ROAD DELAY SOLUTIONS

Shepherds Bay

Urban Renewal Development

Stages 2 and 3

Traffic Impact Assessment

Section 96 Application

Prepared for

Holdmark PROPERTY GROUP

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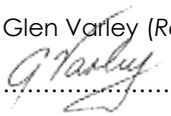
Signed 

Reviewed George Youssef (*Holdmark*)

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ABSTRACT

Road Delay Solutions Pty Ltd has been engaged by *Holdmark Prperty Group* to undertake investigation and provide supporting information into the traffic implications associated with the proposed Shepherds Bay Residential Development, Stages 2 and 3 and the Section 96 Application for the deletion of Community Facility and addition of apartments.

The Section 96 Application specifically proposes…

- *Reduction of the largely unusable stepped terraces within the internal courtyards of each building. These have been replaced by a largely 'at grade' landscaping zone which reduces the amount of hard landscaping and increases the soft landscaping areas,*
- *Amendments to the stepped terraces between Stage 2 and Stage 3 buildings. The current scheme proposed two separate lifts to enable people to traverse from Nancarrow Avenue to Rothesay Avenue. The second lift stopped approximately 4m above the landscaped paving toward Rothesay Avenue and then people traversed a series of ramps and/or stairs to access the lower part of the site. The proposal has one lift that takes people from Nancarrow Avenue to the Upper Basement level. The large curved stairs at Upper Basement and the series of steps between the multiple levels have been deleted. This improves accessibility throughout the site.*
- *The proposed Café, which is currently at Lower Ground level or over 4m above Rothesay Avenue, has been relocated to the Upper Basement level, which allows far greater connectivity incorporating the adjusted landscape areas at this level.*
- *People now have the advantage of being able to access the internal courtyards of both buildings at the Upper Basement levels via generous links through both Stage 2 and Stage 3 buildings. This enables connectivity between the buildings that was not previously available.*
- *The current DA has three storeys of very large unusable space against the cliff. These spaces have been activated by adjusting the carparking areas and apartments as shown. This activates the unusable space by using it as car parking, a potential gym one storey below Nancarrow Avenue and Services spaces.*
- *Removal of unnecessary walling needed to cope with the varying terrace levels both between the two buildings and within their respective internal courtyards.*
- *The number of water features have been reduced and refined.*
- *28 apartments have been added over and above the 17 included as part of the deed of agreement.*

This assessment specifically focuses on the traffic impacts associated with the proposed urban renewal of the Meadowbank Precinct and the committed infrastructure projects associated with the Department of Planning & Infrastructure Concept Approval, MP09_0216.

Stages 2 and 3 of the development will provide for 498 residential apartments and is anticipated to generate some 144 vehicle trips per commuter peak travel period. The Section 96 Application is proposed to include…

- *498 residential apartments,*
- *640 car parking spaces,*
- *64 allocated bicycle spaces at 1 space per 10 car spaces,*
- *Pedestrian and bicycle pathways,*
- *Publically accessible open space,*
- *Provision for emergency and service vehicles, and*
- *Infrastructure improvements to sustain the anticpated level of motor vehicle generation.*

The internal vehicle machinations, parking and service provisions for the proposed Stages 2 and 3 is dealt with in a separate report prepared by Thompson Stanbury Associates.

LOCATION

Located within the precinct known as the Mea*dowbank Employment Area* (MEA) the proposed Holdmark development, Shepherds Bay, is generally bounded by Bowden Street to the west, Constitution Road to the north and Belmore Street to the east, and the Parramatta River to the south.

Figure 1 **Shepherds Bay Development Footprint**
Source *Robertson + Marks Architects, Revision L, 2014*

THE DEVELOPMENT

The full development involves the construction of 1,988, high end, residential apartment dwellings on the shore of the Parramatta River, Shepherds Bay, west of the Ryde Bridge.

Stage 1, involving the construction of 246 residential apartments, is located at the corner of Belmore Street and Rothesay Avenue, replacing the former industrial activities.

Stages 2 and 3 of the development, located to the immediate west of Stage 1, proposes the construction of a further 498 residential apartments, consisting of…

- *4 studio apartments,*
- *253 single bedroom apartments,*
- *12 loft apartmets,*
- *212 two bedroom apartments, and*
- *17 three bedroom apartments.*

Vehicular access to the Stages 2 and 3 buildings is proposed to be facilitated via a single access driveway connecting with Rothesay Avenue in the south-eastern corner of the site. The driveway is proposed to provide a 6m wide ingress laneway, separated from a 6m wide egress lane by a 1m wide median. The driveway will permit access to 640, basement level, parking spaces.

EXISTING CONDITIONS

Road Network

Church Street is classified as a *State Road* under the auspices of the *RMS* and provides the key north-south transport corridor in the area. It typically comprises six (6) traffic lanes (*ie. 3 lanes in each direction*), with opposing traffic flows separated by a central concrete median island.

Victoria Road is also classified as a *State Road* under the auspices of the *RMS* providing a pivotal east-west transport link on the Sydney Metropolitan road network.

Typically comprising six (6) trafficable lanes, with opposing traffic flows separated by a central concrete median island.

Junction Street, Belmore Street and Constitution Road form part of a *collector road system* which permit traffic to enter and leave the Meadowbank Precinct.

Generally consisting of a single trafficable lane in each direction, and with kerbside parking permitted at select locations only, the collector road network affords both local and cross regional traffic the ability to by pass congestion on the arterial road network.

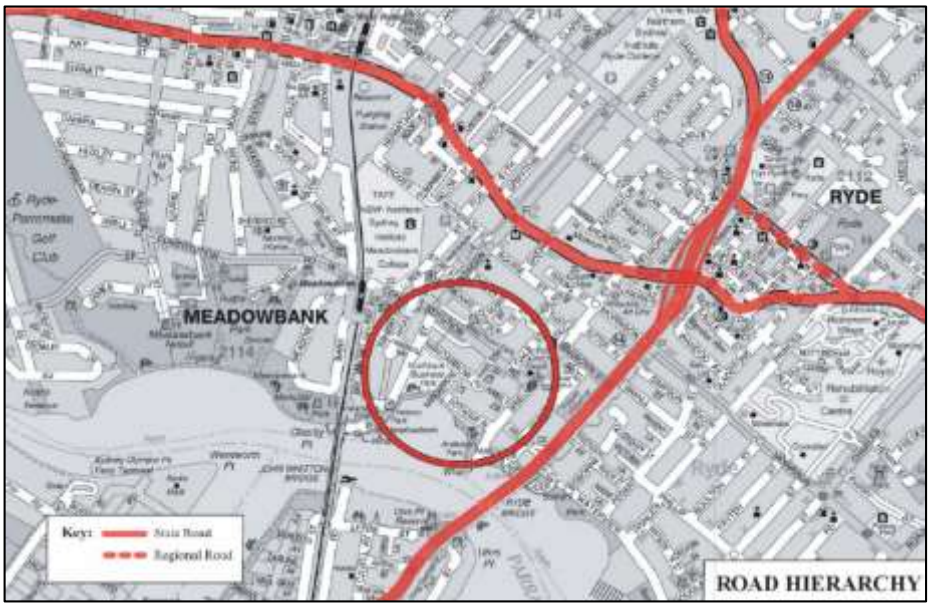


Figure 2 **Meadowbank Road Hierarchy**
Source *Google Maps, 2015*

Existing Traffic Controls

The existing key traffic controls on the surrounding road network, in the vicinity of the Shepherds Bay development site, are…

- *A 70 km/h speed limit on Church Street*
- *A 60 km/h speed limit in Victoria Road,*
- *A 50 km/h speed limit on all other local roads in the area,*
- *Traffic signals on Church Street at its intersection with both Junction Street and Morrison Road,*
- *Traffic signals in Belmore Street at its intersection with both Constitution Road and Junction Street,*
- *Central median islands in Church Street and in Victoria Road ptecluding right turn movements, with the exception of those permitted at key traffic signal controlled intersections,*
- *A roundabout in Constitution Road at its intersection with Bowden Street, and*
- *Roundabouts in Porter Street at its intersection with both Parsonage Street and Well Street.*

Traffic Counts

Road Delay Solutions has commissioned *ROAR Data* to annually count key intersections within the *MEA*, in particular the intersections of Constitution Road with both Bowden Sreet and Belmore Street. These counts have been collected in or around November of each year from 2011 to 2014, inclusive.

The 2014 counts, along with the projected traffic volumes for the respective stages of development, are presented in *Appendix A*.

From the counts, the annual growth rates on each road corridor have been calculated and utilised in the operational computer based modelling of the select infrastructure upgrades associated with the planning approval.

From the collated traffic data, the annual growth in traffic has been determined by Road corridors. Understandably a negative growth rate is currently reported through the precinct given…

- *The transformation of local land uses,*
- *The vacation of local business prior to the development construction, and*
- *The impedance of construction vehicles for the Shepherds Bay and surrounding developments.*

A positive growth rate is anticipated with the occupancy of Stage 1, onwards.

While the *Bureau of Transport Statistics* (BTS) currently lists vehicle growth on the Metropolitan Arterial Road Network as some 1.2%, for the purpose of this assessment, an average 1% growth rate has been applied, annually, to the current traffic figures to assimilate any possible growth in cross regional traffic flow.

On top of the 1% growth rate applied, each annual stage of development has been added to the future traffic projections to enable assessment of a '*worst case*' situation.

Road Corridor	Vehicles per Hour *(All vehicle types)*				Average Growth
	2011	2012	2013	2014	
AM Constitution Road Eastbound	686	692	628	621	-3.2%
AM Constitution Road Westbound	488	452	441	435	-3.7%
AM Bowden Road Northbound	420	438	363	371	-3.5%
AM Bowden Street Southbound	377	369	254	266	-9.5%
AM Belmore Street Northbound	322	337	304	300	-2.1%
AM Belmore Street Southbound	146	152	138	133	-2.9%
AM Railway Parade Northbound	766	770	632	621	-6.4%
AM Railway Parade Southbound	323	437	352	355	5.6%
PM Constitution Road Eastbound	429	340	417	513	8.3%
PM Constitution Road Westbound	619	768	667	580	-0.7%
PM Bowden Road Northbound	413	384	255	189	-22.2%
PM Bowden Street Southbound	374	389	510	540	13.7%
PM Belmore Street Northbound	322	346	331	284	-3.7%
PM Belmore Street Southbound	228	223	246	152	-10.0%
PM Railway Parade Northbound	302	344	375	372	7.4%
PM Railway Parade Southbound	815	849	906	919	4.1%
Average Annual Growth Rate					**-29.0%**

Table 1 **Current Road Network Growth Rates**
Source *Road Delay Solutions, 2014*

FUTURE CONDITIONS

Vehicle Generation

Based upon the *RMS Technical Direction TDT 2013/04a* high density residential apartment developments, the traffic generation for the Stages 2 and 3 has adopted a generation rate of 0.29 vehicles per hour (vph) per apartment, for both the morning and evening commuter peak periods, respectively. This generation rate is considered conservative and will aid in determining the appropriate triggers and warrants for infrastructure during construction of the development.

Travel patterns from the development have been drawn from the BTS data set published in 2011, and have been exported into *Road Delay Solutions'* Netanal strategic model for the purpose of utilising select link analysis to determine the projected movement of development generated traffic within the precinct.

Vehicle Generation Period	RMS Vehicle Generation Rate			
	Sydney Average	Sydney Range	Regional Average	Regional Range
AM peak (1 hour) vehicle trips per unit	**0.19**	0.07-0.32	0.53	0.39-0.67
AM peak (1 hour) vehicle trips per car space	0.15	0.09-0.29	0.35	0.32-0.37
AM peak (1 hour) vehicle trips per bedroom	0.09	0.03-0.13	0.21	0.20-0.22
PM peak (1 hour) vehicle trips per unit	**0.15**	0.06-0.41	0.32	0.22-0.42
PM peak (1hour) vehicle trips per car space	0.12	0.05-0.28	0.26	0.11-0.40
PM peak (1 hour) vehicle trips per bedroom	0.07	0.03-0.17	0.15	0.07-0.22
Daily vehicle trips per unit	1.52	0.77-3.14	4.58	4.37-4.78
Daily vehicle trips per car space	1.34	0.56-2.16	3.22	2.26-4.18
Daily vehicle trips per bedroom	0.72	0.35-1.29	1.93	1.59-2.26

Table 2 **RMS Vehicle Generation Rates**
Source *Extract from RMS Technical Direction, 2013*

Construction Stage	No of Apartments	Vehicle Generation			
		Adopted Rate	Vehicles per Hour *(vph)*	AM Outbound *(80%)*	AM Inbound *(20%)*
1	246	0.29	71	57	14
2 and 3	498*	0.29	144	116	29
4 and 5	511	0.29	148	119	30
6 and 7	311	0.29	90	72	18
8 and 9	422	0.29	122	98	24
Totals	**1988**		**577**	**461**	**115**

** 28 apartments have been added over and above the 17 included as part of the deed of agreement.*

Table 3 **Development Vehicle Generation by Stage**
Source *Holdmark, 2015*

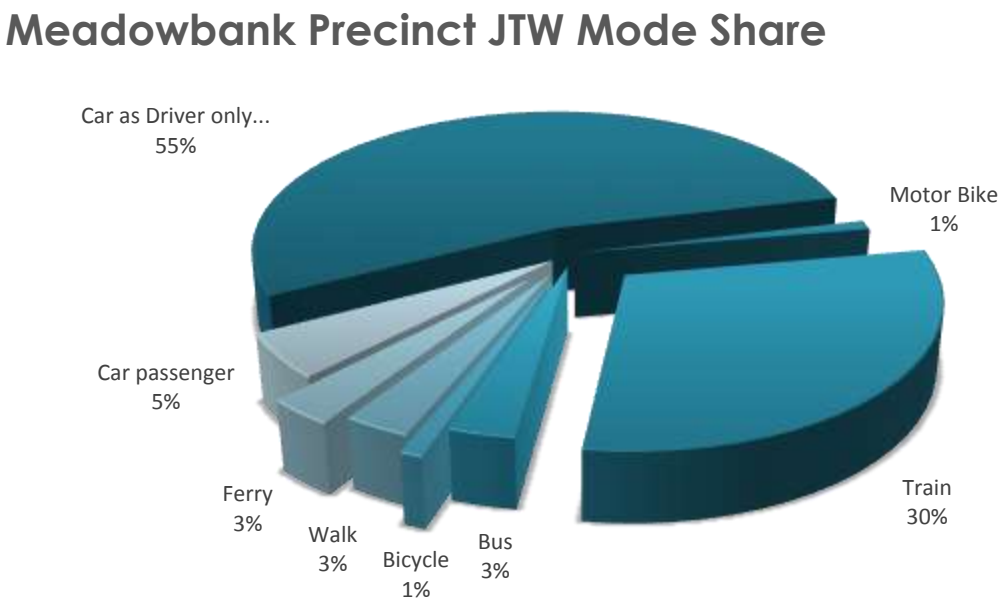


Figure 3 **Meadowbank Precinct JTW Mode Choice**
Source *ABS Census data – 'Suburban Community Profile'- Meadowbank, 2011*

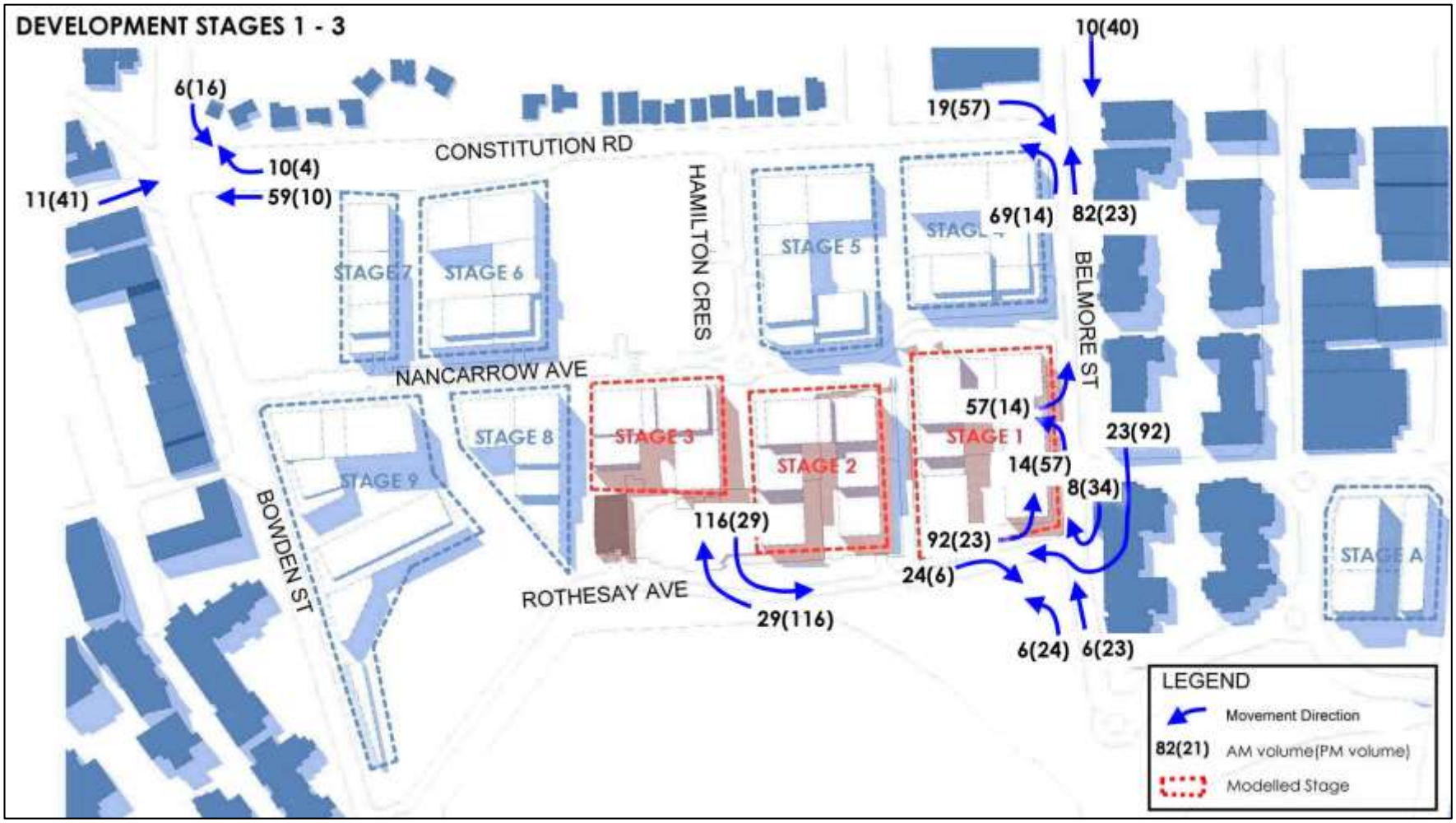


Figure 4 **Stages 1 Through 3 Generated Traffic Flows**
Source *Road Delay Solutions, 2015*

The current predominant available transport mode choices for JTW have been catalogued from those available within, or adjacent to, the *MEA*, and as defined within the *BTS* 2006 transport zone number 2522.

The latest *Household Travel Survey* (HTS) data shows that average weekday trips grew by 1.0% between 2009/10 and 2010/11, which was slower than the 1.6% rate of population growth in the *Sydney Statistical Division* (SSD).

The private motor vehicle remains the dominant mode of transport embraced by the wider Sydney community. The ever increasing use of the private motor vehicle for both journey to work trips and recreational activities, places significant pressure on the road network infrastructure, the environment, health and local amenity, with road authorities compelled to sustain a perceived and expected satisfactory level of service.

In line with NSW 2021 targets, growth in public transport trips has been higher than growth in private vehicle passenger trips. Vehicle driver trips have increased by 1.5%, while train and bus trips increased by 2.6% and 2.3%, respectively. These inherent increases can be attributed to increased traffic congestion on the arterial road system, greater frequency of public transport services and improved intermodal/interchange provisions.

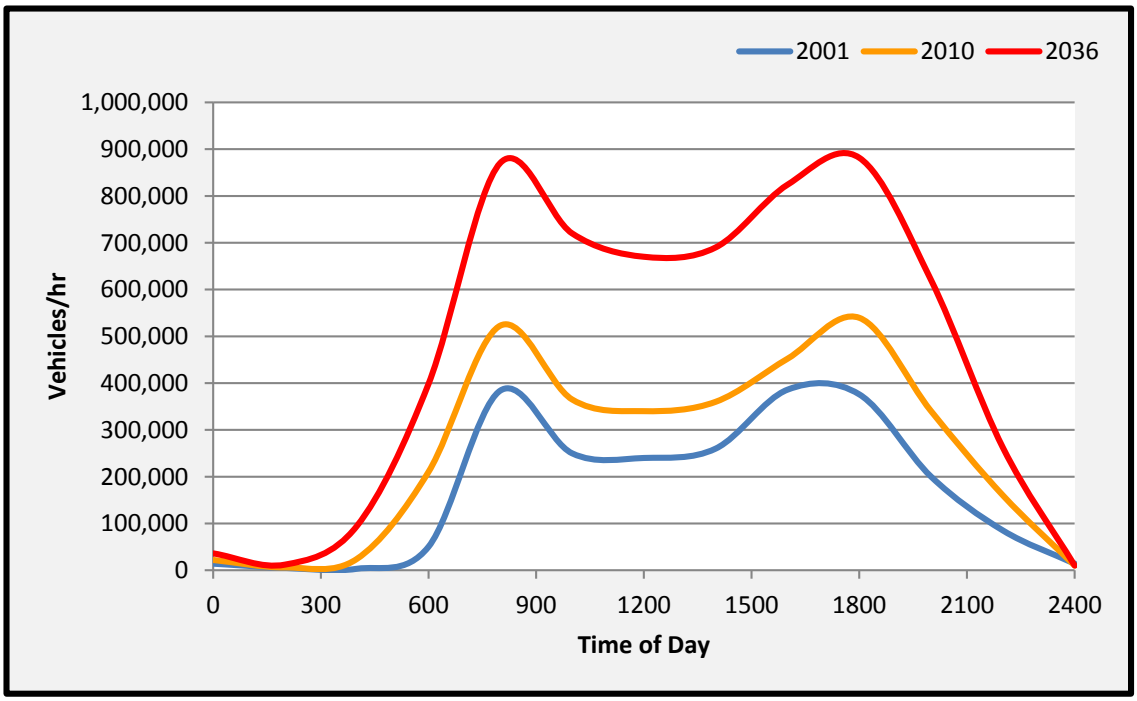


Figure 5 **Projected Sydney Metropolitan Peak Hour Travel Demand**
Source *Road Delay Solutions, Netanal Model 2012*

Infrastructure Requirements

During the planning and approval stage, the form and level of infrastructure required, to sustain the urban renewal development, was diligently assessed.

Holdmark has expressed it's commitment to constructing the following infrastructure during the staged construction of the development, in accordance with the Department of Planning and Infrastructure Approval MP09_0216.

