dr / Sir Reginald Ansett Dr

O'Riordan St (N)			Qantas Dr (W)			S. R. A. Dr (S)			Joyce Dr (E)		
L	T	R	L	T	R	L	T	R	L	T	R
112	493		52	413	471	58	720	276	632	493	231

TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave

Joyce Dr (N)			R. S. Ave (W)			G. H. Dr (S)			G. H. Dr (E)		
L	T	R	L	T	R	L	T	R	L	T	R
165	688		60	75	97	536	1453	159	130	43	88

TCS 589 Botany Rd / General Holmes Dr

Botany Rd (N)			G. H. Dr (W)			Botany Rd (S)		
L	T	R	L	T	R	L	T	R
535	162	185	72	95	660			

TCS 574 Botany Rd / Wentworth Ave

Botany Rd (N)			Botany Rd (S)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
228	323		395	509	304	304		288

TCS 571 Wentworth Ave / Sutherland St

Sutherland St (N)			Wentworth Ave (W)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
65		65	70	699		574		159

TCS 1301 Wentworth Ave / Southern Cross Dr On Ramp

SCD On Ramp (N)			Wentworth Ave (W)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
			124	720		733		396

TCS 593 Wentworth Ave / Southern Cross Dr Off Ramp

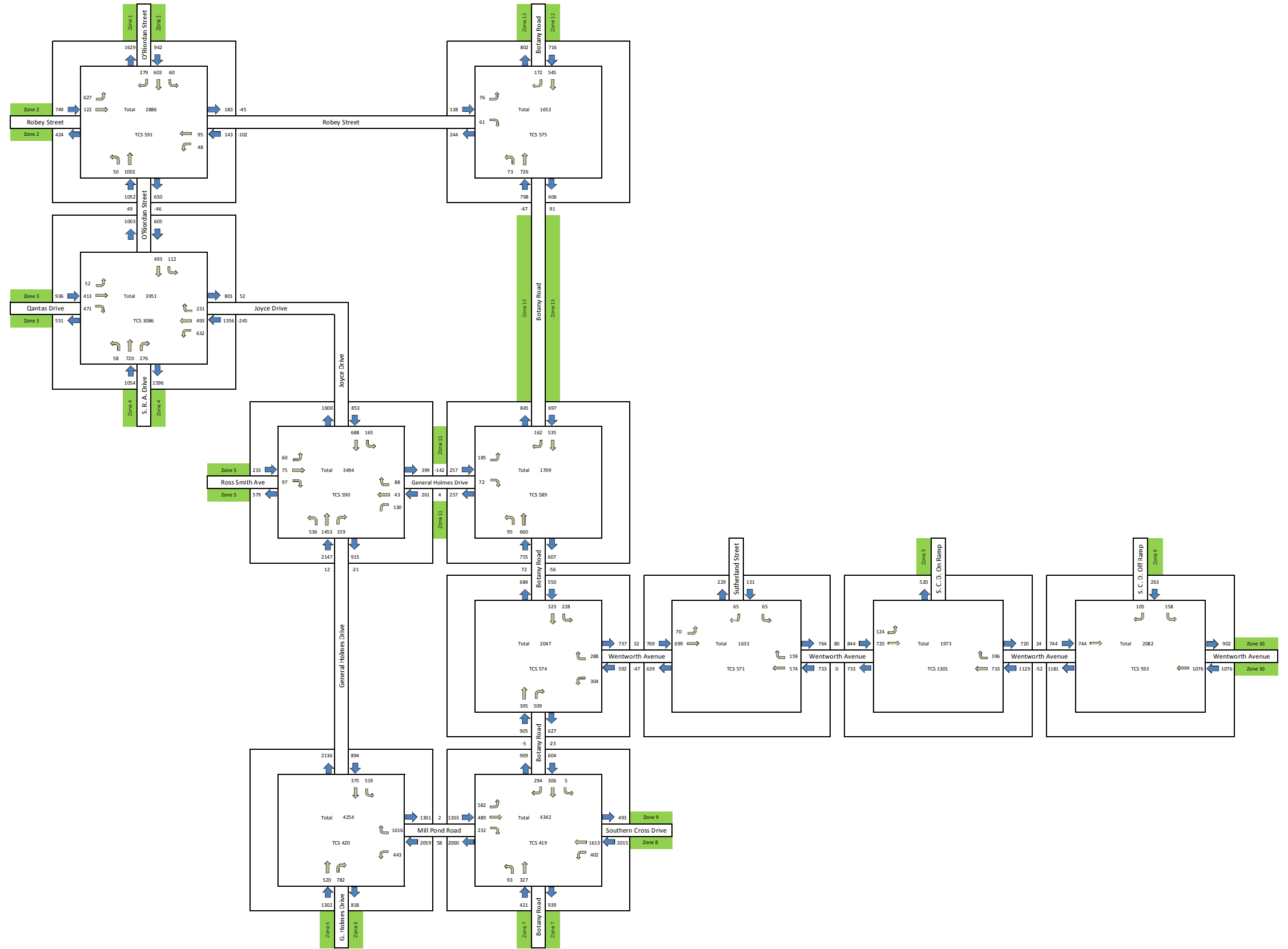
SCD Off Ramp (N)			Wentworth Ave (W)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
158		105	744			1076		

TCS 420 General Holmes Dr / Mill Pond Rd

G. H. Dr (N)			G. H. Dr (S)			Mill Pond Rd (E)		
L	T	R	L	T	R	L	T	R
519	375		520	782	443	402		1616

TCS 419 Botany Rd / Mill Pond Rd / Southern Cross Drive

Botany Rd (N)			Mill Pond Rd (W)			Botany Rd (S)			S. C. Dr (E)		
L	T	R	L	T	R	L	T	R	L	T	R
5	306	294	582	489	232	93	327		402	1613	



### 2013 Turning Flows 7am-8am

**TCS 393 O'Harden St / Robey St**

O'Harden St (N)		Robey St (N)		O'Harden St (S)		Robey St (S)		
L	T	R	L	T	R	L	T	
69	687	413	995	228	53	3056	60	120

**TCS 575 Robey Rd / Robey St**

Robey Rd (N)		Robey St (N)		Robey Rd (S)	
T	R	L	R	L	T
687	304	236	93	115	1147

**TCS 3086 O'Harden St / Joyce Dr / Qantas Dr / St Reginald Assent Dr**

O'Harden St (N)		Qantas Dr (N)		S. R. A. Dr (S)		Joyce Dr (S)				
L	T	R	L	T	R	L	T			
149	495	102	649	667	60	530	318	578	608	409

**TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave**

Joyce Dr (N)		S. S. Ave (N)		G. H. Dr (S)		G. H. Dr (E)				
L	T	R	L	T	R	L	T			
167	1096	70	88	113	373	1652	205	111	53	108

**TCS 589 Robey Rd / General Holmes Dr**

Robey Rd (N)		G. H. Dr (N)		Robey Rd (S)	
T	R	L	R	L	T
655	211	322	73	342	982

**TCS 574 Robey Rd / Wentworth Ave**

Robey Rd (N)		Robey Rd (S)		Wentworth Ave (E)			
L	T	R	L	T	R		
296	420			607	746	435	342

**TCS 573 Wentworth Ave / Sutherland St**

Sutherland St (N)		Wentworth Ave (N)		Wentworth Ave (E)			
L	R	L	T	R	L	T	R
106	106	88	878			717	513

**TCS 1883 Wentworth Ave / Southern Cross Dr On Ramp**

SCD On Ramp (N)		Wentworth Ave (N)		Wentworth Ave (E)			
L	T	R	L	T	R		
		209	916			3070	605

**TCS 599 Wentworth Ave / Southern Cross Dr Off Ramp**

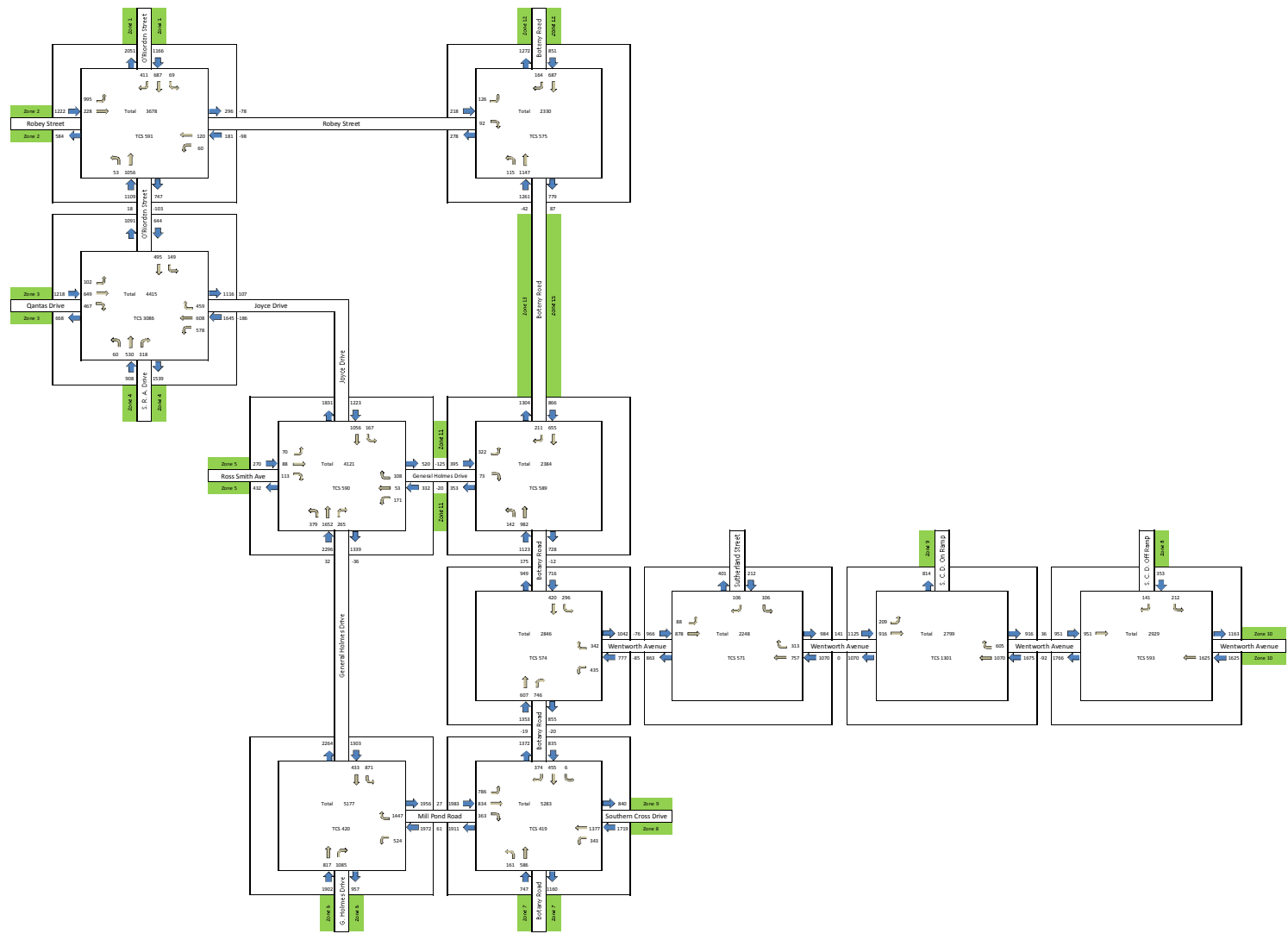
SCD Off Ramp (N)		Wentworth Ave (N)		Wentworth Ave (E)			
L	R	T	L	T	R		
212	141	991				3025	

**TCS 420 General Holmes Dr / Mill Pond Rd**

G. H. Dr (N)		G. H. Dr (S)		Mill Pond Rd (E)			
L	T	R	L	T	R		
871	433			817	3095	524	1467

**TCS 419 Robey Rd / Mill Pond Rd / Southern Cross Drive**

Robey Rd (N)		Mill Pond Rd (N)		Robey Rd (S)		S. C. Dr (E)			
L	R	L	R	L	T	L	T		
6	455	311	786	834	363	161	564	343	1377



2013 Turning Flows 8am-9am

TCS 991 O'Harden St / Robey St

O'Harden St (N)		Robey St (W)		O'Harden St (S)		Robey St (E)		
L	T	R	L	T	R	L	T	
65	654	390	1045	292	58	1163	70	551

TCS 575 Robey Rd / Robey St

Robey Rd (W)		Robey St (N)		Robey Rd (E)	
T	R	L	R	L	T
759	221	256	120	143	1433

TCS 3086 O'Harden St / Joyce Dr / Qantas Dr / St Reginald Assent Dr

O'Harden St (N)		Qantas Dr (W)		S. R. A. Dr (S)		Joyce Dr (E)				
L	T	L	T	L	T	L	T			
171	440	157	572	438	83	468	524	424	303	604

TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave

Joyce Dr (W)		R. S. Ave (W)		G. H. Dr (S)		G. H. Dr (E)				
L	T	L	T	L	T	L	T			
151	1205	74	93	120	286	1498	408	170	51	108

TCS 589 Robey Rd / General Holmes Dr

Robey Rd (W)		G. H. Dr (W)		Robey Rd (E)	
T	R	L	R	L	T
759	201	424	58	309	1168

TCS 574 Robey Rd / Wentworth Ave

Robey Rd (W)		Robey Rd (E)		Wentworth Ave (E)			
L	T	L	T	L	R		
331	469			651	961	523	474

TCS 572 Wentworth Ave / Sutherland St

Sutherland St (W)		Wentworth Ave (W)		Wentworth Ave (E)		
L	R	L	T	L	R	
181	181	106	3084		924	434

TCS 1383 Wentworth Ave / Southern Cross Dr On Ramp

SCD On Ramp (N)		Wentworth Ave (W)		Wentworth Ave (E)		
L	T	L	T	L	R	
		172	1283		1338	573

TCS 559 Wentworth Ave / Southern Cross Dr Off Ramp

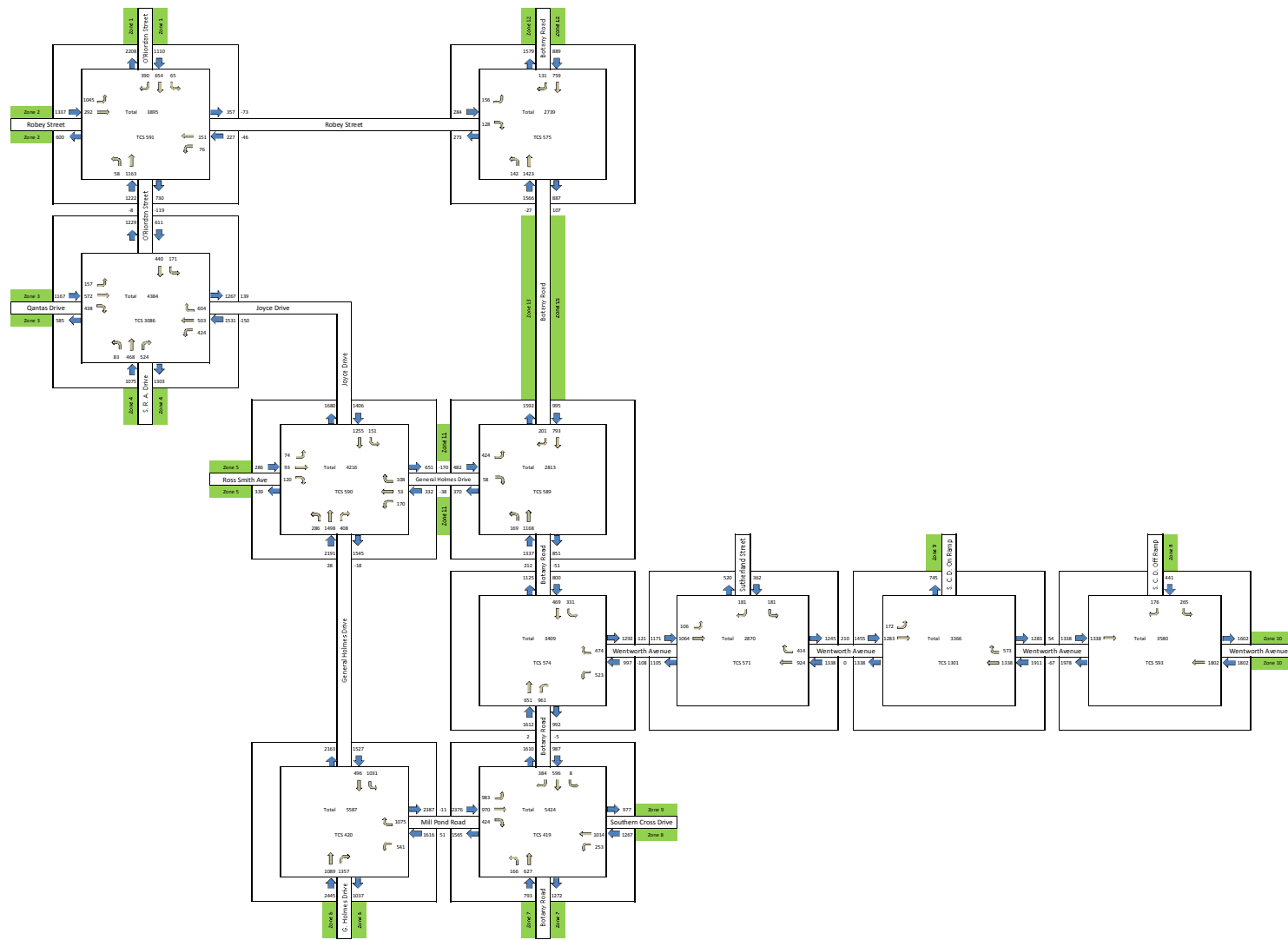
SCD Off Ramp (N)		Wentworth Ave (W)		Wentworth Ave (E)	
L	R	L	T	L	T
265	174		5338		3802

TCS 420 General Holmes Dr / Mill Pond Rd

G. H. Dr (N)		G. H. Dr (S)		Mill Pond Rd (E)		
L	T	L	T	L	R	
1011	496		1089	1337	541	1075

TCS 419 Robey Rd / Mill Pond Rd / Southern Cross Drive

Robey Rd (W)		Mill Pond Rd (W)		Robey Rd (E)		S. C. Dr (E)			
L	R	L	R	L	T	L	T		
8	190	381	181	970	421	156	627	263	1014



2013 Turning Flows 3pm-4pm

TCS 393 O'Meara St / Robey St

O'Meara St (N)		Robey St (W)		O'Meara St (S)		Robey St (E)	
L	T	R	L	T	R	L	T
98	584	522	359	97	47	937	93

TCS 575 Robey Rd / Robey St

Robey Rd (W)			Robey St (E)		
T	R	L	T	R	L
940	204	54	85	87	830

TCS 3086 O'Meara St / Joyce Dr / Qantas Dr / St Reginald Assent Dr

O'Meara St (N)		Qantas Dr (W)		S. R. A. Dr (S)		Joyce Dr (E)	
L	T	R	L	T	R	L	T
321	539	53	268	461	78	599	523

TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave

Joyce Dr (N)		R. S. Ave (W)		G. H. Dr (S)		G. H. Dr (E)	
L	T	R	L	T	R	L	T
130	1202	86	301	225	278	1200	109

TCS 589 Robey Rd / General Holmes Dr

Robey Rd (W)			G. H. Dr (W)			Robey Rd (E)		
T	R	L	T	R	L	T	R	L
782	462	178	65	209	244			

TCS 574 Robey Rd / Wentworth Ave

Robey Rd (W)			Robey Rd (E)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
309	523					455	657	828

TCS 572 Wentworth Ave / Sutherland St

Sutherland St (N)			Wentworth Ave (W)			Wentworth Ave (E)		
L	T	R	L	T	R	L	T	R
210	210	89	892			929	940	

TCS 1883 Wentworth Ave / Southern Cross Dr On Ramp

SCD On Ramp (N)		Wentworth Ave (W)		Wentworth Ave (E)	
L	T	L	T	L	T
		244	1150		1270

TCS 559 Wentworth Ave / Southern Cross Dr Off Ramp

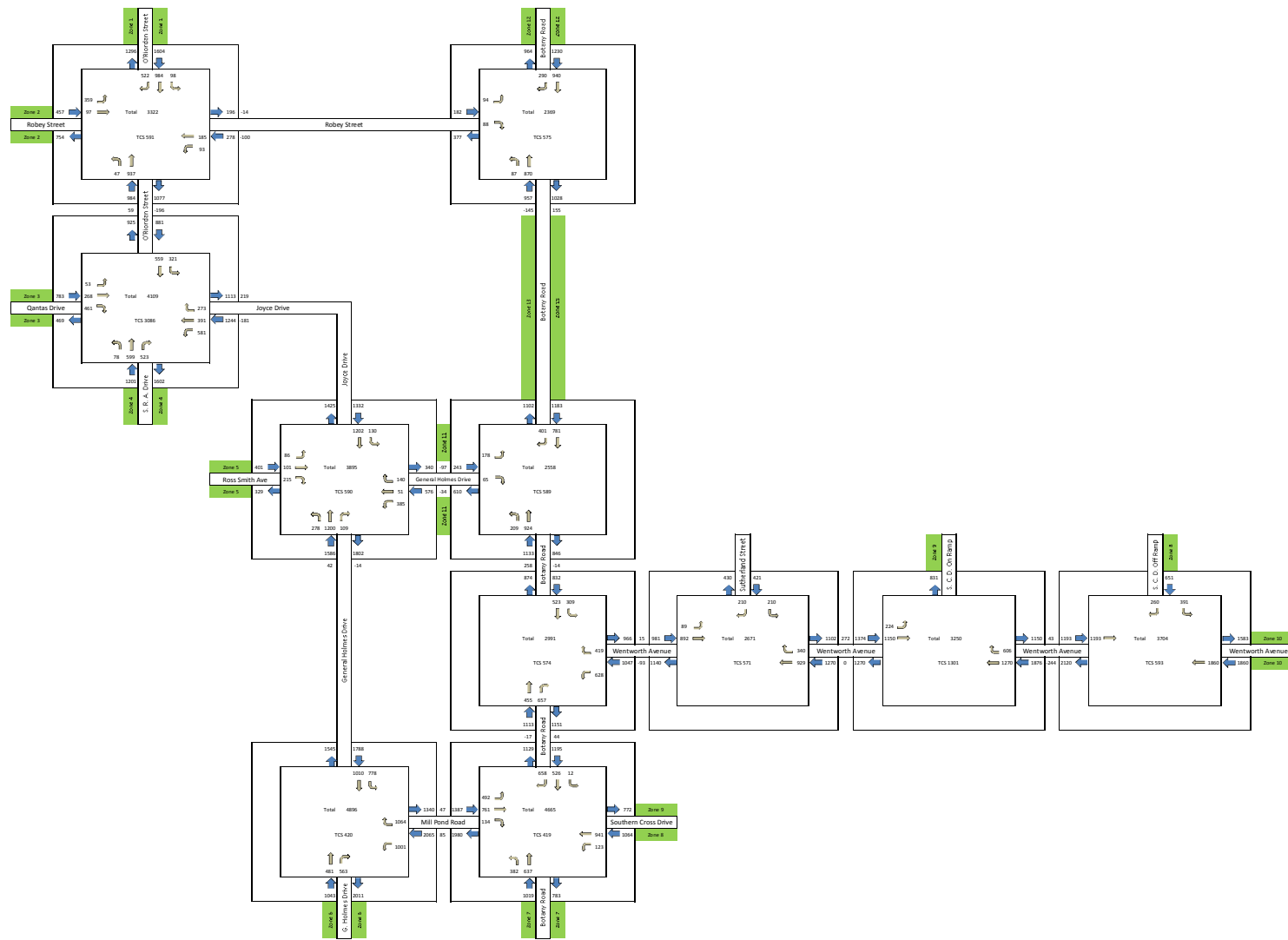
SCD Off Ramp (N)		Wentworth Ave (W)		Wentworth Ave (E)	
L	T	L	T	L	T
391	204		1195		1060

TCS 428 General Holmes Dr / Mill Pond Rd

G. H. Dr (N)		G. H. Dr (S)		Mill Pond Rd (E)	
L	T	L	T	L	R
778	1050			481	563

TCS 419 Robey Rd / Mill Pond Rd / Southern Cross Drive

Robey Rd (W)		Mill Pond Rd (W)		Robey Rd (E)		S. C. Dr (E)	
L	T	L	T	L	T	L	T
12	526	428	463	743	134	382	637



2013 Turning Flows 4pm-5pm

TCS 991 O'Harden St / Robby St

O'Harden St (W)		Robby St (W)		O'Harden St (E)		Robby St (E)		
L	T	R	L	T	R	L	T	
102	1025	645	359	93	47	941	139	278

TCS 575 Robby Rd / Robby St

Robby Rd (W)		Robby St (W)		Robby Rd (E)	
T	R	L	R	L	T
1008	328	52	83	89	885

TCS 3086 O'Harden St / Joyce Dr / Qantas Dr / St Reginald Assent Dr

O'Harden St (W)		Qantas Dr (W)		S. R. A. Dr (E)		Joyce Dr (E)				
L	T	R	L	T	R	L	T			
364	572	55	240	421	74	637	613	610	393	231

TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave

Joyce Dr (W)		R. S. Ave (W)		G. H. Dr (E)		G. H. Dr (E)				
L	T	R	L	T	R	L	T			
120	1338	72	85	182	267	1233	103	466	51	139

TCS 589 Robby Rd / General Holmes Dr

Robby Rd (W)		G. H. Dr (W)		Robby Rd (E)	
T	R	L	R	L	T
837	503	105	62	220	973

TCS 574 Robby Rd / Wentworth Ave

Robby Rd (W)		Robby Rd (E)		Wentworth Ave (E)		
L	T	R	L	T	R	
324	548		487	689	832	423

TCS 575 Wentworth Ave / Sutherland St

Sutherland St (W)		Wentworth Ave (W)		Wentworth Ave (E)			
L	R	L	T	R	L	T	R
191	136	95	948		914	936	

TCS 1883 Wentworth Ave / Southern Cross Dr On Ramp

SCD On Ramp (W)		Wentworth Ave (W)		Wentworth Ave (E)		
L	T	R	L	T	R	
		279	1206		1251	608

TCS 559 Wentworth Ave / Southern Cross Dr Off Ramp

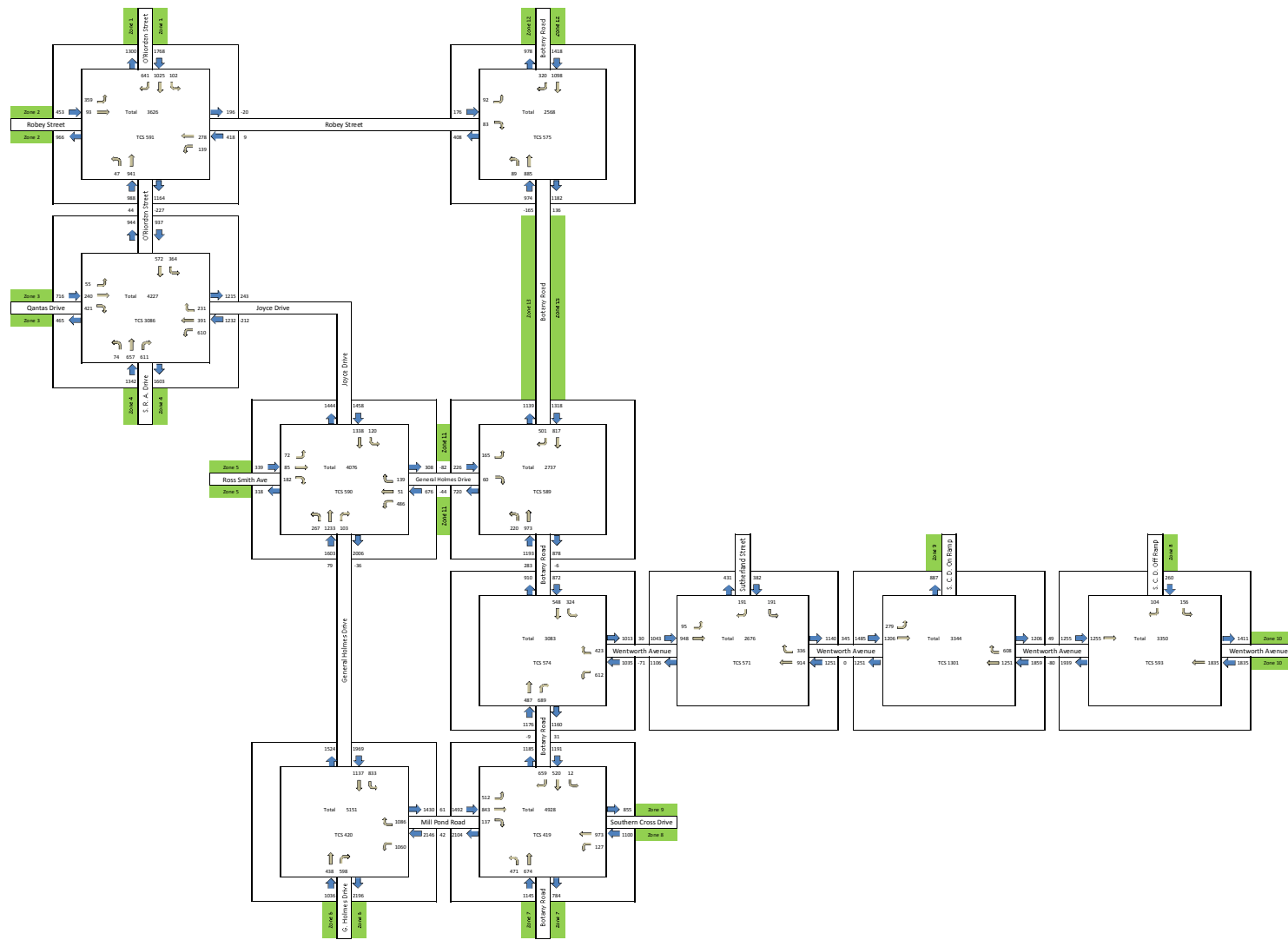
SCD Off Ramp (W)		Wentworth Ave (W)		Wentworth Ave (E)		
L	R	T	L	T	R	
358	324	104	525		385	

TCS 420 General Holmes Dr / Mill Pond Rd

G. H. Dr (W)		G. H. Dr (E)		Mill Pond Rd (E)		
L	T	R	L	T	R	
833	1137		438	538	1050	1086

TCS 419 Robby Rd / Mill Pond Rd / Southern Cross Drive

Robby Rd (W)		Mill Pond Rd (W)		Robby Rd (E)		S. C. Dr (E)			
L	T	R	L	T	R	L	T		
12	520	450	152	843	133	471	674	127	473



### 2013 Turning Flows 5pm-6pm

**TCS 291 O'Harden St / Robey St**

O'Harden St (N)		Robey St (N)		O'Harden St (S)		Robey St (S)	
L	T	R	L	T	R	L	T
100	504	709	376	97	44	874	113
						207	

**TCS 575 Robey Rd / Robey St**

Robey Rd (N)		Robey St (N)		Robey Rd (S)	
T	R	L	R	L	T
1183	351	107	85	89	887

**TCS 3086 O'Harden St / Joyce Dr / Qantas Dr / St Reginald Assent Dr**

O'Harden St (N)		Qantas Dr (N)		S. R. A. Dr (S)		Joyce Dr (S)	
L	T	R	L	T	R	L	T
396	559	49	350	380	85	591	678
						550	