The prescribed infrastructure upgrades include…

- *The extension of Nancarrow Avenue between Hamilton Crescent and Belmore Street,*
- *The provision of left in/left out at the intersection of Belmore Street and Hamilton Crescent,*
- *The provision of left in/left out at the intersection of Belmore Street and Yerong Street,*
- *Underdale Lane Local Area Traffic Management (LATM) measures,*
- *Installation of a pedestrian refuge on Bowden Street near Nancarrow Avenue,*
- *Installation of roundabout in Belmore Street at Rothesay Avenue,*
- *The provision of left in/left out at the intersection of Belmore Street and Yerong Street,*
- *Installation of traffic signals at the intersection of Constitution Road and Bowden Street, and*
- *Installation of traffic signal installation on Railway Road at the current pedestrian crossing near Meadowbank railway station.*

Traffic Impacts

Investigations into the traffic impacts associated with the development vehicle generation has been undertaken using the computer based program, SIDRA.

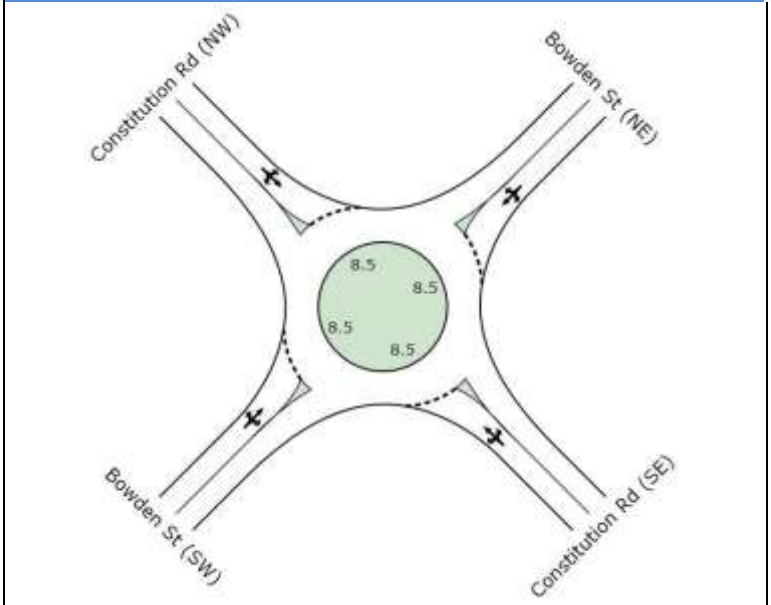
In particular, the intersections of Constitution Road with Belmore Street and also Bowden Street, have been closely scrutinised.

Constitution Road and Bowden Street

It is understood that the intersection was itemised by Council, under the 2005 works program and again identified by Urban Horizon in July of 2010, to be reconstructed and operate under the control of traffic signals.

The single lane circulating roundabout controlled intersection was modelled extensively under both pre and post development conditions during the '*Concept Stage*', at which time an operational Level of Service (LoS) 'A' was reported for both AM and PM peak commuter periods.

Constitution Road and Bowden Street



	AM			PM		
	DS	AVD *(secs)*	LoS	DS	AVD *(secs)*	LoS
Existing	0.615	7.5	A	0.689	9.8	A
Stg 2/3	0.633	9.3	A	0.706	10.4	A

Figure 6 **Constitution Road and Bowden Street Operational Performance**
Source *Road Delay Solutions, Netanal Model 2014*

MOVEMENT SUMMARY

Site: Existing AM 2014

Constitution Rd & Bowden St
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Constitution Rd (SE)											
21	L2	33	7.6	0.399	5.4	LOS A	2.9	20.7	0.53	0.60	45.0
22	T1	266	1.0	0.399	5.1	LOS A	2.9	20.7	0.53	0.60	45.8
23	R2	136	0.6	0.399	6.1	LOS A	2.9	20.7	0.53	0.60	45.6
Approach		435	1.4	0.399	6.1	LOS A	2.9	20.7	0.53	0.60	45.7
NorthEast: Bowden St (NE)											
24	L2	78	0.0	0.358	7.8	LOS A	2.4	17.0	0.76	0.82	43.9
25	T1	69	4.3	0.358	7.8	LOS A	2.4	17.0	0.76	0.82	44.5
26	R2	119	3.5	0.358	10.6	LOS B	2.4	17.0	0.76	0.82	44.3
Approach		266	2.7	0.358	9.2	LOS A	2.4	17.0	0.76	0.82	44.2
NorthWest: Constitution Rd (NW)											
27	L2	142	2.5	0.615	7.7	LOS A	5.8	41.0	0.74	0.76	44.7
28	T1	462	0.6	0.615	7.4	LOS A	5.8	41.0	0.74	0.76	45.4
29	R2	11	0.0	0.615	10.4	LOS B	5.8	41.0	0.74	0.76	45.2
Approach		615	1.0	0.615	7.5	LOS A	5.8	41.0	0.74	0.76	45.2
SouthWest: Bowden St (SW)											
30	L2	6	0.0	0.234	7.2	LOS A	1.4	10.0	0.66	0.75	44.2
31	T1	93	3.7	0.234	7.2	LOS A	1.4	10.0	0.66	0.75	44.8
32	R2	87	3.6	0.234	10.2	LOS B	1.4	10.0	0.66	0.75	44.6
Approach		186	3.5	0.234	8.6	LOS A	1.4	10.0	0.66	0.75	44.7
All Vehicles		1502	1.7	0.615	7.5	LOS A	5.8	41.0	0.67	0.72	45.1

MOVEMENT SUMMARY

Site: Existing PM 2014

Constitution Rd & Bowden St
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Constitution Rd (SE)											
21	L2	27	0.0	0.689	8.2	LOS A	8.0	56.4	0.91	0.99	42.8
22	T1	498	0.9	0.689	11.1	LOS B	8.0	56.4	0.91	0.99	43.4
23	R2	55	1.4	0.689	14.1	LOS B	8.0	56.4	0.91	0.99	43.2
Approach		580	0.9	0.689	11.2	LOS B	8.0	56.4	0.91	0.99	43.4
NorthEast: Bowden St (NE)											
24	L2	76	0.0	0.583	8.1	LOS A	5.2	36.5	0.76	0.83	43.4
25	T1	94	1.2	0.583	8.0	LOS A	5.2	36.5	0.76	0.83	44.0
26	R2	370	0.4	0.583	11.0	LOS B	5.2	36.5	0.76	0.83	43.9
Approach		540	0.5	0.583	10.1	LOS B	5.2	36.5	0.76	0.83	43.8
NorthWest: Constitution Rd (NW)											
27	L2	59	2.7	0.336	5.4	LOS A	2.3	16.1	0.52	0.57	45.5
28	T1	297	0.4	0.336	5.1	LOS A	2.3	16.1	0.52	0.57	46.2
29	R2	1	12.5	0.336	8.4	LOS A	2.3	16.1	0.52	0.57	45.8
Approach		357	0.8	0.336	5.2	LOS A	2.3	16.1	0.52	0.57	46.1
SouthWest: Bowden St (SW)											
30	L2	24	0.0	0.365	12.1	LOS B	2.6	17.9	0.91	0.96	41.8
31	T1	75	1.0	0.365	12.0	LOS B	2.6	17.9	0.91	0.96	42.4
32	R2	86	0.0	0.365	14.9	LOS B	2.6	17.9	0.91	0.96	42.2
Approach		185	0.4	0.365	13.4	LOS B	2.6	17.9	0.91	0.96	42.2
All Vehicles		1662	0.7	0.689	9.6	LOS A	8.0	56.4	0.75	0.84	43.9

Table 4 **2014 Constitution Road/Bowden Street Movement Summaries**
Source *Road Delay Solutions, 2015*

MOVEMENT SUMMARY

Site: Stage 2 and 3 AM

Constitution Rd & Bowden St
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Constitution Rd (SE)											
21	L2	33	7.8	0.398	5.4	LOS A	2.9	20.8	0.53	0.60	45.0
22	T1	269	1.0	0.398	5.1	LOS A	2.9	20.8	0.53	0.60	45.8
23	R2	137	0.6	0.398	8.1	LOS A	2.9	20.8	0.53	0.60	45.6
Approach		439	1.4	0.398	6.0	LOS A	2.9	20.8	0.53	0.60	45.7
NorthEast: Bowden St (NE)											
24	L2	78	0.0	0.356	8.0	LOS A	2.4	17.0	0.77	0.83	43.8
25	T1	69	4.3	0.356	8.0	LOS A	2.4	17.0	0.77	0.83	44.4
26	R2	112	3.5	0.356	11.0	LOS B	2.4	17.0	0.77	0.83	44.2
Approach		259	2.7	0.356	9.3	LOS A	2.4	17.0	0.77	0.83	44.2
NorthWest: Constitution Rd (NW)											
27	L2	143	2.5	0.633	8.0	LOS A	6.2	44.1	0.76	0.78	44.5
28	T1	478	0.6	0.633	7.7	LOS A	6.2	44.1	0.76	0.78	45.2
29	R2	11	0.0	0.633	10.7	LOS B	6.2	44.1	0.76	0.78	45.0
Approach		632	1.0	0.633	7.8	LOS A	6.2	44.1	0.76	0.78	45.1
SouthWest: Bowden St (SW)											
30	L2	6	0.0	0.236	7.2	LOS A	1.4	10.1	0.66	0.75	44.2
31	T1	94	3.7	0.236	7.2	LOS A	1.4	10.1	0.66	0.75	44.8
32	R2	88	3.6	0.236	10.2	LOS B	1.4	10.1	0.66	0.75	44.6
Approach		188	3.5	0.236	8.6	LOS A	1.4	10.1	0.66	0.75	44.7
All Vehicles		1518	1.7	0.633	7.7	LOS A	6.2	44.1	0.68	0.73	45.0

MOVEMENT SUMMARY

Site: Stage 2 and 3 PM

Constitution Rd & Bowden St
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Constitution Rd (SE)											
21	L2	27	0.0	0.706	8.7	LOS A	8.5	60.1	0.94	1.02	42.6
22	T1	503	0.9	0.706	11.6	LOS B	8.5	60.1	0.94	1.02	43.2
23	R2	56	1.4	0.706	14.6	LOS B	8.5	60.1	0.94	1.02	43.0
Approach		586	0.9	0.706	11.7	LOS B	8.5	60.1	0.94	1.02	43.1
NorthEast: Bowden St (NE)											
24	L2	93	0.0	0.635	9.6	LOS A	6.4	44.9	0.82	0.91	42.7
25	T1	95	1.2	0.635	9.5	LOS A	6.4	44.9	0.82	0.91	43.3
26	R2	374	0.4	0.635	12.5	LOS B	6.4	44.9	0.82	0.91	43.1
Approach		562	0.5	0.635	11.5	LOS B	6.4	44.9	0.82	0.91	43.1
NorthWest: Constitution Rd (NW)											
27	L2	60	2.7	0.376	5.4	LOS A	2.7	18.8	0.54	0.58	45.4
28	T1	341	0.4	0.376	5.2	LOS A	2.7	18.8	0.54	0.58	46.1
29	R2	1	12.5	0.376	8.5	LOS A	2.7	18.8	0.54	0.58	45.7
Approach		402	0.8	0.376	5.3	LOS A	2.7	18.8	0.54	0.58	46.0
SouthWest: Bowden St (SW)											
30	L2	24	0.0	0.376	12.5	LOS B	2.7	18.8	0.92	0.97	41.6
31	T1	76	1.0	0.376	12.4	LOS B	2.7	18.8	0.92	0.97	42.2
32	R2	87	0.0	0.376	15.3	LOS B	2.7	18.8	0.92	0.97	42.0
Approach		187	0.4	0.376	13.8	LOS B	2.7	18.8	0.92	0.97	42.0
All Vehicles		1737	0.7	0.706	10.4	LOS B	8.5	60.1	0.81	0.88	43.6

Table 5 **Stages 2 and 3 Constitution Road/Bowden Street Movement Summaries**
Source *Road Delay Solutions, 2015*

The RMS warrant, which the authority is adhereing to stringently for signalisation of the site, requires Constitution Road to realise 900vph in each direction for four (4) one (1) hour periods of a single day.

With the addition of the Stages 1 through 3 vehicle generations, the intersection of Constitution Road and Bowden Street operates satisfactorily under roundabout control and fails to satisfy the warrant for the installation of traffic signals, prior to the release of an Occupancy Certificate for Stage 3.

Constitution Road and Belmore Street

The intersection of Constitution Road with Belmore Street currently operates at a satisfactory LoS during both the morning and evening peak commuter periods.

With the advent of Stages 2 and 3, no adverse impact on operation is reported by the SIDRA modelling. However, the intersection will require the introduction of a 'No Stopping' restriction, in the northbound aaproach of Belmore Street to increase the capacity and operation of the signals. The 'No Stopping' zone should extend from Rothesay Avenue to Constitution Road. This measure will also eliminate the potential conflict between left turn vehicles leaving Hamilton Crescent onto Belmore Street.

Modelling during the '*Concept Stage*' also identified the Belmore Street and Constitution Road as a '*rat run'* utilised by cross regional traffic. Two northbound lanes in Belmore Street between Rothesay Avenue and Constitution Road was identified as critical in ensuring sufficient mid block and queueing capacities for growth along the corridor.

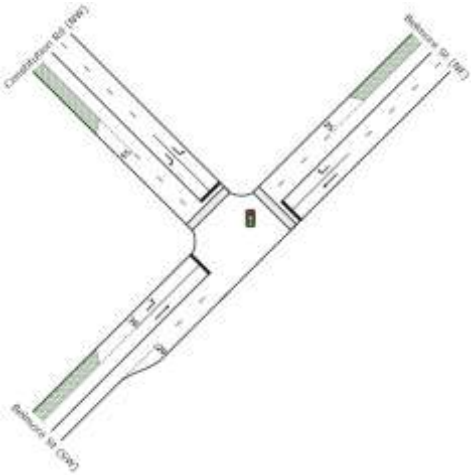
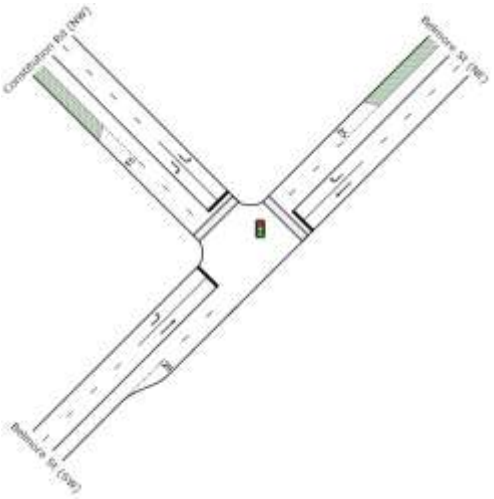
	Existing Layout Constitution Road and Belmore Street			Proposed Layout Constitution Road and Belmore Street		
						
	AM			PM		
	DS	AVD *(secs)*	LoS	DS	AVD *(secs)*	LoS
Existing	0.387	20.0	C	0.514	17.2	B
Stg 2/ 3	0.431	22.3	C	0.489	17.8	B

Figure 7 **Constitution Road and Belmore Street Operational Performance**
Source *Road Delay Solutions, Netanal Model 2014*

MOVEMENT SUMMARY

Site: Existing AM 2014

Belmore St & Constitution Rd
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Belmore St (NE)											
25	T1	27	0.0	0.042	28.6	LOS C	1.0	7.3	0.70	0.52	36.0
26	R2	106	1.6	0.385	55.1	LOS E	5.7	40.6	0.95	0.78	28.3
Approach		133	1.3	0.385	49.8	LOS D	5.7	40.6	0.90	0.73	29.6
NorthWest: Constitution Rd (NW)											
27	L2	216	1.5	0.154	8.5	LOS A	3.3	23.1	0.28	0.62	44.4
29	R2	405	0.7	0.387	19.8	LOS B	12.9	91.1	0.60	0.74	39.0
Approach		621	1.0	0.387	15.9	LOS B	12.9	91.1	0.49	0.70	40.7
SouthWest: Belmore St (SW)											
30	L2	388	0.1	0.287	9.6	LOS A	7.1	49.5	0.34	0.65	43.8
31	T1	84	0.0	0.323	51.8	LOS D	4.5	31.8	0.95	0.74	29.3
Approach		472	0.1	0.323	17.1	LOS B	7.1	49.5	0.45	0.67	40.3
All Vehicles		1226	0.7	0.387	20.0	LOS C	12.9	91.1	0.52	0.69	39.0

MOVEMENT SUMMARY

Site: Existing PM 2014

Belmore St & Constitution Rd
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Belmore St (NE)											
25	T1	35	0.0	0.058	31.0	LOS C	1.4	9.9	0.73	0.55	35.1
26	R2	117	2.4	0.513	59.1	LOS E	6.6	47.2	0.98	0.79	27.5
Approach		152	1.8	0.513	52.6	LOS D	6.6	47.2	0.92	0.73	28.9
NorthWest: Constitution Rd (NW)											
27	L2	232	0.5	0.164	8.5	LOS A	3.5	24.8	0.29	0.62	44.4
29	R2	281	0.0	0.256	17.0	LOS B	7.8	54.3	0.51	0.70	40.2
Approach		513	0.2	0.256	13.1	LOS B	7.8	54.3	0.41	0.67	42.0
SouthWest: Belmore St (SW)											
30	L2	674	0.2	0.514	9.7	LOS A	13.9	97.4	0.39	0.68	43.8
31	T1	52	0.0	0.200	50.7	LOS D	2.8	19.3	0.93	0.70	29.5
Approach		726	0.2	0.514	12.6	LOS B	13.9	97.4	0.43	0.68	42.3
All Vehicles		1391	0.4	0.514	17.2	LOS B	13.9	97.4	0.48	0.68	40.2

Table 6 **2014 Constitution Road/Belmore Street Movement Summaries**
Source *Road Delay Solutions, 2015*

INTERSECTION SUMMARY

Site: Stage 2 and 3 AM

Belmore St & Constitution Rd
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	38.0 km/h	2.2 km/h	38.0 km/h
Travel Distance (Total)	1440.4 veh-km/h	0.2 ped-km/h	1728.6 pers-km/h
Travel Time (Total)	37.9 veh-h/h	0.1 ped-h/h	45.5 pers-h/h
Demand Flows (Total)	1418 veh/h	5 ped/h	1702 pers/h
Percent Heavy Vehicles (Demand)	1.0 %		
Degree of Saturation	0.437	0.001	
Practical Spare Capacity	105.9 %		
Effective Intersection Capacity	3245 veh/h		
Control Delay (Total)	8.80 veh-h/h	0.04 ped-h/h	10.60 pers-h/h
Control Delay (Average)	22.3 sec	30.3 sec	22.4 sec
Control Delay (Worst Lane)	57.5 sec		
Control Delay (Worst Movement)	57.5 sec	45.9 sec	57.5 sec
Geometric Delay (Average)	3.9 sec		
Stop-Line Delay (Average)	18.5 sec		
Idling Time (Average)	16.1 sec		
Intersection Level of Service (LOS)	LOS C	LOS D	
95% Back of Queue - Vehicles (Worst Lane)	14.7 veh		
95% Back of Queue - Distance (Worst Lane)	103.7 m		
Queue Storage Ratio (Worst Lane)	0.37		
Total Effective Stops	996 veh/h	3 ped/h	1199 pers/h
Effective Stop Rate	0.70 per veh	0.70 per ped	0.70 per pers
Proportion Queued	0.57	0.70	0.57
Performance Index	96.2	0.1	96.3
Cost (Total)	823.15 $/h	1.53 $/h	824.67 $/h
Fuel Consumption (Total)	142.3 L/h		
Carbon Dioxide (Total)	335.4 kg/h		
Hydrocarbons (Total)	0.027 kg/h		
Carbon Monoxide (Total)	0.286 kg/h		
NOx (Total)	0.255 kg/h		

Level of Service (LOS) Method: Delay (HCM 2000).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	680,640 veh/y	2,400 ped/y	816,768 pers/y
Delay	4,224 veh-h/y	20 ped-h/y	5,089 pers-h/y
Effective Stops	478,138 veh/y	1,668 ped/y	575,434 pers/y
Travel Distance	691,376 veh-km/y	84 ped-km/y	829,735 pers-km/y
Travel Time	18,171 veh-h/y	38 ped-h/y	21,844 pers-h/y
Cost	395,110 $/y	734 $/y	395,844 $/y
Fuel Consumption	68,316 L/y		
Carbon Dioxide	160,970 kg/y		
Hydrocarbons	13 kg/y		
Carbon Monoxide	137 kg/y		
NOx	122 kg/y		

Organisation: ROAD DELAY SOLUTIONS PTY LTD | Processed: Wednesday, 2 December 2015 9:23:55 AM
Project: Not Saved

Table 7 **AM Stages 2 and 3 Constitution Road/Belmore Street Movement Summaries**
Source *Road Delay Solutions, 2015*

INTERSECTION SUMMARY

Site: Stage 2 and 3 PM

Belmore St & Constitution Rd
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	39.8 km/h	2.2 km/h	39.8 km/h
Travel Distance (Total)	1479.9 veh-km/h	0.2 ped-km/h	1776.1 pers-km/h
Travel Time (Total)	37.2 veh-h/h	0.1 ped-h/h	44.7 pers-h/h
Demand Flows (Total)	1457 veh/h	5 ped/h	1748 pers/h
Percent Heavy Vehicles (Demand)	0.4 %		
Degree of Saturation	0.492	0.003	
Practical Spare Capacity	83.1 %		
Effective Intersection Capacity	2964 veh/h		
Control Delay (Total)	7.30 veh-h/h	0.04 ped-h/h	8.80 pers-h/h
Control Delay (Average)	18.0 sec	30.7 sec	18.1 sec
Control Delay (Worst Lane)	57.9 sec		
Control Delay (Worst Movement)	57.9 sec	54.2 sec	57.9 sec
Geometric Delay (Average)	4.1 sec		
Stop-Line Delay (Average)	13.9 sec		
Idling Time (Average)	11.9 sec		
Intersection Level of Service (LOS)	LOS B	LOS D	
95% Back of Queue - Vehicles (Worst Lane)	14.6 veh		
95% Back of Queue - Distance (Worst Lane)	102.0 m		
Queue Storage Ratio (Worst Lane)	0.63		
Total Effective Stops	995 veh/h	3 ped/h	1197 pers/h
Effective Stop Rate	0.68 per veh	0.68 per ped	0.68 per pers
Proportion Queued	0.50	0.68	0.50
Performance Index	84.0	0.1	84.1
Cost (Total)	807.13 $/h	1.54 $/h	808.67 $/h
Fuel Consumption (Total)	147.0 L/h		
Carbon Dioxide (Total)	345.7 kg/h		
Hydrocarbons (Total)	0.029 kg/h		
Carbon Monoxide (Total)	0.304 kg/h		
NOx (Total)	0.172 kg/h		

Level of Service (LOS) Method: Delay (HCM 2000).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	699,360 veh/y	2,400 ped/y	839,232 pers/y
Delay	3,505 veh-h/y	20 ped-h/y	4,226 pers-h/y
Effective Stops	477,571 veh/y	1,632 ped/y	574,718 pers/y
Travel Distance	710,372 veh-km/y	84 ped-km/y	852,531 pers-km/y
Travel Time	17,840 veh-h/y	38 ped-h/y	21,447 pers-h/y
Cost	387,425 $/y	739 $/y	388,164 $/y
Fuel Consumption	70,538 L/y		
Carbon Dioxide	165,935 kg/y		
Hydrocarbons	14 kg/y		
Carbon Monoxide	146 kg/y		
NOx	82 kg/y		

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Project: Not Saved

Table 8 **PM Stages 2 and 3 Constitution Road/Belmore Street Movement Summaries**
Source *Road Delay Solutions, 2015*

Nancarrow Avenue Extension to Belmore Street

Concept approval conditioned the timing pertaining to the construction of the Nancarrow Avenue extension to Belmore Street prior to the issue of the Occupation Certificate for Stage 4.

No access will be possible to or from Belmore Street during or following completion of Stages 2 and 3.Therefore, construction of the extension should parallel with the construction of Stage 4.

Accordingly, no works are required under this stage of development.

Hamilton Crescent Left In/Left Out at Belmore Street

The Belmore Street access at Hamilton Crescent is dependant upon the construction of the Nancarrow Avenue extension and will be required prior to the issue of the Occupation Certificate for Stage 4.

Accordingly, no works are required under this stage of development.

Constitution Road and Hamilton Crescent

Access to the intersection will be facilitated with the occupancy of Stage 4 onwards and construction of the Nancarrow Road extension to Belmore Street.

It is proposed to install the necessary signposting to prevent right turns from Constitution Road into Hamilton Crescent and likewise from Hamilton Crescent into Constitution Road. In conjunction with the right turn ban from Constitution Road a central median, of sufficient length, should be installed to provide a physical barrier and enforce the restriction.

The works should be undertaken prior to the issue of the Occupancy Certificate for Stage 4.

Accordingly, no action is required under this stage of development.

Belmore Street and Rothesay Avenue Roundabout

Vehicular access for Stages 2 and 3 is proposed via Rothesay Avenue.

Given the projected vehicle generation of 144vph under this Section 96 Application with full occupation of these particular stages, it is considered the roundabout at the intersection of Belmore Street and Rothesay Avenue will need to be constructed prior to the issue of the Occupation Certificate for Stage 2.

Underdale Lane and Bowden Street

Once the Nancarrow Avenue upgrade and extension are complete, the Nancarrow Avenue and Underdale Lane corridor will become an essential link between the development and the Meadowbank Railway Station.

To reduce the conflict between motor vehicles and pedestrian/cyclist activities, measures are to be set in place to deter the lane's use by motor vehicles and highlight the high pedestrian activity. To this end it is proposed to…

- *Install three (3) raised thresholds in Underdale Lane immediately west of Bowden Street, immediately east of Angus Street and immediately east of Railway Road,*
- *Install an alternate road surface coulouring and/or texture, in consultation with Council,*
- *Install signposting denoting high pedestrian and bicycle activity, and*
- *Design and construction of a pedestrian refuge in Bowden Street, between Nancarrow Avenue and Underdale Lane, taking care to avoid driveways, utility services and roadside vegetation.*

Until the Nancarrow Avenue upgrade is complete, access will be restricted to pedestrians by the construction activities associated with Stages 4 and 5.

It is considered the Underdale LATM upgrades and Belmore Street pedestrian refuge construction should be completed prior to the issue of the Occupation Certificate for Stage 4. Accordingly, no works are proposed during Stages 2 and 3.

Belmore Street and Yerong Street Left in/Left out

Conditioned in the concept approval is the design and installation of a triangular splitter island in Yerong Street at the intersection with Belmore Street.

With the occupancy of stages 1 through 3, the installation will be necessary to effectively manage traffic movements to and from Yerong Street.

It is proposed to construct a triangular, concrete, island in Yerong Street to facilitate priority controlled left in/left out.

The construction is to be completed prior to the issue of an Occupancy Certificate for Stage 2 of the development.

Railway Road Pedestrian Crossing

Based upon traffic counts undertaken by *R.O.A.R. Data*, and the projected vehicle generation with 100% occupation of Stages 1, 2 and 3 of the Shepherds Bay development the site fails to satisfy the current *RMS* warrant for traffic signal installation and no further action is considered necessary at this time.

The current volume of pedestrian demand reported during two, typical, consecutive one-hour periods, in the morning commuter peak is 555 with the corresponding vehicle flows in Railway Road of 1232 northbound and 685 southbound.

Extensive queuing was noted, extending to the south in Railway Road from the existing marked foot-crossing, to the railway overbridge roundabout at Bank Street.

The volume reported during two, one-hour periods, of the evening commuter peak totalled 337 with corresponding vehicle flows of 661 northbound and 1763 southbound with extensive queuing noted, extending back into Constitution Road, during the evening peak.

No recent accident history has been reported at the site.

The *RMS* warrant requires the pedestrian flows to exceed 250 persons/hour for each of four (4) one (1) hour periods with conflicting vehicle flows of no less than 600vph, in each direction.

With the addition of pedestrian and vehicle generation projected from Stages 1, 2 and 3, the mid block site does not satisfy the warrant for the installation of traffic signals, at this time.

PUBLIC TRANSPORT

The Metropolitan Strategy, under the auspices of '*Draft SEPP 66 – Integration of Land Use and Transport*', prescribes guiding provisions that aim to ensure the urban structure, building forms, land use locations, development design, subdivision and street layouts to help achieve the following planning objectives...

- *Improving accessibility to housing, employment and services by walking, bicycling and public transport,*
- *Improving the choice of transport and reducing the dependancy on private vehicle usage,*
- *Moderating growth in the demand for travel and the distances travelled, especially by car,*
- *Support the efficient and viable operation of public transport services, and*
- *Providing for the efficient movement of freight.*

The provision seeks to influence mode choice made by both community and business.

The State Government's has invested in 300 new buses across the state, which has resulted in 400 new jobs for bus drivers and 150 jobs in bus construction.

Rail

Meadowbank Railway Station is located near the corner of Railway Road and Constitution Road, some 500-700m from the development. The railway station is approximately 6 to 8 minutes walk utilising the Underdale Lane pedestrian link from nancarrow Avenue.

The railway station is located on the Northern Line, approximately mid-way between Strathfield and Hornsby Railway Stations. The Northern Line operates on a loop comprising Hornsby, the City Circle and Strathfield, via the Epping-Chatswood rail link.

Weekday train services operate every 15 minutes during weekday commuter peak periods, and every 30 minutes outside peak periods. Weekend services also operate every 30 minutes.

Meadowbank Railway Station is located four stops south of Epping Station, a major bus rail interchange with connecting rail services to the City via Macquarie University, Chatswood and North Sydney, and connecting bus services to the Hills District.

To the south Meadowbank Railway Station is located four stops from Strathfield Station, a major bus rail interchange with connections to the North Shore and Western Line, the South Line (to Campbelltown), the Inner West Line between the City Circle and Liverpool, as well as most intercity rail services (ie. to Newcastle, Lithgow and Southern Highlands).

Buses

Bus services through the *MEA* are operated by *Sydney* Buses with weekday services operating every 30 minutes and additional services during the commuter peak periods.

Weekend services generally operate every 60 minutes. Bus stops are located at regular intervals along both sides of Bowden Street and Constitution Road, as well as along Church Street and Victoria Road.

Improved pedestrian access provisions under the development will afford residents greater incemntive to embrace the abundance of public transport oportunitites within the *MEA*.

Route No.	Nearest Bus Stop	Service Route
507	Constitution Road	Meadowbank Station to Sydney CBD & Macquarie University
513	Bowden Street	Meadowbank Wharf to Carlingford Court
533	Church Street	Chatswood to Olympic Park
458	Church Street	Burwood Station to Top Ryde
459	Church Street	Strathfield Station to Macquarie University
534	Victoria Road	West Ryde Station to Chatswood Station
520	Victoria Road	Parramatta Station to Sydney CBD

Pedestrians and Bicyclists

There are a number of cycleways and shared pedestrian paths providing convenient access to and from the Shepherds Bay development for those residents who do not wish to drive or use public transport.

Studies have shown that in Sydney, over 50% of trips are less than 5km; such trips are ideally suited to walking or cycling.

The nearby shared off-road pedestrian and cycleway path which is located along the foreshore continues towards the west to Parramatta and towards the east to the City, using a combination of on and off-road cycleways and pedestrian paths.

An on-road cycleway connects with the foreshore shared pedestrian and cycleway path and follows a generally north-south alignment along Bowden Street and Angus Street to connect with West Ryde Railway Station and other on-road cycleways which extend further to the north. A shared pedestrian and cycleway path also extends southward across Ryde Bridge to the Rhodes peninsula where it connects to other on and off-road cycleways that extend to the south to Concord and Olympic Park.

The proposed development will enhance the options available to residents for walking and cycling through the provision of 3 new east-west cycle links between Bowden Street and Belmore Road. The improved permeability for pedestrians and cyclists offered by these links will provide more direct links for residents when walking or cycling to nearby facilities such as the local primary school, TAFE College, local shops and railway station.

Improved pedestrian links will be provided along all east-west and north-south road links, with additional mid-block pedestrian links to be provided generally following a north-south alignment. The improved pedestrian links will significantly enhance the accessibility of public transport services for residents wishing to walk to the station or to bus stops located in Constitution Road, Bowden Street, Victoria Road, Belmore Street or Church Street.

CONCLUSION

This report, commisiioned by *Holdmark* and undertaken by *Road Delay Solutions*, supports the Section 96 Application by Holdmark.

The Section 96 Applicastion proposes 28 additional apartments over and above the 17 included as part of the deed of agreement, bringing the total number of architecturally designed appartments for Stages 2 and 3 to 498.

The former DA Application sought approval to 431 apartnments.

The 498 apartments proposed under this Section 96 Application will generate some 144vph during the commuter peak travel periods.

The report assess the conditioned infrastructure necessary to sustain the level of development, in accordance with the *Department of Planning & Infrastructure Concept Approval*, MP09_0216 and proposes the relavent timimg for each.

In support of the foregoing assessment, the following is considered relevant to the development Stages 2 and 3...

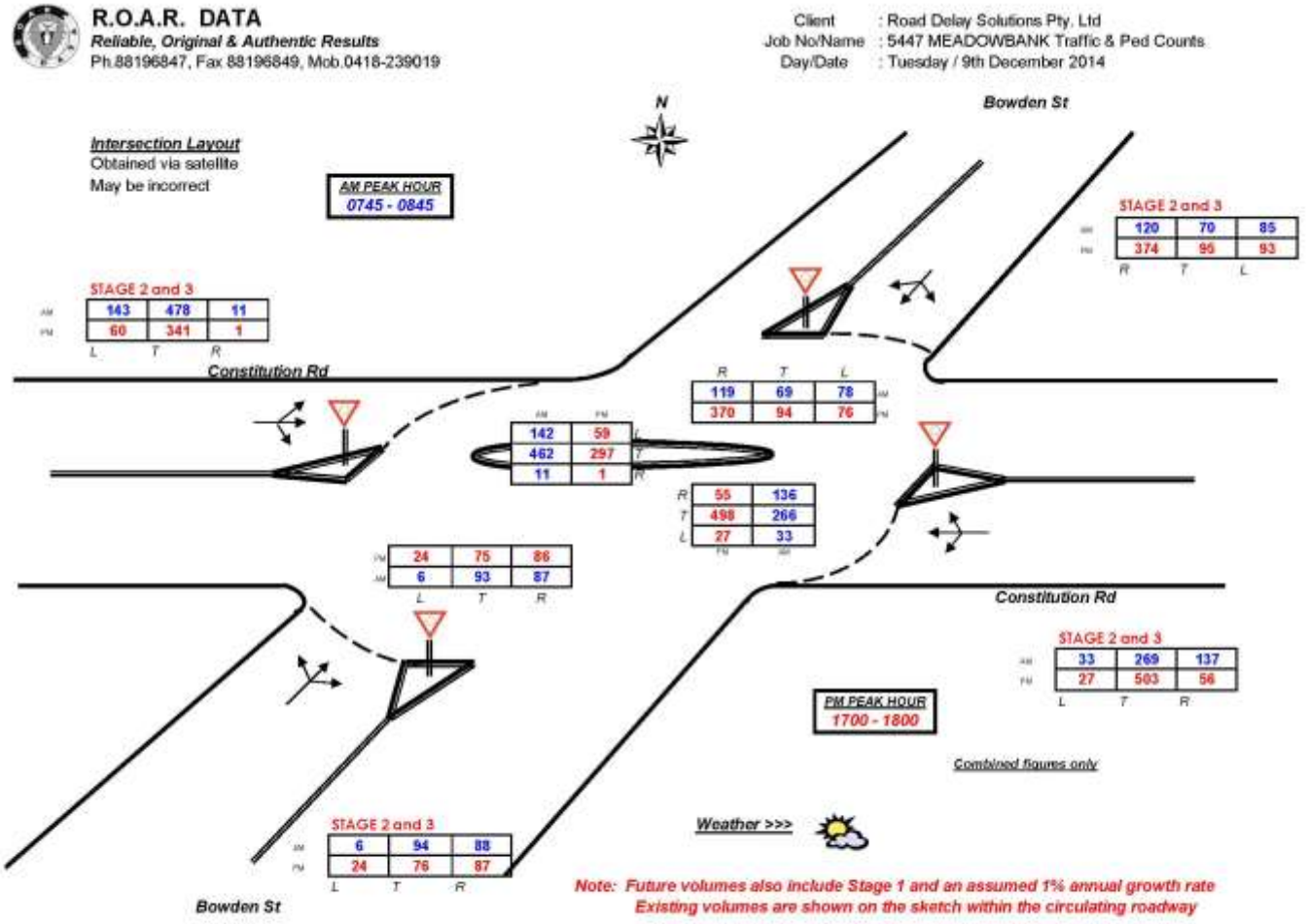
- *The site is ideally located in close proximity to a broad range of public transport alternatives, reducing dependence on use of private passenger vehicles.*
- *The site is located within easy walking/cycling distance of a range of shops and services (such as the local post office, TAFE College and primary schools).*
- *The site is located immediately adjacent to a shared pedestrian and bicycle path with links to Parramatta and the Sydney CBD.*
- *The planned Nancarrow Road extension will improve mobility and accessibility for pedestrians and cyclists.*
- *Construction of a roundabout at the intersection of Belmore Street and Rothesay Avenue should be designed, to Council specifications, prior to issue of the Occupation Certificate for Stage 2 of the development.*
- *Design and construction of a triangular, concrete, island in Yerong Street at Belmore Street to facilitate priority controlled left in/left out with construction to be completed prior to the issue of an Occupancy Certificate for Stage 2 of the development.*

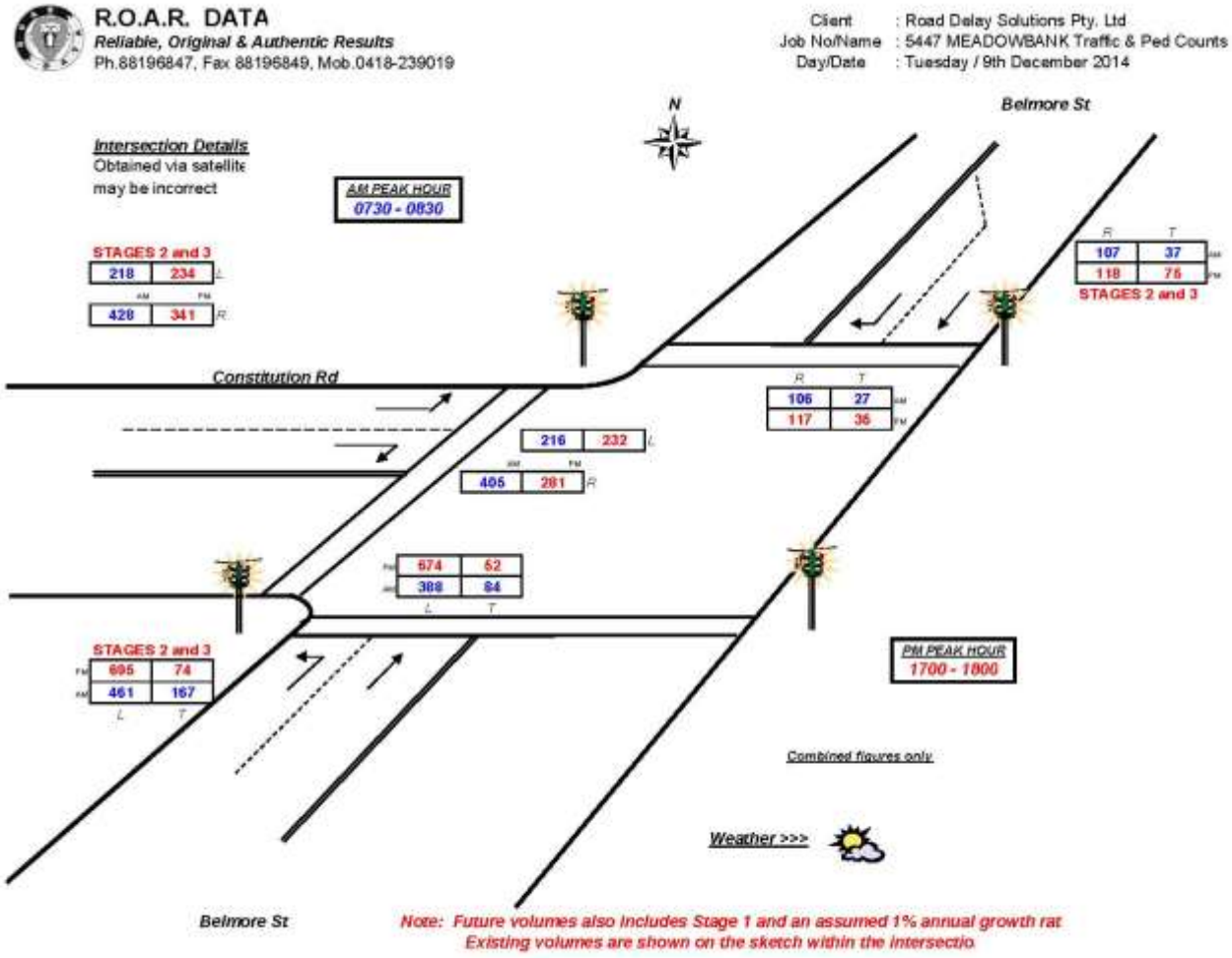
- *No warrant exists for the signalisation of the Constitution Road intersection with Bowden Street.*
- *No warrant exists for the signalisation of the marked foot crossing in Railway Road, at this time.*

APPENDIX A – TRAFFIC COUNTS

Road Delay Solutions has commissioned *ROAR Data* to annually count key intersections within the *MEA*, in particular the intersections of Constitution Road with both Bowden Street and Belmore Street and the pedestrian mid block crossing in railway Road. These counts have been collected in or around November of each year from 2011 to 2014, inclusive.

The 2014 counts, along with the projected traffic volumes for the respective stages of development at key locations, are presented in this Appendix.





R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Road Delay Solutions Pty. Ltd
Job No/Name : 5447 MEADOWBANK Traffic & Ped Counts
Day/Date : Tuesday / 9th December 2014

AM

Railway Rd – Light Vehicles

Time Per	Northbound	Southbound	TOT
0700 - 0715	130	53	183
0715 - 0730	147	75	222
0730 - 0745	156	85	241
0745 - 0800	152	88	240
0800 - 0815	152	96	248
0815 - 0830	161	108	269
0830 - 0845	190	93	283
0845 - 0900	144	87	231
Period End	1232	685	1917

Railway Rd – Heavy Vehicles

Time Per	Northbound	Southbound	TOT
0700 - 0715	0	1	1
0715 - 0730	0	0	0
0730 - 0745	0	0	0
0745 - 0800	0	0	0
0800 - 0815	0	0	0
0815 - 0830	0	1	1
0830 - 0845	0	0	0
0845 - 0900	0	0	0
Period End	0	2	2

Railway Rd – Light Vehicles

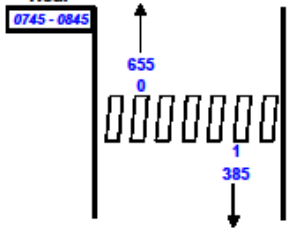
Peak Per	Northbound	Southbound	TOT
0700 - 0800	585	301	886
0715 - 0815	607	344	951
0730 - 0830	621	377	998
0745 - 0845	655	385	1040
0800 - 0900	647	384	1031
PEAK HR	655	385	1040

Railway Rd – Heavy Vehicles

Peak Per	Northbound	Southbound	TOT
0700 - 0800	0	1	1
0715 - 0815	0	0	0
0730 - 0830	0	1	1
0745 - 0845	0	1	1
0800 - 0900	0	1	1
PEAK HR	0	1	1

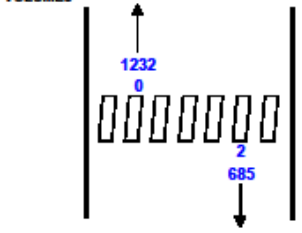
Railway Rd

Peak Hour 0745 - 0845



Railway Rd

TOTAL VOLUMES



PM

Railway Rd – Light Vehicles

Time Per	Northbound	Southbound	TOT
1600 - 1615	85	230	315
1615 - 1630	73	200	273
1630 - 1645	96	222	318
1645 - 1700	72	250	322
1700 - 1715	76	236	312
1715 - 1730	91	210	301
1730 - 1745	103	205	308
1745 - 1800	65	210	275
Period End	661	1763	2424

Railway Rd – Heavy Vehicles

Time Per	Northbound	Southbound	TOT
1600 - 1615	0	0	0
1615 - 1630	1	0	1
1630 - 1645	0	0	0
1645 - 1700	0	0	0
1700 - 1715	0	0	0
1715 - 1730	0	0	0
1730 - 1745	0	0	0
1745 - 1800	0	0	0
Period End	1	0	1

Railway Rd – Light Vehicles

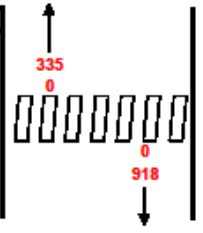
Peak Per	Northbound	Southbound	TOT
1600 - 1700	326	902	1228
1615 - 1715	317	908	1225
1630 - 1730	335	918	1253
1645 - 1745	342	901	1243
1700 - 1800	335	861	1196
PEAK HR	335	918	1253

Railway Rd – Heavy Vehicles

Peak Per	Northbound	Southbound	TOT
1600 - 1700	1	0	1
1615 - 1715	1	0	1
1630 - 1730	0	0	0
1645 - 1745	0	0	0
1700 - 1800	0	0	0
PEAK HR	0	0	0

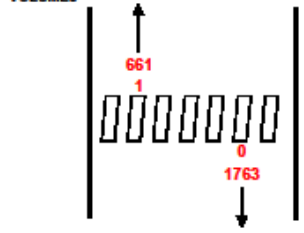
Railway Rd

Peak Hour 1630 - 1730



Railway Rd

TOTAL VOLUMES



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Client : Road Delay Solutions Pty. Ltd
Job No/Name : 5447 MEADOWBANK Traffic & Ped Counts
Day/Date : Tuesday / 9th December 2014

AM

Railway Rd – Light Vehicles

Time Per	Northbound	Southbound	TOT
0700 - 0715	130	53	183
0715 - 0730	147	75	222
0730 - 0745	156	85	241
0745 - 0800	152	88	240
0800 - 0815	152	96	248
0815 - 0830	161	108	269
0830 - 0845	190	93	283
0845 - 0900	144	87	231
Period End	1232	685	1917