**TCS 590 General Holmes Dr / Joyce Dr / Ross Smith Ave**

Joyce Dr (N)		R. S. Ave (N)		G. H. Dr (S)		G. H. Dr (E)	
L	T	R	L	T	R	L	T
116	1568	79	93	128	204	1026	128
						608	

**TCS 588 Robey Rd / General Holmes Dr**

Robey Rd (N)		G. H. Dr (N)		Robey Rd (S)	
T	R	L	R	L	T
849	611	179	67	215	951

**TCS 574 Robey Rd / Wentworth Ave**

Robey Rd (N)		Robey Rd (S)		Wentworth Ave (E)	
L	T	R	L	T	R
338	573			495	732
				604	

**TCS 572 Wentworth Ave / Sutherland St**

Sutherland St (N)		Wentworth Ave (N)		Wentworth Ave (E)	
L	R	L	T	R	L
186	186	101	1000		912
				951	

**TCS 1283 Wentworth Ave / Southern Cross Dr On Ramp**

SCD On Ramp (N)		Wentworth Ave (N)		Wentworth Ave (E)	
L	T	R	L	T	R
			312	1289	
				1289	

**TCS 559 Wentworth Ave / Southern Cross Dr Off Ramp**

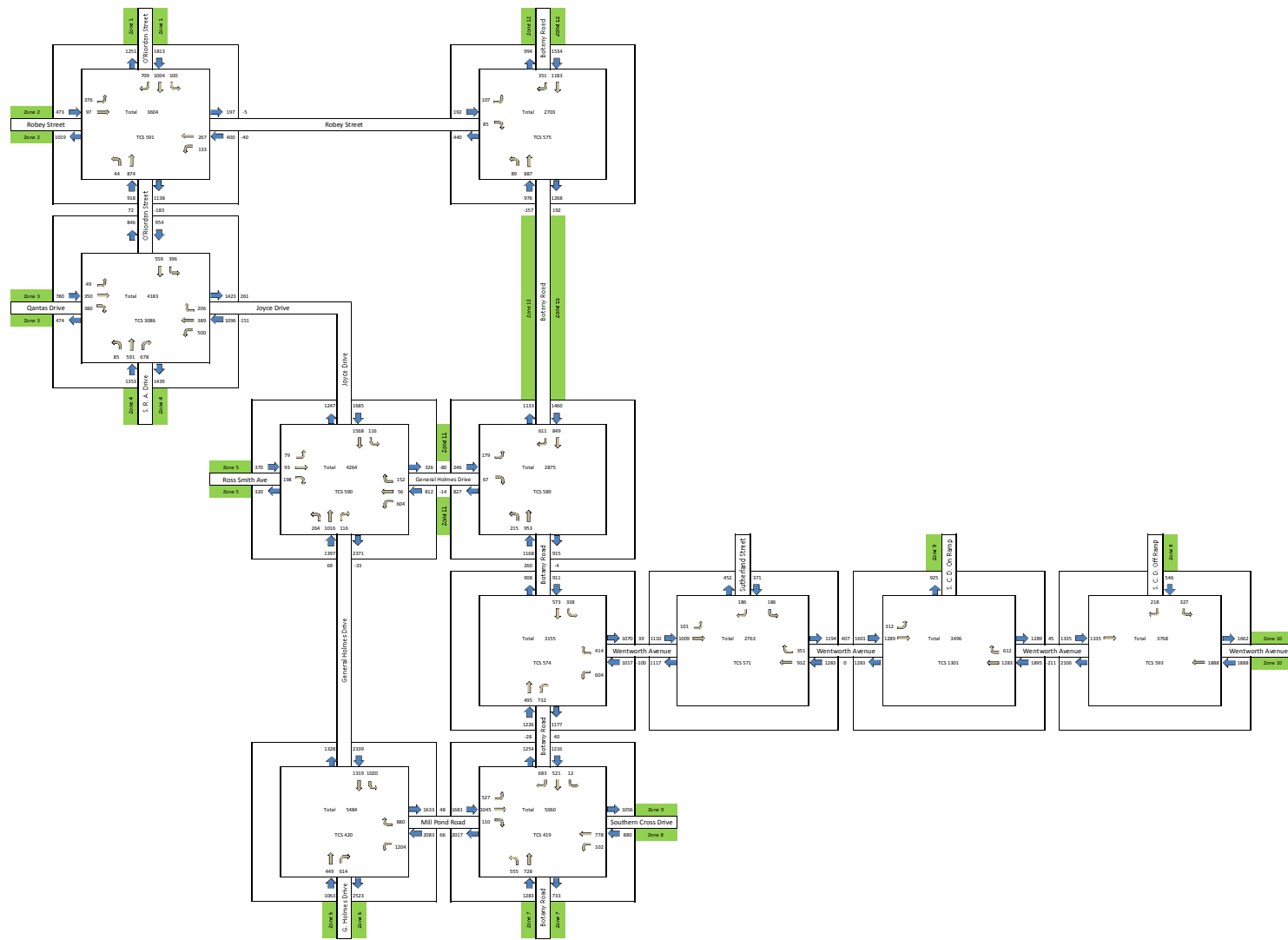
SCD Off Ramp (N)		Wentworth Ave (N)		Wentworth Ave (E)	
L	T	R	L	T	R
287		218		1315	
				1088	

**TCS 428 General Holmes Dr / Mill Pond Rd**

G. H. Dr (N)		G. H. Dr (S)		Mill Pond Rd (E)	
L	T	R	L	T	R
1020	1335			499	614
				1204	

**TCS 419 Robey Rd / Mill Pond Rd / Southern Cross Drive**

Robey Rd (N)		Mill Pond Rd (N)		Robey Rd (S)		S. C. Dr (E)	
L	T	R	L	T	R	L	T
12	521	681	527	1040	110	376	724
						302	





## **Appendix C. AM peak calibration statistics**

Seed 86524 6am-7am

Obs Turning Counts    Modelled Turning Counts    Obs Approach Vol    Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		6:00:00	6:00:00	Difference	% Difference	GEH Statistic
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	520	466	1302	1196	0	0%	0.0		
			NB	Right	388	420	420a	388:420:420a	782	730			54	10%	2.4		
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	443	338	2059	2061	52	7%	1.9		
			WB	Through	392	420	390	392:420:390	1616	1723			105	24%	5.3		
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	519	484	894	834	0	0%	0.0		
			SB	Through	398	420	420b	398:420:420b	375	350			25	7%	1.3		
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Through	441	446	442	441:446:442	95	129	755	641	0	0%	0.0		
			NB	Right	433	589	589a	433:589:589a	660	512			-34	-35%	3.2		
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	185	197	257	353	0	0%	0.0		
			EB	Through	446	589	433	446:589:433	72	156			-12	-6%	0.9		
		Botany Rd	SB	Left	449	589	433	449:589:433	535	555	697	660	0	0%	0.0		
			SB	Right	589a	589	446	589a:589:446	162	105			-4	-4%	0.6		
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	304	340	592	652	0	0%	0.0		
			WB	Right	436	574	433	436:574:433	288	312			-36	-12%	2.0		
		Botany Rd	SB	Left	433	438	436	433:438:436	228	277	950	703	-24	-8%	1.4		
			SB	Through	433	574	574a	433:574:574a	323	426			-49	-22%	3.1		
		Botany Rd	NB	Through	431	574	433	431:574:433	395	338	905	784	-103	-32%	5.3		
			NB	Right	574a	574	436	574a:574:436	509	446			57	15%	3.0		
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	93	136	421	436	63	12%	2.9		
			NB	Through	418	419	419b	418:419:419b	327	300			-43	-40%	4.0		
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	402	383	2015	2044	0	0%	0.0		
			WB	Through	422	419	382	422:419:382	1613	1691			49	12%	2.5		
		Botany Rd	WB	Right	414	417	416	414:417:416	5	43	604	754	-78	-5%	1.9		
			SB	Left	417	419	418	417:419:418	306	442			-38	-835%	7.9		
Mill Pond Rd	SB	Right	419b	419	382	419b:419:382	294	289	1303	1130	-136	-45%	7.1				
	EB	Left	419a	406	419b	419a:406:419b	582	465			25	8%	1.5				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	536	530	2147	2107	0	0%	0.0		
			NB	Through	453	590	451	453:590:451	1453	1450			32	20%	2.6		
		General Holmes Dr	NB	Right	395	590	443	395:590:443	159	127	261	218	82	63%	8.7		
			WB	Left	445	399	395	445:399:395	130	48			-36	-83%	4.6		
		Joyce Dr	WB	Through	443	590	468	443:590:468	43	79	853	879	-3	-4%	0.4		
			WB	Right	443	590	451	443:590:451	38	51			14	9%	1.1		
Ross Smith Ave	SB	Left	450	450	443	450:450:443	185	151	233	174	-40	-8%	1.5				
	SB	Through	450	590	395	450:590:395	688	728			0	0%	0.0				
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	73	35	798	706	19	32%	2.7		
			NB	Through	558	575	472	558:575:472	728	671			0	0%	0.0		
		Robey St	SB	Through	472	575	558	472:575:558	545	607	138	135	-62	-11%	2.6		
			SB	Right	472	575	905	472:575:905	172	117			55	32%	4.5		
		Botany Rd	EB	Left	905	575	472	905:575:472	76	80	1076	1047	-4	-5%	0.4		
			EB	Right	905	575	558	905:575:558	61	55			6	10%	0.8		
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1076	1047	263	260	29	3%	0.9		
			WB	Right	47	34	53	47:34:53	158	162			0	0%	0.0		
		Southern Cross Dr	SB	Left	41	29	18	41:29:18	105	98	744	704	-5	-3%	0.4		
			SB	Right	18	29	34	18:29:34	744	704			7	7%	0.7		
		Wentworth Ave	EB	Left	18	29	34	18:29:34	744	704	1054	1103	40	5%	1.5		
			EB	Through	22	23	26	22:23:26	58	79			-21	-36%	2.5		
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	3086a	3086	20	3086a:3086:20	720	714	1356	1486	6	1%	0.2		
			NB	Right	3086a	3086	35	3086a:3086:35	276	310			-34	-12%	2.0		
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	632	747	605	618	-115	-18%	4.4		
			WB	Through	12	3086	26	12:3086:26	493	437			56	11%	2.6		
		O'Riordan St	WB	Right	35	3086	20	35:3086:20	231	302	936	968	-71	-31%	4.3		
			SB	Left	36	37	35	36:37:35	112	153			-41	-37%	3.8		
Qantas Dr	SB	Through	19	3086	3086a	19:3086:3086a	493	465	1052	1095	28	6%	1.3				
	SB	Right	30	31	20	30:31:20	52	77			0	0%	0.0				
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	471	469	143	151	-2	0%	0.1		
			NB	Through	57	591	591a	57:591:591a	50	67			-17	-34%	2.2		
		Robey St	WB	Left	48	49	19	48:49:19	1002	1028	942	942	26	3%	0.8		
			WB	Through	48	591	54	48:591:54	48	32			-26	-3%	0.8		
		O'Riordan St	WB	Right	43	44	45	43:44:45	60	43	749	774	0	0%	0.0		
			SB	Through	43	591	49	43:591:49	603	590			17	29%	2.4		
Robey St	SB	Right	591a	591	54	591a:591:54	279	309	1076	1047	13	2%	0.5				
	EB	Left	50	52	591a	50:52:591a	627	682			-30	-11%	1.7				
Robey St	EB	Through	50	591	44	50:591:44	122	92	88.3%	89.3%	-55	-9%	2.1				
	EB	Right	50	591	44	50:591:44	122	92			30	25%	2.9				

Criteria for acceptable model performance

- a) Links with difference in flow within 100 vph for flows <700 vph
- Links with difference in flow within 15% for flows 700 - 1700 vph
- Links with difference in flow within 400 vph for flows >1700 vph

b) Links with GEH Statistic < 5

- Links with GEH Statistic b/w 5 and 10
- Links with GEH statistic > 10

69	82%
11	13%
0	0%

89.3%

10.7%

0.0%

Seed 86524 7am-8am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		7:00:00	7:00:00	Difference	% Difference	GEH Statistic
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	817	741	1902	1797	0	0%	0.0		
			NB	Right	388	420	420a	388:420:420a	1085	1056			76	9%	2.7		
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	524	508	16	3%	0.7				
			WB	Through	392	420	390	392:420:390	1447	1494	-47	-3%	1.2				
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	871	896	-26	-3%	2.5				
			SB	Through	398	420	420b	398:420:420b	433	382	51	12%	2.5				
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Through	441	446	442	441:446:442	142	139	1123	1199	3	2%	0.2		
			NB	Right	433	589	589a	433:589:589a	982	1060			-78	-8%	2.5		
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	322	336	-14	-4%	0.8				
			EB	Through	446	589	433	446:589:433	73	138	-65	-90%	6.4				
		Botany Rd	SB	Left	449	589	433	449:589:433	855	681	174	25%	3.7				
			SB	Right	589a	589	446	589a:589:446	211	162	49	23%	3.6				
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	435	542	777	1132	-107	-24%	4.8		
			WB	Right	436	574	433	436:574:433	342	590			-248	-73%	11.5		
		Botany Rd	SB	Left	433	438	436	433:438:436	296	411	-115	-39%	6.1				
			SB	Through	433	574	574a	433:574:574a	420	410	10	2%	0.5				
		Botany Rd	NB	Through	431	574	433	431:574:433	607	620	-13	-2%	0.5				
			NB	Right	574a	574	436	574a:574:436	746	657	89	12%	3.4				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	161	193	747	718	-32	-20%	2.1		
			NB	Through	418	419	419b	418:419:419b	586	525			61	10%	2.6		
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	343	366	-23	-7%	1.2				
			WB	Through	422	419	382	422:419:382	1377	1367	10	1%	0.3				
		Botany Rd	WB	Right	414	417	416	414:417:416	6	9	-3	-42%	1.0				
			SB	Left	417	419	418	417:419:418	455	509	-54	-12%	2.5				
Mill Pond Rd	SB	Right	419b	419	382	419b:419:382	374	422	-48	-13%	2.4						
	EB	Left	419a	406	419b	419a:406:419b	786	747	39	5%	1.4						
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	379	425	2296	2296	-46	-12%	2.3		
			NB	Through	453	590	451	453:590:451	1652	1689			-37	-2%	0.9		
		General Holmes Dr	NB	Right	395	590	443	395:590:443	265	182	83	31%	5.5				
			WB	Left	445	399	395	445:399:395	171	99	72	42%	6.2				
		Joyce Dr	WB	Through	443	590	468	443:590:468	53	57	-4	-7%	0.5				
			NB	Right	443	590	451	443:590:451	108	156	-48	-44%	4.1				
Ross Smith Ave	SB	Left	10	450	443	10:450:443	167	207	-40	-24%	2.9						
	SB	Through	450	590	395	450:590:395	1056	1065	-9	-1%	0.3						
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	115	53	1261	1387	62	54%	6.7		
			NB	Through	558	575	472	558:575:472	1147	1334			-187	-16%	5.3		
		Botany Rd	SB	Left	472	575	558	472:575:558	687	750	-63	-9%	2.4				
			SB	Right	472	575	905	472:575:905	164	99	65	40%	5.7				
		Robey St	EB	Left	905	575	472	905:575:472	126	146	-20	-16%	1.8				
			EB	Right	905	575	558	905:575:558	92	92	0	0%	0.0				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1625	1549	951	1037	76	5%	1.9		
			WB	Right	47	34	53	47:34:53	212	202			10	4%	0.7		
		Southern Cross Dr	SB	Left	41	29	18	41:29:18	141	137	4	3%	0.3				
			EB	Left	18	29	34	18:29:34	951	1037	-86	-9%	2.7				
		Wentworth Ave	WB	Through	22	23	26	22:23:26	60	93	-33	-55%	3.8				
			NB	Through	3086a	3086	20	3086a:3086:20	530	498	32	6%	1.4				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Right	3086a	3086	35	3086a:3086:35	318	337	908	928	-19	-6%	1.0		
			WB	Left	14	16	3086a	14:16:3086a	578	688			-110	-19%	4.4		
		Joyce Dr	WB	Through	12	3086	26	12:3086:26	608	707	-99	-16%	3.9				
			WB	Right	35	3086	20	35:3086:20	459	543	-84	-18%	3.7				
		O'Riordan St	SB	Left	36	37	35	36:37:35	148	257	-108	-73%	7.8				
			SB	Through	19	3086	3086a	19:3086:3086a	495	455	40	8%	1.5				
Qantas Dr	EB	Left	30	31	20	30:31:20	102	116	-14	-13%	1.3						
	EB	Through	32	3086	35	32:3086:35	649	684	-35	-5%	1.4						
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	53	90	1109	1195	-37	-70%	4.4		
			NB	Through	57	591	591a	57:591:591a	1056	1105			-49	-5%	1.5		
		Robey St	NB	Right	48	49	19	48:49:19	60	22	38	63%	6.0				
			WB	Through	48	591	54	48:591:54	120	130	-10	-8%	0.9				
		O'Riordan St	WB	Right	43	44	45	43:44:45	69	58	11	16%	1.3				
			SB	Left	43	591	49	43:591:49	687	695	-8	-1%	0.3				
Robey St	SB	Right	591a	591	54	591a:591:54	411	396	15	4%	0.7						
	EB	Left	50	52	591a	50:52:591a	995	1062	-67	-7%	2.1						
Robey St	EB	Through	50	591	44	50:591:44	228	180	48	21%	3.3						
	EB	Right	50	591	44	50:591:44	0	0	0	0%	0.0						

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700 vph	63	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	14	17%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	<b>88.1%</b>	
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Links with GEH Statistic b/w 5 and 10 10.7%

Links with GEH statistic > 10 1.2%

Seed 86524 8am-9am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Differences	GEH Statistic		
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left	387	420	390	387:420:390	1089	962	2445	2360	0	0%	0.0		
			NB	Right	388	420	420a	388:420:420a	1357	1398			127	12%	4.0		
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	541	519	1616	1620	-22	4%	1.0		
			WB	Right	392	420	390	392:420:390	1075	1101	0	0%	0.0				
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1031	981	1527	1396	-27	-2%	0.8		
			SB	Through	398	420	420b	398:420:420b	495	415	0	0%	0.0				
			SB	Right	441	446	442	441:446:442	169	180	-11	-7%	0.9				
			NB	Through	433	589	589a	433:589:589a	1168	1150	1337	1330	18	2%	0.5		
			NB	Right	446	589a	448	446:589a:448	424	349	0	0%	0.0				
			EB	Through	446	589	433	446:589:433	58	121	482	470	75	18%	3.8		
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	169	180	1337	1330	-11	-7%	0.9		
			NB	Through	433	589	589a	433:589:589a	1168	1150			18	2%	0.5		
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	424	349	0	0%	0.0				
			EB	Through	446	589	433	446:589:433	58	121	-63	-109%	6.7				
		Botany Rd	SB	Left	449	589	433	449:589:433	793	702	995	851	91	12%	3.3		
			SB	Through	449	589	433	449:589:433	793	702	52	26%	3.9				
			SB	Right	589a	589	446	589a:589:446	201	149	-78	-15%	3.3				
			WB	Left	436	574a	421	436:574a:421	523	601	997	1209	-134	-28%	5.8		
			WB	Right	436	574	433	436:574:433	474	608	-7	-2%	0.4				
			SB	Through	433	438	436	433:438:436	331	338	800	823	-16	-3%	0.7		
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	523	601	1612	1656	-58	-9%	2.2		
			WB	Right	436	574	433	436:574:433	474	608			14	3%	0.5		
		Botany Rd	SB	Left	433	438	436	433:438:436	331	338	-11	-3%	0.8				
			SB	Through	433	438	436	433:438:436	469	485	20	3%	0.8				
		Botany Rd	NB	Through	431	574	433	431:574:433	651	709	793	784	-20	-3%	0.8		
			NB	Left	419a	382	392	419a:382:392	165	177	0	0%	0.0				
			NB	Right	418	419	419b	418:419:419b	627	607	-4	-2%	0.3				
			WB	Left	422	418	423	422:418:423	253	257	41	4%	1.3				
			WB	Through	422	419	382	422:419:382	1014	973	0	0%	0.0				
			WB	Right	414	417	416	414:417:416	8	34	-26	-352%	5.8				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	SB	Left	414	417	416	414:417:416	8	34	987	1080	8	3%	0.3		
			SB	Through	417	419	418	417:419:418	595	588			-74	-19%	3.6		
		Southern Cross Dr	SB	Right	419a	419	382	419a:419:382	384	458	-75	-2%	2.4				
			EB	Left	419a	406	419b	419a:406:419b	983	1058	120	12%	4.0				
		Mill Pond Rd	EB	Through	406	419	416	406:419:416	970	850	-59	-14%	2.8				
			EB	Right	408	419	418	408:419:418	424	483	-13	-5%	0.8				
			NB	Left	455	468	461	455:468:461	286	299	9	1%	0.2				
			General Holmes Dr	NB	Through	453	590	451	453:590:451	1498	1489	138	34%	7.5			
			NB	Right	395	590	443	395:590:443	408	270	50	29%	4.2				
			General Holmes Dr	WB	Left	445	399	395	445:399:395	170	120	-16	-29%	2.0			
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	WB	Through	443	590	451	443:590:451	108	143	332	332	-35	-32%	3.1		
			WB	Right	443	590	451	443:590:451	108	143			49	32%	4.3		
		Joyce Dr	SB	Left	10	450	443	10:450:443	151	102	1406	1291	66	5%	1.9		
			SB	Through	450	590	395	450:590:395	1255	1189	0	0%	0.0				
		Ross Smith Ave	EB	Left	456	590	451	456:590:451	74	85	-11	-15%	1.2				
			EB	Through	456	590	443	456:590:443	93	102	-9	-10%	0.9				
			EB	Right	456	590	395	456:590:395	120	83	37	31%	3.6				
			Botany Rd	NB	Left	558	575	905	558:575:905	142	70	72	51%	7.0			
			Botany Rd	NB	Through	558	575	472	558:575:472	1423	1426	-3	0%	0.1			
			Botany Rd	SB	Through	472	575	558	472:575:558	759	762	-3	0%	0.1			
6	Botany Rd/Robey St	Botany Rd	SB	Right	472	575	905	472:575:905	131	141	889	903	-10	-8%	0.9		
			EB	Left	905	575	472	905:575:472	156	180			-24	-16%	1.9		
		Robey St	EB	Right	905	575	558	905:575:558	128	90	284	270	38	30%	3.7		
			WB	Through	34	29	18	34:29:18	1802	1770	1802	1770	32	2%	0.8		
		Southern Cross Dr	WB	Right	47	34	53	47:34:53	265	254	441	402	11	4%	0.7		
			SB	Right	41	29	18	41:29:18	176	148	28	16%	2.2				
		Wentworth Ave	EB	Left	18	29	34	18:29:34	1338	1255	1338	1255	83	6%	2.0		
			EB	Through	18	29	34	18:29:34	1338	1255	-1	-2%	0.2				
		7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	NB	Left	22	23	26	22:23:26	83	84	1075	1052	-39	8%	1.9
					NB	Through	3086a	3086	20	3086a:3086:20	468	429			-15	-3%	0.7
Joyce Dr	NB			Right	3086a	3086	35	3086a:3086:35	524	539	-98	-23%	4.5				
	WB			Left	14	16	3086a	14:16:3086a	424	522	-14	-3%	0.6				
O'Riordan St	WB			Through	12	3086	26	12:3086:26	503	517	-85	-14%	3.4				
	WB			Right	35	3086	20	35:3086:20	604	689	-102	-59%	6.8				
Qantas Dr	SB			Left	36	37	35	36:37:35	171	215	-45	-10%	2.1				
	SB			Through	19	3086	3086a	19:3086:3086a	440	455	0	0%	0.0				
O'Riordan St	EB			Left	30	31	20	30:31:20	157	136	21	13%	1.7				
	EB			Through	32	3086	35	32:3086:35	572	498	74	13%	3.2				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	O'Riordan St	NB	Left	58	54	50	58:54:50	58	115	1222	1247	-57	-98%	6.1		
			NB	Through	57	591	591a	57:591:591a	1163	1132			31	3%	0.9		
		Robey St	WB	Left	48	49	19	48:49:19	76	55	0	0%	0.0				
			WB	Through	48	591	54	48:591:54	151	158	-21	27%	2.5				
		O'Riordan St	WB	Right	43	44	45	43:44:45	65	72	-7	-10%	0.8				
			SB	Through	43	591	49	43:591:49	654	714	-60	-9%	2.3				
		Robey St	SB	Right	591a	591	54	591a:591:54	390	364	26	7%	1.4				
			EB	Left	50	52	591a	50:52:591a	1045	1106	-61	-6%	1.9				
		O'Riordan St	EB	Through	50	591	44	50:591:44	292	205	1337	1311	87	30%	5.5		
			EB	Right	50	591	44	50:591:44	292	205	0	0%	0.0				

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	63	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	17	20%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%
Links with GEH Statistic < 5	90.5%	
Links with GEH Statistic b/w 5 and 10	9.5%	
Links with GEH statistic > 10	0.0%	

68:62:56	L	3798	4975	4201	-774	84%	3.4
68:62:46	T	403					
64:55:65		3871	4218	4583	365	109%	5.5
17:55:65	NB	712					

Seed 28 6am-7am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		6:00:00	6:00:00	Difference	% Difference	GEH Statistic
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	520	484	1302	1158	0	0%	0.0		
			NB	Right	388	420	420a	388:420:420a	782	674			36	7%	1.6		
			WB	Left	411	420b	386	411:420b:386	443	341			108	14%	4.0		
		Mill Pond Rd	WB	Through	392	420	390	392:420:390	1616	1709	102	23%	5.2				
			WB	Right	397	403	420a	397:403:420a	519	487	0	0%	0.0				
			SB	Through	398	420	420b	398:420:420b	375	336	-32	8%	2.0				
2	Botany Rd/General Holmes Dr	General Holmes Dr	NB	Left	441	446	442	441:446:442	95	122	755	694	39	10%	2.0		
			NB	Through	433	589	589a	433:589:589a	660	572			0	0%	0.0		
			NB	Right	441	446	442	441:446:442	95	122			-27	-28%	2.6		
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	185	175	88	13%	3.5				
			EB	Through	446	589	433	446:589:433	72	156	0	0%	0.0				
			EB	Right	446	589	433	446:589:433	72	156	10	6%	0.8				
3	Botany Rd/Wentworth Ave	Botany Rd	NB	Left	449	589	433	449:589:433	535	495	697	595	40	6%	1.6		
			NB	Through	589a	589	446	589a:589:446	162	100			62	38%	5.4		
			NB	Right	436	574a	421	436:574a:421	304	343			-39	-13%	2.2		
		Wentworth Ave	WB	Right	436	574	433	436:574:433	288	344	-56	-19%	3.1				
			SB	Left	433	438	436	433:438:436	228	244	-16	-7%	1.1				
			SB	Through	433	574	574a	433:574:574a	323	399	-76	-24%	4.0				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Through	431	574	433	431:574:433	395	359	905	856	36	9%	1.9		
			NB	Left	574a	574	436	574a:574:436	509	497			12	2%	0.6		
			NB	Right	419a	382	392	419a:382:392	93	134			-41	-2%	3.8		
		Southern Cross Dr	NB	Through	418	419	419b	418:419:419b	327	333	-5	-2%	0.3				
			NB	Left	422	418	423	422:418:423	402	347	0	0%	0.0				
			NB	Right	422	419	382	422:419:382	1613	1673	55	14%	2.8				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	536	518	2147	2100	-18	3%	0.4		
			NB	Through	453	590	451	453:590:451	1453	1464			-11	-1%	0.3		
			NB	Right	395	590	443	395:590:443	159	118			41	26%	3.5		
		General Holmes Dr	WB	Left	445	399	395	445:399:395	130	48	82	63%	8.7				
			WB	Through	443	590	468	443:590:468	43	67	-24	-55%	3.2				
			WB	Right	443	590	451	443:590:451	88	100	-12	-14%	1.3				
Joyce Dr	SB	Left	10	450	443	10:450:443	165	136	29	18%	2.4						
	SB	Through	450	590	395	450:590:395	688	727	-39	-6%	1.5						
	SB	Right	456	590	451	456:590:451	60	50	0	0%	0.0						
6	Botany Rd/Robey St	Botany Rd	EB	Left	456	590	443	456:590:443	75	80	233	180	10	17%	1.4		
			EB	Through	456	590	395	456:590:395	97	50			-5	-6%	0.5		
			EB	Right	558	575	905	558:575:905	73	30			47	49%	5.5		
		Robey St	NB	Left	558	575	905	558:575:905	73	30	43	59%	5.9				
			NB	Through	558	575	472	558:575:472	738	711	15	2%	0.6				
			NB	Right	472	575	558	472:575:558	545	543	2	0%	0.1				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	SB	Right	472	575	905	472:575:905	172	127	716	670	45	26%	3.7		
			EB	Left	905	575	472	905:575:472	76	83			-7	-9%	0.7		
			EB	Right	905	575	558	905:575:558	61	53			8	13%	1.1		
		Southern Cross Dr	WB	Through	34	29	18	34:29:18	1076	1077	-1	0%	0.0				
			WB	Left	47	34	53	47:34:53	158	157	0	0%	0.0				
			WB	Right	41	29	18	41:29:18	105	97	1	0%	0.0				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	58	75	1054	1054	-17	-20%	2.1		
			NB	Through	3086a	3086	20	3086a:3086:20	720	684			36	5%	1.4		
			NB	Right	3086a	3086	35	3086a:3086:35	276	295			-19	-7%	1.1		
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	632	753	-121	-19%	4.6				
			WB	Through	12	3086	26	12:3086:26	493	474	19	4%	0.9				
			WB	Right	35	3086	20	35:3086:20	231	299	-68	-29%	4.2				
O'Riordan St	SB	Left	36	37	35	36:37:35	112	181	-49	-44%	4.2						
	SB	Through	19	3086	3086a	19:3086:3086a	493	484	9	2%	0.4						
	SB	Right	30	31	20	30:31:20	52	91	-39	-76%	4.6						
9	O'Riordan St/Robey St	O'Riordan St	EB	Left	32	3086	35	32:3086:35	413	412	936	978	1	0%	0.1		
			EB	Through	26	3086	3086a	26:3086:3086a	471	475			-4	-1%	0.2		
			EB	Right	58	54	50	58:54:50	50	66			-16	-32%	2.1		
		Robey St	NB	Through	57	591	591a	57:591:591a	1002	1015	-13	-1%	0.4				
			NB	Left	48	49	19	48:49:19	48	28	0	0%	0.0				
			NB	Right	48	591	54	48:591:54	95	127	23	41%	3.2				
O'Riordan St	WB	Through	43	44	45	43:44:45	60	54	-32	-34%	3.0						
	WB	Left	43	591	49	43:591:49	603	626	6	10%	0.8						
	WB	Right	591a	591	54	591a:591:54	279	303	-23	-4%	0.9						
Robey St	SB	Left	50	52	591a	50:52:591a	627	662	-24	-9%	1.4						
	SB	Through	50	591	44	50:591:44	122	83	-35	-6%	1.4						
	SB	Right	50	591	44	50:591:44	122	83	39	32%	3.9						

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	70	84%
Links with difference in flow within 15% for flows 700 - 1700 vph	10	12%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	90.4%	
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Links with GEH Statistic b/w 5 and 10	9.6%	
Links with GEH statistic > 10	0.0%	