Railway Rd – Heavy Vehicles

Time Per	Northbound	Southbound	TOT
0700 - 0715	0	1	1
0715 - 0730	0	0	0
0730 - 0745	0	0	0
0745 - 0800	0	0	0
0800 - 0815	0	0	0
0815 - 0830	0	1	1
0830 - 0845	0	0	0
0845 - 0900	0	0	0
Period End	0	2	2

Railway Rd – Light Vehicles

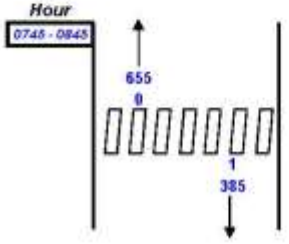
Peak Per	Northbound	Southbound	TOT
0700 - 0800	585	301	886
0715 - 0815	607	344	951
0730 - 0830	621	377	998
0745 - 0845	655	385	1040
0800 - 0900	647	384	1031
PEAK HR	655	385	1040

Railway Rd – Heavy Vehicles

Peak Per	Northbound	Southbound	TOT
0700 - 0800	0	1	1
0715 - 0815	0	0	0
0730 - 0830	0	1	1
0745 - 0845	0	1	1
0800 - 0900	0	1	1
PEAK HR	0	1	1

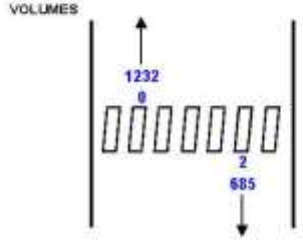
Railway Rd

Peak Hour 0745 - 0845



Railway Rd

TOTAL VOLUMES



PM

Railway Rd – Light Vehicles

Time Per	Northbound	Southbound	TOT
1600 - 1615	85	230	315
1615 - 1630	73	200	273
1630 - 1645	96	222	318
1645 - 1700	72	250	322
1700 - 1715	76	236	312
1715 - 1730	91	210	301
1730 - 1745	103	205	308
1745 - 1800	65	210	275
Period End	661	1763	2424

Railway Rd – Heavy Vehicles

Time Per	Northbound	Southbound	TOT
1600 - 1615	0	0	0
1615 - 1630	1	0	1
1630 - 1645	0	0	0
1645 - 1700	0	0	0
1700 - 1715	0	0	0
1715 - 1730	0	0	0
1730 - 1745	0	0	0
1745 - 1800	0	0	0
Period End	1	0	1

Railway Rd – Light Vehicles

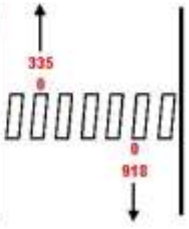
Peak Per	Northbound	Southbound	TOT
1600 - 1700	326	902	1228
1615 - 1715	317	908	1225
1630 - 1730	335	918	1253
1645 - 1745	342	901	1243
1700 - 1800	335	861	1196
PEAK HR	335	918	1253

Railway Rd – Heavy Vehicles

Peak Per	Northbound	Southbound	TOT
1600 - 1700	1	0	1
1615 - 1715	1	0	1
1630 - 1730	0	0	0
1645 - 1745	0	0	0
1700 - 1800	0	0	0
PEAK HR	0	0	0

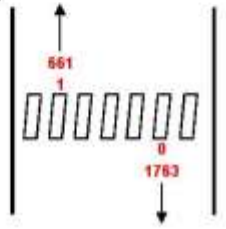
Railway Rd

Peak Hour 1630 - 1730



Railway Rd

TOTAL VOLUMES



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Railway Rd Peds Crossing			
Time Per	Eastbound	Westbound	TOT
0700 - 0715	18	35	53
0715 - 0730	10	48	58
0730 - 0745	16	86	102
0745 - 0800	16	68	84
0800 - 0815	10	88	98
0815 - 0830	18	48	66
0830 - 0845	10	42	52
0845 - 0900	5	37	42
Period End	103	452	555

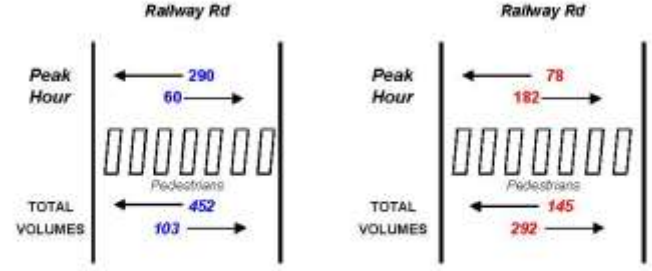
Railway Rd Peds Crossing			
Time Per	Eastbound	Westbound	TOT
1600 - 1615	34	17	51
1615 - 1630	26	13	39
1630 - 1645	23	24	47
1645 - 1700	27	13	40
1700 - 1715	30	19	49
1715 - 1730	30	12	42
1730 - 1745	62	31	93
1745 - 1800	60	16	76
Period End	292	145	437

AM PEAK HOUR
0730 - 0830

Railway Rd Peds Crossing			
Peak Per	Eastbound	Westbound	TOT
0700 - 0800	60	237	297
0715 - 0815	52	290	342
0730 - 0830	60	290	350
0745 - 0845	54	246	300
0800 - 0900	43	215	258
PEAK HR	60	290	350

PM PEAK HOUR
1700 - 1800

Railway Rd Peds Crossing			
Peak Per	Eastbound	Westbound	TOT
1600 - 1700	110	67	177
1615 - 1715	106	69	175
1630 - 1730	110	68	178
1645 - 1745	149	75	224
1700 - 1800	182	78	260
PEAK HR	182	78	260



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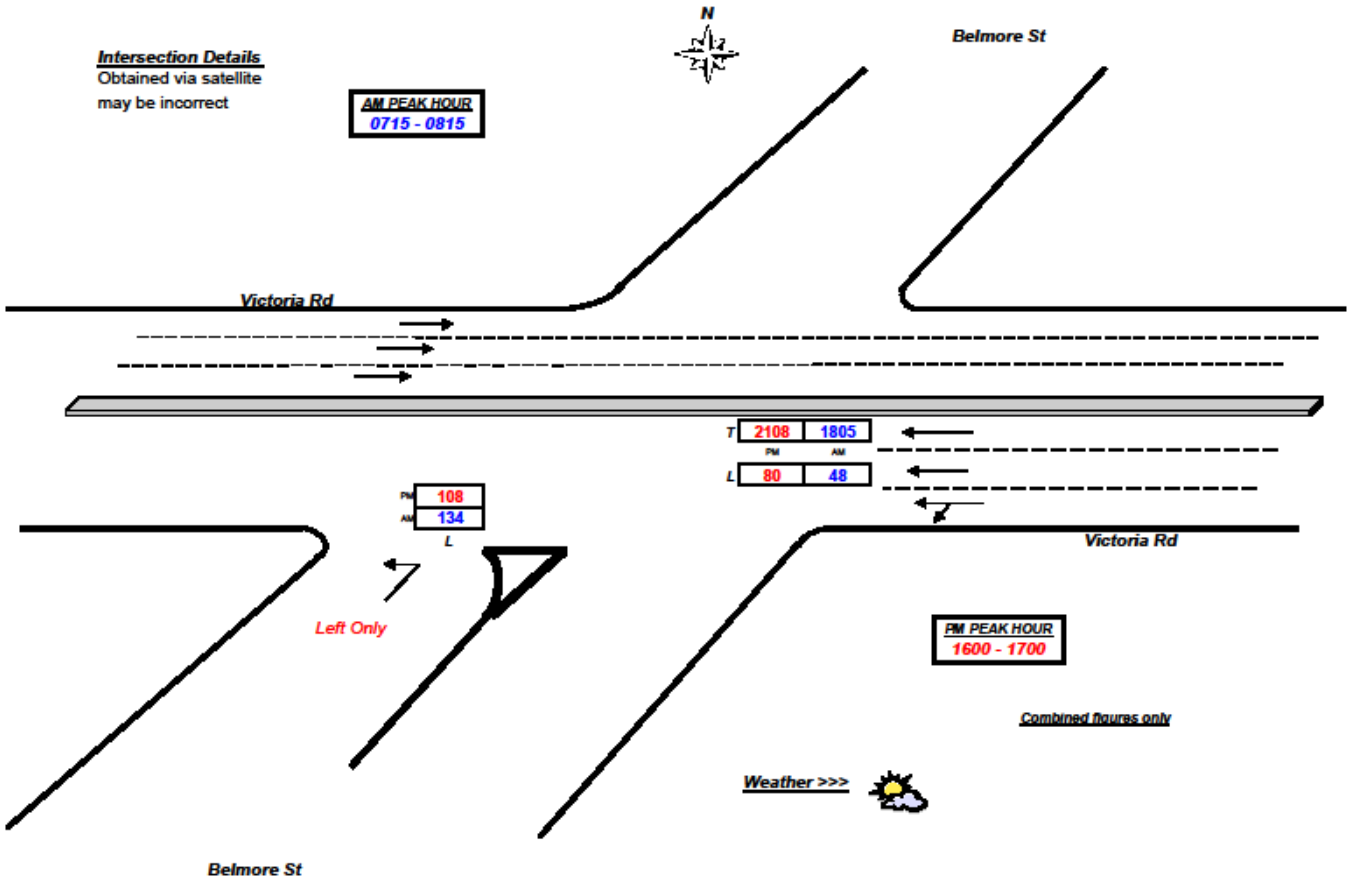

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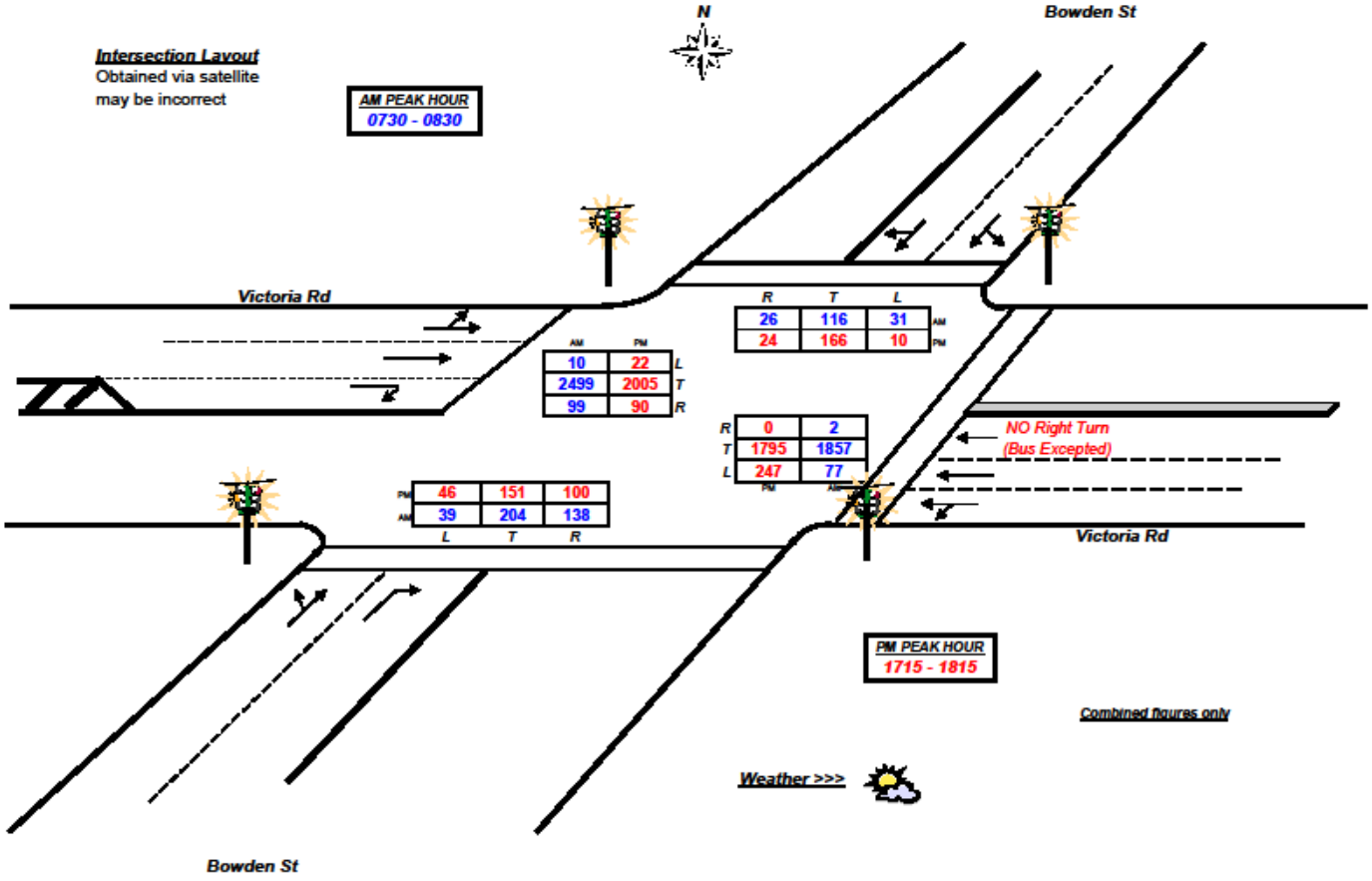

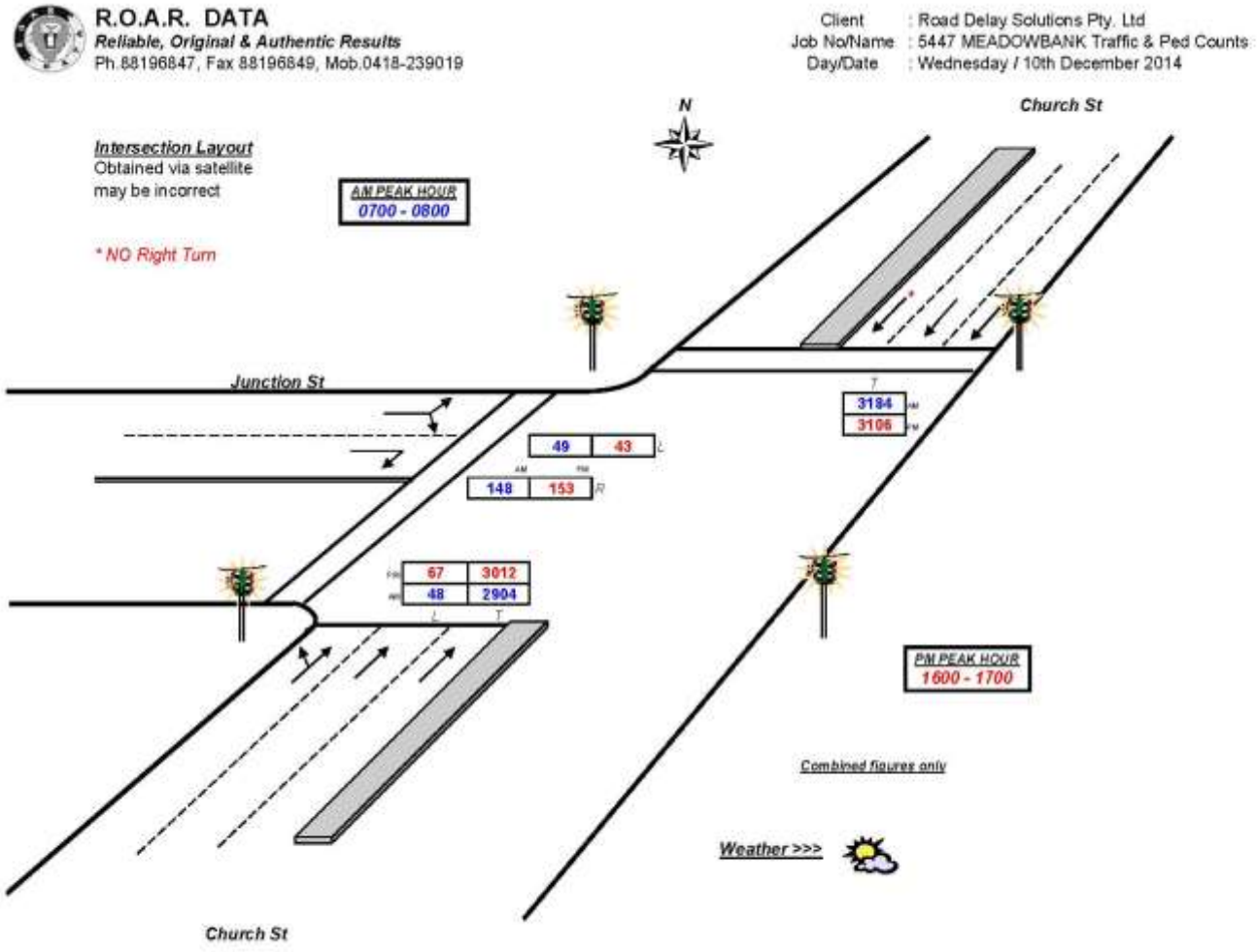

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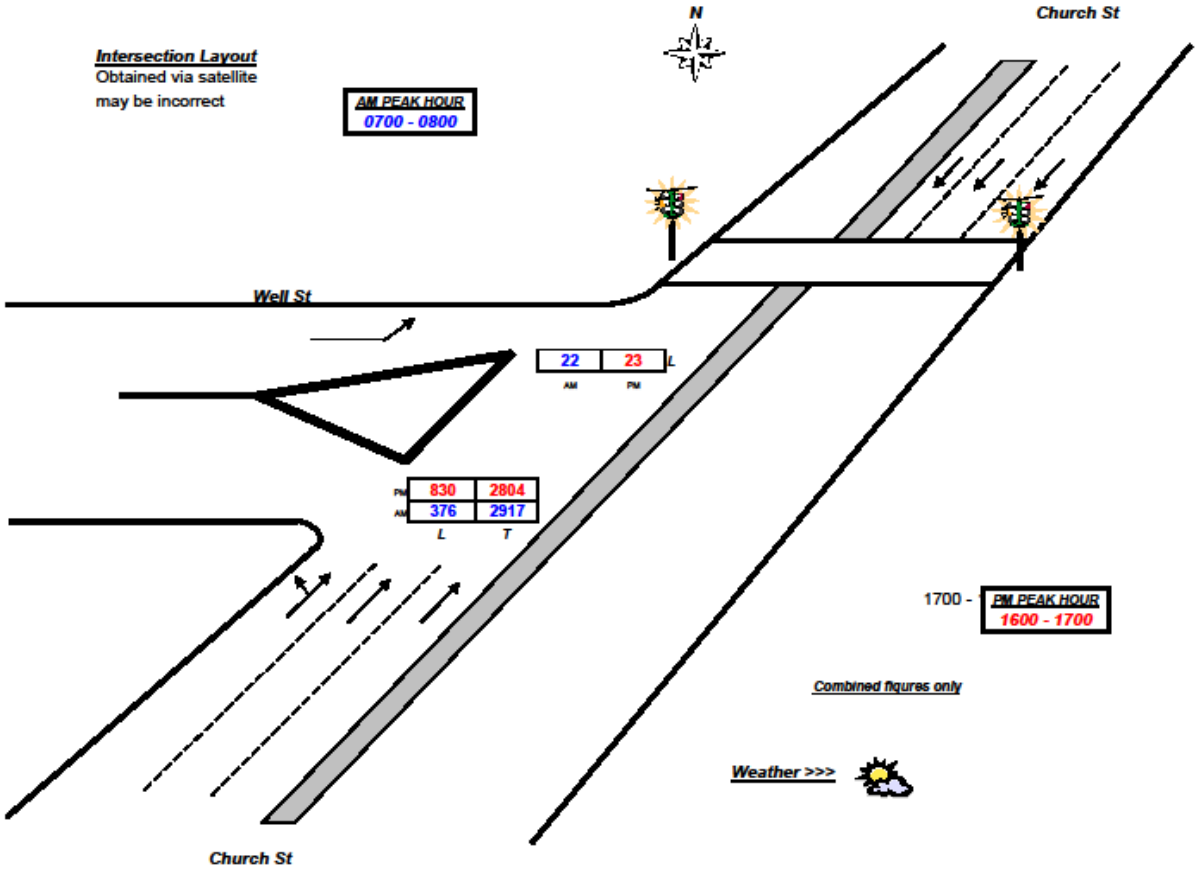
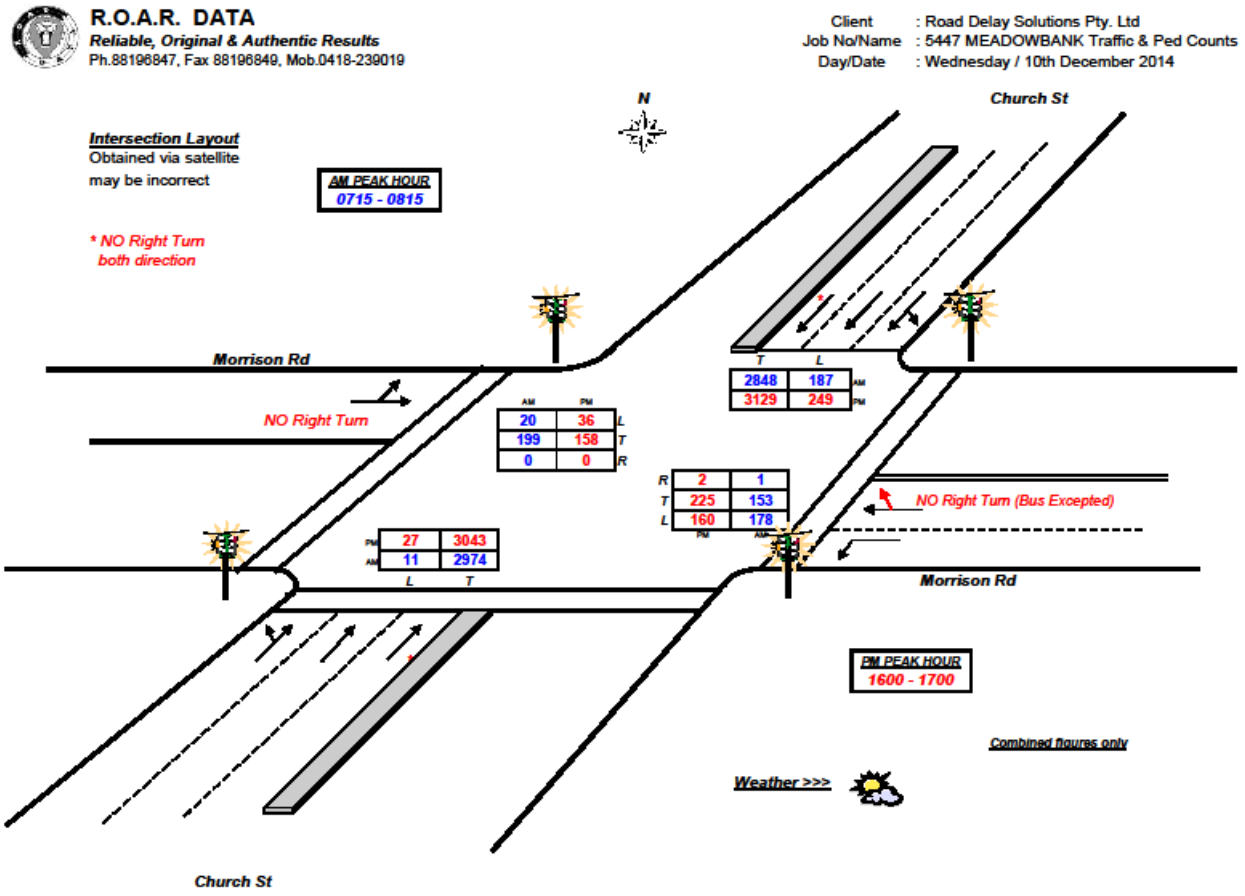
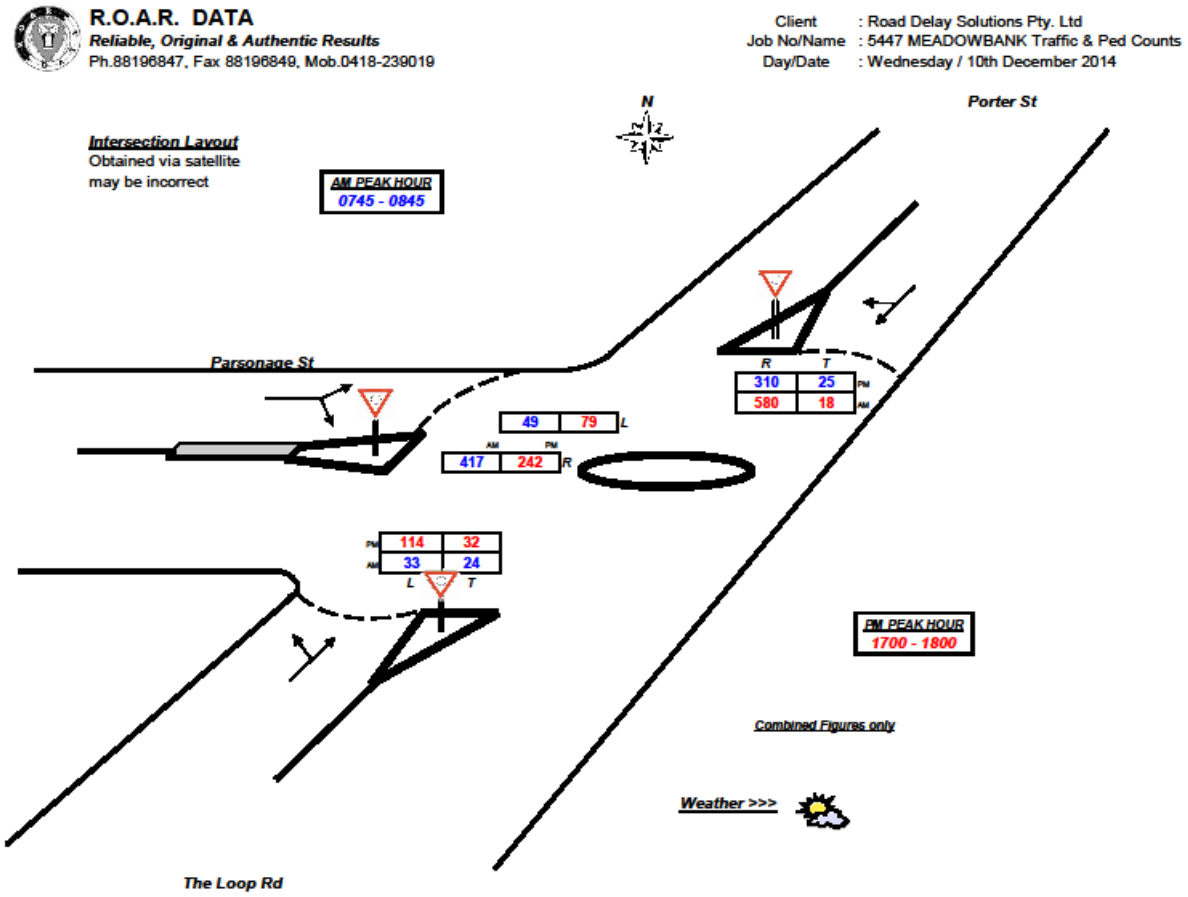
Day/Date : Wednesday / 10th December 2014







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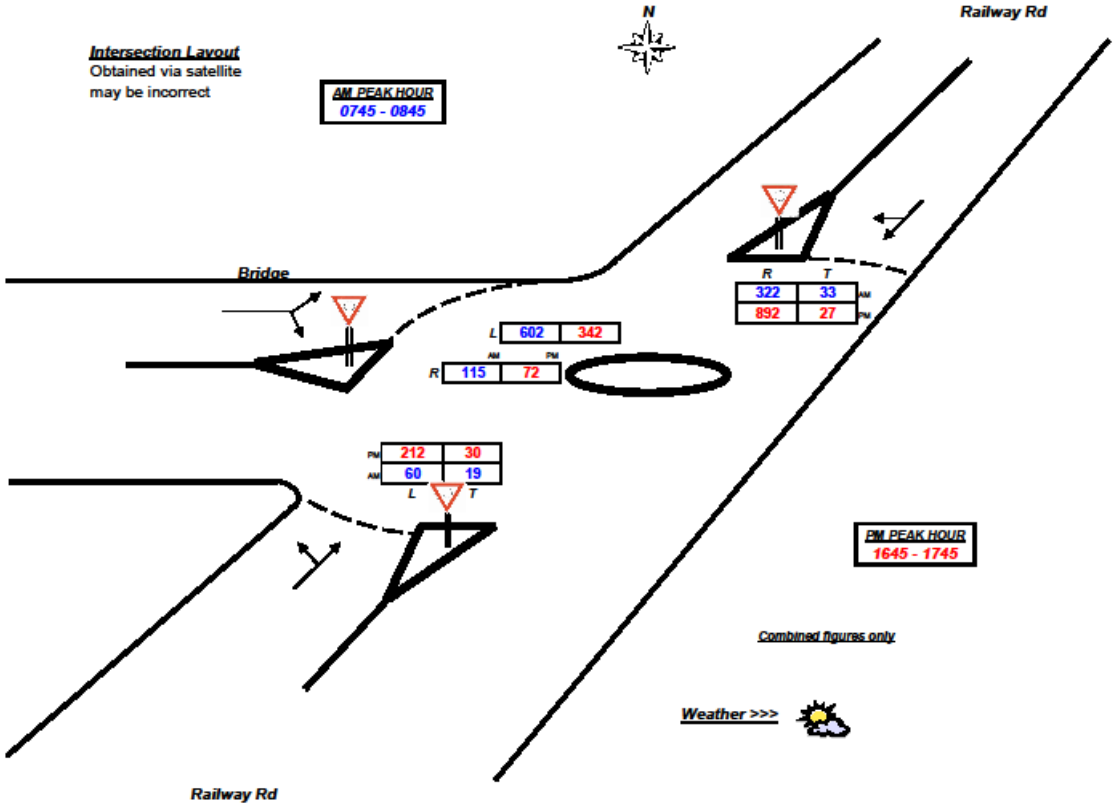

APPENDIX B – PERFORMANCE INDICATORS

General

Intersection performance is best measured by the indicators of Level of Service (LoS), Average Vehicle Delay (AVD) and the Degree of Saturation (DS) during peak hours.

This is defined as the assessment of a qualitative effect of factors influencing vehicle movement through the intersection. Factors such as speed, traffic volume, geometric layout, delay and capacity are qualified and applied to the specific intersection control mode, as shown in Table 1.

The measure of average delay assessed for traffic signal operation is over all movements. For roundabouts and priority controlled intersections, the critical criterion for assessment is the movement with the highest delay per vehicle.

Table A1: Performance Indicators by Control Method

Intersection Control	Performance Measure [Unit]
Sign or Priority Control	→ Delay of critical movement(s) [seconds/vehicle] → Average Vehicle Delay [seconds/vehicle] → Queue length of critical movement(s) [metres]
Traffic Signal Control	→ Delay of critical movement(s) [seconds/vehicle] → Degree of Saturation [ratio of vehicles to capacity] → Average Vehicle Delay [seconds/vehicle] → Cycle Length [seconds] → Queue length of critical movement(s) [metres]
Roundabout Control	→ Delay of critical movement(s) [seconds/vehicle] → Degree of Saturation[ratio of vehicles to capacity] → Average Vehicle Delay [seconds/vehicle] → Queue length of critical movement(s) [metres]

Average Vehicle Delay (AVD)

The AVD is a measure of the operational performance of a road network or an intersection.

AVD is determined globally over a road network or within a cordon during an assignment model run. The AVD exhibited on comparable network models, for analogous peak periods, forms the basis of comparing the operational performance of the road network.

AVD is used in the determination of intersection Level of Service. Generally, the total delay incurred by vehicles through an intersection is averaged to give an indicative delay on any specific approach. Longer delays do occur but only the average over the peak hour period is reported.

Degree of Saturation (DS)

The DS of an intersection is usually taken as the highest ratio of traffic volume on an approach to the intersection compared with its theoretical capacity, and is a measure of the utilisation of available green time. The DS reported is generally of a critical movement through the intersection rather than the DS of the intersection unless equal saturation occurs on all approaches.

For intersections controlled by traffic signals, generally both queue length and delay increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its DS is kept below 0.875. When the DS exceeds 0.9, extensive queues can be expected.

Table A2: Qualified Level of Service by Control Method

LOS	AVD secs	Traffic Signals and Roundabout	Give Way and Stop Sign Priority Control
A	1 to 14	Good operation.	Good operation
B	14 to 28	Good operation with acceptable delays and spare capacity.	Good operation with acceptable delays and spare capacity.
C	28 to 42	Satisfactory.	Satisfactory but accident study and operational analysis required.
D	42 to 56	Operating near capacity.	Near capacity. Accident study and operational analysis required.
E	56 to 70	Unsatisfactory. Traffic signals incidence will cause excessive delays. Requires additional capacity. Roundabouts require alternative control mode.	At capacity. Requires alternative control mode.
F	>70	Unsatisfactory. Over capacity and unstable operation.	Over capacity. Unstable and unsafe operation.

APPENDIX C – ARTERIAL ROAD ASSESSMENT

ROAD DELAY SOLUTIONS

Shepherds Bay, Meadowbank

Addendum

Arterial Road Network

Traffic Signal Operation Assessment

for…

Holdmark PROPERTY GROUP

Reference: 20100099
November 2012

DOCUMENT STATUS

D:\Documents and Drawings\Meadowbank\TMAP\Shepherds Bay Addendum Arterial Road Network.docx

Author	Glen Varley (Road Delay Solutions Pty Ltd)……
Signed	……
Reviewed	Adam Fahim : Brian Mann: ……..……,,,……..
Date	2 November 2012……

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DISCLAIMER

Road Delay Solutions Pty Ltd assumes no responsibility or liability for the predictive nature of any traffic volumes, and resultant conclusions, detailed in this document. The modelling projections are subject to significant uncertainties and unanticipated change, without notice. While all source data, employed in the preparation of this document, has been diligently collated and checked, Road Delay Solutions Pty Ltd is unable to assume responsibility for any errors resulting from such projections.

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

Road Delay Solutions has been engaged by Robertson + Marks Architects and Holdmark NSW Pty Ltd to undertake the preparation of a Strategic Transport Model in support of the Control for the Shepherds Bay Urban Renewal Development.

As part of this process an assessment has been undertaken into the impacts and operational performance of the arterial road network, under the control of traffic signals on Victoria Road and Church Street.

This assessment of the arterial road network, servicing the Meadowbank Employment Area (MEA) and the proposed Shepherds Bay Urban Renewal Development, has been prepared utilising the intersection turn movements, collected by R.O.A.R. in June 2010 to reflect the current base traffic conditions during the commuter peak periods.

The future year 2031 traffic projections have been taken from the preferred Bitzios Saturn models of the precinct for the respective peak commuter periods, with the turn movements interpolated, by percentage, from the base year intersections, by the corresponding vehicle movement.

2 EXISTING CONDITIONS

The existing traffic volumes, as shown in *Figure 1*, were collected by R.O.A.R. DATA in June 2010 and encompass…

- Victoria Road from Bowden Street to Devlin Street, and
- Church Street/Devlin Street from the Ryde Bridge to Victoria Road.

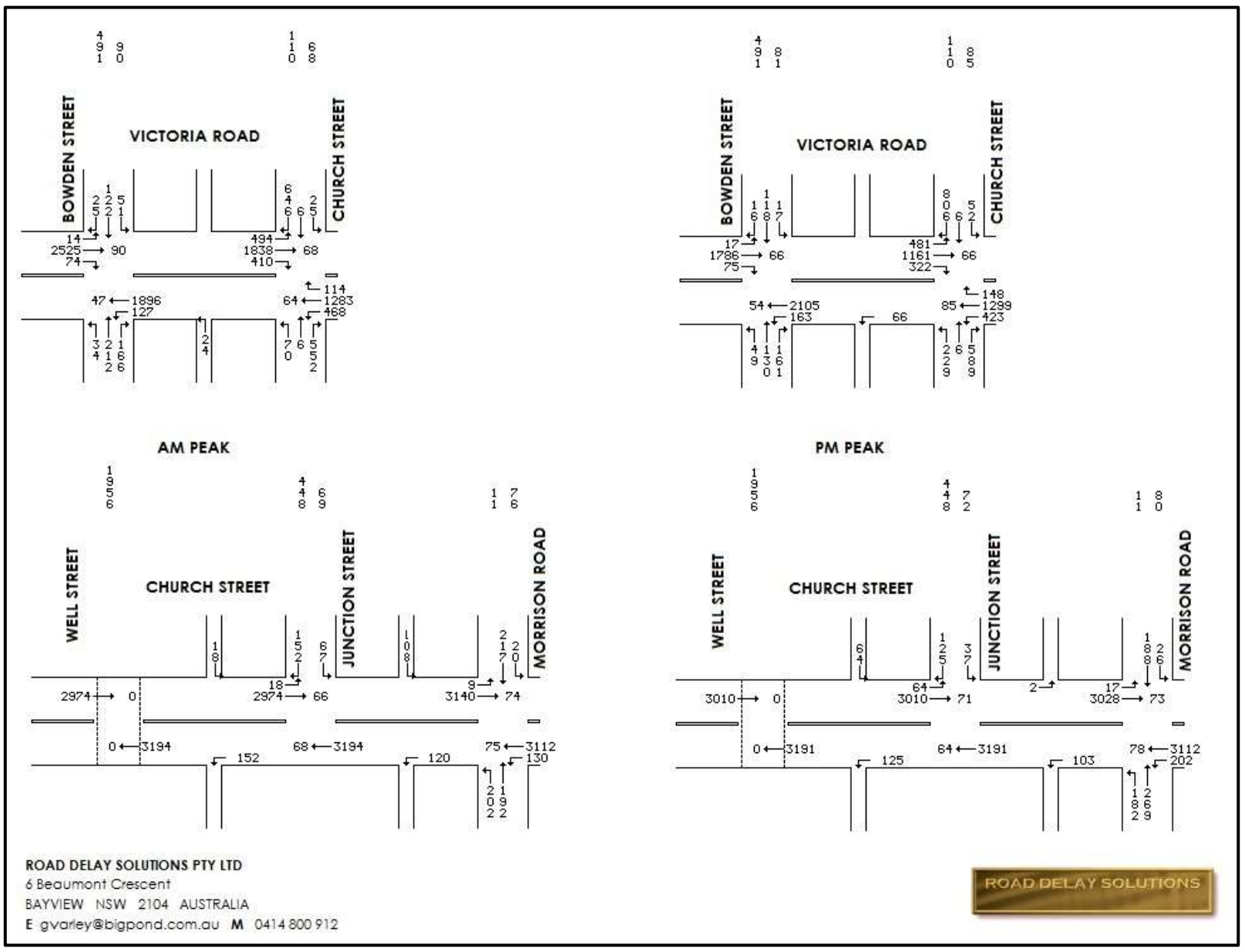
The Victoria Road intersectiuons modelled are…

- Victoria Road and Bowden Street TCS 491, and
- Victoria Road and Church Street TCS 110.

The Church Street intersections modelled are…

- Church Street and Well Street mid block pedestrian site TCS 1956,
- Church Street and Junction Street TCS 448, and
- Church Street and Morrison Road TCS 11.

Figure 8: Existing Traffic



It should be noted that significant vehicle queuing has been observed, predominantly in the peak flow direction, during the commuter periods along Church Street. This resultant, 'platooned', vehicle demand exacerbates the operational route performance of Church Street, but is not directly attributable to the signal operations being assessed in this report.

The Scates Model

The PC based Scates program calculates the optimum phasing design, phase splits, offsets and cycle lengths for network and/or linear traffic signal system operation.

This assessment will detail the operational characteristics of the traffic signal sites modeleld and present the maximum back of queue lengths reported.

A number of input parameters are required by Scates to reflect the current conditions at each traffic signal site. These user defined inputs are presented in *Table 1*.

Table 9: Scates Input Parameters

Parameter	Parameter Value	Remarks
Lane Saturation Thresholds	LT - [1]1750 Thru 1960 RT 1850	The saturation threshold or capacity of each lane, by movement, is expressed in vehicles per hour. The maximum capacity of each lane type yielding a saturation of 1 is employed in the Scates model. The capacities are predetermined on a general acceptance of typical lane types for the specific conditions. The through movement lane types have been found to generally be capable of carrying some 1960 vph within the Sydney regional centres where congested traffic conditions prevail and motorists have become 'conditioned' to driving in closer formation at slow speeds.
% Heavy Vehicles	[2]2	The percentage of heavy on Victoria Road and Church Street, commensurate with the field data collected by R.O.A.R., in June 2010.
Heavy Vehicle PCU Equivalence	[3]2	AUSTROADS prescribes a PCU equivalence of 2.4. Scates accepts whole numbers only with respect to the PCU equivalence. Each heavy vehicle is equivalent to the delay incurred by two (2) passenger vehicles.
Pedestrians	50 peds/hr	An arbitrary 50 pedestrians per hour have been modelled at each site..
Frequency of WALK Green Time	25% / 33%	A pedestrian walk frequency of 30% has been adopted to reflect a call demand for the walk every 3rd cycle.
Pedestrian WALK time	6 sec	Commensurate with current RMS practice.
Pedestrian Clearance time	1.2m/sec	Commensurate with current RMS practice.
Stop Penalty	10 sec	Utilised in the calculation of the intersection Performance Index eg. *Rate of Delay + (Rate of Stops * Stop Penalty)*. A 10 second stop penalty optimises the traffic system to minimise vehicle and operating costs along the corridor.
Predominant Design Speed	60 & 70 km/h	Regulated speeds - Victoria Road is 60 km/h and Church Street is 70 km/h. All residential side streets assume 50 km/h, unless signposted otherwise.
Effective Lost Time (ELT)	4 sec	The total seconds accumulated during the inter-green periods minus the allowance for turn movements on amber, per cycle. 4 seconds is considered an average in s built up urban area.
LT / RT Delay	0 sec	Employed in Scates to reflect the impact of a high ped demand and a LT and/or RT RA hold condition. Should the LT and/or RT movements be able to clear following clearance of the pedestrian demand and within the remaining green time, 0 sec delay should be modelled.
Min Cycle Length	20 sec	Scates begins cycle iterations commencing at the
Max Cycle Length	120 sec	Scates optimises the intersection operation to the upper limit specified but may increase the max cycle length, by up to 20 seconds, if it calculates a cost benefit to do so.

[1] Expressed in vehicles per hour (vph)
[2] Scates converts traffic flow numbers to PCU's during a mode run to reflect the impact of heavy vehicle movements along the corridor
[3] Each heavy vehicle is equivalent to the delay incurred by two (2) passenger vehicles

Victoria Road

Victoria Road currently carries some 4,500 vph during the commuter peak periods. A major arterial corridor linking Parramatta to the Sydney CBD, intermittent bus lanes and a high number of signalised intersections, particularly through the West Ryde Precinct, has a platooning effect on traffic in the peak flow directions.

The intersection with Church Street has a bus only lane operating in the southbound, right turn approach to Victoria Road. To assimilate this feature the Scates model has adopted a late start for the right turn movement of 3 seconds, every 2nd cycle allowing the bus movement some 30 times during the combined morning and evening peak periods.

The modelling indicates that the Victoria Road traffic signals, at Bowden Street and Church Street, currently operate at an acceptable level of service, as shown in *Table 2*.

Queue lengths reported from the model are considered satisfactory and do not impede the operation of preceding intersections along the corridor while all turn movements are adequately contained within their respective bay lengths per cycle.

Table 10: Existing Operation – Victoria Road

Victoria Road Intersections		VICTORIA ROAD OPERATION	
		AM *(CL 139sec)*	PM *(CL 105sec)*
Bowden Street TCS 491	LOS	A	A
	DS	0.90	0.81
	AVD	7	8
Church Street TCS 110	LOS	C	B
	DS	0.67	0.75
	AVD	37	21

Table 11: Existing Queue Lengths – Victoria Road

Victoria Road Intersections		VICTORIA ROAD QUEUES	
		AM *Max. Back of Queue (m)*	PM *Max. Back of Queue (m)*
Bowden Street TCS 491	NB	60	30
	SB	24	18
	EB	85	42
	WB	45	36
Church Street TCS 110	NB	42	42
	SB	48	54
	EB	66	48
	WB	54	54

Church Street

Church Street carries in the order of 6,200 vph during the commuter peaks and is subject to the affects of 'platooned' traffic occurring in the peak flow directions from the intersections of Homebush Bay Drive and Concord Road, to the south, and the Devlin Street and Blaxland Road intersection, to the north.

The Scates analysis does not consider the impacts from residual queueing in Church Street from either the Concord Road intersection with Homebush Bay Drive or the Blaxland Road intersection with Devlin Street. While this is considered necessary to assess the route operation of Church Street, the Concord Road and Blaxland Road intersections are outside the scope of this study. It is further considered that no improvement to the capacity or operation of the modelled intersections in this report will result in a significant gain in route performance.

As a consequence, the modelling suggests that that the traffic signals, from Well Street to Morrison Road, operate at a satisfactory level of service. No significant queueing is generated by these sites and all turn movements are contained within the extents of the current bays.

Most importantly, the modelling indicates the signal operations adequately manage the volume of side street traffic currently accessing the corridor.

Table 12: Existing Operation - Church Street

Church Street Intersections		CHURCH STREET EXISTING	
		AM *(CL 105sec)*	PM *(CL 128sec)*
Well Street TCS 1956	LOS	A	A
	DS	0.80	0.78
	AVD	5	6
Junction Street TCS 448	LOS	A	A
	DS	0.69	0.72
	AVD	5	5
Morrison Road TCS 11	LOS	A	A
	DS	0.76	0.80
	AVD	6	6

Table 13: Existing Queue Lengths – Church Street

Church Street Intersections		CHURCH STREET QUEUES - EXISTING	
		AM *Max. Back of Queue (m)*	PM *Max. Back of Queue (m)*
Well Street TCS 1956-	NB	54	60
	SB	60	60
	EB	-	-
	WB	-	-
Junction Street TCS 448	NB	42	48
	SB	42	36
	EB	18	18
	WB	-	-
Morrison Road TCS 11	NB	48	42
	SB	48	48
	EB	36	30
	WB	36	48

3 FUTURE CONDITIONS

Projected Volumes

The projected base 2031 link volumes, adopted in the Scaters modelling, have been interpolated from the Year 2031 preferred Saturn models, including Part 3A development, and application of the difference volumes, prepared by Bitzios Consulting, and presented in *Figure 2 – AM Peak* and *Figure 3 – PM Peak*.

The future 2031 preferred network traffic projections, prepared by Bitzios Consulting, are shown in *Figure 4 – AM Peak* and *Figure 5 – PM Peak*.