Seed 28 7am-8am

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Difference	GEH Statistic		
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	817	739	1902	1795	0	0%	0.0		
			NB	Right	388	420	420a	388:420:420a	1085	1056			78	10%	2.8		
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	524	495	1972	1899	29	3%	0.9		
			WB	Through	392	420	390	392:420:390	1447	1404			29	6%	1.3		
		2	Botany Rd/General Holmes Dr	General Holmes Dr	SB	Through	397	403	420a	397:403:420a	871	899	1303	1266	-29	-3%	1.0
					SB	Right	398	420	420b	398:420:420b	433	367			65	15%	3.3
Botany Rd	NB			Left	441	446	442	441:446:442	142	109	1123	1175	33	23%	2.9		
	NB			Through	433	589	589a	433:589:589a	982	1066			-84	-9%	2.6		
3	Botany Rd/Wentworth Ave			Wentworth Ave	WB	Left	436	574a	421	436:574a:421	435	513	777	777	0	0%	0.0
					WB	Right	436	574	433	436:574:433	342	575			-78	-18%	3.6
		Botany Rd	SB	Left	433	438	436	433:438:436	296	426	716	840	-233	-68%	10.9		
			SB	Through	433	574	574a	433:574:574a	420	414			-130	-44%	6.8		
		4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Through	431	574	433	431:574:433	607	611	1353	1323	-4	-1%	0.2
					NB	Right	574a	574	436	574a:574:436	746	712			34	5%	1.3
Southern Cross Dr	NB			Left	419a	382	382	419a:382:382	161	191	1719	1610	-30	-19%	2.3		
	NB			Through	418	419	419b	418:419:419b	586	545			41	7%	1.7		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave			General Holmes Dr	NB	Left	422	418	423	422:418:423	343	331	1719	1610	12	3%	0.6
					NB	Through	422	419	382	422:419:382	1377	1279			98	7%	2.7
		Botany Rd	SB	Left	414	417	416	414:417:416	6	9	835	903	-3	-42%	1.0		
			SB	Through	417	419	418	417:419:418	455	489			-34	-8%	1.8		
		6	Botany Rd/Robey St	General Holmes Dr	NB	Right	419a	419	382	419a:419:382	371	405	2296	2224	-31	-2%	1.5
					NB	Through	445	399	395	445:399:395	171	81			90	53%	8.0
Joyce Dr	SB			Left	450	590	395	450:590:395	108	122	1223	1281	-14	-13%	1.3		
	SB			Through	450	590	395	450:590:395	167	195			-28	-17%	2.1		
7	Wentworth Ave/Southern Cross Dr Off Ramp			Wentworth Ave	NB	Left	455	468	461	455:468:461	379	440	270	265	-61	-16%	3.0
					NB	Through	453	590	451	453:590:451	1652	1613			39	2%	1.0
		Robey St	EB	Left	905	575	472	905:575:472	265	171	851	859	94	35%	6.4		
			EB	Through	905	575	558	905:575:558	92	94			-2	-2%	0.2		
		8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Wentworth Ave	WB	Through	34	29	18	34:29:18	1625	1559	1625	1559	66	4%	1.7
					WB	Right	47	34	53	47:34:53	212	209			3	1%	0.2
Sir Reginald Ansett Dr	NB			Through	558	575	472	558:575:472	1147	1344	908	894	-87	-10%	2.5		
	NB			Right	472	575	558	472:575:558	687	754			-67	-10%	2.5		
9	O'Riordan St/Robey St			Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	318	337	1645	1883	-19	-6%	1.0
					WB	Through	12	3086	26	12:3086:26	578	716			-138	-24%	5.4
		O'Riordan St	NB	Left	38	37	35	38:37:35	608	602	644	719	6	1%	0.2		
			NB	Through	19	3086	3086a	19:3086:3086a	459	565			-106	-23%	4.7		
		10	O'Riordan St/Robey St	O'Riordan St	SB	Through	30	31	20	30:31:20	149	256	1218	1249	-109	-9%	3.7
					SB	Right	58	54	50	58:54:50	495	461			34	7%	1.5
Robey St	WB			Left	48	49	19	48:49:19	102	110	1109	1152	-8	-7%	0.7		
	WB			Through	48	591	54	48:591:54	649	705			-56	-9%	2.2		
11	O'Riordan St/Robey St			O'Riordan St	NB	Through	57	591	591a	57:591:591a	467	434	1166	1171	33	7%	1.6
					NB	Right	58	54	50	58:54:50	53	84			-31	-59%	3.8
		Robey St	WB	Left	48	49	19	48:49:19	60	26	1222	1175	34	57%	5.2		
			WB	Through	48	591	54	48:591:54	120	117			3	3%	0.5		
		12	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	69	67	1166	1171	2	2%	0.2
					SB	Through	43	591	49	43:591:49	687	687			0	0%	0.0
Robey St	EB			Left	50	52	591a	50:52:591a	411	417	1222	1175	-6	-1%	0.3		
	EB			Through	50	591	44	50:591:44	995	1009			-14	-1%	0.5		
13	O'Riordan St/Robey St			Robey St	NB	Through	50	591	44	50:591:44	228	166	1222	1175	62	27%	4.4
					NB	Right	50	591	44	50:591:44	0	0			0	0%	0.0

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	62	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	11	13%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	86.7%	
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Links with GEH Statistic b/w 5 and 10 12.0%

Links with GEH statistic > 10 1.2%

Seed 28 8am-9am

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	Obs Turning Counts		Modelled Turning Counts		Obs Approach Vol		Modelled Approach Vol		Difference	% Difference	GEH Statistic
					From	Via	To		8:00:00 9:00:00	8:00:00 9:00:00	8:00:00 9:00:00	8:00:00 9:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	1089	941	2445	2331	0	0%	0.0				
			NB	Right	388	420	420a	388:420:420a	1357	1390			148	14%	4.6				
			WB	Left	411	420b	386	411:420b:386	541	567			-34	-2%	0.9				
		Mill Pond Rd	WB	Through							1616	1652			-26	-5%	1.1		
			WB	Right	392	420	390	392:420:390	1075	1085			0	0%	0.0				
			SB	Left	397	403	420a	397:403:420a	1031	1012			-11	-1%	0.3				
		General Holmes Dr	SB	Through	398	420	420b	398:420:420b	496	408	1527	1420	88	18%	4.1				
			SB	Right								0	0%	0.0					
			SB	Right								11	6%	0.8					
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	169	158	1337	1418	-92	-8%	2.6				
			NB	Through	433	589	589a	433:589:589a	1168	1260			0	0%	0.0				
			NB	Right								82	19%	4.2					
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	424	342	482	499	0	0%	0.0				
			EB	Through								0	0%	0.0					
			EB	Right	446	589	433	446:589:433	58	157			-99	-172%	9.6				
		Botany Rd	SB	Left								0	0%	0.0					
			SB	Through	449	589	433	449:589:433	793	704	995	868	92	12%	3.4				
			SB	Right	589a	589	446	589a:589:446	201	167			34	17%	2.5				
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	523	608	997	1255	-85	-16%	3.6				
			WB	Right	436	574	433	436:574:433	474	647			-173	-37%	7.3				
		Botany Rd	SB	Left	433	438	436	433:438:436	331	370	800	857	-39	-12%	2.1				
			SB	Through	433	574	574a	433:574:574a	469	487			-18	-4%	0.8				
		Botany Rd	NB	Through	431	574	433	431:574:433	651	761	1612	1759	-110	-17%	4.1				
			NB	Right	574a	574	436	574a:574:436	961	998			-37	-4%	1.2				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	166	227	793	916	-61	-37%	4.3				
			NB	Through	418	419	419b	418:419:419b	827	689			-62	-10%	2.4				
			NB	Right								0	0%	0.0					
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	253	297	1267	1229	-44	-18%	2.7				
			WB	Through	422	419	382	422:419:382	1014	932			82	8%	2.6				
			WB	Right								0	0%	0.0					
		Botany Rd	SB	Left	414	417	416	414:417:416	8	45	987	1122	-37	-499%	7.3				
			SB	Through	417	419	418	417:419:418	596	582			14	2%	0.6				
			SB	Right	419b	419	382	419b:419:382	384	495			-111	-29%	5.3				
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	883	1075	2376	2399	-92	-9%	2.8				
			EB	Through	406	419	416	406:419:416	970	865			105	11%	3.5				
			EB	Right	408	419	418	408:419:418	424	459			-35	-8%	1.7				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	286	290	2191	2017	-4	-2%	0.3				
			NB	Through	453	590	451	453:590:451	1498	1447			51	3%	1.3				
			NB	Right	395	590	443	395:590:443	408	280			128	31%	6.9				
		General Holmes Dr	WB	Left	445	399	395	445:399:395	170	128	332	326	42	25%	3.4				
			WB	Through	443	590	468	443:590:468	53	60			-7	-12%	0.9				
			WB	Right	443	590	451	443:590:451	108	138			-30	-27%	2.7				
		Joyce Dr	SB	Left	450	450	443	450:450:443	151	117	1406	1329	34	22%	2.9				
			SB	Through	450	590	395	450:590:395	1255	1212			43	3%	1.2				
			SB	Right								0	0%	0.0					
		Ross Smith Ave	EB	Left	456	590	451	456:590:451	74	83	286	264	-9	-12%	1.0				
			EB	Through	456	590	443	456:590:443	93	101			-8	-9%	0.8				
			EB	Right	456	590	395	456:590:395	120	80			40	33%	4.0				
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	142	69	1566	1600	73	52%	7.1				
			NB	Through	558	575	472	558:575:472	1423	1531			-108	-8%	2.8				
		Botany Rd	SB	Through	472	575	558	472:575:558	759	758	889	858	1	0%	0.0				
			SB	Right	472	575	905	472:575:905	131	100			31	23%	2.9				
		Robey St	EB	Left	905	575	472	905:575:472	156	180	284	289	-24	-16%	1.9				
			EB	Right	905	575	558	905:575:558	128	109			19	15%	1.8				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1802	1828	1802	1828	-26	-1%	0.6				
			WB	Right								0	0%	0.0					
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	265	228	441	383	37	14%	2.3				
			SB	Right	41	29	18	41:29:18	176	155			21	12%	1.7				
		Wentworth Ave	EB	Left								0	0%	0.0					
			EB	Through	18	29	34	18:29:34	1338	1351	1338	1351	-13	-1%	0.5				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	83	67	1075	1047	46	10%	2.2				
			NB	Through	3086a	3086	20	3086a:3086:20	468	422			46	10%	2.2				
			NB	Right	3086a	3086	35	3086a:3086:35	524	538			-14	-3%	0.6				
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	424	498	1531	1679	-74	-17%	3.4				
			WB	Through	12	3086	26	12:3086:26	503	523			-20	-4%	0.9				
			WB	Right	35	3086	20	35:3086:20	604	658			-54	-9%	2.2				
		O'Riordan St	SB	Left	36	37	35	36:37:35	171	274	611	757	-103	-60%	6.9				
			SB	Through	19	3086	3086a	19:3086:3086a	440	483			-43	-10%	2.0				
			SB	Right								0	0%	0.0					
		Qantas Dr	EB	Left	30	31	20	30:31:20	157	124	1167	1065	33	21%	2.8				
			EB	Through	32	3086	35	32:3086:35	572	537			35	6%	1.5				
			EB	Right	26	3086	3086a	26:3086:3086a	438	404			34	8%	1.7				
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	58	97	1222	1190	-39	-67%	4.4				
			NB	Through	57	591	591a	57:591:591a	1163	1093			70	6%	2.1				
			NB	Right								0	0%	0.0					
		Robey St	WB	Left	48	49	19	48:49:19	76	28	227	168	48	63%	6.6				
			WB	Through	48	591	54	48:591:54	151	140			11	7%	0.9				
			WB	Right								0	0%	0.0					
		O'Riordan St	SB	Left	43	44	45	43:44:45	65	77	1110	1177	-12	-18%	1.4				
			SB	Through	43	591	49	43:591:49	654	741			-87	-13%	3.3				
			SB	Right	591a	591	54	591a:591:54	390	359			31	8%	1.6				
		Robey St	EB	Left	50	52	591a	50:52:591a	1045	1148	1337	1370	-103	-10%	3.1				
			EB	Through	50	591	44	50:591:44	292	222			70	24%	4.4				
			EB	Right								0	0%	0.0					

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	12	14%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%
b) Links with GEH Statistic < 5		90.4%
Links with GEH Statistic b/w 5 and 10		9.6%
Links with GEH statistic > 10		0.0%

Seed 560 6am-7am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Difference	GEH Statistic
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	520	447	1302	1223	0	0%	0.0
			NB	Right	388	420	420a	388:420:420a	782	776			7	14%	3.3
			WB	Left	411	420b	386	411:420b:386	443	311			132	30%	6.8
		Mill Pond Rd	WB	Through	392	420	390	392:420:390	1616	1762	-147	-9%	3.6		
			SB	Left	397	403	420a	397:403:420a	519	512	7	1%	0.3		
			SB	Through	398	420	420b	398:420:420b	375	334	41	11%	2.2		
	General Holmes Dr	SB	Right	441	446	442	441:446:442	95	115	-20	-21%	1.9			
		NB	Through	433	589	589a	433:589:589a	660	590	70	11%	2.8			
		NB	Right	446	589a	448	446:589a:448	185	200	-15	-8%	1.1			
		EB	Through	446	589	433	446:589:433	72	142	-70	-9%	6.8			
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	95	115	755	705	-20	-21%	1.9
			NB	Through	433	589	589a	433:589:589a	660	590			70	11%	2.8
			NB	Right	446	589a	448	446:589a:448	185	200			-15	-8%	1.1
		General Holmes Dr	EB	Through	446	589	433	446:589:433	72	142	-70	-9%	6.8		
			SB	Left	449	589	433	449:589:433	535	483	52	10%	2.3		
			SB	Right	589a	589	446	589a:589:446	162	104	58	36%	5.0		
	Botany Rd	WB	Left	436	574a	421	436:574a:421	304	348	-44	-15%	2.4			
		WB	Right	436	574	433	436:574:433	288	325	-37	-13%	2.1			
		SB	Left	433	438	436	433:438:436	228	222	6	2%	0.4			
		SB	Through	433	574	574a	433:574:574a	323	397	-74	-23%	3.9			
3	Botany Rd/Wentworth Ave	Botany Rd	NB	Through	431	574	433	431:574:433	395	386	592	673	9	2%	0.5
			NB	Right	574a	574	436	574a:574:436	509	591			-82	-10%	2.2
			NB	Left	419a	382	392	419a:382:392	93	117			-24	-25%	2.3
		Wentworth Ave	WB	Through	418	419	419b	418:419:419b	327	318	9	3%	0.5		
			WB	Left	422	418	423	422:418:423	402	387	15	4%	0.7		
			WB	Right	422	419	382	422:419:382	1613	1706	-93	-6%	2.3		
	Botany Rd/Southern Cross Dr	WB	Through	414	417	416	414:417:416	5	32	-27	-59%	6.4			
		SB	Through	417	419	418	417:419:418	306	447	-141	-46%	7.3			
		SB	Right	419a	419	382	419a:419:382	294	257	37	12%	2.8			
		EB	Left	419a	406	419b	419a:406:419b	582	635	-53	-9%	2.1			
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Botany Rd	EB	Through	406	419	416	406:419:416	489	418	1303	1287	71	14%	3.3
			EB	Right	408	419	418	408:419:418	232	234			-2	-1%	0.1
			NB	Left	455	468	461	455:468:461	536	529			7	1%	0.3
		General Holmes Dr	NB	Through	453	590	451	453:590:451	1453	1530	-77	-5%	2.0		
			NB	Right	395	590	443	395:590:443	159	126	33	21%	2.7		
			WB	Left	445	399	395	445:399:395	130	50	80	62%	8.4		
	General Holmes Dr	WB	Through	443	590	468	443:590:468	43	55	-12	-27%	1.7			
		WB	Right	443	590	451	443:590:451	88	99	-11	-13%	1.2			
		SB	Left	10	450	443	10:450:443	165	143	22	14%	1.8			
		SB	Through	450	590	395	450:590:395	688	734	-46	-7%	1.7			
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	Joyce Dr	SB	Right	456	590	451	456:590:451	60	60	853	877	0	0%	0.0
			EB	Through	456	590	443	456:590:443	75	71			4	6%	0.5
			EB	Right	456	590	395	456:590:395	97	62			35	36%	3.9
		Ross Smith Ave	NB	Left	558	575	565	558:575:565	73	36	38	52%	5.1		
			NB	Through	472	575	568	472:575:568	726	754	-28	-4%	1.0		
			NB	Right	472	575	905	472:575:905	545	534	11	2%	0.5		
	Botany Rd/Robey St	SB	Right	472	575	905	472:575:905	172	132	40	23%	3.2			
		SB	Left	905	575	472	905:575:472	76	62	14	19%	1.7			
		EB	Right	905	575	558	905:575:558	61	55	6	10%	0.8			
		WB	Through	34	29	18	34:29:18	1076	1103	-27	-3%	0.8			
6	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	47	34	53	47:34:53	158	162	263	276	-5	-3%	0.4
			SB	Right	41	29	18	41:29:18	105	114			-9	-9%	0.9
			EB	Left	18	29	34	18:29:34	744	758			-14	-2%	0.5
		Southern Cross Dr	WB	Through	22	23	26	22:23:26	58	73	-15	-25%	1.8		
			NB	Through	3086a	3086	20	3086a:3086:20	720	634	86	12%	3.3		
			NB	Right	3086a	3086	35	3086a:3086:35	276	309	-33	-12%	1.9		
	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	632	619	1356	1618	-13	-30%	6.9
			WB	Through	12	3086	26	12:3086:26	493	484			9	2%	0.4
			WB	Right	35	3086	20	35:3086:20	231	315			-84	-36%	5.1
		O'Riordan St	SB	Left	38	37	35	38:37:35	112	170	-58	-52%	4.9		
7	O'Riordan St/Robey St	O'Riordan St	SB	Through	19	3086	3086a	19:3086:3086a	493	446	605	616	47	10%	2.2
			SB	Right	30	31	20	30:31:20	52	83			-31	-60%	3.8
			EB	Through	32	3086	35	32:3086:35	413	406			7	2%	0.4
		Qantas Dr	EB	Right	26	3086	3086a	26:3086:3086a	471	433	38	8%	1.8		
			NB	Left	58	54	50	58:54:50	50	68	-18	-36%	2.3		
			NB	Through	57	591	591a	57:591:591a	1002	973	29	3%	0.9		
	O'Riordan St/Robey St	WB	Left	48	49	19	48:49:19	48	24	24	49%	3.9			
		WB	Through	48	591	54	48:591:54	95	142	-47	-49%	4.3			
		WB	Right	43	44	45	43:44:45	60	40	20	34%	2.9			
		SB	Through	43	591	49	43:591:49	603	606	-3	-1%	0.1			
8	O'Riordan St/Robey St	O'Riordan St	SB	Left	591a	591	54	591a:591:54	279	303	942	949	-24	-9%	1.4
			SB	Right	50	52	591a	50:52:591a	627	635			-8	-1%	0.3
			EB	Through	50	591	44	50:591:44	122	78			44	36%	4.4
		Robey St	EB	Right	50	591	44	50:591:44	122	78	44	36%	4.4		
			WB	Through	48	49	19	48:49:19	48	24	24	49%	3.9		
			WB	Right	43	44	45	43:44:45	60	40	20	34%	2.9		
	O'Riordan St	SB	Through	43	591	49	43:591:49	603	606	-3	-1%	0.1			
		SB	Left	591a	591	54	591a:591:54	279	303	-24	-9%	1.4			
		EB	Right	50	52	591a	50:52:591a	627	635	-8	-1%	0.3			
		EB	Through	50	591	44	50:591:44	122	78	44	36%	4.4			
9	O'Riordan St/Robey St	O'Riordan St	WB	Through	48	49	19	48:49:19	48	24	143	166	-47	-49%	4.3
			WB	Right	43	44	45	43:44:45	60	40			20	34%	2.9
			SB	Through	43	591	49	43:591:49	603	606			-3	-1%	0.1
		Robey St	SB	Left	591a	591	54	591a:591:54	279	303	-24	-9%	1.4		
			EB	Right	50	52	591a	50:52:591a	627	635	-8	-1%	0.3		
			EB	Through	50	591	44	50:591:44	122	78	44	36%	4.4		
	O'Riordan St	WB	Through	48	49	19	48:49:19	48	24	749	713	0	0%	0.0	
		WB	Right	43	44	45	43:44:45	60	40			20	34%	2.9	
		SB	Through	43	591	49	43:591:49	603	606			-3	-1%	0.1	
		SB	Left	591a	591	54	591a:591:54	279	303			-24	-9%	1.4	

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	71	86%
Links with difference in flow within 15% for flows 700 - 1700 vph	11	13%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	90.4%
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Links with GEH Statistic b/w 5 and 10 9.6%

Links with GEH statistic > 10 0.0%



Seed 560 7am-8am

Obs Turning Counts    Modelled Turning Counts    Obs Approach Vol    Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Difference	GEH Statistic				
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left	387	420	390	387 420 390	377	0	1903	1891	0	0%	0.0				
				Right	388	420	420a	388 420 420a	388	0	1903	1891	0	0%	0.0				
		Mill Pond Rd	WB	Left	411	420b	386	411 420b 386	524	520	1972	1967	-5	0%	0.1				
				Right	392	420	390	392 420 390	1447	1441	1972	1967	-5	0%	0.2				
		General Holmes Dr	SB	Left	397	403	420a	397 403 420a	871	896	1303	1266	-37	-3%	0.0				
				Right	388	420	420b	388 420 420b	433	372	1303	1266	-37	-3%	0.0				
		2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	448	442	441 448 442	157	0	1123	1173	50	4%	1.3		
						Right	433	589	589a	433 589 589a	882	1024	1123	1173	50	4%	1.3		
				General Holmes Dr	EB	Through	446	589a	448	446 589a 448	322	319	395	453	60	15%	0.0		
						Right	446	589	432	446 589 432	73	134	395	453	60	15%	0.0		
Botany Rd	WB			Left	449	589	433	449 589 433	855	889	866	837	-28	-3%	1.3				
				Right	509a	589	446	509a 589 446	21	148	866	837	-28	-3%	1.3				
3	Botany Rd/Wentworth Ave			Wentworth Ave	WB	Left	436	574a	421	436 574a 421	435	826	777	1100	665	-435	-43%	4.6	
						Right	436	574	433	436 574 433	342	370	777	1100	323	33%	10.7		
				Botany Rd	SB	Left	433	574	436	433 574 436	296	420	716	823	107	15%	0.4		
						Right	433	574	574a	433 574 574a	426	405	716	823	107	15%	0.4		
		Botany Rd	NB	Through	431	574	433	431 574 433	826	811	1353	1349	-4	0%	0.2				
				Right	574a	574	436	574a 574 436	746	738	1353	1349	-4	0%	0.2				
		4	Botany Rd/Southern Cross Dr	Botany Rd	NB	Left	419a	382	392	419a 382 392	161	219	747	744	-3	0%	0.0		
						Right	418	419	419b	418 419 419b	589	0	747	744	-3	0%	0.0		
				Southern Cross Dr	WB	Left	422	419	423	422 419 423	343	307	1719	1644	-75	-4%	2.0		
						Right	422	419	382	422 419 382	1327	1337	1719	1644	-75	-4%	2.0		
Botany Rd	SB			Left	414	417	416	414 417 416	6	33	835	898	63	8%	2.1				
				Right	417	419	418	417 419 418	455	465	835	898	63	8%	2.1				
Mill Pond Rd	EB			Left	419b	419	382	419b 419 382	374	419	1983	1980	-3	0%	0.0				
				Right	419a	408	419b	419a 408 419b	826	371	1983	1980	-3	0%	0.0				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave			General Holmes Dr	NB	Left	405	468	461	405 468 461	329	405	2246	2220	-26	-1%	0.6		
						Right	405	590	451	405 590 451	1052	1030	2246	2220	-26	-1%	0.6		
		General Holmes Dr	WB	Left	445	590	443	445 590 443	265	185	310	310	0	0%	0.0				
				Right	445	590	395	445 590 395	171	83	310	310	0	0%	0.0				
		Joyce Dr	SB	Left	443	590	451	443 590 451	53	65	1223	1251	28	2%	1.5				
				Right	450	443	443	450 443 443	107	184	1223	1251	28	2%	1.5				
		6	Botany Rd/Rubey St	Botany Rd	NB	Left	558	575	505	558 575 505	115	32	1261	1308	47	4%	0.7		
						Right	558	575	472	558 575 472	147	226	1261	1308	47	4%	0.7		
				Rubey St	SB	Left	472	575	558	472 575 558	257	717	833	833	0	0%	0.0		
						Right	472	575	905	472 575 905	188	118	833	833	0	0%	0.0		
7	Wentworth Ave/Southern Cross Dr			Wentworth Ave	WB	Through	34	29	18	34 29 18	1623	1503	1625	1503	-120	-8%	3.0		
						Right	47	34	53	47 34 53	212	231	1625	1503	-120	-8%	3.0		
				Southern Cross Dr	WB	Left	41	29	18	41 29 18	147	147	378	378	0	0%	0.0		
						Right	18	29	34	18 29 34	951	1141	378	378	0	0%	0.0		
				8	Joyce Dr/O'Riordan St/Quantas Dr/Sr Reginald Ansett Dr	Sr Reginald Ansett Dr	NB	Left	32	23	28	32 23 28	92	85	908	919	11	1%	0.2
								Right	3086a	3086	20	3086a 3086 20	820	820	908	919	11	1%	0.2
		Joyce Dr	WB			Through	12	3086	26	12 3086 26	318	325	1645	1921	276	17%	4.2		
						Right	37	3086	20	37 3086 20	495	295	1645	1921	276	17%	4.2		
		O'Riordan St	SB			Left	36	37	35	36 37 35	112	212	644	749	627	97%	2.1		
						Right	30	31	20	30 31 20	102	126	644	749	627	97%	2.1		
9	O'Riordan St/Rubey St	O'Riordan St	NB			Left	57	591a	591a	57 591a 591a	529	1142	1109	1230	108	10%	2.5		
						Right	591a	591	54	591a 591 54	411	442	1109	1230	121	11%	0.2		
		Rubey St	WB			Left	48	49	19	48 49 19	60	32	146	146	0	0%	0.0		
						Right	48	591	54	48 591 54	120	114	146	146	0	0%	0.0		
		O'Riordan St	SB	Left	43	44	45	43 44 45	68	68	1166	1213	45	4%	0.7				
				Right	591a	591	54	591a 591 54	411	442	1166	1213	45	4%	0.7				
		Rubey St	EB	Left	50	52	591a	50 52 591a	92	102	1212	1212	0	0%	0.0				
				Right	50	591	44	50 591 44	225	170	1212	1212	0	0%	0.0				

Criteria for acceptable model performance

Links with difference in flow within 100 uph for flows < 700uph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 uph	13	16%
Links with difference in flow within 400 uph for flows > 1700 uph	0	0%
Links with GEH Statistic < 5	88.2%	
Links with GEH Statistic > 5 and 10	9.6%	
Links with GEH statistic > 10	1.2%	

Seed 560 8am-9am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Difference	GEH Statistic
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	1089	966	2445	2402	123	11%	3.8
			NB	Right	388	420	420a	388:420:420a	1357	1436			-80	-6%	2.1
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	541	554			-13	-2%	0.6
			WB	Through	392	420	390	392:420:390	1075	1145	1616	1699	-71	-7%	2.1
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1031	960	1527	1340	71	7%	2.2
			SB	Through	398	420	420b	398:420:420b	496	380			116	23%	5.5
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	169	184			-15	-9%	1.2
			NB	Through	433	589	589a	433:589:589a	1168	1175	1337	1359	-7	-1%	0.2
		NB	Right					0	0			0	0%	0.0	
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	424	327			97	23%	5.0
			EB	Through	446	589	433	446:589:433	58	156	482	483	-98	-170%	9.5
		EB	Right					0	0			0	0%	0.0	
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	523	566	997	1184	-43	-8%	1.8
			WB	Right	436	574	433	436:574:433	474	618			-144	-30%	6.2
		Botany Rd	SB	Left	433	438	436	433:438:436	331	362	800	855	-31	-9%	1.7
			SB	Through	433	574	574a	433:574:574a	469	493			-24	-5%	1.1
		Botany Rd	NB	Through	431	574	433	431:574:433	651	730	1612	1722	-79	-12%	3.0
			NB	Right	574a	574	436	574a:574:436	961	992			-31	-3%	1.0
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	382	419a:382:382	168	203			-37	-22%	2.7
			NB	Through	418	419	419b	418:419:419b	627	659	793	872	-42	-7%	1.6
		NB	Right					0	0			0	0%	0.0	
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	253	240			13	5%	0.8
			WB	Through	422	419	382	422:419:382	1014	1006	1267	1246	8	1%	0.3
		WB	Right					0	0			0	0%	0.0	
Botany Rd	SB	Left	414	417	416	414:417:416	8	47			-39	-525%	7.6		
	SB	Through	417	419	418	417:419:418	596	562	987	1095	34	6%	1.4		
Mill Pond Rd	SB	Right	419a	419	382	419a:419:382	384	486			-102	-26%	4.9		
	EB	Left	419a	406	419b	419a:406:419b	983	1054			-71	-8%	2.5		
	EB	Through	406	419	416	406:419:416	970	829	2376	2390	141	15%	4.7		
	EB	Right	408	419	418	408:419:418	424	497			-73	-17%	3.4		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	286	319			-33	-12%	1.9
			NB	Through	453	590	451	453:590:451	1498	1513	2191	2093	-15	-1%	0.4
		NB	Right	395	590	443	395:590:443	408	261			147	36%	8.0	
		General Holmes Dr	WB	Left	445	399	395	445:399:395	170	119			51	30%	4.2
			WB	Through	443	590	458	443:590:458	33	77	332	338	-18	-33%	2.2
		WB	Right	443	590	451	443:590:451	108	148			-40	-36%	3.5	
Joyce Dr	SB	Left	10	450	443	10:450:443	151	115			36	24%	3.1		
	SB	Through	450	590	395	450:590:395	1255	1126	1406	1241	129	10%	3.7		
SB	Right					0	0			0	0%	0.0			
Ross Smith Ave	EB	Left	456	590	451	456:590:451	74	92			-18	-24%	2.0		
	EB	Through	456	590	443	456:590:443	93	104	286	295	-11	-12%	1.1		
EB	Right	456	590	395	456:590:395	120	99			21	17%	2.0			
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	142	88	1566	1500	74	52%	7.2
			NB	Through	558	575	472	558:575:472	1423	1432			-9	-1%	0.2
		Botany Rd	SB	Through	472	575	558	472:575:558	759	753	889	857	6	1%	0.2
			SB	Right	472	575	905	472:575:905	131	104			27	20%	2.5
		Robey St	EB	Left	905	575	472	905:575:472	156	193			-37	-24%	2.8
			EB	Right	905	575	558	905:575:558	128	103	284	296	25	20%	2.4
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1802	1810	1802	1810	-8	0%	0.2
			WB	Right					0	0			0	0%	0.0
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	265	231	441	394	34	13%	2.1
			SB	Right	41	29	18	41:29:18	176	163			13	8%	1.0
		Wentworth Ave	EB	Left					0	0			0	0%	0.0
			EB	Through	18	29	34	18:29:34	1338	1329	1338	1329	9	1%	0.2
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	83	95			-12	-11%	1.3
			NB	Through	3086a	3086	20	3086a:3086:20	468	415	1075	1040	53	15%	2.5
		NB	Right	3086a	3086	35	3086a:3086:35	524	530			-6	-1%	0.3	
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	424	529			-105	-25%	4.8
			WB	Through	12	3086	26	12:3086:26	603	523	1531	1752	-20	-4%	0.9
		WB	Right	35	3086	20	35:3086:20	604	700			-96	-16%	3.8	
O'Riordan St	SB	Left	36	37	35	36:37:35	171	246			-75	-44%	5.2		
	SB	Through	19	3086	3086a	19:3086:3086a	440	461	611	707	-21	-5%	1.0		
SB	Right					0	0			0	0%	0.0			
Qantas Dr	EB	Left	30	31	20	30:31:20	157	133			24	15%	2.0		
	EB	Through	32	3086	35	32:3086:35	572	490	1167	995	82	14%	3.5		
EB	Right	26	3086	3086a	26:3086:3086a	438	372			66	15%	3.3			
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	58	102			-44	-75%	4.9
			NB	Through	57	591	591a	57:591:591a	1163	1142	1222	1244	21	2%	0.6
		NB	Right					0	0			0	0%	0.0	
		Robey St	WB	Left	48	49	19	48:49:19	76	41			35	46%	4.5
			WB	Through	48	591	54	48:591:54	151	132	227	173	19	13%	1.6
		WB	Right					0	0			0	0%	0.0	
O'Riordan St	SB	Left	43	44	45	43:44:45	65	76			-11	-16%	1.3		
	SB	Through	43	591	49	43:591:49	654	685	1110	1156	-31	-5%	1.2		
SB	Right	591a	591	54	591a:591:54	390	395			-5	-1%	0.2			
Robey St	EB	Left	50	52	591a	50:52:591a	1045	1146			-101	-10%	3.1		
	EB	Through	50	591	44	50:591:44	292	227	1337	1373	65	22%	4.0		
EB	Right					0	0			0	0%	0.0			