The turn movements employed in the Scates models were proportioned from the link volumes, based upon the current percentage movement volumes, shown in *Figure 1*.

The future traffic movements modelled at each intersection are presented in *Figure* 6.

Comparison modelling for year 2031, with and without the proposed 3A development, resulted in no significant difference in the operation levels reported at the modelled intersections.

Victoria Road

The future traffic projections suggest that traffic volumes on Victoria Road will be in the order of 5,100 vph and 4,900 vph during the morning and evening commuter peak periods, respectively. This constitutes an increases of some 10.9% in the morning peak and 16.7%% during the evening peak.

The modelling indicates that the Victoria Road traffic signals, subjected to the projected volumes as determined by Bitzios Consulting, should operate at an acceptable level of service, as shown in *Table* 6.

Queue lengths reported from the model are considered satisfactory and will not impede the operation of preceding intersections along the corridor, while all turn movements are adequately contained within their respective bay lengths per cycle.

As a result of the future year modelling it is deduced the future traffic generation associated with the proposed Shepherds Bay development does not necessitate any need for infrastructure improvements along the Victoria Road corridor.

Table 14: Future Operation – Victoria Road

Victoria Road Intersections		VICTORIA ROAD WITHOUT DEVELOPMENT		VICTORIA ROAD WITH DEVELOPMENT	
		AM (CL 140sec)	PM (CL 105sec)	AM (CL 139sec)	PM (CL 105sec)
Bowden Street TCS 491	LOS	B	B	B	B
	DS	0.99	0.77	0.98	0.75
	AVD	26	18	24	18
Church Street TCS 110	LOS	C	B	C	B
	DS	0.89	0.82	0.89	0.80
	AVD	35	23	36	23

Table 15: Future Queue Lengths with Development – Victoria Road

Victoria Road Intersections		VICTORIA ROAD QUEUES WITH DEVELOPMENT	
		AM *Max. Back of Queue (m)*	PM *Max. Back of Queue (m)*
Bowden Street TCS 491	NB	54	54
	SB	126	48
	EB	36	42
	WB	30	54
Church Street TCS 110	NB	42	24
	SB	54	24
	EB	60	54
	WB	78	42

Church Street

With increases of 6.5% and 17.5% in the morning and evening peak commuter periods, respectively, Church Street is projected to carry some 6,600vph in the morning peak and 7,400vph in the evening peak.

Under theses increases Church Street has been found to should operate at an acceptable level of service, as shown in *Table 8*.

The reported queue lengths, generated by the three intersections modelled, do not impede the operation of preceding intersections and all turn movements are satisfactorily contained within the existing turn bays. However, in the broader regional context, residual queuing northbound, from the upstream intersection of Devlin Street and Blaxland Road has a dramatic impact on the Concord Road/Church Street route performance, which has been excluded from the operational modelling. It was found through sensitivity modelling that increasing the capacity on Church Street northbound, between Ryde Bridge and the Devlin Street underpass would have little to no significant impact on the residual queue length observed along the section as any isolated measure does not address the broader, downstream, impact of the Devlin Street intersection operation at Blaxland Road.

Table 16: Future Operation - Church Street

Church Street Intersections		CHURCH STREET WITHOUT DEVELOPMENT		CHURCH STREET WITH DEVELOPMENT	
		AM (CL 105sec)	PM (CL 128sec)	AM (CL 105sec)	PM (CL 128sec)
Well Street TCS 1956	LOS	A	A	A	A
	DS	0.87	0.88	0.88	0.86
	AVD	5	6	5	5
Junction Street TCS 448	LOS	A	A	A	A
	DS	0.81	0.86	0.82	0.84
	AVD	6	5	6	5
Morrison Road TCS 11	LOS	A	A	A	A
	DS	0.76	0.76	0.76	0.79
	AVD	6	6	6	6

Table 17: Future Queue Lengths with Development – Church Street

Church Street Intersections		CHURCH STREET QUEUES WITH DEVELOPMENT	
		AM Max. Back of Queue (m)	PM Max. Back of Queue (m)
Well Street TCS 1956-	NB	60	72
	SB	66	72
	EB	-	-
	WB	-	-
Junction Street TCS 448	NB	54	60
	SB	54	36
	EB	30	24
	WB	-	-
Morrison Road TCS 11	NB	48	42
	SB	48	48
	EB	36	30
	WB	36	36

Figure 9: 2031 AM Peak Bitzios Traffic Volumes with Development

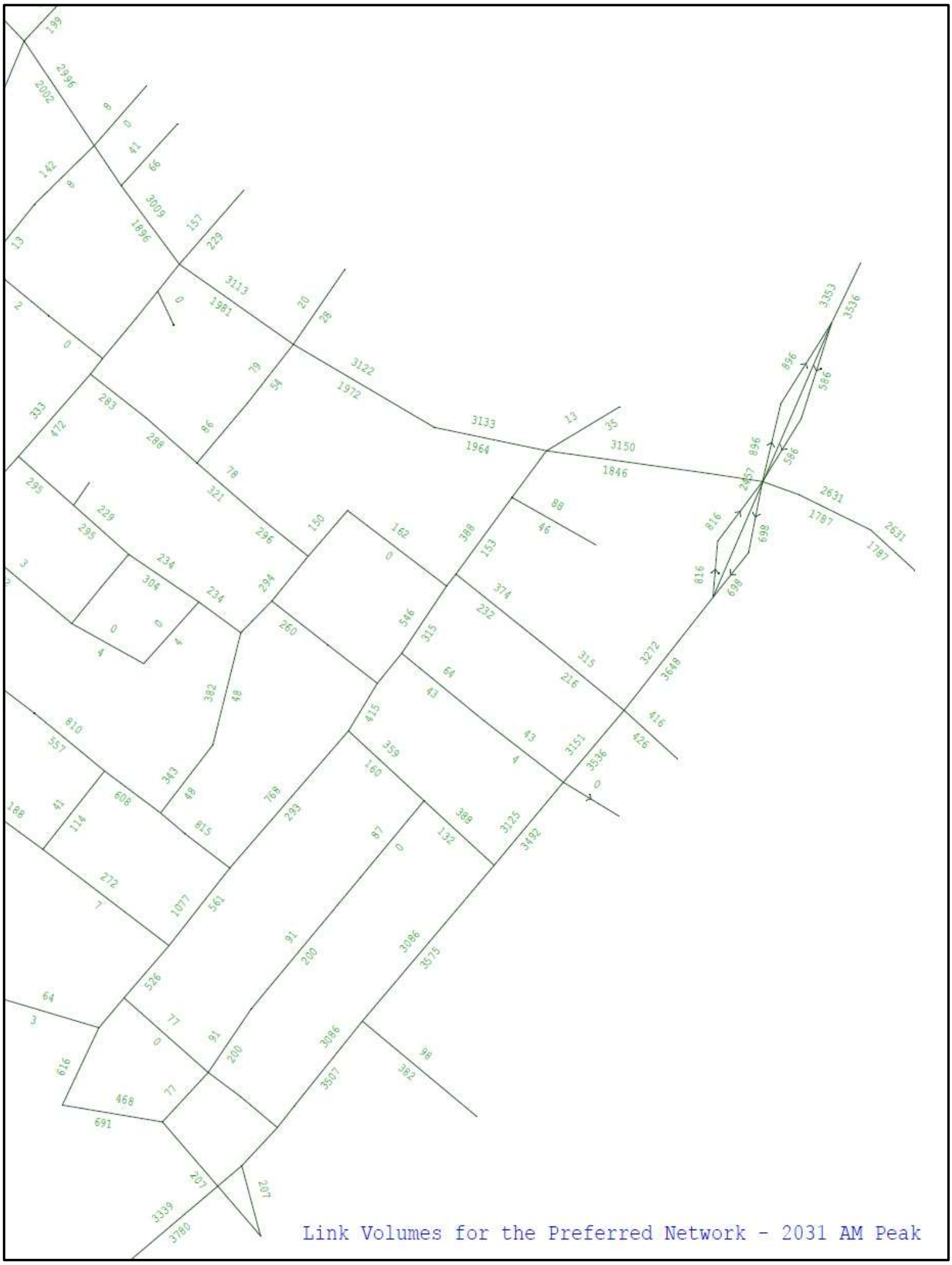


Figure 10: 2031 PM Peak Bitzios Traffic Volumes with Development

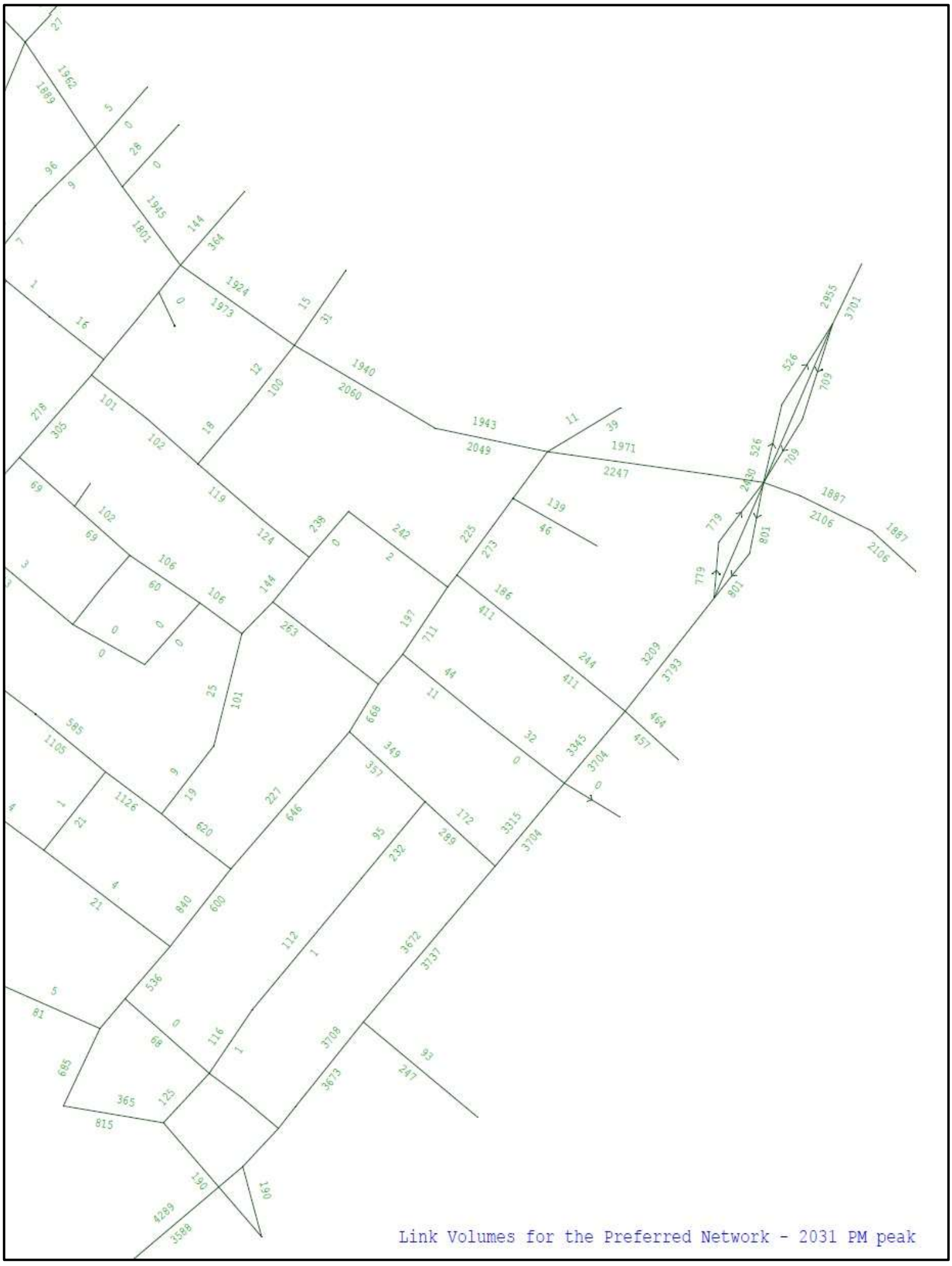


Figure 11: 2031 AM Peak Difference Plot

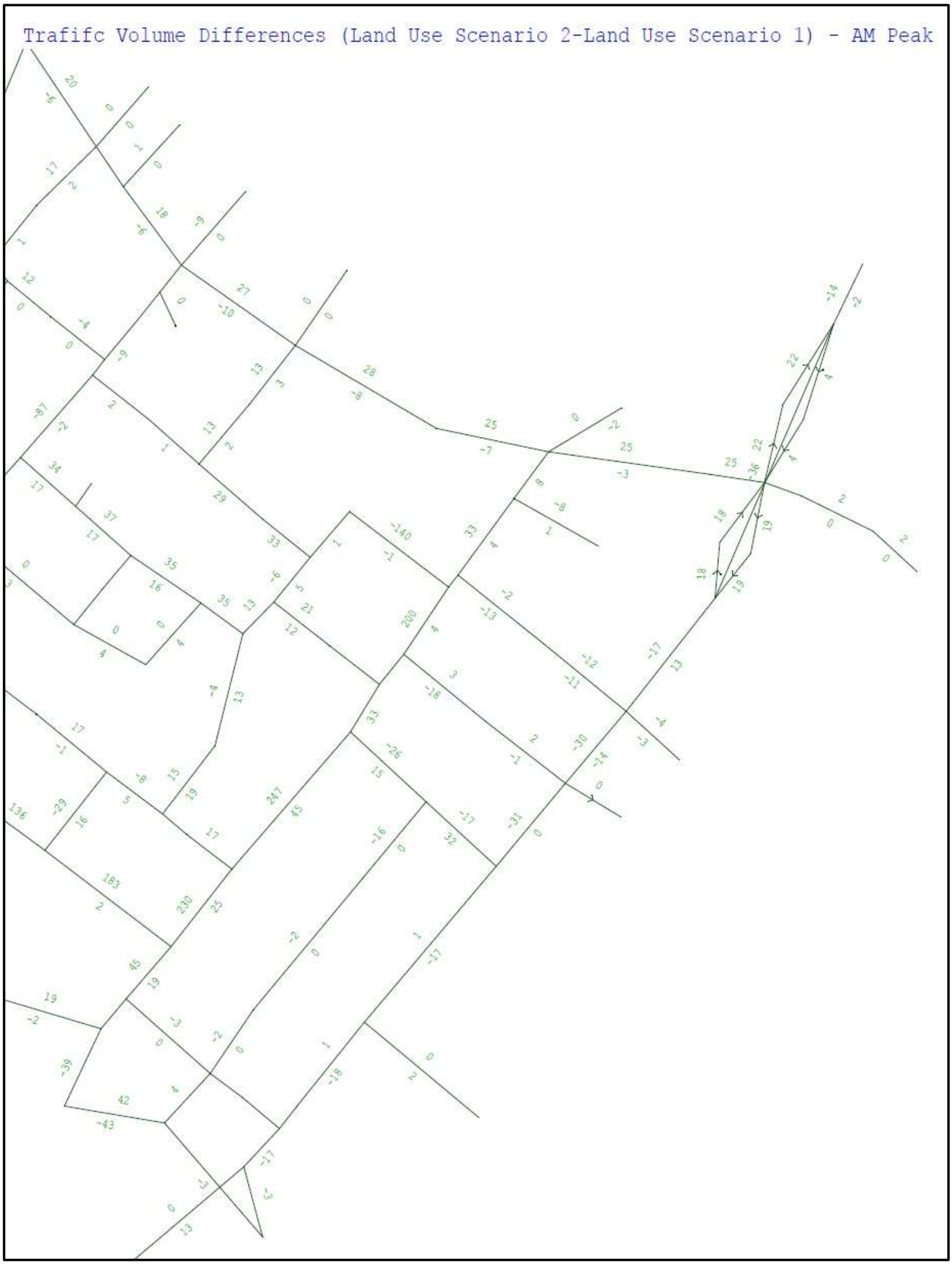


Figure 12: 2031 PM Peak Bitzios Traffic Volumes with Development

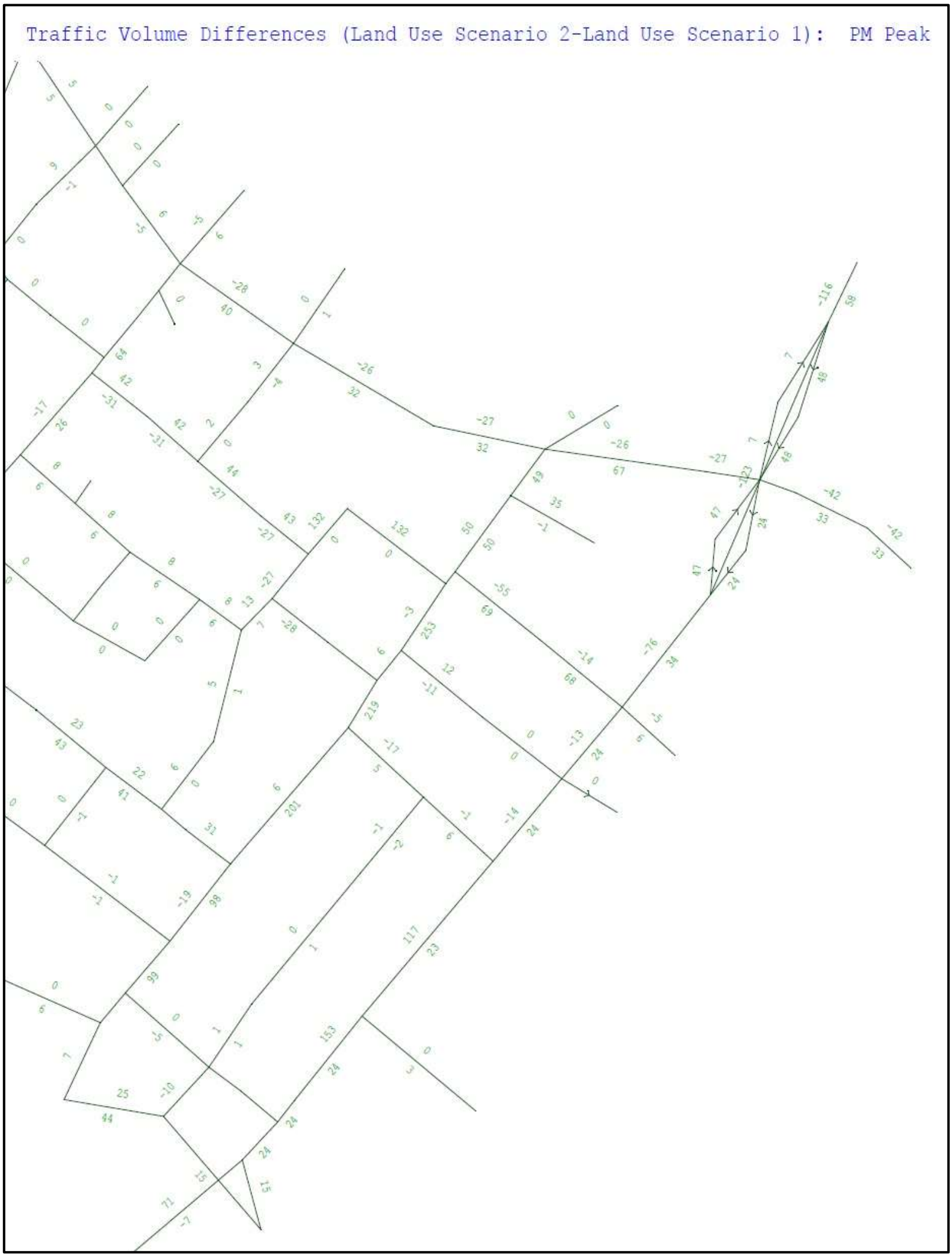
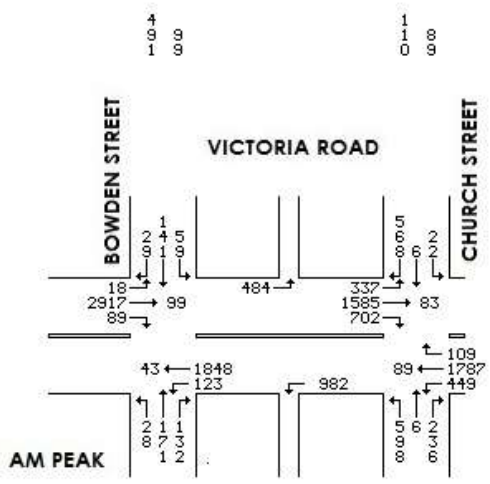
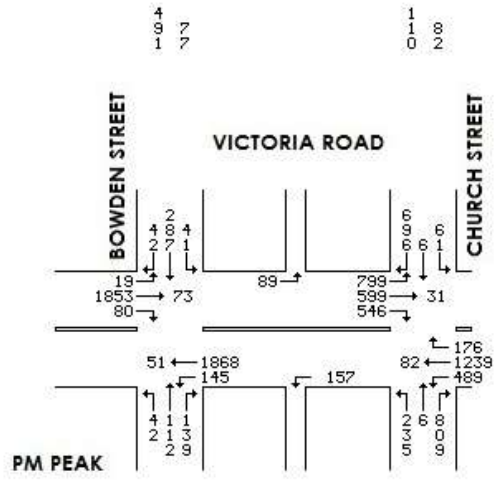


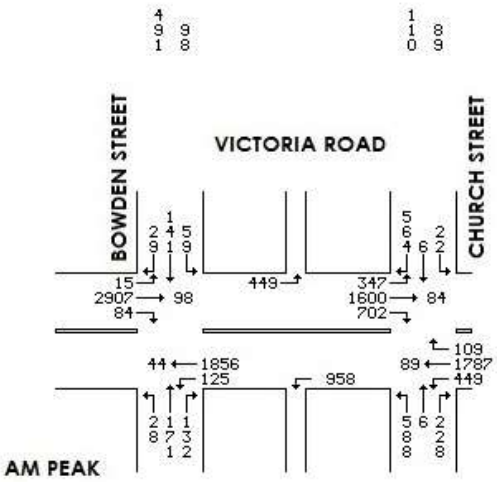
Figure 13: 2031 Future Modelled Traffic Volumes