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	18%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5

90.4%

Links with GEH Statistic b/w 5 and 10

9.6%

Links with GEH statistic > 10

0.0%

Seed 2849 6am-7am

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	Obs Turning Counts		Modelled Turning Counts		Obs Approach Vol		Modelled Approach Vol		Difference	% Difference	GEH Statistic
					From	Via	To		6:00:00 7:00:00	6:00:00 7:00:00	6:00:00 7:00:00	6:00:00 7:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	520	468	1302	1218	0	0%	0.0				
			NB	Right	388	420	420a	388:420:420a	782	750			52	10%	2.3				
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	443	349			32	4%	1.2				
			WB	Through					0	0	2059	1899	94	21%	4.7				
		General Holmes Dr	WB	Right	392	420	390	392:420:390	1616	1550			0	0%	0.0				
			SB	Left	397	403	420a	397:403:420a	519	509			66	4%	1.6				
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	95	110	894	849	10	2%	0.5				
			NB	Through	433	589	589a	433:589:589a	660	548			35	9%	1.8				
		NB	Right					0	0			0	0%	0.0					
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	185	212			-15	-15%	1.5				
			EB	Through					0	0	257	352	112	17%	4.6				
		Botany Rd	EB	Right	446	589	433	446:589:433	72	140			0	0%	0.0				
SB	Left		449	589	433	449:589:433	535	528			-7	-1%	0.3						
3	Botany Rd/Wentworth Ave	Wentworth Ave	NB	Through	589a	589	446	589a:589:446	162	120	697	649	42	26%	3.5				
			WB	Left	436	574a	421	436:574a:421	304	363			-59	-19%	3.2				
		WB	Right	436	574	433	436:574:433	288	318	592	681	-30	-10%	1.7					
		Botany Rd	SB	Left	433	438	436	433:438:436	228	257			-29	-13%	1.9				
			SB	Through	433	574	574a	433:574:574a	323	404	550	661	-81	-25%	4.3				
		Botany Rd	NB	Through	431	574	433	431:574:433	395	345	905	867	50	13%	2.6				
NB	Right		574a	574	436	574a:574:436	509	522			-13	-2%	0.6						
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	93	111	421	378	-18	-19%	1.7				
			NB	Through	418	419	419b	418:419:419b	327	267			60	16%	3.5				
		NB	Right					0	0			0	0%	0.0					
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	402	312			90	22%	4.8				
			WB	Through	422	419	382	422:419:382	1613	1534	2015	1846	79	5%	2.0				
		Botany Rd	WB	Right					0	0			0	0%	0.0				
SB	Left		414	417	416	414:417:416	5	36			-31	-83%	7.0						
5	General Holmes Dr/Ross Smith Ave	General Holmes Dr	SB	Through	417	419	418	417:419:418	306	424	604	757	-118	-39%	6.2				
			SB	Right	419b	419	382	419b:419:382	294	297			-3	-1%	0.2				
		Joyce Dr	EB	Left	419x	406	419b	419x:406:419b	582	609			-27	-5%	1.1				
			EB	Through	406	419	416	406:419:416	489	406	1303	1259	83	17%	3.9				
		Ross Smith Ave	EB	Right	408	419	418	408:419:418	232	244			-12	-5%	0.8				
			NB	Left	455	468	461	455:468:461	536	446			90	17%	4.1				
6	Botany Rd/Robey St	Botany Rd	NB	Through	453	590	451	453:590:451	1453	1340	2147	1924	113	8%	3.0				
			NB	Right	395	590	443	395:590:443	159	138			21	13%	1.7				
		General Holmes Dr	WB	Left	445	399	395	445:399:395	130	61			69	53%	7.1				
			WB	Through	443	590	468	443:590:468	43	60	261	213	-17	-39%	2.3				
		Joyce Dr	WB	Right	443	590	451	443:590:451	88	92			-4	-5%	0.5				
			SB	Left	450	450	443	450:450:443	165	148			17	11%	1.4				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	SB	Through	450	590	395	450:590:395	688	725	853	883	-47	-7%	1.8				
			SB	Right					0	0			0	0%	0.0				
		Robey St	EB	Left	456	590	451	456:590:451	60	49			11	19%	1.5				
			EB	Through	456	590	443	456:590:443	75	72	233	177	3	4%	0.4				
		Botany Rd	EB	Right	456	590	395	456:590:395	97	56			41	42%	4.7				
			NB	Left	558	575	905	558:575:905	73	29	798	757	44	60%	6.1				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Botany Rd	NB	Through	558	575	472	558:575:472	726	728			-2	0%	0.1				
			SB	Through	472	575	558	472:575:558	545	589	716	700	-44	-6%	1.9				
		Robey St	SB	Right	472	575	905	472:575:905	172	111			61	35%	5.1				
			EB	Left	905	575	472	905:575:472	76	77	138	139	-1	-1%	0.1				
		Wentworth Ave	EB	Right	905	575	558	905:575:558	61	62			-1	-1%	0.1				
			WB	Through	34	29	18	34:29:18	1076	1103			-27	-3%	0.8				
9	O'Riordan St/Robey St	Wentworth Ave	WB	Right					0	0	1076	1103	0	0%	0.0				
			SB	Left	47	34	53	47:34:53	158	149	263	250	9	5%	0.7				
		Southern Cross Dr	SB	Right	41	29	18	41:29:18	105	101			4	4%	0.4				
			EB	Left					0	0	744	744	0	0%	0.0				
		Wentworth Ave	EB	Through	18	29	34	18:29:34	744	744			0	0%	0.0				
			NB	Left	22	23	26	22:23:26	58	61	1054	1046	-8	-1%	0.3				
10	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Through	3086a	3086	20	3086a:3086:20	720	635			85	12%	3.3				
			NB	Right	3086a	3086	35	3086a:3086:35	276	330			-54	-19%	3.1				
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	632	719			-87	-14%	3.3				
			WB	Through	12	3086	26	12:3086:26	493	389	1356	1401	104	21%	4.9				
		O'Riordan St	WB	Right	35	3086	20	35:3086:20	231	293			-62	-27%	3.8				
			SB	Left	36	37	35	36:37:35	112	161			-49	-44%	4.2				
11	O'Riordan St/Robey St	Qantas Dr	SB	Through	19	3086	3086a	19:3086:3086a	493	504	605	665	-11	-2%	0.5				
			SB	Right					0	0			0	0%	0.0				
		O'Riordan St	EB	Left	30	31	20	30:31:20	52	86			-34	-66%	4.1				
			EB	Through	32	3086	35	32:3086:35	413	406	936	968	7	2%	0.4				
		Robey St	EB	Right	26	3086	3086a	26:3086:3086a	471	476			-5	-1%	0.2				
			NB	Left	58	54	50	58:54:50	50	68			-18	-36%	2.3				
12	O'Riordan St/Robey St	O'Riordan St	NB	Through	57	591	591a	57:591:591a	1002	952	1052	1020	50	5%	1.6				
			NB	Right					0	0			0	0%	0.0				
		Robey St	WB	Left	48	49	19	48:49:19	48	30			18	37%	2.8				
			WB	Through	48	591	54	48:591:54	95	105	143	135	-10	-11%	1.0				
		O'Riordan St	WB	Right					0	0			0	0%	0.0				
			SB	Left	43	44	45	43:44:45	60	47			13	22%	1.8				
Robey St	SB	Through	43	591	49	43:591:49	603	648	942	995	-45	-7%	1.8						
	SB	Right	591a	591	54	591a:591:54	279	300			-21	-7%	1.2						
13	O'Riordan St/Robey St	Robey St	EB	Left	50	52	591a	50:52:591a	627	752			-125	-20%	4.8				
			EB	Through	50	591	44	50:591:44	122	93	749	845	29	24%	2.8				
		O'Riordan St	EB	Right					0	0			0	0%	0.0				
			NB	Left					0	0			0	0%	0.0				

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700 vph	70	84%
Links with difference in flow within 15% for flows 700 - 1700 vph	10	12%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	92.3%
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Links with GEH Statistic b/w 5 and 10 7.2%  
 Links with GEH statistic > 10 0.0%

Seed 2849 7am-8am

Obs Turning Counts    Modelled Turning Counts    Obs Approach Vol    Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		7:00:00	7:00:00	Difference	% Diff	Stat	GEH
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00						
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	817	711	1902	1756	0	0%	0.0			
			NB	Right	388	420	420a	388:420:420a	1085	1045			106	13%	3.8			
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	524	508	16	3%	0.7					
			WB	Through	392	420	390	392:420:390	1447	1596	-149	-10%	3.8					
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	871	901	-31	-4%	1.0					
			SB	Through	398	420	420b	398:420:420b	433	353	80	18%	4.0					
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	142	123	1123	1164	19	13%	1.6			
			NB	Through	433	589	589a	433:589:589a	982	1041			-59	-6%	1.9			
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	322	308	14	4%	0.8					
			EB	Through	446	589	433	446:589:433	73	159	0	0%	0.0					
		Botany Rd	SB	Left	449	589	433	449:589:433	855	699	156	18%	4.0					
			SB	Through	589a	589	446	589a:589:446	211	145	66	31%	4.9					
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	435	540	777	1104	-105	-24%	4.7			
			WB	Right	436	574	433	436:574:433	342	564			-222	-65%	10.4			
		Botany Rd	SB	Left	433	438	436	433:438:436	296	458	162	-55%	8.3					
			SB	Through	433	574	574a	433:574:574a	420	401	19	4%	0.9					
		Botany Rd	NB	Through	431	574	433	431:574:433	607	604	3	0%	0.1					
			NB	Right	574a	574	436	574a:574:436	745	654	92	12%	3.5					
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	161	194	747	704	-33	-21%	2.5			
			NB	Through	418	419	419b	418:419:419b	588	510			78	13%	3.2			
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	343	364	-21	-6%	1.1					
			WB	Through	422	419	382	422:419:382	1377	1471	-94	-7%	2.5					
		Botany Rd	WB	Right	414	417	416	414:417:416	6	16	0	0%	0.0					
			SB	Left	417	419	418	417:419:418	455	474	-19	-4%	0.9					
Mill Pond Rd	SB	Right	419a	419	382	419a:419:382	374	418	-44	-12%	2.2							
	EB	Left	419a	406	419b	419a:406:419b	786	746	40	5%	1.4							
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	379	456	2296	2380	-77	-20%	3.8			
			NB	Through	453	590	451	453:590:451	1652	1762			-110	-7%	2.7			
		General Holmes Dr	NB	Right	395	590	443	395:590:443	265	162	103	38%	7.0					
			WB	Left	445	399	395	445:399:395	171	80	91	53%	8.1					
		Joyce Dr	WB	Through	443	590	468	443:590:468	53	55	-2	-3%	0.2					
			WB	Right	443	590	451	443:590:451	108	144	-36	-33%	3.2					
Ross Smith Ave	SB	Left	450	450	443	10:450:443	167	209	-42	-25%	3.0							
	SB	Through	450	590	395	450:590:395	1056	1079	-23	-2%	0.7							
6	Botany Rd/Robey St	Botany Rd	SB	Left	456	590	451	456:590:451	70	68	1223	1288	2	0%	0.0			
			EB	Through	456	590	443	456:590:443	88	90			-2	-3%	0.3			
		Robey St	EB	Right	456	590	395	456:590:395	113	98	15	13%	1.4					
			NB	Left	558	575	505	558:575:505	115	99	16	57%	7.5					
		Botany Rd	NB	Through	443	590	468	443:590:468	1147	1282	-145	-13%	4.2					
			SB	Through	472	575	558	472:575:558	687	722	-35	-5%	1.3					
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1625	1510	951	1090	115	7%	2.9			
			WB	Right	47	34	53	47:34:53	212	195			17	8%	1.2			
		Southern Cross Dr	SB	Right	41	29	18	41:29:18	141	118	23	16%	2.0					
			EB	Left	18	29	34	18:29:34	951	1090	-139	-15%	4.3					
		Wentworth Ave	EB	Through	18	29	34	18:29:34	951	1090	-139	-15%	4.3					
			NB	Left	22	23	26	22:23:26	60	68	-8	-13%	1.0					
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Through	3086a	3086	20	3086a:3086:20	530	494	908	914	36	7%	1.6			
			NB	Right	3086a	3086	35	3086a:3086:35	318	352			-34	-11%	1.8			
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	578	758	-180	-31%	7.0					
			WB	Through	12	3086	26	12:3086:26	608	695	-87	-14%	3.4					
		O'Riordan St	WB	Right	35	3086	20	35:3086:20	458	577	-118	-26%	5.2					
			SB	Left	36	37	35	36:37:35	149	244	-95	-64%	8.6					
Qantas Dr	SB	Through	19	3086	3086a	19:3086:3086a	495	440	55	11%	2.5							
	SB	Right	30	31	20	30:31:20	102	116	-14	-13%	1.3							
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	53	90	1109	1183	-37	-70%	4.4			
			NB	Through	57	591	591a	57:591:591a	1056	1093			-37	-3%	1.1			
		Robey St	WB	Left	48	49	19	48:49:19	60	29	31	52%	4.7					
			WB	Through	48	591	54	48:591:54	120	125	-5	-4%	0.4					
		O'Riordan St	WB	Right	43	44	45	43:44:45	69	84	-15	-22%	1.8					
			SB	Through	43	591	49	43:591:49	687	647	40	6%	1.5					
Robey St	SB	Right	591a	591	54	591a:591:54	411	428	-17	-4%	0.8							
	EB	Left	50	52	591a	50:52:591a	995	1070	-75	-8%	2.3							
Robey St	EB	Through	50	591	44	50:591:44	228	140	88	38%	6.5							
	EB	Right	50	591	44	50:591:44	228	140	88	38%	6.5							

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 vph	13	16%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	86.7%
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Links with GEH Statistic b/w 5 and 10 12.0%

Links with GEH statistic >10 1.2%

Seed 2849 8am-9am

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Difference	GEH Statistic
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	1089	932	2445	2286	0	0%	0.0
			NB	Right	388	420	420a	388:420:420a	1357	1354			157	14%	4.9
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	541	561	1616	1723	3	0%	0.1
			WB	Through	392	420	390	392:420:390	1075	1162			-20	-4%	0.9
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1021	998	1527	1397	0	0%	0.0
			SB	Through	398	420	420b	398:420:420b	496	399			33	3%	1.0
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	169	186	1337	1390	97	20%	4.6
			NB	Through	433	589	589a	433:589:589a	1168	1204			0	0%	0.0
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	424	323	482	458	-17	-10%	1.3
			EB	Through	446	589	433	446:589:433	58	135			-36	-3%	1.0
		Botany Rd	SB	Left	449	589	433	449:589:433	793	721	995	901	0	0%	0.0
			SB	Through	589a	589	446	589a:589:446	201	180			72	9%	2.6
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	523	585	997	1225	-62	-12%	2.6
			WB	Right	436	574	433	436:574:433	474	640			-166	-35%	7.0
		Botany Rd	SB	Left	433	438	436	433:438:436	331	367	800	856	-36	-11%	1.9
			SB	Through	433	574	574a	433:574:574a	469	489			-20	-4%	0.9
		Botany Rd	NB	Through	431	574	433	431:574:433	651	750	1612	1718	-99	-15%	3.7
			NB	Right	574a	574	436	574a:574:436	961	968			-7	-1%	0.2
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	168	216	793	900	-50	-30%	3.8
			NB	Through	418	419	419b	418:419:419b	627	684			-57	-9%	2.2
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	253	265	1267	1271	0	0%	0.0
			WB	Through	422	419	382	422:419:382	1014	1006			-12	-5%	0.8
		Botany Rd	WB	Right	414	417	416	414:417:416	8	41	987	1110	8	1%	0.3
			SB	Left	417	419	418	417:419:418	596	583			0	0%	0.0
Mill Pond Rd	SB	Right	419b	419	382	419b:419:382	384	486	2376	2349	-102	-26%	4.9		
	EB	Left	419a	406	419b	419a:406:419b	863	1042			13	2%	0.5		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	286	295	2191	2087	-9	-3%	0.6
			NB	Through	453	590	451	453:590:451	1498	1534			-36	-2%	0.9
		General Holmes Dr	NB	Right	395	590	443	395:590:443	408	258	332	369	150	37%	8.2
			WB	Left	445	399	395	445:399:395	170	128			42	25%	3.4
		Joyce Dr	WB	Through	443	590	468	443:590:468	53	66	1406	1283	-13	-24%	1.8
			WB	Right	443	590	451	443:590:451	108	165			-57	-32%	4.8
Ross Smith Ave	SB	Left	10	450	443	10:450:443	151	98	286	281	53	35%	4.7		
	SB	Through	450	590	395	450:590:395	1255	1185			70	6%	2.0		
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	142	80	1566	1513	62	44%	5.9
			NB	Through	558	575	472	558:575:472	1423	1433			-10	-1%	0.3
		Robey St	SB	Through	472	575	558	472:575:558	759	783	889	891	-24	-3%	0.9
			SB	Right	472	575	905	472:575:905	131	108			23	17%	2.1
		Botany Rd	EB	Left	905	575	472	905:575:472	156	182	284	303	-26	-17%	2.0
			EB	Right	905	575	558	905:575:558	128	121			7	6%	0.7
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1802	1765	1802	1765	37	2%	0.9
			WB	Right	47	34	53	47:34:53	265	267			0	0%	0.0
		Southern Cross Dr	SB	Left	41	29	18	41:29:18	176	146	1338	1315	-2	-1%	0.1
			SB	Right	18	29	34	18:29:34	1338	1315			30	17%	2.4
		Wentworth Ave	EB	Left	22	23	26	22:23:26	83	81	1338	1315	2	2%	0.2
			EB	Through	3086a	3086	20	3086a:3086:20	468	408			60	13%	2.9
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	524	528	1075	1017	-4	-1%	0.2
			NB	Through	3086a	3086	20	3086a:3086:20	424	534			-110	-26%	5.0
		Joyce Dr	WB	Through	12	3086	26	12:3086:26	503	542	1531	1803	-39	-8%	1.7
			WB	Right	35	3086	20	35:3086:20	604	727			-123	-20%	4.8
		O'Riordan St	SB	Left	36	37	35	36:37:35	171	247	611	689	-76	-44%	5.2
			SB	Through	19	3086	3086a	19:3086:3086a	440	442			-2	0%	0.1
Qantas Dr	EB	Left	30	31	20	30:31:20	157	137	1167	1066	20	13%	1.6		
	EB	Through	32	3086	35	32:3086:35	572	515			57	10%	2.4		
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	438	414	1222	1252	24	6%	1.2
			NB	Through	57	591	591a	57:591:591a	58	105			-47	-81%	5.2
		Robey St	NB	Right	57	591	591a	57:591:591a	1163	1147	227	186	16	1%	0.5
			WB	Left	48	49	19	48:49:19	76	39			37	48%	4.8
		O'Riordan St	WB	Through	48	591	54	48:591:54	151	147	1110	1106	4	3%	0.3
			WB	Right	43	44	45	43:44:45	0	0			0	0%	0.0
Robey St	SB	Left	43	44	45	43:44:45	65	93	1337	1337	-28	-42%	3.1		
	SB	Through	43	591	49	43:591:49	654	666			-12	-2%	0.5		
Robey St	EB	Right	591a	591	54	591a:591:54	390	347	1110	1106	43	11%	2.3		
	EB	Left	50	52	591a	50:52:591a	1045	1122			-77	-7%	2.3		
Robey St	EB	Through	50	591	44	50:591:44	292	215	1337	1337	77	26%	4.8		
	EB	Right	50	591	44	50:591:44	0	0			0	0%	0.0		

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	59	71%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	18%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	<b>89.2%</b>	
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Links with GEH Statistic  
 b/w 5 and 10      10.8%  
 Links with GEH statistic  
 > 10      0.0%

Seed 7771 6am-7am

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	Obs Turning Counts		Modelled Turning Counts		Obs Approach Vol		Modelled Approach Vol		Difference	% Difference	GEH Statistic
					From	Via	To		6:00:00 7:00:00	6:00:00 7:00:00	6:00:00 7:00:00	6:00:00 7:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	520	502	1302	1263	0	0%	0.0				
			NB	Right	388	420	420a	388:420:420a	782	761			18	3%	0.8				
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	443	330	2059	2039	113	26%	5.7				
			WB	Through	392	420	380	392:420:380	1616	1709			0	0%	0.0				
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	519	479	894	804	-94	-8%	2.3				
			SB	Through	398	420	420b	398:420:420b	375	325			40	8%	1.8				
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	95	110	755	660	0	0%	0.0				
			NB	Through	433	589	589a	433:589:589a	660	550			-15	-15%	1.5				
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	185	191	257	345	110	17%	4.5				
			EB	Through	446	589	433	446:589:433	72	154			0	0%	0.0				
		Botany Rd	SB	Left	449	589	433	449:589:433	535	545	697	655	-82	-115%	7.8				
			SB	Through	589a	589	446	589a:589:446	162	110			0	0%	0.0				
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	304	321	592	622	17	8%	1.0				
			WB	Right	436	574	433	436:574:433	288	301			-13	-4%	0.7				
		Botany Rd	SB	Left	433	438	436	433:438:436	228	259	550	686	-31	-14%	2.0				
			SB	Through	433	574	574a	433:574:574a	323	427			-104	-32%	5.4				
		Botany Rd	NB	Through	431	574	433	431:574:433	395	359	905	909	36	9%	1.9				
			NB	Right	574a	574	436	574a:574:436	509	550			-41	-8%	1.8				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	93	118	421	425	-25	-26%	2.4				
			NB	Through	418	419	419b	418:419:419b	327	307			20	8%	1.1				
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	402	332	2015	1989	0	0%	0.0				
			WB	Through	422	419	382	422:419:382	1613	1657			-44	-3%	1.1				
		Botany Rd	SB	Left	414	417	416	414:417:416	5	37	604	734	0	0%	0.0				
			SB	Through	417	419	418	417:419:418	306	422			-116	-38%	6.1				
Mill Pond Rd	EB	Left	419b	419	382	419b:419:382	294	275	1303	1236	19	6%	1.1						
	EB	Through	406	419	416	406:419:416	382	611			-29	-5%	1.2						
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	536	533	2147	2147	3	1%	0.1				
			NB	Through	453	590	451	453:590:451	1453	1494			-41	-3%	1.1				
		General Holmes Dr	NB	Right	395	590	443	395:590:443	159	120	261	210	39	24%	3.3				
			WB	Left	445	399	395	445:399:395	130	50			80	62%	8.4				
		Joyce Dr	WB	Through	443	590	468	443:590:468	43	62	853	846	-19	-44%	2.6				
			WB	Right	443	590	451	443:590:451	88	98			-10	-12%	1.1				
Ross Smith Ave	SB	Left	10	450	443	10:450:443	165	148	233	195	17	11%	1.4						
	SB	Through	450	590	395	450:590:395	588	698			-10	-1%	0.4						
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	60	57	798	741	3	5%	0.4				
			NB	Through	558	575	472	558:575:472	726	706			20	3%	0.7				
		Botany Rd	SB	Through	472	575	558	472:575:558	545	601	716	709	-56	-10%	2.3				
			SB	Right	472	575	905	472:575:905	172	108			64	37%	3.4				
		Robey St	EB	Left	905	575	472	905:575:472	76	74	138	132	2	3%	0.3				
			EB	Right	905	575	558	905:575:558	61	58			3	5%	0.4				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1076	1062	1076	1068	14	1%	0.4				
			WB	Right	47	34	53	47:34:53	158	164			-7	-4%	0.5				
		Southern Cross Dr	SB	Left	41	29	18	41:29:18	105	84	263	248	21	20%	2.2				
			SB	Right	18	29	34	18:29:34	744	796			0	0%	0.0				
		Wentworth Ave	EB	Left	22	23	26	22:23:26	98	62	744	796	-32	-7%	1.9				
			EB	Through	22	23	26	22:23:26	744	796			0	0%	0.0				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	3086a	3086	20	3086a:3086:20	42	378	1054	1041	4	8%	1.5				
			NB	Right	3086a	3086	35	3086a:3086:35	276	301			-25	-9%	1.5				
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	632	776	1356	1556	-144	-23%	5.4				
			WB	Through	12	3086	26	12:3086:26	493	467			26	5%	1.2				
		O'Riordan St	WB	Through	35	3086	20	35:3086:20	231	313	605	638	-82	-35%	5.0				
			SB	Left	36	37	35	36:37:35	112	158			-46	-42%	4.0				
Qantas Dr	SB	Through	19	3086	3086a	19:3086:3086a	493	480	936	911	13	3%	0.8						
	SB	Right	30	31	20	30:31:20	52	80			0	0%	0.0						
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	50	54	1052	1079	-4	-8%	0.5				
			NB	Through	57	591	591a	57:591:591a	1002	1025			-23	-2%	0.7				
		Robey St	NB	Right	48	49	19	48:49:19	48	18	143	140	0	0%	0.0				
			WB	Through	48	591	54	48:591:54	95	122			30	62%	5.2				
		O'Riordan St	WB	Right	43	44	45	43:44:45	0	0	942	989	-27	-28%	2.6				
			SB	Left	43	591	49	43:591:49	60	51			9	15%	1.2				
Robey St	SB	Through	591a	591	54	591a:591:54	603	635	749	743	-32	-5%	1.3						
	EB	Left	50	52	591a	50:52:591a	279	303			-24	-9%	1.4						
Robey St	EB	Through	50	591	44	50:591:44	627	661	0	0	-34	-5%	1.3						
	EB	Right	50	591	44	50:591:44	122	82			40	33%	4.0						

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	88	82%
Links with difference in flow within 15% for flows 700 - 1700 vph	11	13%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%
b) Links with GEH Statistic < 5	88.0%	

Links with GEH Statistic b/w 5 and 10 12.0%  
 Links with GEH statistic > 10 0.0%

Seed 7771 7am-8am

Obs Turning Counts    Modelled Turning Counts    Obs Approach Vol    Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Difference	GEH Statistic
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	817	729	1902	1844	88	11%	3.2
			NB	Right	388	420	420a	388:420:420a	1085	1115			-30	-3%	0.9
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	524	483			41	8%	1.8
			WB	Through					0	0	1972	1923	0	0%	0.0
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1447	1440			7	1%	0.2
			SB	Through	398	420	420b	398:420:420b	871	862			9	1%	0.3
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Through	441	446	442	441:446:442	142	141	1123	1208	-85	-9%	2.7
			NB	Right	433	589	589a	433:589:589a	982	1067			0	0%	0.0
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	322	315			7	2%	0.4
			EB	Through	446	589	433	446:589:433	73	146	395	461	0	0%	0.0
		Botany Rd	SB	Left	449	589	433	449:589:433	855	702	866	859	0	0%	0.0
			SB	Right	589a	589	446	589a:589:446	211	157			54	26%	4.0
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	435	536	777	1140	-101	-23%	4.6
			WB	Right	436	574	433	436:574:433	342	604			-262	-77%	12.1
		Botany Rd	SB	Left	433	438	436	433:438:436	296	453	852	852	0	0%	0.0
			SB	Through	433	574	574a	433:574:574a	420	399	716	852	21	5%	1.0
		Botany Rd	NB	Through	431	574	433	431:574:433	607	610	1353	1339	-3	-1%	0.1
			NB	Right	574a	574	436	574a:574:436	746	729			17	2%	0.6
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	161	186	747	714	-25	-3%	1.9
			NB	Through	418	419	419b	418:419:419b	586	528			58	10%	2.4
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	343	327			16	5%	0.9
			WB	Through	422	419	382	422:419:382	1377	1327	1719	1654	50	4%	1.3
		Botany Rd	WB	Right					0	0			0	0%	0.0
			SB	Left	414	417	416	414:417:416	6	9	835	889	-3	-42%	1.0
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Through	455	468	461	455:468:461	379	405	2296	2192	-26	-7%	1.3
			NB	Right	453	590	451	453:590:451	1652	1622			30	2%	0.8
		General Holmes Dr	NB	Right	395	590	443	395:590:443	265	165			100	38%	6.8
			WB	Left	445	399	395	445:399:395	171	91	332	306	80	47%	7.0
		Joyce Dr	WB	Through	443	590	468	443:590:468	53	55			-2	-3%	0.2
			WB	Right	443	590	451	443:590:451	108	160			-52	-48%	4.5
Ross Smith Ave	SB	Left	10	450	443	10:450:443	167	203	1223	1236	-36	-21%	2.8		
6	Botany Rd/Robey St	Botany Rd	NB	Through	558	575	905	558:575:905	115	58	1261	1368	57	4%	6.1
			NB	Through	558	575	472	558:575:472	1147	1310			-163	-14%	4.7
		Robey St	SB	Through	472	575	558	472:575:558	687	762	851	878	-75	-11%	2.8
			SB	Right	472	575	905	472:575:905	164	116			48	29%	4.0
		Robey St	EB	Left	905	575	472	905:575:472	126	119	218	215	7	5%	0.6
			EB	Right	905	575	558	905:575:558	92	96			-4	-4%	0.4
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1625	1559	1625	1559	66	4%	1.7
			WB	Right					0	0			0	0%	0.0
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	212	183	353	314	29	13%	2.0
			SB	Right	41	29	18	41:29:18	141	131			10	7%	0.9
		Wentworth Ave	EB	Left					0	0	951	1147	0	0%	0.0
			EB	Through	18	29	34	18:29:34	951	1147			-196	-21%	5.9
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	60	66	908	881	-6	-10%	0.8
			NB	Through	3086a	3086	20	3086a:3086:20	530	503			27	5%	1.2
		Joyce Dr	NB	Right	3086a	3086	35	3086a:3086:35	318	312			6	2%	0.3
			WB	Left	14	16	3086a	14:16:3086a	578	686	1645	1920	-108	-19%	4.3
		O'Riordan St	WB	Through	12	3086	26	12:3086:26	608	673			-65	-11%	2.6
			WB	Right	35	3086	20	35:3086:20	459	561			-102	-22%	4.5
9	O'Riordan St/Robey St	O'Riordan St	SB	Left	36	37	35	36:37:35	148	229	644	683	-80	-54%	5.8
			SB	Through	19	3086	3086a	19:3086:3086a	495	454			41	8%	1.9
		Robey St	SB	Right					0	0			0	0%	0.0
			EB	Left	30	31	20	30:31:20	102	115	1218	1239	-13	-12%	1.2
		O'Riordan St	EB	Through	32	3086	35	32:3086:35	649	715			-66	-10%	2.5
			EB	Right	26	3086	3086a	26:3086:3086a	467	409			58	12%	2.8
10	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	53	84	1109	1174	-31	-59%	3.8
			NB	Through	57	591	591a	57:591:591a	1056	1090			-34	-3%	1.0
		Robey St	NB	Right					0	0			0	0%	0.0
			WB	Left	48	49	19	48:49:19	60	25	181	168	35	58%	5.4
		O'Riordan St	WB	Through	48	591	54	48:591:54	120	143			-23	-19%	2.0
			WB	Right					0	0			0	0%	0.0
11	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	69	56	1166	1111	13	18%	1.6
			SB	Through	43	591	49	43:591:49	687	650			37	5%	1.4
		Robey St	SB	Right	591a	591	54	591a:591:54	411	405			6	1%	0.3
			EB	Left	50	52	591a	50:52:591a	995	1077	1222	1236	-82	-8%	2.6
		Robey St	EB	Through	50	591	44	50:591:44	228	159			69	30%	4.9
			EB	Right					0	0			0	0%	0.0

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	62	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	13	16%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5	89.2%	
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Links with GEH Statistic b/w 5 and 10 9.6%  
 Links with GEH statistic > 10 1.2%

Seed 7771 8am-9am

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	Obs Turning Counts		Modelled Turning Counts		Obs Approach Vol		Modelled Approach Vol		Difference	% Difference	GEH Statistic
					From	Via	To		8:00:00 9:00:00	8:00:00 9:00:00	8:00:00 9:00:00	8:00:00 9:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Through	387	420	390	387:420:390	1089	936	2445	2331	0	0%	0.0				
			NB	Right	388	420	420a	388:420:420a	1357	1395			153	14%	4.8				
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	541	617			-76	-14%	3.2				
			WB	Through	392	420	390	392:420:390	1075	1106	1616	1723	-32	-3%	1.0				
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1031	987			44	4%	1.4				
			SB	Through	398	420	420b	398:420:420b	498	409	1527	1396	87	18%	4.1				
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	169	171			-2	-1%	0.2				
			NB	Through	433	589	589a	433:589:589a	1168	1246	1337	1417	-78	-7%	2.2				
		NB	Right					0	0			0	0%	0.0					
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	424	332			92	22%	4.7				
			EB	Through	446	589	433	446:589:433	58	121	482	453	0	0%	0.0				
		Botany Rd	SB	Left	449	589	433	449:589:433	793	735	995	881	98	7%	2.1				
SB	Through		589a	589	446	589a:589:446	201	146			55	27%	4.2						
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	523	614	997	1265	-91	-17%	3.8				
			WB	Right	436	574	433	436:574:433	474	651			-177	-37%	7.5				
		Botany Rd	SB	Left	433	438	436	433:438:436	331	350	800	859	-19	-6%	1.0				
			SB	Through	433	574	574a	433:574:574a	469	509			-40	-9%	1.8				
		Botany Rd	NB	Through	431	574	433	431:574:433	651	784	1612	1748	-113	-17%	4.3				
			NB	Right	574a	574	436	574a:574:436	961	984			-23	-2%	0.7				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	166	240			-74	-44%	5.2				
			NB	Through	418	419	419b	418:419:419b	827	690	793	930	-63	-10%	2.4				
		NB	Right					0	0			0	0%	0.0					
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	253	238			15	6%	0.9				
			WB	Through	422	419	382	422:419:382	1014	959	1267	1197	55	5%	1.8				
		Botany Rd	WB	Right					0	0			0	0%	0.0				
			SB	Left	414	417	416	414:417:416	8	46			-38	-512%	7.4				
		Botany Rd	SB	Through	417	419	418	417:419:418	596	603	987	1165	-7	-1%	0.3				
			SB	Right	419b	419	382	419b:419:382	384	516			-132	-34%	6.2				
		Mill Pond Rd	EB	Left	419k	406	419b	419k:406:419b	863	1067			-84	-8%	2.6				
			EB	Through	406	419	416	406:419:416	970	870	2376	2377	100	10%	3.3				
		Mill Pond Rd	EB	Right	408	419	418	408:419:418	424	440			-16	-4%	0.8				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	286	271			15	5%	0.9				
			NB	Through	453	590	451	453:590:451	1498	1615	2191	2060	-17	-1%	0.4				
		NB	Right	395	590	443	395:590:443	408	274			134	33%	7.3					
		General Holmes Dr	WB	Left	445	399	395	445:399:395	170	116	332	318	54	32%	4.6				
			WB	Through	443	590	468	443:590:468	53	66			-13	-24%	1.6				
		Joyce Dr	WB	Right	443	590	451	443:590:451	108	136			-28	-25%	2.5				
			SB	Left	10	450	443	10:450:443	151	103	1406	1267	48	32%	4.2				
		Joyce Dr	SB	Through	450	590	395	450:590:395	1255	1164			91	7%	2.6				
			SB	Right					0	0			0	0%	0.0				
		Ross Smith Ave	EB	Left	456	590	451	456:590:451	74	97			-23	-31%	2.5				
			EB	Through	456	590	443	456:590:443	93	78	286	290	15	16%	1.6				
		Ross Smith Ave	EB	Right	456	590	395	456:590:395	120	115			5	4%	0.4				
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	142	66	1566	1577	76	54%	7.5				
			NB	Through	558	575	472	558:575:472	1423	1511			-88	-6%	2.3				
		Botany Rd	SB	Through	472	575	558	472:575:558	759	785	889	911	-26	-3%	0.9				
			SB	Right	472	575	905	472:575:905	131	126			5	4%	0.4				
		Robey St	EB	Left	905	575	472	905:575:472	158	189	284	294	-43	-28%	3.3				
			EB	Right	905	575	558	905:575:558	128	95			33	26%	3.2				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1802	1775	1802	1775	27	1%	0.6				
			WB	Right					0	0			0	0%	0.0				
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	265	245	441	409	20	7%	1.2				
			SB	Right	41	29	18	41:29:18	176	164			12	7%	1.0				
		Wentworth Ave	EB	Left					0	0	1338	1333	5	0%	0.1				
			EB	Through	18	29	34	18:29:34	1338	1333			5	0%	0.1				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	83	85			-2	-3%	0.3				
			NB	Through	3086a	3086	20	3086a:3086:20	468	430	1075	1058	38	8%	1.8				
		NB	Right	3086a	3086	35	3086a:3086:35	524	543			-19	-4%	0.8					
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	424	530			-106	-25%	4.8				
			WB	Through	12	3086	26	12:3086:26	503	538	1531	1762	-35	-7%	1.6				
		O'Riordan St	WB	Right	35	3086	20	35:3086:20	604	694			-90	-15%	3.5				
			SB	Left	36	37	35	36:37:35	171	233	611	692	-62	-36%	4.3				
		Qantas Dr	SB	Through	19	3086	3086a	19:3086:3086a	440	459			-19	-4%	0.9				
			SB	Right					0	0			0	0%	0.0				
		O'Riordan St	EB	Left	30	31	20	30:31:20	157	152			5	3%	0.4				
			EB	Through	32	3086	35	32:3086:35	572	502	1167	1042	70	12%	3.0				
		O'Riordan St	EB	Right	26	3086	3086a	26:3086:3086a	438	388			50	11%	2.5				
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	58	106			-48	-82%	5.3				
			NB	Through	57	591	591a	57:591:591a	1163	1157	1222	1263	6	1%	0.2				
		NB	Right					0	0			0	0%	0.0					
		Robey St	WB	Left	48	49	19	48:49:19	76	42			34	44%	4.4				
			WB	Through	48	591	54	48:591:54	151	156	227	198	-5	-3%	0.4				
		O'Riordan St	WB	Right					0	0			0	0%	0.0				
			SB	Left	43	44	45	43:44:45	65	82			-17	-25%	1.9				
		Robey St	SB	Through	43	591	49	43:591:49	654	664	1110	1109	-10	-1%	0.4				
			SB	Right	591a	591	54	591a:591:54	390	363			27	7%	1.4				
		Robey St	EB	Left	50	52	591a	50:52:591a	1045	1110			-65	-6%	2.0				
			EB	Through	50	591	44	50:591:44	292	224	1337	1334	68	23%	4.2				
		Robey St	EB	Right					0	0			0	0%	0.0				

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	14	17%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%
b) Links with GEH Statistic < 5		90.4%
Links with GEH Statistic b/w 5 and 10		9.6%
Links with GEH statistic > 10		0.0%



## **Appendix D. PM peak calibration statistics**

Seed 86524 3pm-4pm

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Differences	GEH Statistic
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0	0	1043	997	0	0%	0.0	
			NB	Through	397	420	390	387:420:390	481			437	44	9%	2.0
			NB	Right	388	420	420a	388:420:420a	563			560	3	0%	0.1
			WB	Left	411	420b	386	411:420b:386	1001			956	45	5%	1.4
		Mill Pond Rd	WB	Through					0	0	2065	2004	0	0%	0.0
			WB	Right	392	420	390	392:420:390	1064	1048			16	1%	0.5
			SB	Left	397	403	420a	397:403:420a	778	756			22	3%	0.8
			SB	Through	398	420	420b	398:420:420b	1010	1046			-36	-4%	1.1
			SB	Right					0	0			0	0%	0.0
			EB	Left	441	446	442	441:446:442	209	148			61	29%	4.5
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	209	148	1133	996	61	29%	4.5
			NB	Through	433	589	589a	433:589:589a	924	848			76	8%	2.6
			NB	Right					0	0			0	0%	0.0
			EB	Left	446	589a	448	446:589a:448	178	163			15	8%	1.1
		General Holmes Dr	EB	Through					0	0	243	265	0	0%	0.0
			EB	Right	446	589	433	446:589:433	65	102			-37	-57%	4.1
			SB	Left					0	0			0	0%	0.0
			SB	Through	449	589	433	449:589:433	781	808			-27	-3%	1.0
			SB	Right	589a	589	446	589a:589:446	401	391			10	3%	0.5
			EB	Left	436	574a	421	436:574a:421	628	708			-80	-13%	3.1
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	628	708	1047	1269	-80	-13%	3.1
			WB	Right	436	574	433	436:574:433	419	561			-142	-34%	6.4
			SB	Left	433	438	436	433:438:436	309	406			-97	-31%	5.1
			SB	Through	433	574	574a	433:574:574a	523	513			10	2%	0.4
		Botany Rd	NB	Through	431	574	433	431:574:433	455	443	12	3%	0.5		
			NB	Right	574a	574	436	574a:574:436	657	821	-164	-25%	6.0		
			NB	Left	419a	382	382	419a:382:382	382	323	59	15%	3.1		
			NB	Through	418	419	419b	418:419:419b	637	765	-128	-20%	4.8		
			NB	Right					0	0	0	0%	0.0		
			WB	Left	422	418	423	422:418:423	123	113	10	8%	0.9		
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Southern Cross Dr	WB	Through	422	419	382	422:419:382	941	946	1064	1059	-5	-1%	0.2
			WB	Right					0	0			0	0%	0.0
			SB	Left	414	417	416	414:417:416	12	21			-9	-80%	2.3
			SB	Through	417	419	418	417:419:418	526	498			28	5%	1.2
		Botany Rd	SB	Right	419b	419	382	419b:419:382	658	741	-83	-13%	3.2		
			EB	Left	419a	406	419b	419a:406:419b	492	499	-7	-1%	0.3		
			EB	Through	406	419	416	406:419:416	761	655	106	14%	4.0		
			EB	Right	408	419	418	408:419:418	134	165	-31	-23%	2.5		
			NB	Left	455	468	461	455:468:461	278	263	15	5%	0.9		
			NB	Through	453	590	451	453:590:451	1200	1138	62	5%	1.8		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	278	263	1586	1473	15	5%	0.9
			NB	Through	453	590	451	453:590:451	1200	1138			62	5%	1.8
			NB	Right	395	590	443	395:590:443	109	72			37	34%	3.9
			WB	Left	445	399	395	445:399:395	385	332			53	14%	2.8
		General Holmes Dr	WB	Through	443	590	468	443:590:468	51	66	-15	-28%	1.9		
			WB	Right	443	590	451	443:590:451	140	133	7	5%	0.6		
			SB	Left	10	450	443	10:450:443	130	90	40	31%	3.8		
			SB	Through	450	590	395	450:590:395	1202	1261	-59	-5%	1.7		
			SB	Right					0	0	0	0%	0.0		
			EB	Left	456	590	451	456:590:451	86	74	12	14%	1.3		
6	Botany Rd/Robey St	Robey St	EB	Through	456	590	443	456:590:443	101	102	401	385	-1	-1%	0.1
			EB	Right	456	590	395	456:590:395	215	209			6	3%	0.4
			NB	Left	558	575	905	558:575:905	87	94			-7	-8%	0.7
			NB	Through	558	575	472	558:575:472	870	918			-48	-6%	1.6
		Botany Rd	SB	Through	472	575	558	472:575:558	940	1094	-154	-16%	4.8		
			SB	Right	472	575	905	472:575:905	290	222	68	24%	4.3		
			EB	Left	905	575	472	905:575:472	94	74	20	21%	2.2		
			EB	Right	905	575	558	905:575:558	88	110	-22	-25%	2.2		
			WB	Through	34	29	18	34:29:18	1860	1821	39	2%	0.9		
			WB	Right					0	0	0	0%	0.0		
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	SB	Left	47	34	53	47:34:53	391	414	651	542	-23	-4%	1.2
			SB	Right	41	29	18	41:29:18	260	128			132	51%	9.5
			EB	Left					0	0			0	0%	0.0
			EB	Through	18	29	34	18:29:34	1193	1133			60	5%	1.8
		Southern Cross Dr	NB	Left	22	23	26	22:23:26	78	53	25	32%	3.1		
			NB	Through	3086a	3086	20	3086a:3086:20	599	576	23	4%	1.0		
			NB	Right	3086a	3086	35	3086a:3086:35	523	537	-14	-3%	0.6		
			WB	Left	14	16	3086a	14:16:3086a	581	607	-26	-4%	1.1		
			WB	Through	12	3086	26	12:3086:26	391	421	-30	-8%	1.5		
			WB	Right	35	3086	20	35:3086:20	273	320	-47	-17%	2.8		
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	SB	Left	36	37	35	36:37:35	321	491	1244	1348	-170	-53%	8.4
			SB	Through	19	3086	3086a	19:3086:3086a	659	568			91	14%	2.9
			SB	Right					0	0			0	0%	0.0
			EB	Left	30	31	20	30:31:20	53	58			-5	-9%	0.7
		O'Riordan St	EB	Through	32	3086	35	32:3086:35	268	327	-59	-22%	3.4		
			EB	Right	26	3086	3086a	26:3086:3086a	461	394	67	15%	3.3		
			NB	Left	58	54	50	58:54:50	47	59	-12	-26%	1.7		
			NB	Through	57	591	591a	57:591:591a	937	878	59	6%	2.0		
			NB	Right					0	0	0	0%	0.0		
			WB	Left	48	49	19	48:49:19	93	131	-39	-42%	3.6		
9	O'Riordan St/Robey St	O'Riordan St	WB	Through	48	591	54	48:591:54	185	187	278	318	-2	-1%	0.1
			WB	Right					0	0			0	0%	0.0
			SB	Left	43	44	45	43:44:45	98	100			-2	-2%	0.2
			SB	Through	43	591	49	43:591:49	984	934			50	5%	1.6
		Robey St	SB	Right	591a	591	54	591a:591:54	522	574	-52	-10%	2.2		
			EB	Left	50	52	591a	50:52:591a	359	386	-27	-7%	0.3		
			EB	Through	50	591	44	50:591:44	97	82	15	16%	1.6		
			EB	Right					0	0	0	0%	0.0		

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	63	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%
Links with GEH Statistic < 5	94.0%	
Links with GEH Statistic b/w 5 and 10	6.0%	
Links with GEH statistic > 10	0.0%	

Seed 86524 4pm-5pm

Obs Turning Counts      Modelled Turning Counts      Obs Approach Vol      Modelled Approach Vol

Junction No.	Junction	Direction	Turning Movement		Node		Node Description	7:00:00		7:00:00		0.29166667	Difference	% Differences	GEH Statistic		
			From	Via	8:00:00	8:00:00		8:00:00	8:00:00								
1	General Holmes Dr/ Mill Pond Rd	General Holmes Dr	NB	Left			..			1036		1001	0	0.0	0.0		
			NB	Through	387	420	390	387:420:390	438	405	2095		33	0.1	1.6		
		Mill Pond Rd	NB	Right	388	420	420a	388:420:420a	597.5	596	1657		2	0.0	0.1		
			WB	Left	411	420b	386	411:420b:386	1059.75	1017	2146	2083	43	0.0	1.3		
		General Holmes Dr	WB	Through	392	420	390	392:420:390	1086	1066	3055		0	0.0	0.0		
			SB	Left	397	403	420a	397:403:420a	832.75	888	1969	1887	-55	-0.1	1.9		
			SB	Through	398	420	420b	398:420:420b	1136.5	999	1356		138	0.1	4.2		
			SB	Right				..			0	0	0	0.0	0.0		
			NB	Left	441	446	442	441:446:442	219.6992721	178	1193	1106	42	0.2	3.0		
			NB	Through	433	589	589a	433:589:589a	973.4	928	1139		45	0.0	1.5		
2	Botany Rd/General Holmes	General Holmes Dr	NB	Right			..			165		0	0.0	0.0			
			EB	Left	446	589a	448	446:589a:448	165.4	151	225	259	14	0.1	1.1		
		Botany Rd	EB	Through	446	589	433	446:589:433	60.4	108	979		-48	-0.8	5.2		
			SB	Left	446	589	433	446:589:433	60.4	0	1318	1414	0	0.0	0.0		
		General Holmes Dr	SB	Through	449	589	433	449:589:433	817.4	871	1930		-54	-0.1	1.8		
			SB	Right	589a	589	446	589a:589:446	500.8	543	1536		-42	-0.1	1.8		
			WB	Left	436	574a	421	436:574a:421	611.6	694	1359	1267	-82	-0.1	3.2		
			WB	Right	436	574	433	436:574:433	423.4	573	1295		-150	-0.4	6.7		
			SB	Left	433	438	436	433:438:436	323.780625	376	1359	972	-52	-0.2	2.8		
			SB	Through	433	574	574a	433:574:574a	548.2	596	1724		-48	-0.1	2.0		
3	Botany Rd/Wentworth Ave	Wentworth Ave	NB	Through	431	574	433	431:574:433	486.8	521	1647	1332	-34	-0.1	1.5		
			NB	Right	574a	574	436	574a:574:436	689	811	1834		-122	-0.2	4.5		
		Botany Rd	NB	Left	419a	382	392	419a:382:392	471.4	439	1145	1233	32	0.1	1.5		
			NB	Through	418	419	419b	418:419:419b	673.6	794	801		-120	-0.2	4.4		
		Southern Cross Dr	NB	Right				..			0	0	0	0.0	0.0		
			WB	Left	422	418	423	422:418:423	127.1118367	111	1100	1052	16	0.1	1.5		
		4	Mill Pond Rd/Southern Cross Dr	Southern Cross Dr	WB	Through	422	419	382	422:419:382	973.2	941	985		32	0.0	1.0
					WB	Right				..			532		0	0.0	0.0
				Botany Rd	SB	Left	414	417	418	414:417:418	11.62016679	64	1191	1260	-52	-0.5	8.5
					SB	Through	417	419	418	417:419:418	520	496	1691		24	0.0	1.1
Mill Pond Rd	SB			Right	419b	419	382	419b:419:382	659	700	2014		-41	-0.1	1.6		
	EB			Left	419x	406	419b	419x:406:419b	511.6	538	1492	1481	-26	-0.1	1.2		
General Holmes Dr	EB			Through	406	419	416	406:419:416	843.2	810	1247		33	0.0	1.2		
	EB			Right	408	419	418	408:419:418	136.8	133	1637		4	0.0	0.3		
	NB			Left	455	468	461	455:468:461	267	262	1803	1479	5	0.0	0.3		
	NB			Through	453	590	451	453:590:451	1233	1138	1822		95	0.1	2.8		
	NB	Right	395	590	443	395:590:443	103	79	640		24	0.2	2.5				
	SB	Left	445	399	395	445:399:395	485.8	455	678	712	31	0.1	1.4				
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	WB	Through	443	590	468	443:590:468	51.2340909	85	310		-34	-0.7	4.1		
			WB	Right	443	590	451	443:590:451	139.1650909	172	1597		-33	-0.2	2.6		
		Joyce Dr	SB	Left	10	450	443	10:450:443	120	80	1458	1363	40	0.3	4.0		
			SB	Through	450	590	395	450:590:395	1338.2	1283	1411		56	0.0	1.5		
		Ross Smith Ave	SB	Right				..			157		0	0.0	0.0		
			EB	Left	456	590	451	456:590:451	72.32	76	339	334	-4	-0.1	0.4		
		Botany Rd	EB	Through	456	590	443	456:590:443	85.12666667	101	355		-16	-0.2	1.6		
			NB	Right	456	590	395	456:590:395	181.5533333	157	1165		25	0.1	1.9		
			NB	Left	558	575	905	558:575:905	88.54	85	2072	1080	4	0.0	0.4		
			NB	Through	558	575	472	558:575:472	885.4	995	2303		-110	-0.1	3.6		
SB	Through		472	575	558	472:575:558	1098.35	1287	1510	1501	-189	-0.2	5.5				
SB	Right		472	575	905	472:575:905	319.65	214	495		106	0.3	6.5				
6	Botany Rd/Robey St	Robey St	EB	Left	905	575	472	905:575:472	92.4	63	2011	191	29	0.3	3.3		
			EB	Through	905	575	558	905:575:558	83.4	128	1919		-45	-0.5	4.3		
		Wentworth Ave	WB	Through	34	29	18	34:29:18	1835.2	1794	1991	1794	41	0.0	1.0		
			WB	Right				..			260		0	0.0	0.0		
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	155.7	147	280	276	9	0.1	0.7		
			SB	Right	41	29	18	41:29:18	103.8	129	1359		-25	-0.2	2.3		
		Wentworth Ave	EB	Left				..			0	0	0	0.0	0.0		
			EB	Through	18	29	34	18:29:34	1255	1136	1986		119	0.1	3.4		
			NB	Left	22	23	26	22:23:26	73.8	51	1342	1374	23	0.3	2.9		
			NB	Through	3086a	3086	20	3086a:3086:20	657.4	653	1878		4	0.0	0.2		
NB	Right		3086a	3086	35	3086a:3086:35	610.6	670	1612		-59	-0.1	2.3				
WB	Left		14	16	3086a	14:16:3086a	609.6	661	1232	1408	-51	-0.1	2.0				
7	Sir Reginald Ansett Dr/Robey St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	WB	Through	12	3086	26	12:3086:26	391.4	432	967		-41	-0.1	2.0		
			WB	Right	35	3086	20	35:3086:20	231.4	215	1168		94	-0.4	5.1		
		O'Riordan St	SB	Left	36	37	35	36:37:35	364.2	420	937	992	-56	-0.2	2.8		
			SB	Through	19	3086	3086a	19:3086:3086a	572.35	572	627		0	0.0	0.0		
		Qantas Dr	SB	Right				..			295		0	0.0	0.0		
			EB	Left	30	31	20	30:31:20	55	59	716	721	-4	-0.1	0.5		
		O'Riordan St	EB	Through	32	3086	35	32:3086:35	240.2	270	708		-30	-0.1	1.9		
			EB	Right	26	3086	3086a	26:3086:3086a	420.8	392	1409		29	0.1	1.4		
			NB	Left	58	54	50	58:54:50	47.06	52	968	1034	-41	-0.1	0.7		
			NB	Through	57	591	591a	57:591:591a	941.2	982	1089		-41	0.0	1.3		
NB	Right					..			0	0	0	0.0	0.0				
WB	Left		48	49	19	48:49:19	139.2	46	418	293	93	0.7	9.7				
8	O'Riordan St/Robey St	Robey St	WB	Through	48	591	54	48:591:54	278.4	247	381		31	0.1	1.9		
			WB	Right				..			0	0	0	0.0	0.0		
		O'Riordan St	SB	Left	43	44	45	43:44:45	102.46	102	1768	1749	0	0.0	0.0		
			SB	Through	43	591	49	43:591:49	1024.6	970	2024		55	0.1	1.7		
		Robey St	SB	Right	591a	591	54	591a:591:54	640.6	677	1093		-36	-0.1	1.4		
			EB	Left	50	52	591a	50:52:591a	359.2	348	453	441	11	0.0	0.6		
		Robey St	EB	Through	50	591	44	50:591:44	93.4	93	93		0	0.0	0.0		
			EB	Right				..			0	0	0	0.0	0.0		

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	64	76%
Links with difference in flow within 15% for flows 700 - 1700 vph	40	48%
Links with difference in flow within 400 vph for flows >1700 vph	1	1%

b) Links with GEH Statistic < 5		91.7%
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Links with GEH Statistic  
b/w 5 and 10      8.3%  
Links with GEH statistic > 10      0.0%

Seed 86524 5pm-6pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Difference	GEH Statistic	
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left					0	0	1063	1016	0	0%	0.0	
			NB	Through	387	420	390	387:420:390	448.75	382			67	15%	3.3	
			NB	Right	388	420	420a	388:420:420a	613.75	634			-20	-3%	0.8	
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	1203.75	1174			30	2%	0.9	
			WB	Through								2083	2032	0	0%	0.0
			WB	Right	392	420	390	392:420:390	879.5	858			22	2%	0.7	
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1019.5	1040			-21	-2%	0.6	
			SB	Through	398	420	420b	398:420:420b	1319	1269			50	4%	1.4	
			SB	Right								2339	2309	0	0%	0.0
		2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	215.1390929	162			53	25%
NB	Through				433	589	589a	433:589:589a	953.2	815			138	14%	4.6	
NB	Right											1168	977	0	0%	0.0
General Holmes Dr	EB			Left	446	589a	448	446:589a:448	179.4	123			56	31%	4.6	
	EB			Through								246	284	0	0%	0.0
	EB			Right	446	589	433	446:589:433	66.6	161			-94	-142%	9.8	
Botany Rd	SB			Left								1460	1609	0	0%	0.0
	SB			Through	449	589	433	449:589:433	848.8	954			-105	-12%	3.5	
	SB			Right	589a	589	446	589a:589:446	611.4	655			-44	-7%	1.7	
3	Botany Rd/Wentworth Ave			Wentworth Ave	WB	Left	436	574a	421	436:574a:421	603.8	693			-89	-15%
		WB	Right		436	574	433	436:574:433	413.6	529			-115	-28%	5.3	
		Botany Rd	SB	Left	433	438	436	433:438:436	338.428125	520			-182	-54%	8.8	
			SB	Through	433	574	574a	433:574:574a	573	598			-25	-4%	1.0	
		Botany Rd	NB	Through	431	574	433	431:574:433	494.6	467			28	6%	1.3	
			NB	Right	574a	574	436	574a:574:436	731.8	874			-142	-19%	5.0	
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	555.4	561			-6	-1%	0.2	
			NB	Through	418	419	419b	418:419:419b	727.6	741			-13	-2%	0.5	
			NB	Right								1283	1302	0	0%	0.0
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	101.642449	109			-7	-7%	0.7	
			WB	Through	422	419	382	422:419:382	778.2	744			34	4%	1.2	
			WB	Right								880	853	0	0%	0.0
		Botany Rd	SB	Left	414	417	416	414:417:416	11.82747915	9			10	83%	3.7	
			SB	Through	417	419	418	417:419:418	521.4	523			-2	0%	0.1	
			SB	Right	419b	419	382	419b:419:382	683.2	757			-74	-11%	2.8	
			Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	526.6	591			-64	-12%	2.7
EB	Through			406	419	416	406:419:416	1044.6	965			80	8%	2.5		
EB	Right		408	419	418	408:419:418	109.8	124			-14	-13%	1.3			
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	264.2	220			44	17%	2.8	
			NB	Through	453	590	451	453:590:451	1016.4	941			75	7%	2.4	
			NB	Right	395	590	443	395:590:443	116.4	91			25	22%	2.5	
		General Holmes Dr	WB	Left	445	399	395	445:399:395	604.4	559			45	6%	1.9	
			WB	Through	443	590	468	443:590:468	55.81709091	102			-46	-82%	5.2	
			WB	Right	443	590	451	443:590:451	151.8829091	166			-14	-9%	1.1	
		Joyce Dr	SB	Left	10	450	443	10:450:443	116.4	122			-6	-5%	0.5	
			SB	Through	450	590	395	450:590:395	1568.4	1535			33	2%	0.8	
			SB	Right								1685	1657	0	0%	0.0
		Ross Smith Ave	EB	Left	456	590	451	456:590:451	78.976	69			10	13%	1.2	
EB	Through		456	590	443	456:590:443	92.96133333	89			4	4%	0.4			
EB	Right		456	590	395	456:590:395	198.265667	235			-7	-3%	0.5			
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.72	82			7	8%	0.7	
			NB	Through	558	575	472	558:575:472	887.2	858			29	3%	1.0	
		Botany Rd	SB	Through	472	575	558	472:575:558	1182.95	1487			-304	-26%	8.3	
			SB	Right	472	575	905	472:575:905	351.45	276			75	21%	4.3	
		Robey St	EB	Left	905	575	472	905:575:472	107	114			-7	-7%	0.7	
			EB	Right	905	575	558	905:575:558	85.2	119			-34	-40%	3.3	
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1888.2	1891			-3	0%	0.1	
			WB	Right								1888	1891	0	0%	0.0
		Southern Cross Dr	SB	Left	47	34	53	47:34:53	177	263			-86	-49%	9.8	
			SB	Right	41	29	18	41:29:18	118	52			66	56%	7.2	
		Wentworth Ave	EB	Left								1335	1313	0	0%	0.0
			EB	Through	18	29	34	18:29:34	1334.6	1313			22	2%	0.6	
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	84.8	62			23	27%	2.7	
			NB	Through	3086a	3086	20	3086a:3086:20	590.8	627			-36	-6%	1.5	
			NB	Right	3086a	3086	35	3086a:3086:35	677.8	671			7	1%	0.3	
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	500.2	495			5	1%	0.2	
			WB	Through	12	3086	26	12:3086:26	389.4	491			-12	-3%	0.6	
			WB	Right	35	3086	20	35:3086:20	206.2	271			-65	-31%	4.2	
		O'Riordan St	SB	Left	36	37	35	36:37:35	395.6	590			-184	-47%	8.3	
			SB	Through	19	3086	3086a	19:3086:3086a	558.55	563			-4	-1%	0.2	
			SB	Right								954	1143	0	0%	0.0
		Qantas Dr	EB	Left	30	31	20	30:31:20	49.2	93			-44	-89%	5.2	
EB	Through		32	3086	35	32:3086:35	350	412			-62	-18%	3.2			
EB	Right		26	3086	3086a	26:3086:3086a	380.4	372			8	2%	0.4			
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	43.71	85			-41	-84%	5.1	
			NB	Through	57	591	591a	57:591:591a	674.2	904			-30	-3%	1.0	
			NB	Right								918	989	0	0%	0.0
		Robey St	WB	Left	48	49	19	48:49:19	133.3	115			18	14%	1.6	
			WB	Through	48	591	54	48:591:54	266.6	247			20	7%	1.2	
			WB	Right								400	362	0	0%	0.0
		O'Riordan St	SB	Left	43	44	45	43:44:45	100.42	110			-10	-10%	0.9	
			SB	Through	43	591	49	43:591:49	1004.2	1022			18	2%	0.6	
			SB	Right	591a	591	54	591a:591:54	708.8	682			27	4%	1.0	
		Robey St	EB	Left	50	591	591a	50:591:591a	376.4	404			-28	-7%	1.4	
EB	Through		50	591	44	50:591:44	36.6	125			-28	-29%	2.7			
EB	Right									473	529	0	0%	0.0		