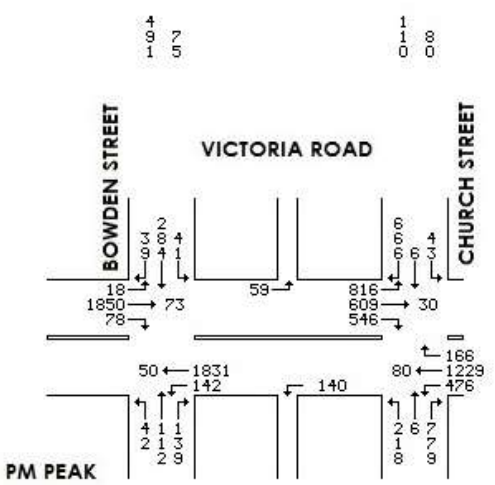
2031 VICTORIA ROAD BASE CASE



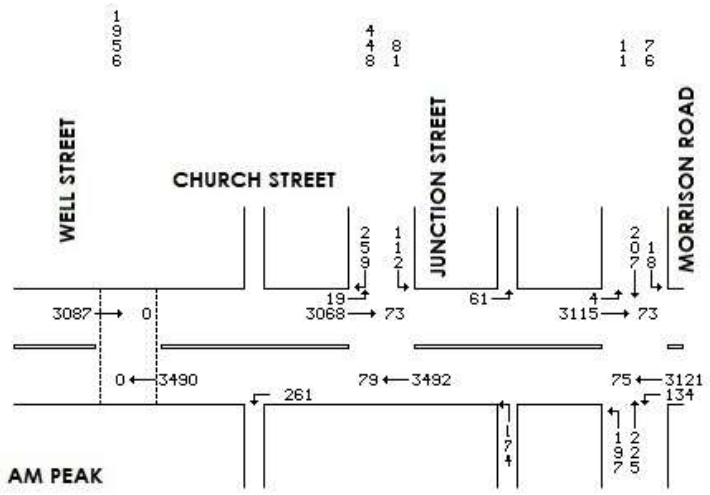


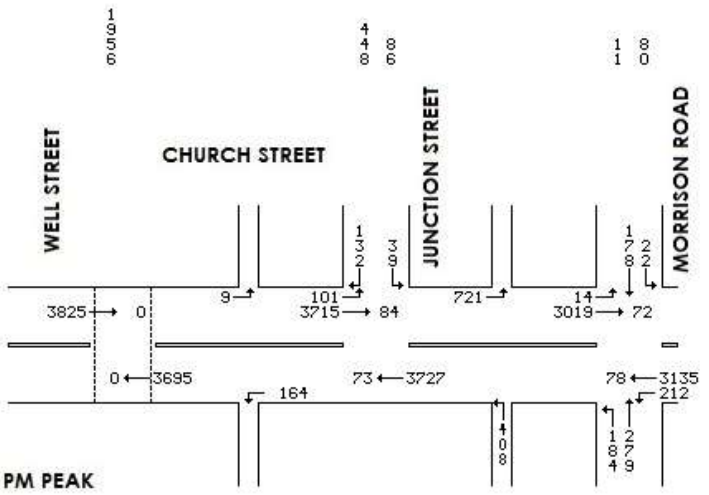
2031 VICTORIA ROAD WITH DEVELOPMENT



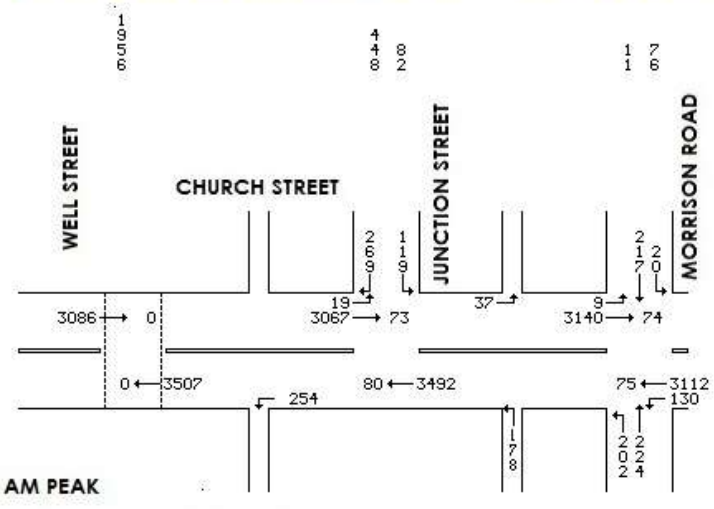


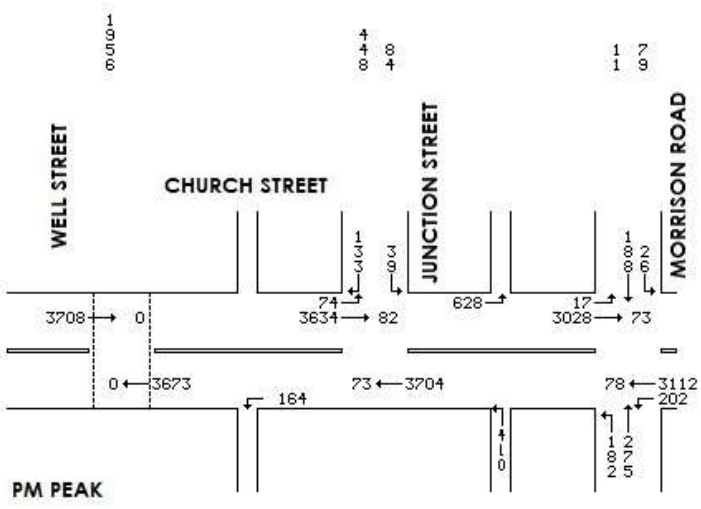
2031 CHURCH STREET BASE CASE





2031 CHURCH STREET WITH DEVELOPMENT





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4 CONCLUSION

Adopting the future year traffic projections provided by Bitzios Consulting, it can be concluded from the foregoing assessment that…

- The residual queuing experienced, primarily on Church Street during the evening commuter peak periods as a result of the operations of intersections beyond the scope of this project, have not been factored into the operation of the modeled intersections,
- The future operations of traffic signals on Church Street, between Well Street and Morrison Road, will be satisfactory,
- The future operations of traffic signals on Victoria Road, between Bowden Street and Church Street, will be satisfactory,
- The future traffic generation resulting from the proposed urban renewal of Shepherds Bay will have no detrimental impact on the operations of Victoria Road and Church Street, and
- No warrant can be drawn for any improvements to road infrastructure on Victoria Road and/or Church Street as a result of the proposed Shepherds Bay development.

APPENDIX A – Performance Indicators

General

Intersection performance is best measured by the indicators of Level of Service (LoS), Average Vehicle Delay (AVD) and the Degree of Saturation (DS) during peak hours.

This is defined as the assessment of a qualitative effect of factors influencing vehicle movement through the intersection. Factors such as speed, traffic volume, geometric layout, delay and capacity are qualified and applied to the specific intersection control mode, as shown in Table 1.

The measure of average delay assessed for traffic signal operation is over all movements. For roundabouts and priority controlled intersections, the critical criterion for assessment is the movement with the highest delay per vehicle.

Table A1: Performance Indicators by Control Method

Intersection Control	Performance Measure [Unit]
Sign or Priority Control	→ Delay of critical movement(s) [seconds/vehicle] → Average Vehicle Delay [seconds/vehicle] → Queue length of critical movement(s) [metres]
Traffic Signal Control	→ Delay of critical movement(s) [seconds/vehicle] → Degree of Saturation [ratio of vehicles to capacity] → Average Vehicle Delay [seconds/vehicle] → Cycle Length [seconds] → Queue length of critical movement(s) [metres]
Roundabout Control	→ Delay of critical movement(s) [seconds/vehicle] → Degree of Saturation[ratio of vehicles to capacity] → Average Vehicle Delay [seconds/vehicle] → Queue length of critical movement(s) [metres]

Average Vehicle Delay (AVD)

The AVD is a measure of the operational performance of a road network or an intersection.

AVD is determined globally over a road network or within a cordon during an assignment model run. The AVD exhibited on comparable network models, for analogous peak periods, forms the basis of comparing the operational performance of the road network.

AVD is used in the determination of intersection Level of Service. Generally, the total delay incurred by vehicles through an intersection is averaged to give an indicative delay on any specific approach. Longer delays do occur but only the average over the peak hour period is reported.

Degree of Saturation (DS)

The DS of an intersection is usually taken as the highest ratio of traffic volume on an approach to the intersection compared with its theoretical capacity, and is a measure of the utilisation of available green time. The DS reported is generally of a critical movement through the intersection rather than the DS of the intersection unless equal saturation occurs on all approaches.

For intersections controlled by traffic signals, generally both queue length and delay increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its DS is kept below 0.875. When the DS exceeds 0.9, extensive queues can be expected.

Table A2: Qualified Level of Service by Control Method

LOS	AVD secs	Traffic Signals and Roundabout	Give Way and Stop Sign Priority Control
A	1 to 14	Good operation.	Good operation
B	14 to 28	Good operation with acceptable delays and spare capacity.	Good operation with acceptable delays and spare capacity.
C	28 to 42	Satisfactory.	Satisfactory but accident study and operational analysis required.
D	42 to 56	Operating near capacity.	Near capacity. Accident study and operational analysis required.
E	56 to 70	Unsatisfactory. Traffic signals incidence will cause excessive delays. Requires additional capacity. Roundabouts require alternative control mode.	At capacity. Requires alternative control mode.
F	>70	Unsatisfactory. Over capacity and unstable operation.	Over capacity. Unstable and unsafe operation.

APPENDIX B – SCATES OUTPUT

Victoria Road Existing – VICX.DAT

```
SCATES Program Version: 2013  Date: 27-OCT-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: VICX
VICTORIA ROAD
2010 EXISTING VOLUMES
```

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	14	1750	A	0	0.0	17	1750	A	0	0.0	102	1750	A	0	0.0
1T	2525	3710	A			1786	3710	A			7	3710	A		
1R	74	1850	S			75	1850	S			36	1850	S		
2L	34	1750	B			49	1750	B			102	1750	B		
2T	212	1750	B			130	1750	B			457	1750	B		
2R	166	1850	S			161	1850	S			36	1850	S		
3L	127	1750	A	0	0.0	163	1750	A	0	0.0	102	1750	A	0	0.0
3T	1896	5670	A	24	0	2105	5670	A	0	66	7	5670	A	0	108
3R	0	0	S			0	0	S			0	0	S		
4L	51	1750	B			17	1750	B			102	1750	B		
4T	122	3600	B			118	3600	B			457	1850	B		
4R	25	1850	S			16	1850	S			36	1850	S		

Type = COCO
File = VICX

TCS = 491

A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
1	22	4.0	0	0	0	0'	0	0
2	5	4.0	0	0	0	0'	0	0
3	5	4.0	0	0	0	0'	0	0
4	24	4.0	0	0	0	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	40	40	20	6	16	0%	50	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	6	18	0%	50	100

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	494	1750	S	0	0.0	481	1750	S	0	0.0	102	1750	S	0	0.0
1T	1838	5880	A	0	0	1161	5880	A	0	0	7	5880	A	72	0
1R	410	3700	G			322	3700	G			108	3700	G		
2L	70	1750	S			229	1750	S			102	1750	S		
2T	6	3920	E			6	3920	E			457	3920	E		
2R	552	3700	D			589	3700	D			108	3700	D		
3L	468	1750	S	0	0.0	423	1750	S	0	0.0	102	1750	S	0	0.0
3T	1283	5880	A			1299	5880	A			7	5880	A		
3R	114	3700	G			148	3700	G			108	3700	G		

```
 4L     25 1750   GE            52 1750   GE           102 1750   GE
 4T      6 3920    E             6 3920    E           457 3920    E
 4R    646 3700    D           806 3700    D           108 3700    D
Type = DODO                    A    Min   ELT H%AM H%PM H%B   L/S L-PD R-PD
File = VICX                    1     32  4.0    0    0    0         0
                               2     30  4.0    0    0    0         0
TCS =  110                     3     32  4.0    0    0    0         0
                               4      5  4.0    0    0    0         0
          PEDESTRIAN VOLUME    WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App     P#AM     P#PM     P#B  Walk    Clear                   FACT     FACT
 1       50       50       25  6       26        0%             50       100
 2       50       50       25  6       24        0%             50       100
 3       50       50       25  6       26        0%             50       100
 4       0        0        0   0       0         0%             100      100
--------------------------------------------------------------------------------
```

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	3	0	0	2	0	0	3	0	0	2	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	LT	9999	1750	LT	9999	1750	LT	9999	1750	LT	9999	1750
	2	T	9999	1960	R	9999	1850	T	9999	1960	TR	9999	1850
	3	R	35	1850				T	9999	1960			
	4												
	5												
	6												
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	35
Depart	0	0	0	0	0	0	0	0	0	0	0	40

File = VICX
Type = COCO TCS = 491

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	6	0	0	4	0	0	6	0	0	4	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	L	50	1750	L	9999	1750	L	110	1750	L	65	1750
	2	T	9999	1960	T	9999	3920	T	9999	1960	T	9999	3920
	3	T	9999	1960	R	100	1850	T	9999	1960	R	9999	1850
	4	T	9999	1960	R	100	1850	T	9999	1960	R	120	1850
	5	R	70	1850				R	120	1850			
	6	R	70	1850				R	120	1850			
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	0
Depart	0	0	0	0	0	0	0	0	0	0	0	0

File = VICX
Type = DODO TCS = 110

	AM PEAK				PM PEAK				BUSINESS			
Ph	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL
A	78.9	78.9	139	139	79.7	79.7	105	105	26.8	26.8	56	56
B	21.1	21.1			20.3	20.3			73.2	73.2		
C												
D												
E												
F			dlay	dlay			dlay	dlay			dlay	dlay
G			0.7	0.7			0.5	0.5			0.1	0.1
Seq		AB	dlay	25		AB	dlay	13		AB	dlay	3
			Stps	3.0			Stps	2.1			Stps	0.7
Mode	1		DS	0.90	1		DS	0.81	1		DS	0.48

```
File = VICX                    A     Bay  Bay  Slip Slip          Type
                                     Req  Act  Req  Act
TCS =  491                     1      15   35   21    0          COCO
                               2                 11    0
                               3                 21    0
                               4      10    0    11    0
                                    Bays if all intersections are optimised
--------------------------------------------------------------------------------


              AM PEAK                    PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL    CL   GT%  GT%       CL    CL   GT%  GT%       CL    CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  37.8 35.8       139   105 33.4 33.4       105   105 34.8 34.8        56    56
  B
  C
  D  29.1 27.4                 33.0 33.0                 15.8 15.8
  E  13.7 18.1                 18.1 18.1                 33.6 33.6
  F                  dlay dlay                   dlay dlay                   dlay dlay
  G  19.5 18.8       2.7   1.9 15.5 15.5       1.9   1.9 15.8 15.8       0.5   0.5
 Seq     ADEG  dlay   53    45     ADEG  dlay   43    43     ADEG  dlay    8     8
               Stps  3.9   4.1           Stps  3.8   3.8           Stps  1.2   1.2
Mode    1       DS  0.67 0.74    1       DS  0.75 0.75    1       DS  0.51 0.51
File = VICX                    A     Bay  Bay  Slip Slip          Type
                                     Req  Act  Req  Act
TCS =  110                     1      45   70   12   50          DODO
                               2      61  100
                               3      18  120   24  110
                               4                 16   65
                                    Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

TCS = 491 Isolated Operation Degree of Saturation for PM Peak VICX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.39	80	0	5	0	6	0.39	80	0	5	0	6
1	T	0.64	80	3	752	13	42	0.64	80	3	752	13	42
1	R	0.81	80	1	67	1	6	0.81	80	1	67	1	6
2	L	0.62	17	1	41	1	30	0.62	17	1	41	1	30
2	T	0.62	17	1	109	3	30	0.62	17	1	109	3	30
2	R	0.81	17	3	167	5	30	0.81	17	3	167	5	30
3	L	0.53	80	0	59	1	36	0.53	80	0	59	1	36
3	T	0.53	80	3	760	15	36	0.53	80	3	760	15	36
3	R												
4	L	0.26	17	0	13	0	18	0.26	17	0	13	0	18
4	T	0.26	17	1	93	3	18	0.26	17	1	93	3	18
4	R	0.31	17	0	12	0	18	0.31	17	0	12	0	18
INT		0.81	105					0.81	105				

TCS = 491 Pedestrian - Vehicle Delay PM Peak File = VICX

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				17	0.0	4.3				17	0.0	4.3
1	T	40	0.5	46.7	1786	2.9	5.9	40	0.5	46.7	1786	2.9	5.9
1	R				75	0.9	41.8				75	0.9	41.8
2	L				49	0.6	40.8				49	0.6	40.8
2	T	0	0.0		130	1.5	40.8	0	0.0		130	1.5	40.8
2	R				161	2.7	60.7				161	2.7	60.7
3	L				163	0.2	5.1				163	0.2	5.1
3	T	0	0.0		2105	3.0	5.1	0	0.0		2105	3.0	5.1
3	R												
4	L				17	0.2	38.3				17	0.2	38.3
4	T	0	0.0		118	1.3	38.3	0	0.0		118	1.3	38.3
4	R				16	0.2	42.3				16	0.2	42.3
INT		40	1	46.7	4637	13	10.4	40	1	46.7	4637	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops PM Peak File = VICX

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS	
1	L				17	0.0	1.2	0	0.0	A	0	6
1	T	40	0.5	46.7	1786	0.6	1.2	0	0.0	A	0	6
1	R				75	0.0	0.0	0	0.0	A	0	6
2	L				49	0.6	40.8	41	0.8	C	1	12
2	T	0	0.0		130	1.5	40.8	109	0.8	C	3	30
2	R				161	2.7	60.7	167	1.0	E	5	30
3	L				163	0.4	8.0	57	0.4	A	1	6
3	T	0	0.0		2105	4.7	8.0	738	0.4	A	15	36
3	R											
4	L				17	0.2	38.3	13	0.8	C	0	6
4	T	0	0.0		118	1.3	38.3	93	0.8	C	3	12
4	R				16	0.2	42.3	12	0.8	D	0	6
INT		40	1	46.7	4637	12	9.3	1230	0.3	A		

TCS = 491 Isolated Operation Degree of Saturation for Business Peak VICX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
1	T	0.02	11	0	5	0	6	0.02	11	0	5	0	6
1	R	0.13	11	0	26	0	6	0.13	11	0	26	0	6
2	L	0.48	37	0	46	1	24	0.48	37	0	46	1	24
2	T	0.48	37	1	205	2	24	0.48	37	1	205	2	24
2	R	0.24	37	0	28	0	6	0.24	37	0	28	0	6
3	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
3	T	0.01	11	0	5	0	6	0.01	11	0	5	0	6
3	R												
4	L	0.43	37	0	43	1	24	0.43	37	0	43	1	24
4	T	0.43	37	1	194	2	18	0.43	37	1	194	2	18
4	R	0.46	37	0	29	0	24	0.46	37	0	29	0	24
INT		0.48	56					0.48	56				

TCS = 491 Pedestrian - Vehicle Delay Business Peak File = VICX
Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			102	0.5	19.2				102	0.5	19.2
1	T	20	0.1	22.3 7	0.0	18.1	20	0.1	22.3	7	0.0	18.1
1	R			36	0.2	18.1				36	0.2	18.1
2	L			102	0.1	4.7				102	0.1	4.7
2	T	0	0.0	457	0.6	4.7	0	0.0		457	0.6	4.7
2	R			36	0.2	22.4				36	0.2	22.4
3	L			102	0.5	19.2				102	0.5	19.2
3	T	0	0.0	7	0.0	18.1	0	0.0		7	0.0	18.1
3	R											
4	L			102	0.1	4.5				102	0.1	4.5
4	T	0	0.0	457	0.6	4.5	0	0.0		457	0.6	4.5
4	R			36	0.2	22.9				36	0.2	22.9
INT		20	0	22.3 1444	3	8.0	20	0	22.3	1444	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops Business Peak File = VICX

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			102	0.0	0.2	0	0.0	A	0	6
1	T	20	0.1	22.3 7	0.0	0.2	0	0.0	A	0	6
1	R			36	0.0	0.0	0	0.0	A	0	6
2	L			102	0.1	4.7	46	0.4	A	1	6
2	T	0	0.0	457	0.6	4.7	205	0.4	A	2	24
2	R			36	0.2	22.4	28	0.8	B	0	6
3	L			102	0.0	0.4	2	0.0	A	0	6
3	T	0	0.0	7	0.0	0.4	0	0.0	A	0	6
3	R										
4	L			102	0.1	4.5	43	0.4	A	1	6
4	T	0	0.0	457	0.6	4.5	194	0.4	A	2	18
4	R			36	0.2	22.9	29	0.8	B	0	6
INT		20	0	22.3 1444	2	4.7	548	0.4	A		

TCS = 491 Isolated Operation Degree of Saturation for AM Peak VICX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.34	106	0	4	0 6	0.34	106	0	4	0	6
1	T	0.90	106	10	1756	25 84	0.90	106	10	1756	25	84
1	R	0.72	106	1	60	1 6	0.72	106	1	60	1	6
2	L	0.77	25	1	31	1 60	0.77	25	1	31	1	60
2	T	0.77	25	4	192	7 60	0.77	25	4	192	7	60
2	R	0.82	25	4	167	6 42	0.82	25	4	167	6	42
3	L	0.47	106	0	43	1 42	0.47	106	0	43	1	42
3	T	0.47	106	3	635	18 42	0.47	106	3	635	18	42
3	R											
4	L	0.30	25	1	40	2 24	0.30	25	1	40	2	24
4	T	0.30	25	2	95	4 24	0.30	25	2	95	4	24
4	R	0.64	25	0	20	1 24	0.64	25	0	20	1	24
INT		0.90	139				0.90	139				

TCS = 491 Pedestrian - Vehicle Delay AM Peak File = VICX

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				14	0.0	5.4				14	0.0	5.4
1	T	40	0.7	63.6	2525	10.1	14.4	40	0.7	63.6	2525	10.1	14.4
1	R				74	1.0	46.8				74	1.0	46.8
2	L				34	0.6	60.8				34	0.6	60.8
2	T	0	0.0		212	3.5	59.7	0	0.0		212	3.5	59.7
2	R				166	3.5	76.5				166	3.5	76.5
3	L				127	0.2	6.2				127	0.2	6.2
3	T	0	0.0		1896	3.3	6.2	0	0.0		1896	3.3	6.2
3	R												
4	L				51	0.7	49.2				51	0.7	49.2
4	T	0	0.0		122	1.7	49.2	0	0.0		122	1.7	49.2
4	R				25	0.4	60.8				25	0.4	60.8
INT		40	1	63.6	5246	25	17.1	40	1	63.6	5246	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops AM Peak File = VICX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			14	0.0	2.6	0	0.0	A	0	6
1	T	40	0.7	63.6 2525	1.8	2.6	0	0.0	A	0	6
1	R			74	0.0	0.0	0	0.0	A	0	6
2	L			34	0.6	60.8	31	0.9	E	1	12
2	T	0	0.0	212	3.5	59.7	192	0.9	E	7	60
2	R			166	3.5	76.5	167	1.0	F	6	42
3	L			127	0.0	0.5	3	0.0	A	0	6
3	T	0	0.0	1896	0.3	0.5	46	0.0	A	2	6
3	R										
4	L			51	0.7	49.2	40	0.8	D	2	6
4	T	0	0.0	122	1.7	49.2	95	0.8	D	4	24
4	R			25	0.4	60.8	20	0.8	E	1	6
INT		40	1	63.6 5246	13	8.6	593	0.1	A		

TCS = 110 Isolated Operation Degree of Saturation for PM Peak VICX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.30	97	0	43	1 12	0.30	97	0	43	1 12
1	T	0.55	38	9	834	22 48	0.55	38	9	834	22 48
1	R	0.75	12	4	290	9 30	0.75	12	4	290	9 30
2	L	0.30	46	1	133	4 24	0.30	46	1	133	4 24
2	T	0.02	15	0	5	0 6	0.02	15	0	5	0 6
2	R	0.75	22	6	503	14 42	0.75	22	6	503	14 42
3	L	0.29	89	0	78	2 12	0.29	89	0	78	2 12
3	T	0.75	31	12	1056	27 54	0.75	31	12	1056	27 54
3	R	0.75	6	2	143	4 18	0.75	6	2	143	4 18
4	L	0.12	26	0	36	1 12	0.12	26	0	36	1 12
4	T	0.02	21	0	4	0 6	0.02	21	0	4	0 6
4	R	0.75	31	8	661	17 54	0.75	31	8	661	17 54
INT		0.75	105				0.75	105			

TCS = 110 Pedestrian - Vehicle Delay PM Peak File = VICX

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver
1	L			481	0.1	0.4			481	0.1	0.4
1	T	50	0.6	46.7 1161	8.7	26.9	50	0.6	46.7 1161	8.7	26.9
1	R			322	4.3	47.6			322	4.3	47.6
2	L			229	1.2	18.9			229	1.2	18.9
2	T	50	0.6	46.7 6	0.1	38.7	50	0.6	46.7 6	0.1	38.7
2	R			589	6.5	39.6			589	6.5	39.6
3	L			423	0.2	1.7			423	0.2	1.7
3	T	50	0.6	46.7 1299	12.0	33.4	50	0.6	46.7 1299	12.0	33.4
3	R			148	2.3	56.0			148	2.3	56.0
4	L			52	0.4	30.3			52	0.4	30.3
4	T	0	0.0	6	0.1	33.5	0	0.0	6	0.1	33.5
4	R			806	7.6	34.1			806	7.6	34.1
INT		150	2	46.7 5522	43	28.3	150	2	46.7 5522	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops PM Peak File = VICX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			481	0.0	0.0	0	0.0	A	0	6
1	T	50	0.6	46.7 1161	13.4	41.7	778	0.7	C	22	48
1	R			322	0.4	5.0	9	0.0	A	0	6
2	L			229	1.2	18.9	133	0.6	B	4	24
2	T	50	0.6	46.7 6	0.1	38.7	5	0.8	C	0	6
2	R			589	6.5	39.6	503	0.9	C	14	42
3	L			423	0.0	0.0	0	0.0	A	0	6
3	T	50	0.6	46.7 1299	2.4	6.7	0	0.0	A	0	6
3	R			148	0.0	0.0	0	0.0	A	0	6
4	L			52	0.4	30.3	36	0.7	C	1	12
4	T	0	0.0	6	0.1	33.5	4	0.7	C	0	6
4	R			806	7.6	34.1	661	0.8	C	17	54
INT		150	2	46.7 5522	32	21.0	2129	0.4	B		

TCS = 110 Isolated Operation Degree of Saturation for Business Peak VICX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
1	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
1	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
2	L	0.07	47	0	16	0	6	0.07	47	0	16	0	6
2	T	0.44	15	2	342	5	18	0.44	15	2	342	5	18
2	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
3	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
3	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
3	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
4	L	0.15	22	0	60	1	6	0.15	22	0	60	1	6
4	T	0.51	13	2	359	5	18	0.51	13	2	359	5	18
4	R	0.40	5	1	92	2	6	0.40	5	1	92	2	6
INT		0.51	56					0.51	56				

TCS = 110 Pedestrian - Vehicle Delay Business Peak File = VICX

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				102	0.2	5.3				102	0.2	5.3
1	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
1	R				108	0.7	24.1				108	0.7	24.1
2	L				102	0.0	0.8				102	0.0	0.8
2	T	25	0.2	22.3	457	2.2	17.1	25	0.2	22.3	457	2.2	17.1
2	R				108	0.7	24.1				108	0.7	24.1
3	L				102	0.2	5.3				102	0.2	5.3
3	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
3	R				108	0.7	24.1				108	0.7	24.1
4	L				102	0.3	11.2				102	0.3	11.2
4	T	0	0.0		457	2.4	18.8	0	0.0		457	2.4	18.8
4	R				108	0.7	24.2				108	0.7	24.2
INT		75	0	22.3	1768	8	16.6	75	0	22.3	1768	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops Business Peak File = VICX

---------- Delays & Stops after Co-ordinated Evaluation----------													
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS			
1	L				102	0.0	0.0	0	0.0	A	0	6	
1	T	25	0.2	22.3	7	0.0	0.4	2	0.3	A	0	6	
1	R				108	0.2	5.0	2	0.0	A	0	6	
2	L				102	0.0	0.8	16	0.2	A	0	6	
2	T	25	0.2	22.3	457	2.2	17.1	342	0.7	B	5	18	
2	R				108	0.7	24.1	91	0.8	B	1	6	
3	L				102	0.0	0.0	0	0.0	A	0	6	
3	T	25	0.2	22.3	7	0.0	0.0	0	0.0	A	0	6	
3	R				108	0.0	0.0	0	0.0	A	0	6	
4	L				102	0.3	11.2	60	0.6	A	1	6	
4	T	0	0.0		457	2.4	18.8	359	0.8	B	5	18	
4	R				108	0.7	24.2	92	0.9	B	1	6	
INT		75	0	22.3	1768	7	13.2	963	0.5	A			

TCS = 110 Isolated Operation Degree of Saturation for AM Peak VICX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.30	131	0	34	1	12	0.30	99	0	37	1	6
1	T	0.67	65	15	1278	38	78	0.74	44	13	1392	31	66
1	R	0.67	23	6	346	13	42	0.74	16	5	361	10	36
2	L	0.08	69	0	33	1	12	0.08	54	0	32	1	6
2	T	0.03	15	0	5	0	6	0.02	15	0	5	0	6
2	R	0.67	31	8	453	17	54	0.74	21	6	473	13	42
3	L	0.34	112	0	113	4	24	0.33	85	0	108	3	18
3	T	0.63	48	13	962	32	66	0.68	34	11	1005	25	54
3	R	0.67	6	2	101	4	18	0.65	5	2	101	3	12
4	L	0.09	23	0	19	1	6	0.07	21	0	18	1	6
4	T	0.02	18	0	5	0	6	0.02	17	0	5	0	6
4	R	0.67	36	8	520	18	60	0.74	25	7	544	15	48
INT		0.67	139					0.74	105				

TCS = 110 Pedestrian - Vehicle Delay AM Peak File = VICX
Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			494	0.0	0.3				494	0.0	0.3
1	T	50	0.9	63.6 1838	14.6	28.5	50	0.6	46.7	1838	13.0	25.5
1	R			410	6.2	54.3				410	5.1	44.4
2	L			70	0.4	18.4				70	0.3	13.0
2	T	50	0.9	63.6 6	0.1	55.5	50	0.6	46.7	6	0.1	38.7
2	R			552	7.5	49.2				552	6.2	40.4
3	L			468	0.5	3.6				468	0.3	2.5
3	T	50	0.9	63.6 1283	13.4	37.7	50	0.6	46.7	1283	11.1	31.1
3	R			114	2.1	65.2				114	1.6	49.1
4	L			25	0.3	49.5				25	0.2	33.9
4	T	0	0.0	6	0.1	52.6	0	0.0		6	0.1	37.3
4	R			646	8.2	45.9				646	6.8	37.9
INT		150	3	63.6 5912	53	32.5	150	2	46.7	5912	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops AM Peak File = VICX

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			494	0.0	0.0	0	0.0	A	0	6
1	T	50	0.9	63.6 1838	40.9	80.0	1909	1.0	F	38	78
1	R			410	0.6	5.0	16	0.0	A	1	6
2	L			70	0.4	18.4	33	0.5	B	1	12
2	T	50	0.9	63.6 6	0.1	55.5	5	0.8	D	0	6
2	R			552	7.5	49.2	453	0.8	D	17	54
3	L			468	0.0	0.0	0	0.0	A	0	6
3	T	50	0.9	63.6 1283	2.7	7.5	0	0.0	A	0	6
3	R			114	0.0	0.0	0	0.0	A	0	6
4	L			25	0.3	49.5	19	0.8	D	1	6
4	T	0	0.0	6	0.1	52.6	5	0.8	D	0	6
4	R			646	8.2	45.9	520	0.8	D	18	60
INT		150	3	63.6 5912	61	37.0	2960	0.5	C		

Victoria Road Future without Development – VICB.DAT

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SCATES Program Version: 2013  Date: 02-NOV-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: VICB
VICTORIA ROAD
2031 BITZIOS BASE VOLUMES
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	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	18	1750	A	0	0.0	19	1750	A	0	0.0	102	1750	A	0	0.0
1T	2917	3710	A			1853	3710	A			7	3710	A		
1R	89	1850	S			80	1850	S			36	1850	S		
2L	28	1750	B			42	1750	B			102	1750	B		
2T	171	1750	B			112	1750	B			457	1750	B		
2R	132	1850	S			139	1850	S			36	1850	S		
3L	123	1750	A	0	0.0	145	1750	A	0	0.0	102	1750	A	0	0.0
3T	1848	5670	A	0	982	1868	5670	A	0	157	7	5670	A	0	108
3R	0	0	S			0	0	S			0	0	S		
4L	59	1750	B			41	1750	B			102	1750	B		
4T	141	3600	B			287	3600	B			457	1850	B		
4R	29	1850	S			42	1850	S			36	1850	S		

Type = COCO
File = VICB

TCS = 491

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
	1	22	4.0	0	0	0	0'	0	0
	2	5	4.0	0	0	0	0'	0	0
	3	5	4.0	0	0	0	0'	0	0
	4	24	4.0	0	0	0	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	40	40	20	6	16	0%	50	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	6	18	0%	50	100

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	337	1750	S	0	0.0	799	1750	S	0	0.0	102	1750	S	0	0.0
1T	1585	5880	A	0	484	599	5880	A	0	89	7	5880	A	72	0
1R	702	3700	G			546	3700	G			108	3700	G		
2L	598	1750	S			235	1750	S			102	1750	S		
2T	6	3920	E			6	3920	E			457	3920	E		
2R	236	3700	D			809	3700	D			108	3700	D		
3L	449	1750	S	0	0.0	489	1750	S	0	0.0	102	1750	S	0	0.0
3T	1787	5880	A			1239	5880	A			7	5880	A		
3R	109	3700	G			176	3700	G			108	3700	G		
4L	22	1750	GE			61	1750	GE			102	1750	GE		
4T	6	3920	E			6	3920	E			457	3920	E		
4R	568	3700	D			696	3700	D			108	3700	D		

Type = DODO

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD