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	62	74%
Links with difference in flow within 15% for flows 700 - 1700 vph	17	20%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5

Links with GEH Statistic

b/w 5 and 10

Links with GEH statistic > 10

0.0%

86.9%

Seed 28 3pm-4pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Differences	GEH Statistic		
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left					0	0	1043	1022	0	0%	0.0		
			NB	Through	387	420	390	387:420:390	480.75	439			42	9%	1.9		
			NB	Right	388	420	420a	388:420:420a	562.5	583			-21	-4%	0.9		
			WB	Left	411	420b	386	411:420b:386	1001.25	959			42	4%	1.3		
			WB	Through							2065	2022			0	0%	0.0
		General Holmes Dr	WB	Right	392	420	390	392:420:390	1063.75	1063			1	0%	0.0		
			SB	Left	397	403	420a	397:403:420a	777.5	808			-31	-4%	1.1		
			SB	Through	398	420	420b	398:420:420b	1010	985			25	2%	0.8		
			SB	Right							1788	1793			0	0%	0.0
			SB	Through													
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	208.5485961	127			82	39%	6.3		
			NB	Through	433	589	589a	433:589:589a	924	824			100	11%	3.4		
			NB	Right							1133	961			0	0%	0.0
			EB	Left	446	589a	448	446:589a:448	178	189			-11	-6%	0.8		
			EB	Through							243	300			0	0%	0.0
		General Holmes Dr	EB	Right	446	589	433	446:589:433	64.8	111			-46	-71%	4.9		
			SB	Left													
			SB	Through	449	589	433	449:589:433	781.2	778			3	0%	0.1		
			SB	Right	589a	589	446	589a:589:446	401.4	427			-26	-6%	1.3		
			WB	Left	436	574a	421	436:574a:421	627.6	748			-120	-19%	4.6		
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Right	436	574	433	436:574:433	419	521			-102	-24%	4.7		
			SB	Left	433	438	436	433:438:436	308.896875	377			-68	-22%	3.7		
			SB	Through	433	574	574a	433:574:574a	523	509			14	3%	0.6		
			NB	Through	431	574	433	431:574:433	455.4	430			25	6%	1.2		
			NB	Right	574a	574	436	574a:574:436	657.2	855			-198	-30%	7.2		
		Botany Rd	NB	Left	419a	382	392	419a:382:392	381.8	316			66	17%	3.5		
			NB	Through	418	419	419b	418:419:419b	637	764			-127	-20%	4.8		
			NB	Right													
			WB	Left	422	418	423	422:418:423	122.9061224	126			-3	0%	0.0		
			WB	Through	422	419	382	422:419:382	941	954			-13	-1%	0.4		
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	SB	Left	414	417	416	414:417:416	11.68158179	25			-13	-114%	3.1		
			SB	Through	417	419	418	417:419:418	525.6	482			44	8%	1.9		
			SB	Right	419b	419	382	419b:419:382	657.6	754			-96	-15%	3.6		
			EB	Left	419x	406	419b	419x:406:419b	492.2	527			-35	-7%	1.5		
			EB	Through	406	419	416	406:419:416	760.6	704			57	7%	2.1		
		Southern Cross Dr	EB	Right	408	419	418	408:419:418	134.2	162			-28	-21%	2.3		
			NB	Left	455	468	461	455:468:461	277.8	262			16	6%	1.0		
			NB	Through	453	590	451	453:590:451	1199.8	1154			46	4%	1.3		
			WB	Right	395	590	443	395:590:443	108.8	81			28	26%	2.9		
			WB	Left	445	399	395	445:399:395	384.6	368			17	6%	1.0		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	WB	Through	443	590	468	443:590:468	51.39636364	65			-14	-25%	1.8		
			WB	Right	443	590	451	443:590:451	139.6036364	121			19	13%	1.6		
			SB	Left	10	450	443	10:450:443	130	102			28	22%	2.6		
			SB	Through	450	590	395	450:590:395	1202.2	1215			-13	-1%	0.4		
			SB	Right													
		Joyce Dr	EB	Left	456	590	451	456:590:451	85.58933333	85			1	1%	0.1		
			EB	Through	456	590	443	456:590:443	100.7457778	117			-16	-16%	1.6		
			EB	Right	456	590	395	456:590:395	214.8648889	198			17	8%	1.2		
			NB	Left	558	575	905	558:575:905	88.98	104			-17	-20%	1.7		
			NB	Through	558	575	472	558:575:472	869.8	905			-35	-4%	1.2		
6	Botany Rd/Robey St	Botany Rd	SB	Through	472	575	558	472:575:558	939.95	1101			-161	-17%	5.0		
			SB	Right	472	575	905	472:575:905	290.25	194			96	33%	6.2		
			EB	Left	905	575	472	905:575:472	94.2	71			23	25%	2.6		
			EB	Through	905	575	558	905:575:558	87.8	108			-20	-23%	2.0		
			WB	Through	34	29	18	34:29:18	1860	1786			74	4%	1.7		
		Wentworth Ave	WB	Right													
			SB	Left	47	34	53	47:34:53	390.6	365			26	7%	1.3		
			SB	Right	41	29	18	41:29:18	260.4	129			131	50%	9.4		
			EB	Left													
			EB	Through	18	29	34	18:29:34	1192.8	1106			87	7%	2.6		
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	NB	Left	22	23	26	22:23:26	78.4	61			17	22%	2.1		
			NB	Through	3086a	3086	20	3086a:3086:20	599.4	615			-16	-3%	0.6		
			NB	Right	3086a	3086	35	3086a:3086:35	523.2	544			-21	-4%	0.9		
			WB	Left	14	16	3086a	14:16:3086a	581	597			-16	-3%	0.7		
			WB	Through	12	3086	26	12:3086:26	390.8	439			-48	-12%	2.4		
		Joyce Dr	WB	Right	35	3086	20	35:3086:20	272.6	307			-34	-13%	2.0		
			SB	Left	36	37	35	36:37:35	321.4	434			-113	-35%	5.8		
			SB	Through	19	3086	3086a	19:3086:3086a	559.45	554			5	1%	0.2		
			SB	Right													
			EB	Left	30	31	20	30:31:20	53	50			3	6%	0.4		
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	EB	Through	32	3086	35	32:3086:35	268.4	350			-82	-30%	4.6		
			EB	Right	26	3086	3086a	26:3086:3086a	461.4	431			30	7%	1.4		
			NB	Left	58	54	50	58:54:50	48.84	58			-11	-24%	1.5		
			NB	Through	57	591	591a	57:591:591a	936.8	920			17	2%	0.6		
			NB	Right													
		O'Riordan St	WB	Left	48	49	19	48:49:19	92.5	113			-21	-22%	2.0		
			WB	Through	48	591	54	48:591:54	185	183			2	1%	0.1		
			WB	Right													
			SB	Left	43	44	45	43:44:45	98.4	86			12	13%	1.3		
			SB	Through	43	591	49	43:591:49	984	894			90	9%	2.9		
9	O'Riordan St/Robey St	O'Riordan St	SB	Right	591a	591	54	591a:591:54	522	536			-14	-3%	0.6		
			EB	Left	50	591	591a	50:591:591a	359.4	359			0	0%	0.0		
			EB	Through	50	591	44	50:591:44	97.4	94			3	3%	0.3		
			EB	Right													
			WB	Through													
		Robey St	WB	Left													
			WB	Right													
			SB	Left													
			SB	Through													
			SB	Right													

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 vph	13	16%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5		
Links with GEH Statistic		92.8%

b/w 5 and 10 7.2%

Links with GEH statistic > 10 0.0%

Seed 28 4pm-5pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0				0	0%	0.0		
			NB	Through	387	420	390	387:420:390	438	369	1036	1073	69	16%	3.4	
			NB	Right	388	420	420a	388:420:420a	597.5	704			-107	-18%	4.2	
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	1059.75	1018			42	4%	1.3	
			WB	Through	392	420	390	392:420:390	1086	1022	2146	2020	64	6%	2.6	
			WB	Right	397	403	420a	397:403:420a	832.75	853			-20	-2%	0.7	
	General Holmes Dr	SB	Through	398	420	420b	398:420:420b	1136.5	1069	1969	1922	68	6%	2.0		
		SB	Left					0	0			0	0%	0.0		
		SB	Right					0	0			0	0%	0.0		
	2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	219.6992721	148			72	33%	5.3
				NB	Through	433	589	589a	433:589:589a	973.4	957	1193	1105	16	2%	0.5
				NB	Right					0	0			0	0%	0.0
General Holmes Dr			EB	Left	446	589a	448	446:589a:448	165.4	154			11	7%	0.9	
			EB	Through					0	0			0	0%	0.0	
			EB	Right	446	589	433	446:589:433	80.4	108	226	262	-48	-70%	5.2	
Botany Rd		SB	Left					0	0			0	0%	0.0		
		SB	Through	449	589	433	449:589:433	817.4	838	1318	1430	-21	-3%	0.7		
		SB	Right	589a	589	446	589a:589:446	500.8	592			-91	-18%	3.9		
3		Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	611.6	676	1035	1263	-64	-11%	2.5
				WB	Right	436	574	433	436:574:433	423.4	587			-164	-39%	7.3
				WB	Through	433	438	436	433:438:436	323.780625	362	872	949	-38	-12%	2.1
	Botany Rd		SB	Through	433	574	574a	433:574:574a	548.2	587			-39	-7%	1.6	
			NB	Through	431	574	433	431:574:433	486.8	523	1176	1443	-36	-7%	1.6	
			NB	Right	574a	574	436	574a:574:436	889	920			-231	-34%	8.1	
	Botany Rd	NB	Left	419a	382	392	419a:382:392	471.4	446			25	5%	1.2		
		NB	Through	418	419	419b	418:419:419b	673.6	801	1145	1247	-127	-19%	4.7		
		NB	Right					0	0			0	0%	0.0		
		WB	Left	422	418	423	422:418:423	127.1118367	111			16	13%	1.5		
		WB	Through	422	419	382	422:419:382	973.2	885	1100	996	88	9%	2.9		
		WB	Right					0	0			0	0%	0.0		
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Southern Cross Dr	SB	Left	414	417	416	414:417:416	11.62016679	51			-39	-339%	7.0	
			SB	Through	417	419	418	417:419:418	520	504	1191	1270	16	3%	0.7	
			SB	Right	419b	419	382	419b:419:382	659	715			-56	-8%	2.1	
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	511.6	638			-126	-25%	5.3	
			EB	Through	406	419	416	406:419:416	843.2	766	1492	1559	77	9%	2.7	
			EB	Right	408	419	418	408:419:418	136.8	155			-18	-13%	1.5	
	General Holmes Dr	NB	Left	455	468	461	455:468:461	267	245			22	8%	1.4		
		NB	Through	453	590	451	453:590:451	1233	1068	1603	1391	165	13%	4.9		
		NB	Right	395	590	443	395:590:443	103	78			25	24%	2.6		
		WB	Left	445	399	395	445:399:395	485.8	513			-27	-6%	1.2		
		WB	Through	443	590	468	443:590:468	51.23490909	74	676	736	-23	-44%	2.9		
		WB	Right	443	590	451	443:590:451	139.16590909	149			-10	-7%	0.8		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	Joyce Dr	SB	Left	10	450	443	10:450:443	120	71			49	41%	5.0	
			SB	Through	450	590	395	450:590:395	1338.2	1276	1458	1347	62	5%	1.7	
			SB	Right					0	0			0	0%	0.0	
		Ross Smith Ave	EB	Left	456	590	451	456:590:451	72.32	88			-16	-22%	1.8	
			EB	Through	456	590	443	456:590:443	85.12686667	114	339	363	-29	-34%	2.9	
			EB	Right	456	590	395	456:590:395	181.5533333	161			21	11%	1.6	
	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.54	82			7	7%	0.7	
			NB	Through	558	575	472	558:575:472	885.4	1038	974	1120	-163	-17%	4.9	
			NB	Right	472	575	558	472:575:558	1098.35	1323	1418	1529	-225	-20%	6.5	
		Robey St	SB	Right	472	575	905	472:575:905	319.65	206			114	36%	7.0	
			EB	Left	905	575	472	905:575:472	92.4	64	176	172	28	31%	3.2	
			EB	Right	905	575	558	905:575:558	83.4	108			-25	-29%	2.5	
6	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Through	34	29	18	34:29:18	1835.2	1730	1835	1730	105	6%	2.5	
			WB	Left					0	0			0	0%	0.0	
			WB	Right	47	34	53	47:34:53	155.7	152			4	2%	0.3	
		Southern Cross Dr	SB	Right	41	29	18	41:29:18	103.8	145	260	297	-41	-40%	3.7	
			EB	Left					0	0			0	0%	0.0	
			EB	Through	18	29	34	18:29:34	1255	1236	1255	1236	19	2%	0.5	
	7	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Left	22	23	26	22:23:26	73.8	50			24	32%	3.0
				NB	Through	3086a	3086	20	3086a:3086:20	657.4	655	1342	1319	2	0%	0.1
				NB	Right	3086a	3086	35	3086a:3086:35	610.6	614			-3	-1%	0.1
			Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	609.6	662			-52	-9%	2.1
				WB	Through	12	3086	26	12:3086:26	391.4	396	1232	1326	-5	-1%	0.2
				WB	Right	35	3086	20	35:3086:20	231.4	288			-37	-16%	2.3
O'Riordan St		SB	Left	36	37	35	36:37:35	364.2	478			-114	-31%	5.5		
		SB	Through	19	3086	3086a	19:3086:3086a	572.35	615	937	1093	-43	-7%	1.8		
		SB	Right					0	0			0	0%	0.0		
Qantas Dr		EB	Left	30	31	20	30:31:20	55	59			-4	-7%	0.5		
		EB	Through	32	3086	35	32:3086:35	240.2	252	716	689	-12	-5%	0.8		
		EB	Right	26	3086	3086a	26:3086:3086a	420.8	378			43	10%	2.1		
	NB	Left	58	54	50	58:54:50	47.06	65			-18	-38%	2.4			
	NB	Through	57	591	591a	57:591:591a	941.2	902	988	967	48	3%	1.3			
	NB	Right					0	0			0	0%	0.0			
8	O'Riordan St/Robey St	O'Riordan St	WB	Left	48	49	19	48:49:19	139.2	62			77	55%	7.7	
			WB	Through	48	591	54	48:591:54	278.4	227	418	289	51	18%	3.2	
			WB	Right					0	0			0	0%	0.0	
		Robey St	SB	Left	43	44	45	43:44:45	102.46	68			34	34%	3.7	
			SB	Through	43	591	49	43:591:49	1024.6	1030	1768	1788	-5	-1%	0.2	
			SB	Right	591a	591	54	591a:591:54	640.6	690			-49	-8%	1.9	
	Robey St	EB	Left	50	591	591a	50:591:591a	359.2	342	453	446	17	5%	0.9		
		EB	Through	50	591	44	50:591:44	93.4	104			-11	-11%	1.1		
		EB	Right					0	0			0	0%	0.0		

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5	86.7%
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Links with GEH Statistic b/w 5 and 10 13.3%

Links with GEH statistic > 10 0.0%

Seed 28 5pm-6pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Differences	GEH Statistic
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00			
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				:	0	0	1063	973	0	0%	0.0
			NB	Through	387	420	390	387:420:390	448.75	336			113	25%	5.7
			NB	Right	388	420	420a	388:420:420a	613.75	637			-23	-4%	0.9
			WB	Left	411	420b	386	411:420b:386	1203.75	1229			-25	-2%	0.7
			WB	Through									0	0%	0.0
		Mill Pond Rd	WB	Right	392	420	390	392:420:390	879.5	886			-7	-1%	0.2
			SB	Left	397	403	420a	397:403:420a	1019.5	1050			-31	-3%	0.8
			SB	Through	398	420	420b	398:420:420b	1319	1314			5	0%	0.1
			SB	Right				:	0	0	2339	2364	0	0%	0.0
			SB	Through				:	0	0			0	0%	0.0
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	215.1390929	173			42	20%	3.0
			NB	Through	433	589	589a	433:589:589a	953.2	843			110	12%	3.7
			NB	Right				:	0	0	1168	1016	0	0%	0.0
			EB	Left	446	589a	448	446:589a:448	179.4	101			78	44%	6.6
			EB	Through				:	0	0			0	0%	0.0
		General Holmes Dr	EB	Right	446	589	433	446:589:433	86.6	149			-82	-124%	7.9
			SB	Left				:	0	0	246	250	0	0%	0.0
			SB	Through				:	0	0			0	0%	0.0
			SB	Right	449	589	433	449:589:433	848.8	924			-75	-9%	2.5
			SB	Through	589a	589	446	589a:589:446	611.4	657			-46	-7%	1.8
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	603.8	675			-71	-12%	2.8
			WB	Right	436	574	433	436:574:433	413.6	522			-108	-26%	5.0
			SB	Left	433	438	436	433:438:436	338.42825	485			-147	-43%	7.2
			SB	Through	433	574	574a	433:574:574a	573	582			-9	-2%	0.4
			NB	Through	431	574	433	431:574:433	494.6	495			0	0%	0.0
		Botany Rd	NB	Right	574a	574	436	574a:574:436	731.8	903			-171	-23%	6.0
			NB	Left	419a	382	392	419a:382:392	555.4	606			-51	-9%	2.1
			NB	Through	418	419	419b	418:419:419b	727.6	804			-76	-11%	2.8
			NB	Right				:	0	0	1283	1410	0	0%	0.0
			WB	Left	422	418	423	422:418:423	101.642449	105			-3	-3%	0.3
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Southern Cross Dr	WB	Through	422	419	382	422:419:382	778.2	770			8	1%	0.3
			WB	Right				:	0	0	880	875	0	0%	0.0
			SB	Left	414	417	416	414:417:416	11.82747915	1			11	92%	4.3
			SB	Through	417	419	418	417:419:418	521.4	501			20	4%	0.9
			SB	Right	419b	419	382	419b:419:382	683.2	742			-59	-9%	2.2
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	526.6	590			-63	-12%	2.7
			EB	Through	406	419	416	406:419:416	1044.6	973			72	7%	2.3
			EB	Right	408	419	418	408:419:418	109.8	125			-15	-14%	1.4
			NB	Left	455	468	461	455:468:461	264.2	244			20	8%	1.3
			NB	Through	453	590	451	453:590:451	1016.4	929			87	9%	2.8
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Right	395	590	443	395:590:443	116.4	53			63	54%	6.9
			WB	Left	445	399	395	445:399:395	604.4	589			-15	3%	0.4
			WB	Through	443	590	468	443:590:468	55.81709091	60			-4	-7%	0.5
			WB	Right	443	590	451	443:590:451	151.8829091	180			-28	-19%	2.2
			SB	Left	10	450	443	10:450:443	116.4	115			1	1%	0.1
		Joyce Dr	SB	Through	450	590	395	450:590:395	1668.4	1523			165	3%	1.2
			SB	Right				:	0	0	1685	1638	0	0%	0.0
			EB	Left	456	590	451	456:590:451	78.976	67			12	15%	1.4
			EB	Through	456	590	443	456:590:443	92.96133333	82			11	12%	1.2
			EB	Right	456	590	395	456:590:395	198.2626667	219			-21	-10%	0.4
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.72	83			6	8%	0.6
			NB	Through	558	575	472	558:575:472	887.2	861			26	3%	0.8
			SB	Through	472	575	558	472:575:558	1182.95	1480			-297	-25%	8.1
			SB	Right	472	575	905	472:575:905	351.45	272			79	23%	4.5
			EB	Left	905	575	472	905:575:472	107	124			-17	-16%	1.6
		Robey St	EB	Right	905	575	558	905:575:558	85.2	103			-18	-21%	1.8
			WB	Through	34	29	18	34:29:18	1888.2	1879			9	0%	0.2
			WB	Right				:	0	0	1888	1879	0	0%	0.0
			SB	Left	47	34	53	47:34:53	177	303			-126	-71%	8.1
			SB	Right	41	29	18	41:29:18	118	62			56	47%	5.8
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Left				:	0	0	1335	1303	0	0%	0.0
			EB	Through	18	29	34	18:29:34	1334.6	1303			32	2%	0.9
			NB	Left	22	23	26	22:23:26	84.8	59			26	30%	3.0
			NB	Through	3086a	3086	20	3086a:3086:20	590.8	560			31	5%	1.3
			NB	Right	3086a	3086	35	3086a:3086:35	677.8	731			-53	-8%	2.0
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	500.2	507			-7	-1%	0.3
			WB	Through	12	3086	26	12:3086:26	389.4	417			-28	-7%	1.4
			WB	Right	35	3086	20	35:3086:20	206.2	244			-38	-18%	2.5
			SB	Left	36	37	35	36:37:35	395.6	545			-149	-38%	6.8
			SB	Through	19	3086	3086a	19:3086:3086a	558.55	543			16	3%	0.7
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	O'Riordan St	SB	Right				:	0	0	954	1088	0	0%	0.0
			EB	Left	30	31	20	30:31:20	49.2	62			-13	-26%	1.7
			EB	Through	32	3086	35	32:3086:35	350	366			-16	-5%	0.8
			EB	Right	26	3086	3086a	26:3086:3086a	380.4	373			7	2%	0.4
			NB	Left	58	54	50	58:54:50	43.71	56			-12	-28%	1.7
		Qantas Dr	NB	Through	57	591	591a	57:591:591a	674.2	807			67	8%	2.3
			NB	Right				:	0	0	918	863	0	0%	0.0
			WB	Left	48	49	19	48:49:19	133.3	99			34	26%	3.2
			WB	Through	48	591	54	48:591:54	266.6	248			19	7%	1.2
			WB	Right				:	0	0	400	347	0	0%	0.0
9	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	100.42	111			-11	-11%	1.0
			SB	Through	43	591	49	43:591:49	1004.2	995			9	1%	0.3
			SB	Right	591a	591	54	591a:591:54	708.8	739			-30	-4%	1.1
			EB	Left	50	52	591a	50:52:591a	376.4	409			-33	-9%	1.6
			EB	Through	50	591	44	50:591:44	36.6	115			-18	-19%	1.8
		Robey St	EB	Right				:	0	0	473	524	0	0%	0.0

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	59	71%
Links with difference in flow within 15% for flows 700 - 1700 vph	18	22%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5

Links with GEH Statistic	86.7%
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b/w 5 and 10

Links with GEH statistic > 10	13.3%
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0.0%

Seed 560 3pm-4pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Differences	GEH Statistic		
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0	0			0	0%	0.0			
			NB	Through	387	420	390	387:420:390	480.75	443	1043	1019	38	8%	1.8		
			NB	Right	388	420	420a	388:420:420a	562.5	576			-14	-2%	0.6		
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	1001.25	960			41	4%	1.3		
			WB	Through	392	420	390	392:420:390	1063.75	1051	2065	2011	12	1%	0.0		
			WB	Right	397	403	420a	397:403:420a	777.5	785			-8	-1%	0.3		
		General Holmes Dr	SB	Through	398	420	420b	398:420:420b	1010	1044	1788	1829	-34	-3%	1.1		
			SB	Right					0	0			0	0%	0.0		
			SB	Left	441	446	442	441:446:442	208.5485961	159			50	24%	3.7		
		2	Botany Rd/General Holmes Dr	Botany Rd	NB	Through	433	589	589a	433:589:589a	924	878	1133	1037	46	5%	1.5
NB	Right								0	0			0	0%	0.0		
NB	Left				446	589a	448	446:589a:448	178	181			17	10%	1.3		
General Holmes Dr	EB			Through	446	589	433	446:589:433	64.8	108	243	269	-43	-67%	4.6		
	EB			Right					0	0			0	0%	0.0		
	EB			Left	449	589	433	449:589:433	781.2	824	1183	1204	-43	-5%	1.5		
Botany Rd	SB			Through	589a	589	446	589a:589:446	401.4	380			21	5%	1.1		
	SB			Right					0	0			0	0%	0.0		
	SB			Left	436	574a	421	436:574a:421	627.6	739			-111	-18%	4.3		
3	Botany Rd/Wentworth Ave			Wentworth Ave	WB	Right	436	574	433	436:574:433	419	570	1047	1309	-151	-36%	6.8
		WB	Left		433	438	436	433:438:436	308.896875	404	832	932	-95	-31%	5.0		
		WB	Through		433	574	574a	433:574:574a	523	528			-5	-1%	0.2		
		Botany Rd	NB	Through	431	574	433	431:574:433	455.4	469	1113	1317	-14	-3%	0.6		
			NB	Right	574a	574	436	574a:574:436	657.2	848			-191	-29%	7.0		
			NB	Left	419a	382	392	419a:382:392	381.8	321			61	16%	3.2		
		Botany Rd	NB	Through	418	419	419b	418:419:419b	637	797	1019	1118	-61	-25%	6.0		
			NB	Right					0	0			0	0%	0.0		
			NB	Left	422	418	423	422:418:423	122.9061224	139			-16	-13%	1.4		
		Southern Cross Dr	WB	Through	422	419	382	422:419:382	941	951	1064	1090	-10	-1%	0.3		
WB	Right						0	0			0	0%	0.0				
WB	Left		414	417	416	414:417:416	11.68158179	23			-11	-97%	2.7				
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	SB	Through	417	419	418	417:419:418	525.6	504	1195	1272	22	4%	1.0		
			SB	Right	419b	419	382	419b:419:382	657.6	745			-87	-13%	3.3		
			SB	Left	419x	406	419b	419x:406:419b	492.2	521			-29	-9%	1.3		
		Mill Pond Rd	EB	Through	406	419	416	406:419:416	760.6	678	1387	1362	83	11%	3.1		
			EB	Right	408	419	418	408:419:418	134.2	163			-29	-21%	2.4		
			EB	Left	455	468	461	455:468:461	277.8	256			22	8%	1.3		
		5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Through	453	590	451	453:590:451	1199.8	1160	1586	1491	40	3%	1.2
					NB	Right	395	590	443	395:590:443	108.8	75			34	31%	3.5
					NB	Left	445	399	395	445:399:395	384.6	321			64	17%	3.4
				General Holmes Dr	WB	Through	443	590	458	443:590:458	51.39636364	72	576	533	-21	-40%	2.6
WB	Right				443	590	451	443:590:451	139.6036364	140			0	0%	0.0		
WB	Left				10	450	443	10:450:443	130	97			33	25%	3.1		
Joyce Dr	SB			Through	450	590	395	450:590:395	1202.2	1264	1332	1361	-62	-5%	1.8		
	SB			Right					0	0			0	0%	0.0		
	SB			Left	456	590	451	456:590:451	85.58933333	67			19	22%	2.1		
Ross Smith Ave	EB			Through	456	590	443	456:590:443	100.7457778	104	401	411	-3	-3%	0.3		
	EB	Right	456	590	395	456:590:395	214.8848889	240			-25	-12%	1.7				
	EB	Left	558	575	905	558:575:905	88.98	97			-10	-12%	1.0				
6	Botany Rd/Robey St	Botany Rd	NB	Through	558	575	472	558:575:472	869.8	943	957	1040	-73	-8%	2.4		
			NB	Right	472	575	558	472:575:558	939.95	1100			-160	-17%	5.0		
			NB	Left	472	575	905	472:575:905	290.25	214	1230	1314	76	26%	4.8		
		Robey St	EB	Through	905	575	472	905:575:472	94.2	64	182	170	30	32%	3.4		
			EB	Right	905	575	558	905:575:558	87.8	106			-18	-21%	1.8		
			EB	Left	34	29	18	34:29:18	1860	1810			50	3%	1.2		
		Wentworth Ave	WB	Through					0	0	1860	1810	0	0%	0.0		
			WB	Right	47	34	53	47:34:53	390.6	407			-16	-4%	0.8		
			WB	Left	41	29	18	41:29:18	260.4	124	651	531	136	52%	9.8		
		Southern Cross Dr	EB	Through					0	0			0	0%	0.0		
EB	Right		18	29	34	18:29:34	1192.8	1148	1193	1148	45	4%	1.3				
EB	Left						0	0			0	0%	0.0				
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	NB	Left	22	23	26	22:23:26	78.4	58			20	26%	2.5		
			NB	Through	3086a	3086	20	3086a:3086:20	599.4	548	1201	1178	51	9%	2.1		
			NB	Right	3086a	3086	35	3086a:3086:35	523.2	572			-49	-9%	2.1		
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	581	614	1244	1367	-33	-6%	1.4		
			WB	Through	12	3086	26	12:3086:26	390.8	459			-59	-15%	2.9		
			WB	Right	35	3086	20	35:3086:20	272.6	303			-30	-11%	1.8		
		O'Riordan St	SB	Left	36	37	35	36:37:35	321.4	477			-156	-48%	7.8		
			SB	Through	19	3086	3086a	19:3086:3086a	559.45	518	881	995	41	7%	1.8		
			SB	Right					0	0			0	0%	0.0		
		Qantas Dr	EB	Left	30	31	20	30:31:20	53	52			1	2%	0.1		
EB	Through		32	3086	35	32:3086:35	268.4	319	783	796	-51	-19%	3.0				
EB	Right		26	3086	3086a	26:3086:3086a	461.4	425			36	8%	1.7				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	O'Riordan St	NB	Left	58	54	50	58:54:50	48.84	52			-5	-11%	0.7		
			NB	Through	57	591	591a	57:591:591a	936.8	853	984	905	84	9%	2.8		
			NB	Right					0	0			0	0%	0.0		
		Robey St	WB	Left	48	49	19	48:49:19	92.5	127			-35	-37%	3.3		
			WB	Through	48	591	54	48:591:54	185	184	278	311	1	1%	0.1		
			WB	Right					0	0			0	0%	0.0		
		O'Riordan St	SB	Left	43	44	45	43:44:45	98.4	87			11	12%	1.2		
			SB	Through	43	591	49	43:591:49	984	874	1604	1486	110	11%	3.6		
			SB	Right	591a	591	54	591a:591:54	522	525			-3	-1%	0.1		
		Robey St	EB	Left	50	591	44	50:591:44	359.4	383			-24	-7%	1.2		
EB	Through		50	591	44	50:591:44	97.8	83	457	466	14	15%	1.5				
EB	Right						0	0			0	0%	0.0				
9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	48.84	52			-5	-11%	0.7		
			NB	Through	57	591	591a	57:591:591a	936.8	853	984	905	84	9%	2.8		
			NB	Right					0	0			0	0%	0.0		
		Robey St	WB	Left	48	49	19	48:49:19	92.5	127			-35	-37%	3.3		
			WB	Through	48	591	54	48:591:54	185	184	278	311	1	1%	0.1		
			WB	Right					0	0			0	0%	0.0		
		O'Riordan St	SB	Left	43	44	45	43:44:45	98.4	87			11	12%	1.2		
			SB	Through	43	591	49	43:591:49	984	874	1604	1486	110	11%	3.6		
			SB	Right	591a	591	54	591a:591:54	522	525			-3	-1%	0.1		
		Robey St	EB	Left	50	591	44	50:591:44	359.4	383			-24	-7%	1.2		
EB	Through		50	591	44	50:591:44	97.8	83	457	466	14	15%	1.5				
EB	Right						0	0			0	0%	0.0				

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	



Seed 560 4pm-5pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Differences	GEH Statistic		
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left					0	0	1036	1081	0	0%	0.0		
			NB	Through	387	420	390	387:420:390	438	409			29	7%	1.4		
			NB	Right	388	420	420a	388:420:420a	597.5	672			-75	-12%	3.0		
			WB	Left	411	420b	386	411:420b:386	1059.75	996			64	6%	2.0		
			WB	Through							2146	2009			0	0%	0.0
		General Holmes Dr	WB	Right	392	420	390	392:420:390	1086	1013			73	7%	2.3		
			SB	Left	397	403	420a	397:403:420a	832.75	881			-48	-6%	1.6		
			SB	Through	398	420	420b	398:420:420b	1136.5	1054			83	7%	2.5		
			SB	Right							1969	1935			0	0%	0.0
			SB	Through											0	0%	0.0
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	219.6992721	174			46	21%	3.3		
			NB	Through	433	589	589a	433:589:589a	973.4	943			30	3%	1.0		
			NB	Right							1193	1117			0	0%	0.0
			EB	Left	446	589a	448	446:589a:448	165.4	155			10	6%	0.8		
			EB	Through											0	0%	0.0
		General Holmes Dr	EB	Right	446	589	433	446:589:433	80.4	130			-70	-115%	7.1		
			SB	Left							226	285			0	0%	0.0
			SB	Through											0	0%	0.0
			SB	Right	449	589	433	449:589:433	817.4	797			20	2%	0.7		
			WB	Through	589a	589	446	589a:589:446	500.8	609			-108	-22%	4.6		
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	611.6	686			-74	-12%	2.9		
			WB	Right	436	574	433	436:574:433	423.4	609			-186	-44%	8.2		
			SB	Left	433	438	436	433:438:436	323.780625	366			-42	-13%	2.3		
			SB	Through	433	574	574a	433:574:574a	548.2	554			-6	-1%	0.2		
			NB	Through	431	574	433	431:574:433	486.8	516			-29	-6%	1.3		
		Botany Rd	NB	Right	574a	574	436	574a:574:436	889	896			-7	-1%	0.2		
			NB	Left	419a	382	392	419a:382:392	471.4	434			37	8%	1.8		
			NB	Through	418	419	419b	418:419:419b	673.6	796			-122	-18%	4.5		
			NB	Right							1145	1230			0	0%	0.0
			WB	Left	422	418	423	422:418:423	127.118367	123			4	3%	0.4		
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Southern Cross Dr	WB	Through	422	419	382	422:419:382	973.2	905			68	7%	2.2		
			WB	Right							1100	1028			0	0%	0.0
			SB	Left	414	417	416	414:417:416	11.62016679	64			-52	-451%	8.5		
			SB	Through	417	419	418	417:419:418	520	475			45	9%	2.0		
			SB	Right	419b	419	382	419b:419:382	659	702			-43	-7%	1.6		
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	511.6	617			-105	-21%	4.4		
			EB	Through	406	419	416	406:419:416	843.2	785			58	7%	2.0		
			EB	Right	408	419	418	408:419:418	136.8	152			-15	-11%	1.3		
			NB	Left	455	468	461	455:468:461	267	257			10	4%	0.6		
			NB	Through	453	590	451	453:590:451	1233	1107			126	10%	3.7		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Right	395	590	443	395:590:443	103	72			31	30%	3.3		
			WB	Left	445	399	395	445:399:395	485.8	513			-27	-6%	2.2		
			WB	Through	443	590	458	443:590:458	51.23490909	87			-36	-70%	4.3		
			WB	Right	443	590	451	443:590:451	139.16590909	177			-38	-27%	3.0		
			SB	Left	10	450	443	10:450:443	120	94			26	22%	2.5		
		Joyce Dr	SB	Through	450	590	395	450:590:395	1338.2	1305			33	2%	0.9		
			SB	Right							1458	1399			0	0%	0.0
			EB	Left	456	590	451	456:590:451	72.32	86			-14	-19%	1.5		
			EB	Through	456	590	443	456:590:443	85.12686667	112			-27	-32%	2.7		
			EB	Right	456	590	395	456:590:395	181.5533333	153			29	16%	2.2		
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.54	82			7	7%	0.7		
			NB	Through	558	575	472	558:575:472	885.4	1020			-135	-15%	4.4		
			SB	Through	472	575	558	472:575:558	1098.35	1315			-217	-20%	6.2		
			SB	Right	472	575	905	472:575:905	319.65	224			96	30%	5.8		
			EB	Left	905	575	472	905:575:472	92.4	60			32	35%	3.7		
		Robey St	EB	Right	905	575	558	905:575:558	83.4	93			-10	-12%	1.0		
			WB	Through	34	29	18	34:29:18	1835.2	1839			-4	0%	0.1		
			WB	Right							1835	1839			0	0%	0.0
			SB	Left	47	34	53	47:34:53	155.7	161			-5	-3%	0.4		
			SB	Right	41	29	18	41:29:18	103.8	133			-29	-28%	2.7		
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Left							260	294			0	0%	0.0
			EB	Through	18	29	34	18:29:34	1255	1208			47	4%	1.3		
			NB	Left	22	23	26	22:23:26	73.8	52			22	30%	2.7		
			NB	Through	3086a	3086	20	3086a:3086:20	657.4	680			-23	-3%	0.9		
			NB	Right	3086a	3086	35	3086a:3086:35	610.6	653			-42	-7%	1.7		
		Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	WB	Left	14	16	3086a	14:16:3086a	609.6	608			2	0%	0.1		
			WB	Through	12	3086	26	12:3086:26	391.4	463			-72	-18%	3.5		
			WB	Right	35	3086	20	35:3086:20	231.4	308			-77	-33%	4.7		
			SB	Left	36	37	35	36:37:35	364.2	489			-125	-34%	6.0		
			SB	Through	19	3086	3086a	19:3086:3086a	572.35	600			-28	-5%	1.1		
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	SB	Right							937	1089			0	0%	0.0
			EB	Left	30	31	20	30:31:20	55	66			-11	-20%	1.4		
			EB	Through	32	3086	35	32:3086:35	240.2	242			-2	-1%	0.1		
			EB	Right	26	3086	3086a	26:3086:3086a	420.8	353			68	14%	2.9		
			NB	Left	58	54	50	58:54:50	47.06	64			-17	-36%	2.3		
		O'Riordan St	NB	Through	57	591	591a	57:591:591a	941.2	983			-42	-4%	1.3		
			NB	Right							988	1047			0	0%	0.0
			WB	Left	48	49	19	48:49:19	139.2	69			70	50%	6.9		
			WB	Through	48	591	54	48:591:54	278.4	232			46	17%	2.9		
			WB	Right							418	301			0	0%	0.0
9	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	102.46	65			37	37%	4.1		
			SB	Through	43	591	49	43:591:49	1024.6	1031			-6	-1%	0.2		
			SB	Right	591a	591	54	591a:591:54	640.6	655			-14	-2%	0.6		
			EB	Left	50	52	591a	50:52:591a	359.2	375			-16	-4%	0.8		
			EB	Through	50	591	44	50:591:44	93.4	86			7	8%	0.8		
		Robey St	EB	Right							453	461			0	0%	0.0

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	18%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5		
Links with GEH Statistic		90.4%

b/w 5 and 10 9.6%

Links with GEH statistic > 10 0.0%

Seed 560 5pm-6pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0	0			0	0%	0.0		
			NB	Through	387	420	390	387:420:390	448.75	339	1063	987	110	24%	5.5	
			NB	Right	388	420	420a	388:420:420a	613.75	648			-34	-6%	1.4	
			WB	Left	411	420b	386	411:420b:386	1203.75	1197			7	1%	0.2	
			WB	Through							2083	2092	-9	-0%	0.0	
		General Holmes Dr	WB	Right	392	420	390	392:420:390	879.5	895			-16	-2%	0.5	
			SB	Left	397	403	420a	397:403:420a	1019.5	1095			-76	-7%	2.3	
			SB	Through	398	420	420b	398:420:420b	1319	1282	2339	2377	-37	3%	1.0	
			SB	Right									0	0%	0.0	
			SB	Through									0	0%	0.0	
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	215.1390929	169	1168	1020	46	21%	3.3	
			NB	Through	433	589	589a	433:589:589a	953.2	851			102	11%	3.4	
			NB	Right									0	0%	0.0	
			EB	Left	446	589a	448	446:589a:448	179.4	111			88	38%	5.7	
			EB	Through							246	264	-18	-3%	0.0	
		General Holmes Dr	EB	Right	446	589	433	446:589:433	86.6	153			-66	-130%	8.2	
			SB	Left									0	0%	0.0	
			SB	Through	449	589	433	449:589:433	848.8	913	1460	1607	-64	-8%	2.2	
			SB	Right	589a	589	446	589a:589:446	611.4	694			-83	-14%	3.2	
			WB	Left	436	574a	421	436:574a:421	603.8	709			-105	-17%	4.1	
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Right	436	574	433	436:574:433	413.6	545	1017	1254	-131	-32%	6.0	
			SB	Left	433	438	436	433:438:436	338.428125	507	911	1070	-169	-50%	8.2	
			SB	Through	433	574	574a	433:574:574a	573	563			10	2%	0.4	
			NB	Through	431	574	433	431:574:433	494.6	479	1226	1349	-128	-19%	4.9	
			NB	Right	574a	574	436	574a:574:436	731.8	870			-138	-19%	4.9	
		Botany Rd	NB	Left	419a	382	392	419a:382:392	555.4	569			-14	-2%	0.6	
			NB	Through	418	419	419b	418:419:419b	727.6	747	1283	1316	-19	-3%	0.7	
			NB	Right									0	0%	0.0	
			WB	Left	422	418	423	422:418:423	101.642449	129			-27	-27%	2.5	
			WB	Through	422	419	382	422:419:382	778.2	758	880	887	-7	0%	0.0	
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Southern Cross Dr	WB	Right									20	3%	0.7	
			SB	Left	414	417	416	414:417:416	11.82747915	4			8	66%	2.8	
			SB	Through	417	419	418	417:419:418	521.4	526	1216	1291	-5	-1%	0.2	
			SB	Right	419b	419	382	419b:419:382	683.2	751			-78	-11%	2.9	
			EB	Left	419x	406	419b	419x:406:419b	526.6	592			-65	-12%	2.8	
		Mill Pond Rd	EB	Through	406	419	416	406:419:416	1044.6	1010	1681	1745	-35	-3%	1.1	
			EB	Right	408	419	418	408:419:418	109.8	143			-33	-30%	3.0	
			NB	Left	455	468	461	455:468:461	264.2	249			15	6%	0.9	
			NB	Through	453	590	451	453:590:451	1016.4	921	1397	1243	95	9%	3.1	
			NB	Right	395	590	443	395:590:443	116.4	73			43	37%	4.5	
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	WB	Left	445	399	395	445:399:395	694.4	610			8	1%	0.2	
			WB	Through	443	590	468	443:590:468	55.81709091	90	812	864	-34	-61%	4.0	
			WB	Right	443	590	451	443:590:451	151.8829091	164			-12	-8%	1.0	
			SB	Left	10	450	443	10:450:443	116.4	105			11	10%	1.1	
			SB	Through	450	590	395	450:590:395	1568.4	1537	1685	1642	31	2%	0.8	
		Joyce Dr	SB	Right										0	0%	0.0
			EB	Left	456	590	451	456:590:451	78.976	60			19	24%	2.3	
			EB	Through	456	590	443	456:590:443	92.96133333	85	370	341	8	9%	0.8	
			EB	Right	456	590	395	456:590:395	198.265667	196			2	1%	0.2	
			NB	Left	559	575	905	559:575:905	88.72	80			9	10%	0.9	
6	Botany Rd/Robey St	Botany Rd	NB	Through	558	575	472	558:575:472	887.2	882	976	962	5	1%	0.2	
			SB	Through	472	575	558	472:575:558	1182.95	1500			-317	-27%	8.7	
			SB	Right	472	575	905	472:575:905	351.45	285			66	19%	3.7	
			EB	Left	905	575	472	905:575:472	107	85			22	21%	2.2	
			EB	Right	905	575	558	905:575:558	85.2	107	192	192	-22	-26%	2.2	
		Robey St	WB	Through	34	29	18	34:29:18	1888.2	1885	1888	1885	3	0%	0.1	
			WB	Right										0	0%	0.0
			SB	Left	47	34	53	47:34:53	177	273			-96	-54%	8.4	
			SB	Right	41	29	18	41:29:18	118	43	295	316	75	64%	5.4	
			EB	Left									0	0%	0.0	
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Through	18	29	34	18:29:34	1334.6	1285	1335	1285	50	4%	1.4	
			NB	Left	22	23	26	22:23:26	84.8	56			29	34%	3.4	
			NB	Through	3086a	3086	20	3086a:3086:20	590.8	559	1353	1339	32	5%	1.3	
			NB	Right	3086a	3086	35	3086a:3086:35	677.8	724			-46	-7%	1.7	
			WB	Left	14	16	3086a	14:16:3086a	500.2	512			-12	-2%	0.5	
		Joyce Dr	WB	Through	12	3086	26	12:3086:26	389.4	412	1096	1142	-23	-6%	1.1	
			WB	Right	35	3086	20	35:3086:20	206.2	218			-12	-6%	0.8	
			SB	Left	36	37	35	36:37:35	395.6	549			-153	-39%	7.1	
			SB	Through	19	3086	3086a	19:3086:3086a	558.55	547	954	1096	12	2%	0.5	
			SB	Right									0	0%	0.0	
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	EB	Left	30	31	20	30:31:20	49.2	74			-25	-50%	3.2	
			EB	Through	32	3086	35	32:3086:35	350	387	780	811	-37	-11%	1.9	
			EB	Right	26	3086	3086a	26:3086:3086a	380.4	350			30	8%	1.6	
			NB	Left	58	54	50	58:54:50	43.71	69			-25	-58%	3.4	
			NB	Through	57	591	591a	57:591:591a	674.2	792	918	861	92	9%	2.8	
		O'Riordan St	WB	Left	48	49	19	48:49:19	133.3	123			10	8%	0.9	
			WB	Through	48	591	54	48:591:54	266.6	242	400	365	25	9%	1.5	
			WB	Right									0	0%	0.0	
			SB	Left	43	44	45	43:44:45	100.42	102			-2	-2%	0.2	
			SB	Through	43	591	49	43:591:49	1004.2	982	1813	1767	22	2%	0.7	
Robey St	SB	Right	591a	591	54	591a:591:54	708.8	683			26	4%	1.0			
	EB	Left	50	591	44	50:591:44	376.4	375			1	0%	0.1			
	EB	Through	50	591	44	50:591:44	36.6	94	473	469	3	3%	0.3			
	EB	Right									0	0%	0.0			
	EB	Through									0	0%	0.0			

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	59	71%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5		
Links with GEH Statistic		89.2%

b/w 5 and 10 10.8%

Links with GEH statistic > 10 0.0%

Seed 2849 3pm-4pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	Left	NB					0	0	1043	1052	0	0%	0.0	
				NB	Through	387	420	390	387:420:390	480.75	429		52	11%	2.4	
				NB	Right	388	420	420a	388:420:420a	562.5	623		-61	-11%	2.5	
				WB	Left	411	420b	386	411:420b:386	1001.25	946		55	6%	1.8	
				WB	Through	392	420	390	392:420:390	1063.75	1055		0	0%	0.0	
		Mill Pond Rd	Right	WB	Through	392	420	390	392:420:390	1063.75	1055	2065	2001	9	1%	0.3
				SB	Left	397	403	420a	397:403:420a	777.5	783		-6	-1%	0.2	
				SB	Through	398	420	420b	398:420:420b	1010	973	1788	1756	37	4%	1.2
				SB	Right					0	0		0	0%	0.0	
				SB	Through	441	446	442	441:446:442	208.5485961	134		75	36%	5.7	
2	Botany Rd/General Holmes Dr	Botany Rd	Left	NB	Through	433	589	589a	433:589:589a	924	857	1133	991	67	7%	2.2
				NB	Right					0	0		0	0%	0.0	
				EB	Left	446	589a	448	446:589a:448	178	175		3	2%	0.2	
				EB	Through					0	0	243	263	0	0%	0.0
				EB	Right	446	589	433	446:589:433	64.8	88		-23	-36%	2.7	
		General Holmes Dr	Right	SB	Left					0	0		0	0%	0.0	
				SB	Through	449	589	433	449:589:433	781.2	775	1183	1156	6	1%	0.2
				SB	Right	589a	589	446	589a:589:446	401.4	381		20	5%	1.0	
				WB	Left	436	574a	421	436:574a:421	627.6	751	1047	1300	-123	-20%	4.7
				WB	Right	436	574	433	436:574:433	419	549		-130	-31%	5.9	
3	Botany Rd/Wentworth Ave	Wentworth Ave	Left	SB	Left	433	438	436	433:438:436	308.898875	352	832	859	-43	-14%	2.4
				SB	Through	433	574	574a	433:574:574a	523	507		16	3%	0.7	
				NB	Through	431	574	433	431:574:433	455.4	452	1113	1335	3	1%	0.2
				NB	Right	574a	574	436	574a:574:436	657.2	883		-226	-34%	9.1	
				NB	Left	419a	382	392	419a:382:392	381.8	333		49	13%	2.6	
		Botany Rd	Right	NB	Through	418	419	419b	418:419:419b	637	782	1019	1115	-145	-23%	5.4
				NB	Right					0	0		0	0%	0.0	
				WB	Left	422	418	423	422:418:423	122.9061224	159		-36	-29%	3.0	
				WB	Through	422	419	382	422:419:382	941	927	1064	1086	14	1%	0.5
				WB	Right	414	417	416	414:417:416	11.68158179	17		-5	-46%	1.4	
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Botany Rd	Left	SB	Through	417	419	418	417:419:418	525.6	530	1195	1284	-26	-1%	0.2
				SB	Right	419b	419	382	419b:419:382	657.6	737		-79	-12%	3.0	
				EB	Left	419x	406	419b	419x:406:419b	492.2	560		-68	-14%	3.0	
				EB	Through	406	419	416	406:419:416	760.6	665	1387	1409	96	13%	3.6
				EB	Right	408	419	418	408:419:418	134.2	184		-50	-37%	3.9	
		Southern Cross Dr	Right	NB	Left	455	468	461	455:468:461	277.8	277		1	0%	0.0	
				NB	Through	453	590	451	453:590:451	1199.8	1137	1586	1479	63	5%	1.8
				NB	Right	395	590	443	395:590:443	108.8	65		64	40%	4.7	
				WB	Left	445	399	395	445:399:395	384.6	335		28	12%	1.8	
				WB	Through	443	590	468	443:590:468	51.39636364	61	576	507	-10	-19%	1.3
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	Right	WB	Through	443	590	451	443:590:451	139.6036364	111		29	20%	2.6	
				SB	Left	10	450	443	10:450:443	130	87		43	33%	4.1	
				SB	Through	450	590	395	450:590:395	1202.2	1241	1332	1328	-39	-3%	1.1
				SB	Right					0	0		0	0%	0.0	
				EB	Left	456	590	451	456:590:451	85.58933333	66	401	367	20	23%	2.3
		Joyce Dr	Right	EB	Through	456	590	443	456:590:443	100.7457778	112		-11	-11%	1.1	
				EB	Right	456	399	395	456:399:395	214.8648889	189		12	2%	0.8	
				NB	Left	559	575	905	559:575:905	85.88	66		21	24%	2.4	
				NB	Through	558	575	472	558:575:472	869.8	973	957	1039	-103	-12%	3.4
				SB	Through	472	575	558	472:575:558	939.95	1077	1230	1278	-137	-15%	4.3
6	Botany Rd/Robey St	Botany Rd	Right	SB	Through	472	575	905	472:575:905	290.25	201		89	31%	5.7	
				EB	Left	905	575	472	905:575:472	94.2	58	182	142	4	4%	0.4
				EB	Right	905	575	558	905:575:558	87.8	84		4	4%	0.4	
				WB	Through	34	29	18	34:29:18	1860	1797		63	3%	1.5	
				WB	Right					0	0		0	0%	0.0	
		Wentworth Ave	Left	SB	Left	47	34	53	47:34:53	390.6	377		14	3%	0.7	
				SB	Right	41	29	18	41:29:18	260.4	123	651	500	137	53%	9.8
				EB	Left					0	0		0	0%	0.0	
				EB	Through	18	29	34	18:29:34	1192.8	1131	1193	1131	62	5%	1.8
				EB	Right	22	23	26	22:23:26	78.4	63		15	20%	1.8	
7	Wentworth Ave/Southern Cross Dr Off Ramp	Sir Reginald Ansett Dr	Left	NB	Through	3086a	3086	20	3086a:3086:20	599.4	621	1201	1244	-22	-4%	0.9
				NB	Right	3086a	3086	35	3086a:3086:35	523.2	560		-37	-7%	1.6	
				WB	Left	14	16	3086a	14:16:3086a	581	608		-27	-5%	1.1	
				WB	Through	12	3086	26	12:3086:26	390.8	388	1244	1323	5	1%	0.2
				WB	Right	35	3086	20	35:3086:20	272.6	329		-56	-21%	3.3	
		Joyce Dr	Right	SB	Left	36	37	35	36:37:35	321.4	450		-129	-40%	6.5	
				SB	Through	19	3086	3086a	19:3086:3086a	559.45	595	881	1045	-36	-6%	1.5
				SB	Right					0	0		0	0%	0.0	
				EB	Left	30	31	20	30:31:20	53	63		-10	-19%	1.3	
				EB	Through	32	3086	35	32:3086:35	268.4	313	783	795	-45	-17%	2.6
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Qantas Dr	Right	EB	Through	26	3086	3086a	26:3086:3086a	461.4	419		42	9%	2.0	
				NB	Left	58	54	50	58:54:50	48.84	50		-3	-7%	0.5	
				NB	Through	57	591	591a	57:591:591a	936.8	952	984	1002	-15	-2%	0.5
				NB	Right					0	0		0	0%	0.0	
				WB	Left	48	49	19	48:49:19	92.5	131		-39	-42%	3.6	
		O'Riordan St	Right	WB	Through	48	591	54	48:591:54	185	137	278	268	48	26%	3.8
				WB	Right					0	0		0	0%	0.0	
				SB	Left	43	44	45	43:44:45	98.4	66		32	33%	3.6	
				SB	Through	43	591	49	43:591:49	984	923	1604	1482	61	6%	2.0
				SB	Right	591a	591	54	591a:591:54	522	493		29	6%	1.3	
9	O'Riordan St/Robey St	Robey St	Right	EB	Left	50	591	591a	50:591:591a	359.4	392		33	9%	1.7	
				EB	Through	50	591	44	50:591:44	97.4	73	457	465	24	25%	2.6
				EB	Right					0	0		0	0%	0.0	
				WB	Left	48	49	19	48:49:19	92.5	131		-39	-42%	3.6	
				WB	Through	48	591	54	48:591:54	185	137		48	26%	3.8	
		O'Riordan St	Right	WB	Right					0	0		0	0%	0.0	
				SB	Left	43	44	45	43:44:45	98.4	66		32	33%	3.6	
				SB	Through	43	591	49	43:591:49	984	923	1604	1482	61	6%	2.0
				SB	Right	591a	591	54	591a:591:54	522	493		29	6%	1.3	
				EB	Left	50	591	591a	50:591:591a	359.4	392		33	9%	1.7	

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	61	73%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	18%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5

Links with GEH Statistic	91.6%
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b/w 5 and 10

8.4%

Links with GEH statistic

> 10

0.0%

Seed 2849 4pm-5pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0				0	0%	0.0		
			NB	Through	387	420	390	387:420:390	438	346	1036	1054	92	21%	4.6	
			NB	Right	388	420	420a	388:420:420a	597.5	708			-111	-18%	4.3	
		WB	Left	411	420b	386	411:420b:386	1059.75	1008			52	5%	1.6		
		WB	Through										0	0%	0.0	
		WB	Right	392	420	390	392:420:390	1086	1066			20	2%	0.8		
	General Holmes Dr	General Holmes Dr	SB	Left	397	403	420a	397:403:420a	832.75	864			-31	-4%	1.1	
			SB	Through	398	420	420b	398:420:420b	1136.5	1059			78	7%	2.3	
			SB	Right									0	0%	0.0	
		Botany Rd	NB	Left	441	446	442	441:446:442	219.6992721	168			52	24%	3.7	
			NB	Through	433	589	589a	433:589:589a	973.4	1001			-28	-3%	0.9	
			NB	Right								0	0%	0.0		
2	Botany Rd/General Holmes Dr	General Holmes Dr	EB	Left	446	589a	448	446:589a:448	165.4	149			16	10%	1.3	
			EB	Through									0	0%	0.0	
			EB	Right	446	589	433	446:589:433	60.4	97			-37	-61%	4.1	
		Botany Rd	SB	Left									0	0%	0.0	
			SB	Through	449	589	433	449:589:433	817.4	813			4	1%	0.2	
			SB	Right	589a	589	446	589a:589:446	500.8	550			-49	-10%	2.1	
	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	611.6	668			-56	-9%	2.2	
			WB	Through	436	574	433	436:574:433	423.4	633			-210	-50%	9.1	
			WB	Right	433	438	436	433:438:436	323.780625	316			8	2%	0.4	
		Botany Rd	SB	Through	433	574	574a	433:574:574a	548.2	592			-44	-8%	1.8	
			NB	Through	431	574	433	431:574:433	486.8	540			-53	-11%	2.3	
			NB	Right	574a	574	436	574a:574:436	689	934			-245	-36%	8.6	
3	Botany Rd/Southern Cross Dr	Botany Rd	NB	Left	419a	382	392	419a:382:392	471.4	436			35	8%	1.7	
			NB	Through	418	419	419b	418:419:419b	673.6	829			-155	-23%	5.7	
			NB	Right									0	0%	0.0	
		Southern Cross Dr	WB	Left	422	418	423	422:418:423	127.118367	117			10	8%	0.9	
			WB	Through	422	419	382	422:419:382	973.2	939			34	4%	1.1	
			WB	Right								0	0%	0.0		
	Botany Rd	SB	Left	414	417	416	414:417:416	11.62016679	70			-58	-502%	9.1		
		SB	Through	417	419	418	417:419:418	520	489			31	6%	1.4		
		SB	Right	419b	419	382	419b:419:382	659	697			-38	-5%	1.5		
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	511.6	642			-130	-25%	5.4	
			EB	Through	406	419	416	406:419:416	843.2	775			68	8%	2.4	
			EB	Right	408	419	418	408:419:418	136.8	150			-13	-10%	1.1	
4	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	267	266			1	0%	0.1	
			NB	Through	453	590	451	453:590:451	1233	1073			160	13%	4.7	
			NB	Right	395	590	443	395:590:443	103	70			33	32%	3.5	
		General Holmes Dr	WB	Left	445	399	395	445:399:395	485.8	476			9	2%	0.4	
			WB	Through	443	590	468	443:590:468	51.23490909	75			-24	-46%	3.0	
			WB	Right	443	590	451	443:590:451	139.16590909	162			-23	-16%	1.9	
	Joyce Dr	SB	Left	10	450	443	10:450:443	120	71			49	41%	5.0		
		SB	Through	450	590	395	450:590:395	1338.2	1298			40	3%	1.1		
		SB	Right								0	0%	0.0			
	Ross Smith Ave	Ross Smith Ave	EB	Left	456	590	451	456:590:451	72.32	84			-12	-16%	1.3	
			EB	Through	456	590	443	456:590:443	85.12686667	102			-17	-20%	1.7	
			EB	Right	456	590	395	456:590:395	181.5533333	157			14	2%	0.9	
Botany Rd		NB	Left	558	575	905	558:575:905	88.54	92			-4	-5%	0.5		
		NB	Through	558	575	472	558:575:472	885.4	1058			-173	-19%	5.5		
		NB	Right	472	575	558	472:575:558	1098.35	1256			-158	-14%	4.6		
Botany Rd/Robey St	Botany Rd	SB	Right	472	575	905	472:575:905	319.65	213			148	1469	107	33%	6.5
		EB	Left	905	575	472	905:575:472	92.4	78			14	16%	1.6		
		EB	Right	905	575	558	905:575:558	83.4	107			-24	-28%	2.4		
	Robey St	WB	Through	34	29	18	34:29:18	1835.2	1760			75	4%	1.8		
		WB	Left									0	0%	0.0		
		WB	Right	47	34	53	47:34:53	155.7	162			-6	-4%	0.5		
5	Wentworth Ave/Southern Cross Dr Off Ramp	Southern Cross Dr	SB	Right	41	29	18	41:29:18	103.8	143			-39	-35%	3.5	
			EB	Left									0	0%	0.0	
			EB	Through	18	29	34	18:29:34	1255	1194			61	5%	1.7	
		Wentworth Ave	WB	Left	22	23	26	22:23:26	73.8	52			22	30%	2.7	
			WB	Through	3086a	3086	20	3086a:3086:20	657.4	620			37	6%	1.5	
			WB	Right	3086a	3086	35	3086a:3086:35	610.6	604			7	1%	0.3	
	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	609.6	630			-20	-3%	0.8	
			WB	Through	12	3086	26	12:3086:26	391.4	432			-41	-10%	2.0	
			WB	Right	35	3086	20	35:3086:20	231.4	257			-26	-15%	2.3	
		O'Riordan St	SB	Left	36	37	35	36:37:35	364.2	483			-119	-33%	5.8	
			SB	Through	19	3086	3086a	19:3086:3086a	572.35	618			-46	-8%	1.9	
			SB	Right									0	0%	0.0	
Qantas Dr	EB	Left	30	31	20	30:31:20	55	56			-1	-2%	0.1			
	EB	Through	32	3086	35	32:3086:35	240.2	280			-40	-17%	2.5			
	EB	Right	26	3086	3086a	26:3086:3086a	420.8	354			57	13%	2.9			
6	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	47.06	70			-23	-49%	3.0	
			NB	Through	57	591	591a	57:591:591a	941.2	876			65	7%	2.2	
			NB	Right									0	0%	0.0	
		Robey St	WB	Left	48	49	19	48:49:19	139.2	52			87	63%	8.9	
			WB	Through	48	591	54	48:591:54	278.4	248			30	11%	1.9	
			WB	Right								0	0%	0.0		
	O'Riordan St	SB	Left	43	44	45	43:44:45	102.46	80			22	22%	2.4		
		SB	Through	43	591	49	43:591:49	1024.6	1065			-40	-4%	1.2		
		SB	Right	591a	591	54	591a:591:54	640.6	668			-27	-4%	1.1		
	Robey St	EB	Left	50	52	591a	50:52:591a	359.2	380			-21	-6%	1.1		
		EB	Through	50	591	44	50:591:44	93.4	109			-16	-17%	1.6		
		EB	Right									0	0%	0.0		

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	17	20%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5

Links with GEH Statistic	88.0%
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b/w 5 and 10

12.0%

Links with GEH statistic

> 10

0.0%

Seed 2849 5pm-6pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0	0			0	0%	0.0		
			NB	Through	387	420	390	387:420:390	448.75	355	1063	982	94	21%	4.7	
			NB	Right	388	420	420a	388:420:420a	613.75	627			-13	-2%	0.5	
			WB	Left	411	420b	386	411:420b:386	1203.75	1159			45	4%	1.3	
			WB	Through												
		Mill Pond Rd	WB	Right	392	420	390	392:420:390	879.5	837	2083	1996	0	0%	0.0	
			SB	Left	397	403	420a	397:403:420a	1019.5	1064			-45	-4%	1.4	
			SB	Through	398	420	420b	398:420:420b	1319	1228	2339	2292	91	7%	2.6	
			SB	Right									0	0%	0.0	
			SB	Through												
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	215.1390929	176	1168	1115	39	18%	2.8	
			NB	Through	433	589	589a	433:589:589a	953.2	939			14	1%	0.5	
			NB	Right									0	0%	0.0	
			EB	Left	446	589a	448	446:589a:448	179.4	119			60	34%	4.9	
			EB	Through												
		General Holmes Dr	EB	Right	446	589	433	446:589:433	66.6	0	246	256	-70	-106%	7.0	
			SB	Left									0	0%	0.0	
			SB	Through	449	589	433	449:589:433	848.8	906	1460	1537	-57	-7%	1.9	
			SB	Right	589a	589	446	589a:589:446	611.4	631			-20	-3%	0.8	
			SB	Through												
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	603.8	705	1017	1284	-101	-17%	4.0	
			WB	Right	436	574	433	436:574:433	413.6	579			-165	-40%	7.4	
			SB	Left	433	438	436	433:438:436	338.428125	491	911	1045	-153	-15%	7.5	
			SB	Through	433	574	574a	433:574:574a	573	554			19	3%	0.8	
			NB	Through	431	574	433	431:574:433	494.6	534	1226	1443	-39	-3%	1.7	
		Botany Rd	NB	Right	574a	574	436	574a:574:436	731.8	909			-177	-24%	6.2	
			NB	Left	419a	382	392	419a:382:392	555.4	572			-17	-3%	0.7	
			NB	Through	418	419	419b	418:419:419b	727.6	844	1283	1416	-116	-16%	4.2	
			NB	Right									0	0%	0.0	
			WB	Left	422	418	423	422:418:423	101.642249	109			-7	-7%	0.7	
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	WB	Through	422	419	382	422:419:382	778.2	737	880	846	41	5%	1.5	
			WB	Right									0	0%	0.0	
			SB	Left	414	417	416	414:417:416	11.82727915	2			10	83%	3.7	
			SB	Through	417	419	418	417:419:418	321.4	510	1216	1234	-11	2%	0.5	
			SB	Right	419b	419	382	419b:419:382	683.2	722			-39	-6%	1.5	
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	526.6	586			-59	-11%	2.5	
			EB	Through	406	419	416	406:419:416	1044.6	991	1681	1699	54	5%	1.7	
			EB	Right	408	419	418	408:419:418	109.8	122			-12	-11%	1.1	
			NB	Left	455	468	461	455:468:461	264.2	198			66	25%	4.4	
			NB	Through	453	590	451	453:590:451	1016.4	938	1397	1210	78	8%	2.5	
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Right	395	590	443	395:590:443	116.4	74			42	36%	4.3	
			WB	Left	445	399	395	445:399:395	604.4	549			66	9%	3.2	
			WB	Through	443	590	468	443:590:468	55.81709091	77	812	809	-21	-3%	2.6	
			WB	Right	443	590	451	443:590:451	151.8829091	184			-32	-21%	2.5	
			SB	Left	10	450	443	10:450:443	116.4	116			0	0%	0.0	
		Joyce Dr	SB	Through	450	590	395	450:590:395	1568.4	1545	1685	1661	23	1%	0.6	
			SB	Right									0	0%	0.0	
			EB	Left	456	590	451	456:590:451	78.976	64			15	19%	1.8	
			EB	Through	456	590	443	456:590:443	92.96133333	67	370	313	26	28%	2.9	
			EB	Right	456	590	395	456:590:395	198.265667	182			16	8%	1.2	
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.72	92	976	1061	-3	-4%	0.3	
			NB	Through	558	575	472	558:575:472	887.2	969			-82	-9%	2.7	
			SB	Through	472	575	558	472:575:558	1182.95	1424	1534	1700	-241	-20%	6.7	
			SB	Right	472	575	905	472:575:905	351.45	276			75	21%	4.3	
			EB	Left	905	575	472	905:575:472	107	86	192	198	21	20%	2.1	
		Robey St	EB	Right	905	575	558	905:575:558	85.2	112			-27	-31%	2.7	
			WB	Through	34	29	18	34:29:18	1888.2	1980	1888	1980	-92	-5%	2.1	
			WB	Right									0	0%	0.0	
			SB	Left	47	34	53	47:34:53	177	258			-81	-46%	5.6	
			SB	Right	41	29	18	41:29:18	118	54	295	312	64	54%	5.8	
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Left									0	0%	0.0	
			EB	Through	18	29	34	18:29:34	1334.6	1329	1335	1329	6	0%	0.2	
			NB	Left	22	23	26	22:23:26	84.8	61			24	28%	2.8	
			NB	Through	3086a	3086	20	3086a:3086:20	590.8	606	1353	1379	-15	-3%	0.6	
			NB	Right	3086a	3086	35	3086a:3086:35	677.8	712			-34	-5%	1.3	
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	500.2	552	1096	1170	-52	-10%	2.3	
			WB	Through	12	3086	26	12:3086:26	389.4	396			-7	-2%	0.3	
			WB	Right	35	3086	20	35:3086:20	206.2	222			-16	-8%	1.1	
			SB	Left	36	37	35	36:37:35	395.6	565			-169	-43%	7.7	
			SB	Through	19	3086	3086a	19:3086:3086a	558.55	592	954	1157	-33	-6%	1.4	
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	O'Riordan St	SB	Right									0	0%	0.0	
			EB	Left	30	31	20	30:31:20	49.2	78			-29	-59%	3.6	
			EB	Through	32	3086	35	32:3086:35	350	392	780	824	-42	-12%	2.2	
			EB	Right	26	3086	3086a	26:3086:3086a	380.4	354			26	7%	1.4	
			NB	Left	58	54	50	58:54:50	43.71	54			-10	-24%	1.5	
		Qantas Dr	NB	Through	57	591	591a	57:591:591a	674.2	848	918	902	36	3%	0.9	
			NB	Right									0	0%	0.0	
			WB	Left	48	49	19	48:49:19	133.3	113			20	15%	1.8	
			WB	Through	48	591	54	48:591:54	266.6	255	400	368	12	4%	0.7	
			WB	Right									0	0%	0.0	
9	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	100.42	97			3	3%	0.3	
			SB	Through	43	591	49	43:591:49	1004.2	1053	1813	1862	-49	-5%	1.5	
			SB	Right	591a	591	54	591a:591:54	708.8	712			-3	0%	0.1	
			EB	Left	50	52	591a	50:52:591a	376.4	451			-75	-20%	3.7	
			EB	Through	50	591	44	50:591:44	36.6	101	473	552	-4	-5%	0.4	
		Robey St	EB	Right										0	0%	0.0

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5

Links with GEH Statistic	90.4%
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b/w 5 and 10

Links with GEH statistic	9.6%
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> 10

0.0%
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Seed 7771 3pm-4pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	6:00:00		6:00:00		Difference	% Difference	GEH Statistic		
					From	Via	To		7:00:00	7:00:00	7:00:00	7:00:00					
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left					0	0	1043	1008	0	0%	0.0		
			NB	Through	387	420	390	387:420:390	480.75	486			-5	-1%	0.2		
			NB	Right	388	420	420a	388:420:420a	562.5	522			41	7%	1.7		
			WB	Left	411	420b	386	411:420b:386	1001.25	961			40	4%	1.3		
			WB	Through							2065	1989			0	0%	0.0
		General Holmes Dr	WB	Right	392	420	390	392:420:390	1063.75	1028			36	3%	1.1		
			SB	Left	397	403	420a	397:403:420a	777.5	763			15	2%	0.5		
			SB	Through	398	420b	420b	398:420b:420b	1010	947			63	6%	2.0		
			SB	Right							1788	1710			0	0%	0.0
			SB	Through											0	0%	0.0
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	208.5485961	148			61	29%	4.5		
			NB	Through	433	589	589a	433:589:589a	924	819			105	11%	3.6		
			NB	Right							1133	967			0	0%	0.0
			EB	Left	446	589a	448	446:589a:448	178	170			8	4%	0.6		
			EB	Through							243	282			0	0%	0.0
		General Holmes Dr	EB	Right	446	589	433	446:589:433	64.8	112			-47	-73%	9.0		
			SB	Left											0	0%	0.0
			SB	Through	449	589	433	449:589:433	781.2	787			-6	-1%	0.2		
			SB	Right	589a	589	446	589a:589:446	401.4	362			39	10%	2.0		
			SB	Through							1183	1149			0	0%	0.0
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	627.6	692			-64	-10%	2.5		
			WB	Right	436	574	433	436:574:433	419	550			-131	-31%	6.0		
			SB	Left	433	438	436	433:438:436	308.898875	362			-53	-17%	2.9		
			SB	Through	433	574	574a	433:574:574a	523	547			-24	-5%	1.0		
			NB	Through	431	574	433	431:574:433	455.4	417			38	8%	1.8		
		Botany Rd	NB	Right	574a	574	436	574a:574:436	657.2	832			-175	-27%	6.4		
			NB	Left	419a	382	392	419a:382:392	381.8	326			56	15%	3.0		
			NB	Through	418	419	419b	418:419:419b	637	784			-147	-23%	5.5		
			NB	Right							1019	1110			0	0%	0.0
			WB	Left	422	418	423	422:418:423	122.9061224	136			-13	-11%	1.2		
4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	WB	Through	422	419	382	422:419:382	941	910			31	3%	1.0		
			WB	Right							1064	1046			0	0%	0.0
			SB	Left	414	417	416	414:417:416	11.68158179	25			-13	-14%	3.1		
			SB	Through	417	419	418	417:419:418	525.6	467			59	11%	2.6		
			SB	Right	419b	419	382	419b:419:382	657.6	750			-92	-14%	3.5		
		Southern Cross Dr	EB	Left	419x	406	419b	419x:406:419b	492.2	463			29	6%	1.3		
			EB	Through	406	419	416	406:419:416	760.6	663			98	13%	3.7		
			EB	Right	408	419	418	408:419:418	134.2	165			-31	-23%	2.5		
			NB	Left	455	468	461	455:468:461	277.8	260			18	6%	1.1		
			NB	Through	453	590	451	453:590:451	1199.8	1177			23	2%	0.7		
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Right	395	590	443	395:590:443	108.8	80			29	26%	3.0		
			WB	Left	445	399	395	445:399:395	384.6	313			72	19%	3.8		
			WB	Through	443	590	468	443:590:468	51.39636364	61			-10	-19%	1.3		
			WB	Right	443	590	451	443:590:451	139.6036364	129			11	8%	0.9		
			SB	Left	10	450	443	10:450:443	130	98			32	25%	3.0		
		Joyce Dr	SB	Through	450	590	395	450:590:395	1202.2	1184			18	2%	0.5		
			SB	Right							1332	1282			0	0%	0.0
			EB	Left	456	590	451	456:590:451	85.58933333	77			9	10%	1.0		
			EB	Through	456	590	443	456:590:443	100.7457778	105			-4	-4%	0.4		
			EB	Right	456	590	395	456:590:395	214.8648889	217			-2	-1%	0.1		
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	905	558:575:905	88.98	107			-20	-23%	2.0		
			NB	Through	558	575	472	558:575:472	869.8	881			-11	-1%	0.4		
			SB	Through	472	575	558	472:575:558	939.95	1060			-120	-13%	3.8		
			SB	Right	472	575	905	472:575:905	290.25	245			45	16%	2.8		
			EB	Left	905	575	472	905:575:472	94.2	70			24	26%	2.7		
		Robey St	EB	Right	905	575	558	905:575:558	87.8	84			4	4%	0.4		
			WB	Through	34	29	18	34:29:18	1860	1830			30	2%	0.7		
			WB	Right							1860	1830			0	0%	0.0
			SB	Left	47	34	53	47:34:53	390.6	374			17	4%	0.8		
			SB	Right	41	29	18	41:29:18	260.4	124			136	52%	9.8		
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Left											0	0%	0.0
			EB	Through	18	29	34	18:29:34	1192.8	1086			107	9%	3.2		
			NB	Left	22	23	26	22:23:26	78.4	53			25	32%	3.1		
			NB	Through	3086a	3086	20	3086a:3086:20	599.4	579			20	3%	0.8		
			NB	Right	3086a	3086	35	3086a:3086:35	523.2	528			-5	-1%	0.2		
		Southern Cross Dr	WB	Left	14	16	3086a	14:16:3086a	581	614			-33	-6%	1.4		
			WB	Through	12	3086	26	12:3086:26	390.8	424			-33	-8%	1.7		
			WB	Right	35	3086	20	35:3086:20	272.6	355			-82	-30%	4.7		
			SB	Left	36	37	35	36:37:35	321.4	440			-119	-37%	6.1		
			SB	Through	19	3086	3086a	19:3086:3086a	559.45	556			3	1%	0.1		
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Joyce Dr	SB	Right											0	0%	0.0
			EB	Left	30	31	20	30:31:20	53	45			8	15%	1.1		
			EB	Through	32	3086	35	32:3086:35	268.4	311			-43	-16%	2.5		
			EB	Right	26	3086	3086a	26:3086:3086a	461.4	402			59	13%	2.9		
			NB	Left	58	54	50	58:54:50	48.84	60			-13	-28%	1.8		
		O'Riordan St	NB	Through	57	591	591a	57:591:591a	936.8	922			15	2%	0.5		
			NB	Right							984	982			0	0%	0.0
			WB	Left	48	49	19	48:49:19	92.5	141			-49	-52%	4.5		
			WB	Through	48	591	54	48:591:54	185	209			-24	-13%	1.7		
			WB	Right							278	350			0	0%	0.0
9	O'Riordan St/Robey St	Robey St	SB	Left	43	44	45	43:44:45	98.4	85			13	14%	1.4		
			SB	Through	43	591	49	43:591:49	984	865			119	12%	3.9		
			SB	Right	591a	591	54	591a:591:54	522	525			-3	-1%	0.1		
			EB	Left	50	52	591a	50:52:591a	359.4	400			-41	-11%	2.1		
			EB	Through	50	591	44	50:591:44	97.4	70			27	28%	3.0		
		O'Riordan St	EB	Right							457	470			0	0%	0.0

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	62	75%
Links with difference in flow within 15% for flows 700 - 1700 vph	15	18%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5		
Links with GEH Statistic		92.8%

b/w 5 and 10 7.2%

Links with GEH statistic > 10 0.0%

Seed 7771 4pm-5pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	7:00:00		7:00:00		Difference	% Differences	GEH Statistic	
					From	Via	To		8:00:00	8:00:00	8:00:00	8:00:00				
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left				0				0	0%	0.0		
			NB	Through	387	420	390	387:420:390	438	392	1036	1034	46	11%	2.3	
			NB	Right	388	420	420a	388:420:420a	597.5	642			-45	-7%	1.8	
			WB	Left	411	420b	386	411:420b:386	1059.75	1029			31	3%	1.0	
			WB	Through							2146	2021	125	6%	2.0	
		General Holmes Dr	WB	Right	392	420	390	392:420:390	1086	992			94	9%	2.9	
			SB	Left	397	403	420a	397:403:420a	832.75	879			-46	-6%	1.6	
			SB	Through	398	420	420b	398:420:420b	1136.5	1060	1969	1939	77	7%	2.3	
			SB	Right									0	0%	0.0	
			SB	Through									0	0%	0.0	
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	219.6992721	160			60	27%	4.3	
			NB	Through	433	589	589a	433:589:589a	973.4	941	1193	1101	32	3%	1.0	
			NB	Right									0	0%	0.0	
			EB	Left	446	589a	448	446:589a:448	165.4	136			29	18%	2.4	
			EB	Through							226	231	-5	0%	0.0	
		General Holmes Dr	EB	Right	446	589	433	446:589:433	60.4	95			-35	-57%	3.9	
			SB	Left									0	0%	0.0	
			SB	Through	449	589	433	449:589:433	917.4	841	1318	1427	-24	-3%	0.8	
			SB	Right	589a	589	446	589a:589:446	500.8	586			-85	-17%	3.7	
			SB	Through									0	0%	0.0	
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	611.6	667	1035	1253	-55	-9%	2.2	
			WB	Right	436	574	433	436:574:433	423.4	586			-163	-38%	7.2	
			SB	Left	433	438	436	433:438:436	323.780625	340	872	926	-16	-5%	0.9	
			SB	Through	433	574	574a	433:574:574a	548.2	586			-38	-7%	1.6	
			NB	Through	431	574	433	431:574:433	486.8	522	1176	1411	-35	-7%	1.6	
		Botany Rd	NB	Right	574a	574	436	574a:574:436	689	889			-200	-29%	7.1	
			NB	Left	419a	382	392	419a:382:392	471.4	467			4	1%	0.2	
			NB	Through	418	419	419b	418:419:419b	673.6	823	1145	1290	-149	-22%	5.5	
			NB	Right									0	0%	0.0	
			WB	Left	422	418	423	422:418:423	127.1118367	120			7	6%	0.6	
4	Botany Rd/Southern Cross Dr/ Mill Pond Rd	Southern Cross Dr	WB	Through	422	419	382	422:419:382	973.2	864	1100	984	109	11%	3.6	
			WB	Right									0	0%	0.0	
			SB	Left	414	417	416	414:417:416	11.62016679	58			-46	-399%	7.9	
			SB	Through	417	419	418	417:419:418	520	484	1191	1248	-36	-7%	1.6	
			SB	Right	419b	419	382	419b:419:382	659	706			-47	-7%	1.8	
		Mill Pond Rd	EB	Left	419x	406	419b	419x:406:419b	511.6	585			-73	-14%	3.1	
			EB	Through	406	419	416	406:419:416	843.2	781	1492	1517	62	7%	2.2	
			EB	Right	408	419	418	408:419:418	136.8	151			-14	-10%	1.2	
			NB	Left	455	468	461	455:468:461	267	268			-1	0%	0.1	
			NB	Through	453	590	451	453:590:451	1233	1055	1603	1392	178	14%	5.3	
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Right	395	590	443	395:590:443	103	69			34	33%	3.7	
			WB	Left	445	399	395	445:399:395	485.8	514			-28	-6%	1.3	
			WB	Through	443	590	468	443:590:468	51.23490909	79	676	750	-28	-54%	3.4	
			WB	Right	443	590	451	443:590:451	139.16590909	157			-18	-13%	1.5	
			SB	Left	10	450	443	10:450:443	120	61			59	49%	6.2	
		Joyce Dr	SB	Through	450	590	395	450:590:395	1338.2	1285	1458	1346	53	4%	1.5	
			SB	Right									0	0%	0.0	
			EB	Left	456	590	451	456:590:451	72.32	87			-15	-20%	1.6	
			EB	Through	456	590	443	456:590:443	85.12686667	101	339	345	-16	-19%	1.6	
			EB	Right	456	590	395	456:590:395	181.5533333	157			25	14%	1.9	
6	Botany Rd/Robey St	Botany Rd	NB	Left	559	575	905	559:575:905	88.54	75			14	15%	1.5	
			NB	Through	558	575	472	558:575:472	885.4	1008	974	1083	-123	-14%	4.0	
			SB	Through	472	575	558	472:575:558	1098.35	1316	1418	1557	-218	-20%	6.3	
			SB	Right	472	575	905	472:575:905	319.65	241			79	25%	4.7	
			EB	Left	905	575	472	905:575:472	92.4	70	176	184	22	24%	2.5	
		Robey St	EB	Through	905	575	558	905:575:558	83.4	114			-31	-37%	3.1	
			WB	Through	34	29	18	34:29:18	1835.2	1770	1835	1770	65	4%	1.5	
			WB	Right									0	0%	0.0	
			SB	Left	47	34	53	47:34:53	155.7	145			11	7%	0.9	
			SB	Right	41	29	18	41:29:18	103.8	149	260	294	-45	-44%	4.0	
7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	EB	Left									0	0%	0.0	
			EB	Through	18	29	34	18:29:34	1255	1145	1255	1145	110	9%	3.2	
			NB	Left	22	23	26	22:23:26	73.8	40			34	46%	4.5	
			NB	Through	3086a	3086	20	3086a:3086:20	657.4	648	1342	1317	9	1%	0.4	
			NB	Right	3086a	3086	35	3086a:3086:35	610.6	629			-18	-3%	0.7	
		Joyce Dr	WB	Left	14	16	3086a	14:16:3086a	609.6	602	1232	1297	8	1%	0.3	
			WB	Through	12	3086	26	12:3086:26	391.4	418			-27	-7%	1.3	
			WB	Right	35	3086	20	35:3086:20	231.4	277			-46	-20%	2.9	
			SB	Left	36	37	35	36:37:35	364.2	460			-96	-26%	4.7	
			SB	Through	19	3086	3086a	19:3086:3086a	572.35	630	937	1090	-58	-10%	2.4	
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	O'Riordan St	SB	Right									0	0%	0.0	
			EB	Left	30	31	20	30:31:20	55	60			-5	-9%	0.7	
			EB	Through	32	3086	35	32:3086:35	240.2	262	716	710	-22	-9%	1.4	
			EB	Right	26	3086	3086a	26:3086:3086a	420.8	388			33	8%	1.6	
			NB	Left	58	54	50	58:54:50	47.06	57	988	975	-10	-21%	1.4	
		Qantas Dr	NB	Through	57	591	591a	57:591:591a	941.2	918			23	2%	0.8	
			NB	Right									0	0%	0.0	
			WB	Left	48	49	19	48:49:19	139.2	73			66	48%	6.4	
			WB	Through	48	591	54	48:591:54	278.4	239	418	312	39	14%	2.4	
			WB	Right									0	0%	0.0	
9	O'Riordan St/Robey St	O'Riordan St	SB	Left	43	44	45	43:44:45	102.46	87			15	15%	1.6	
			SB	Through	43	591	49	43:591:49	1024.6	1020	1768	1800	5	0%	0.1	
			SB	Right	591a	591	54	591a:591:54	640.6	663			-52	-8%	2.0	
			EB	Left	50	52	591a	50:52:591a	359.2	302			57	16%	3.1	
			EB	Through	50	591	44	50:591:44	93.4	99	453	401	-6	-6%	0.6	
		Robey St	EB	Right										0	0%	0.0

Criteria for acceptable model performance

Links with difference in flow within 100 vph for flows <700vph	64	77%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

Links with GEH Statistic < 5

Links with GEH Statistic	90.4%
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b/w 5 and 10

9.6%

Links with GEH statistic

> 10

0.0%

Seed 7771 5pm-6pm

Obs Turning Counts Modelled Turning Counts Obs Approach Vol Modelled Approach Vol

Junction No.	Junction	Approach	Direction	Turning Movement	Node			Node Description	8:00:00		8:00:00		Difference	% Differences	GEH Statistic				
					From	Via	To		9:00:00	9:00:00	9:00:00	9:00:00							
1	General Holmes Dr/Mill Pond Rd	General Holmes Dr	NB	Left					0	0	1063	980	0	0%	0.0				
			NB	Through	387	420	390	387:420:390	448.75	367			82	18%	4.0				
			NB	Right	388	420	420a	388:420:420a	613.75	613			1	0%	0.0				
		Mill Pond Rd	WB	Left	411	420b	386	411:420b:386	1203.75	1191			13	1%	0.4				
			WB	Through								2083	2088	0	0%	0.0			
			WB	Right	392	420	390	392:420:390	879.5	897			-18	-2%	0.8				
		General Holmes Dr	SB	Left	397	403	420a	397:403:420a	1019.5	1056			-37	-4%	1.1				
			SB	Through	398	420	420b	398:420:420b	1319	1218			101	8%	2.8				
			SB	Right								2339	2274	65	3%	1.5			
			SB	Through								0	0%	0.0					
2	Botany Rd/General Holmes Dr	Botany Rd	NB	Left	441	446	442	441:446:442	215.1390929	228			-13	-6%	0.9				
			NB	Through	433	589	589a	433:589:589a	953.2	910			43	5%	1.4				
			NB	Right								1168	1138	30	3%	1.0			
		General Holmes Dr	EB	Left	446	589a	448	446:589a:448	179.4	107			72	40%	6.1				
			EB	Through								246	236	10	4%	1.0			
			EB	Right	446	589	433	446:589:433	66.6	129			-62	-94%	6.3				
		Botany Rd	SB	Left								1460	1471	-11	-1%	0.1			
			SB	Through	449	589	433	449:589:433	848.8	846			3	0%	0.1				
			SB	Right	589a	589	446	589a:589:446	611.4	625			-14	-2%	0.5				
			SB	Through								0	0%	0.0					
3	Botany Rd/Wentworth Ave	Wentworth Ave	WB	Left	436	574a	421	436:574a:421	603.8	740			-136	-23%	5.3				
			WB	Right	436	574	433	436:574:433	413.6	668			-254	-62%	10.9				
		Botany Rd	SB	Left	433	438	436	433:438:436	338.42825	472			911	985	-74	-8%	2.6		
			SB	Through	433	574	574a	433:574:574a	573	513			60	10%	2.6				
		Botany Rd	NB	Through	431	574	433	431:574:433	494.6	473			22	4%	1.0				
			NB	Right	574a	574	436	574a:574:436	731.8	895			-163	-22%	5.7				
		4	Botany Rd/Southern Cross Dr/Mill Pond Rd	Botany Rd	NB	Left	419a	382	392	419a:382:392	555.4	550			5	1%	0.2		
					NB	Through	418	419	419b	418:419:419b	727.6	797			-69	-10%	2.5		
					NB	Right								1283	1347	-64	-5%	1.8	
				Southern Cross Dr	WB	Left	422	418	423	422:418:423	101.64249	110			-8	-8%	0.8		
WB	Through				422	419	382	422:419:382	778.2	785			-7	-1%	0.2				
WB	Right											880	895	-15	-2%	0.5			
Botany Rd	SB			Left	414	417	416	414:417:416	11.8274915	1			11	92%	4.3				
	SB			Through	417	419	418	417:419:418	521.4	504			17	3%	0.8				
	SB			Right	419b	419	382	419b:419:382	683.2	751			-68	-11%	2.9				
	EB			Left	419x	406	419b	419x:406:419b	526.6	569			-42	-8%	1.8				
	EB	Through	406	419	416	406:419:416	1044.6	986			59	6%	1.8						
	EB	Right	408	419	418	408:419:418	109.8	120			-10	-9%	1.0						
5	General Holmes Dr/Joyce Dr/Ross Smith Ave	General Holmes Dr	NB	Left	455	468	461	455:468:461	264.2	243			21	8%	1.3				
			NB	Through	453	590	451	453:590:451	1016.4	953			63	6%	2.0				
			NB	Right	395	590	443	395:590:443	116.4	78			38	33%	3.9				
		General Holmes Dr	WB	Left	445	399	395	445:399:395	694.4	547			147	9%	2.4				
			WB	Through	443	590	468	443:590:468	55.81709091	97			-41	-73%	4.7				
			WB	Right	443	590	451	443:590:451	151.8829091	206			-54	-36%	4.0				
		Joyce Dr	SB	Left	10	450	443	10:450:443	116.4	88			28	24%	2.8				
			SB	Through	450	590	395	450:590:395	1568.4	1502			66	4%	1.7				
		Ross Smith Ave	SB	Right								1685	1590	95	6%	1.7			
			EB	Left	456	590	451	456:590:451	78.976	80			-1	-1%	0.1				
EB	Through		456	590	443	456:590:443	92.96133333	70			23	25%	2.5						
EB	Right		456	590	395	456:590:395	198.265667	194			4	2%	0.3						
EB	Through		558	575	905	558:575:905	88.72	114			-25	-28%	2.5						
6	Botany Rd/Robey St	Botany Rd	NB	Left	558	575	472	558:575:472	887.2	901			-14	-2%	0.5				
			NB	Through	472	575	558	472:575:558	1182.95	1376			-193	-16%	5.4				
		Robey St	SB	Right	472	575	905	472:575:905	351.45	284			67	19%	3.8				
			SB	Through	905	575	472	905:575:472	107	104			3	3%	0.3				
		Robey St	EB	Left	905	575	558	905:575:558	85.2	98			-13	-15%	1.3				
			EB	Through	34	29	18	34:29:18	1888.2	1909			-21	-1%	0.5				
		7	Wentworth Ave/Southern Cross Dr Off Ramp	Wentworth Ave	WB	Right							1888	1909	-21	-1%	0.5		
					WB	Through	47	34	53	47:34:53	177	273			0	0%	0.0		
				Southern Cross Dr	SB	Right	41	29	18	41:29:18	118	51			295	324	-29	-9%	1.0
					SB	Through								1335	1286	49	4%	1.3	
Wentworth Ave	EB			Left								0	0%	0.0					
	EB			Through	18	29	34	18:29:34	1334.6	1286			49	4%	1.3				
	NB			Left	22	23	26	22:23:26	84.8	56			29	34%	3.4				
	NB			Through	3086a	3086	20	3086a:3086:20	590.8	653			-62	-11%	2.5				
	NB			Right	3086a	3086	35	3086a:3086:35	677.8	666			12	2%	0.5				
	WB			Left	14	16	3086a	14:16:3086a	500.2	558			-58	-12%	2.5				
8	Joyce Dr/O'Riordan St/Qantas Dr/Sir Reginald Ansett Dr	Sir Reginald Ansett Dr	NB	Through	12	3086	26	12:3086:26	389.4	483			-74	-19%	3.6				
			NB	Right	35	3086	20	35:3086:20	206.2	224			-18	-8%	1.2				
			NB	Left	36	37	35	36:37:35	395.6	538			-142	-36%	6.6				
		Joyce Dr	SB	Through	19	3086	3086a	19:3086:3086a	558.55	576			-17	-3%	0.7				
			SB	Right								954	1114	-160	-15%	4.5			
		Qantas Dr	EB	Left	30	31	20	30:31:20	49.2	77			-28	-57%	3.5				
			EB	Through	32	3086	35	32:3086:35	350	385			-35	-10%	1.8				
			EB	Right	26	3086	3086a	26:3086:3086a	380.4	336			44	12%	2.3				
		9	O'Riordan St/Robey St	O'Riordan St	NB	Left	58	54	50	58:54:50	43.71	63			-19	-44%	2.8		
					NB	Through	57	591	591a	57:591:591a	674.2	899			-32	-4%	0.8		
Robey St	WB			Left	48	49	19	48:49:19	133.3	124			9	7%	0.8				
	WB			Through	48	591	54	48:591:54	266.6	278			-11	-4%	0.7				
O'Riordan St	WB			Right								400	402	-2	0%	0.0			
	SB			Left	43	44	45	43:44:45	100.42	96			4	4%	0.4				
	SB			Through	43	591	49	43:591:49	1004.2	1005			-1	0%	0.0				
	SB			Right	591a	591	54	591a:591:54	708.8	753			-44	-6%	1.6				
	EB			Left	50	591	44	50:591:44	376.4	387			-11	-3%	0.5				
	EB			Through	50	591	44	50:591:44	36.6	107			-10	-11%	1.0				
EB	Right								473	494	-21	-4%	0.5						

Criteria for acceptable model performance

a) Links with difference in flow within 100 vph for flows <700vph	60	72%
Links with difference in flow within 15% for flows 700 - 1700 vph	16	19%
Links with difference in flow within 400 vph for flows >1700 vph	0	0%

b) Links with GEH Statistic < 5	88.0%
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Links with GEH Statistic b/w 5 and 10 10.8%

Links with GEH statistic > 10 1.2%