```
File = VICB                      1     32  4.0    0    0    0         0
                                 2     30  4.0    0    0    0         0
TCS =  110                       3     32  4.0    0    0    0         0
                                 4      5  4.0    0    0    0         0
          PEDESTRIAN VOLUME      WALK-CLEARANCE    TRAM DATA      PEDEST   TRAM
App     P#AM     P#PM     P#B    Walk     Clear                   FACT     FACT
 1       50       50       25    6        26         0%            50       100
 2       50       50       25    6        24         0%            50       100
 3       50       50       25    6        26         0%            50       100
 4       0        0        0     0        0          0%            100      100
-------------------------------------------------------------------------------
```

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	3	0	0	2	0	0	3	0	0	2	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	LT	9999	1750	LT	9999	1750	LT	9999	1750	LT	9999	1750
	2	T	9999	1960	R	9999	1850	T	9999	1960	TR	9999	1850
	3	R	35	1850				T	9999	1960			
	4												
	5												
	6												
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	35
Depart	0	0	0	0	0	0	0	0	0	0	0	40

File = VICB
Type = COCO TCS = 491

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	6	0	0	4	0	0	6	0	0	4	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	L	50	1750	L	9999	1750	L	110	1750	L	65	1750
	2	T	9999	1960	T	9999	3920	T	9999	1960	T	9999	3920
	3	T	9999	1960	R	100	1850	T	9999	1960	R	9999	1850
	4	T	9999	1960	R	100	1850	T	9999	1960	R	120	1850
	5	R	70	1850				R	120	1850			
	6	R	70	1850				R	120	1850			
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	0
Depart	0	0	0	0	0	0	0	0	0	0	0	0

File = VICB
Type = DODO TCS = 110

	AM PEAK				PM PEAK				BUSINESS			
Ph	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL
A	82.9	82.9	140	140	73.2	73.2	105	105	26.8	26.8	56	56
B	17.1	17.1			26.8	26.8			73.2	73.2		
C												
D												
E												
F			dlay	dlay			dlay	dlay			dlay	dlay
G			0.7	0.7			0.5	0.5			0.1	0.1
Seq		AB	dlay	47	47	AB	dlay	18	18	AB	dlay	3	3
			Stps	4.2	4.2		Stps	2.5	2.5		Stps	0.7	0.7
Mode	1		DS	0.99	0.99	1		DS	0.77	0.77	1	DS	0.48	0.48

File = VICB A Bay Bay Slip Slip Type

```
                                        Req  Act  Req  Act
TCS =  491                         1     21   35   27    0            COCO
                                   2                11    0
                                   3                27    0
                                   4     13    0    18    0
                                        Bays if all intersections are optimised
--------------------------------------------------------------------------------


              AM PEAK                    PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  36.8 37.6       140  113 29.5 29.5       105  105 34.8 34.8        56   56
  B
  C
  D  20.0 20.8                30.5 30.5                15.8 15.8
  E  13.6 16.8                18.1 18.1                33.6 33.6
  F                 dlay dlay                  dlay dlay                 dlay dlay
  G  29.6 24.8       2.7  2.1 21.8 21.8       1.9  1.9 15.8 15.8       0.5  0.5
 Seq     ADEG  dlay   68   57     ADEG  dlay   46   46     ADEG  dlay    8    8
               Stps  4.6  4.6           Stps  3.8  3.8           Stps  1.2  1.2
Mode    1       DS  0.89 0.89    1       DS  0.82 0.82    1       DS  0.51 0.51
File = VICB                        A     Bay  Bay  Slip Slip           Type
                                         Req  Act  Req  Act
TCS =  110                         1     90   70   20   50             DODO
                                   2    102  100
                                   3     29  120   46  110
                                   4                20   65
                                        Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

TCS = 491 Isolated Operation Degree of Saturation for PM Peak VICB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.46	73	0	8	0	6	0.46	73	0	8	0	6
1	T	0.73	73	5	1032	17	54	0.73	73	5	1032	17	54
1	R	0.77	73	1	70	1	6	0.77	73	1	70	1	6
2	L	0.38	24	0	32	1	24	0.38	24	0	32	1	24
2	T	0.38	24	1	85	3	24	0.38	24	1	85	3	24
2	R	0.77	24	2	138	4	24	0.77	24	2	138	4	24
3	L	0.51	73	0	62	1	42	0.51	73	0	62	1	42
3	T	0.51	73	4	799	17	42	0.51	73	4	799	17	42
3	R												
4	L	0.45	24	0	32	1	36	0.45	24	0	32	1	36
4	T	0.45	24	3	222	6	30	0.45	24	3	222	6	30
4	R	0.56	24	1	35	1	36	0.56	24	1	35	1	36
INT		0.77	105					0.77	105				

TCS = 491 Pedestrian - Vehicle Delay PM Peak File = VICB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				19	0.0	7.3				19	0.0	7.3
1	T	40	0.5	46.7	1853	5.1	10.0	40	0.5	46.7	1853	5.1	10.0
1	R				80	0.9	41.6				80	0.9	41.6
2	L				42	0.4	34.1				42	0.4	34.1
2	T	0	0.0		112	1.1	34.1	0	0.0		112	1.1	34.1
2	R				139	2.2	57.3				139	2.2	57.3
3	L				145	0.3	7.7				145	0.3	7.7
3	T	0	0.0		1868	4.0	7.6	0	0.0		1868	4.0	7.6
3	R												
4	L				41	0.4	34.7				41	0.4	34.7
4	T	0	0.0		287	2.8	34.7	0	0.0		287	2.8	34.7
4	R				42	0.5	44.8				42	0.5	44.8
INT		40	1	46.7	4628	18	13.8	40	1	46.7	4628	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops PM Peak File = VICB

------------ Delays & Stops after Co-ordinated Evaluation----------												
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS		
1	L				19	0.0	2.0	0	0.0	A	0	6
1	T	40	0.5	46.7	1853	1.0	2.0	0	0.0	A	0	6
1	R				80	0.0	0.0	0	0.0	A	0	6
2	L				42	0.4	34.1	32	0.8	C	1	12
2	T	0	0.0		112	1.1	34.1	85	0.8	C	2	24
2	R				139	2.2	57.3	138	1.0	E	4	24
3	L				145	1.2	30.0	87	0.6	C	1	6
3	T	0	0.0		1868	15.6	30.0	1118	0.6	C	17	42
3	R											
4	L				41	0.4	34.7	32	0.8	C	1	6
4	T	0	0.0		287	2.8	34.7	222	0.8	C	6	30
4	R				42	0.5	44.8	35	0.8	D	1	6
INT		40	1	46.7	4628	25	19.6	1749	0.4	B		

TCS = 491 Isolated Operation Degree of Saturation for Business Peak VICB

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
1	T	0.02	11	0	5	0	6	0.02	11	0	5	0	6
1	R	0.13	11	0	26	0	6	0.13	11	0	26	0	6
2	L	0.48	37	0	46	1	24	0.48	37	0	46	1	24
2	T	0.48	37	1	205	2	24	0.48	37	1	205	2	24
2	R	0.24	37	0	28	0	6	0.24	37	0	28	0	6
3	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
3	T	0.01	11	0	5	0	6	0.01	11	0	5	0	6
3	R												
4	L	0.43	37	0	43	1	24	0.43	37	0	43	1	24
4	T	0.43	37	1	194	2	18	0.43	37	1	194	2	18
4	R	0.46	37	0	29	0	24	0.46	37	0	29	0	24
INT		0.48	56					0.48	56				

TCS = 491 Pedestrian - Vehicle Delay Business Peak File = VICB
Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			102	0.5	19.2				102	0.5	19.2
1	T	20	0.1	22.3 7	0.0	18.1	20	0.1	22.3	7	0.0	18.1
1	R			36	0.2	18.1				36	0.2	18.1
2	L			102	0.1	4.7				102	0.1	4.7
2	T	0	0.0	457	0.6	4.7	0	0.0		457	0.6	4.7
2	R			36	0.2	22.4				36	0.2	22.4
3	L			102	0.5	19.2				102	0.5	19.2
3	T	0	0.0	7	0.0	18.1	0	0.0		7	0.0	18.1
3	R											
4	L			102	0.1	4.5				102	0.1	4.5
4	T	0	0.0	457	0.6	4.5	0	0.0		457	0.6	4.5
4	R			36	0.2	22.9				36	0.2	22.9
INT		20	0	22.3 1444	3	8.0	20	0	22.3	1444	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops Business Peak File = VICB

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			102	0.0	0.2	0	0.0	A	0	6
1	T	20	0.1	22.3 7	0.0	0.2	0	0.0	A	0	6
1	R			36	0.0	0.0	0	0.0	A	0	6
2	L			102	0.1	4.7	46	0.4	A	1	6
2	T	0	0.0	457	0.6	4.7	205	0.4	A	2	24
2	R			36	0.2	22.4	28	0.8	B	0	6
3	L			102	0.0	0.4	2	0.0	A	0	6
3	T	0	0.0	7	0.0	0.4	0	0.0	A	0	6
3	R										
4	L			102	0.1	4.5	43	0.4	A	1	6
4	T	0	0.0	457	0.6	4.5	194	0.4	A	2	18
4	R			36	0.2	22.9	29	0.8	B	0	6
INT		20	0	22.3 1444	2	4.7	548	0.4	A		

TCS = 491 Isolated Operation Degree of Saturation for AM Peak VICB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.39	112	0	5	0 6	0.39	112	0	5	0 6
1	T	0.99	112	30	2947	41 138	0.99	112	30	2947	41 138
1	R	0.74	112	1	71	1 6	0.74	112	1	71	1 6
2	L	0.80	20	1	27	1 54	0.80	20	1	27	1 54
2	T	0.80	20	3	164	6 54	0.80	20	3	164	6 54
2	R	0.97	20	6	214	8 54	0.97	20	6	214	8 54
3	L	0.43	112	0	34	1 36	0.43	112	0	34	1 36
3	T	0.43	112	2	508	14 36	0.43	112	2	508	14 36
3	R										
4	L	0.45	20	1	49	2 30	0.45	20	1	49	2 30
4	T	0.45	20	2	116	5 30	0.45	20	2	116	5 30
4	R	0.75	20	1	29	1 30	0.75	20	1	29	1 30
INT		0.99	140				0.99	140			

TCS = 491 Pedestrian - Vehicle Delay AM Peak File = VICB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				18	0.0	4.0				18	0.0	4.0
1	T	40	0.7	64.1	2917	29.6	36.6	40	0.7	64.1	2917	29.6	36.6
1	R				89	1.1	42.6				89	1.1	42.6
2	L				28	0.5	69.5				28	0.5	69.5
2	T	0	0.0		171	3.3	68.9	0	0.0		171	3.3	68.9
2	R				132	6.4	174.5				132	6.4	174.5
3	L				123	0.1	4.3				123	0.1	4.3
3	T	0	0.0		1848	2.2	4.3	0	0.0		1848	2.2	4.3
3	R												
4	L				59	0.9	55.0				59	0.9	55.0
4	T	0	0.0		141	2.2	55.0	0	0.0		141	2.2	55.0
4	R				29	0.7	83.9				29	0.7	83.9
INT		40	1	64.1	5555	47	30.4	40	1	64.1	5555	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops AM Peak File = VICB

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			18	0.2	36.3	0	0.0	C	0	6
1	T	40	0.7	64.1 2917	29.4	36.3	0	0.0	C	0	6
1	R			89	0.0	0.0	0	0.0	A	0	6
2	L			28	0.5	69.5	27	1.0	E	1	12
2	T	0	0.0	171	3.3	68.9	164	1.0	E	6	54
2	R			132	6.4	174.5	214	1.6	F	8	54
3	L			123	0.2	5.6	27	0.2	A	1	6
3	T	0	0.0	1848	2.9	5.6	406	0.2	A	14	36
3	R										
4	L			59	0.9	55.0	49	0.8	D	2	12
4	T	0	0.0	141	2.2	55.0	116	0.8	D	5	24
4	R			29	0.7	83.9	29	1.0	F	1	6
INT		40	1	64.1 5555	47	30.2	1032	0.2	C		

TCS = 110 Isolated Operation Degree of Saturation for PM Peak VICB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.49	97	0	95	2 12	0.49	97	0	95	2 12
1	T	0.27	40	4	372	11 24	0.27	40	4	372	11 24
1	R	0.82	19	7	502	14 42	0.82	19	7	502	14 42
2	L	0.21	66	1	92	3 18	0.21	66	1	92	3 18
2	T	0.02	19	0	4	0 6	0.02	19	0	4	0 6
2	R	0.82	28	9	708	18 54	0.82	28	9	708	18 54
3	L	0.36	82	0	134	3 24	0.36	82	0	134	3 24
3	T	0.82	27	13	1068	27 60	0.82	27	13	1068	27 60
3	R	0.82	6	3	190	6 18	0.82	6	3	190	6 18
4	L	0.16	23	1	45	1 12	0.16	23	1	45	1 12
4	T	0.02	13	0	5	0 6	0.02	13	0	5	0 6
4	R	0.82	24	8	621	16 54	0.82	24	8	621	16 54
INT		0.82	105				0.82	105			

TCS = 110 Pedestrian - Vehicle Delay PM Peak File = VICB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				799	0.1	0.5				799	0.1	0.5
1	T	50	0.6	46.7	599	3.7	22.5	50	0.6	46.7	599	3.7	22.5
1	R				546	7.1	46.5				546	7.1	46.5
2	L				235	0.6	8.5				235	0.6	8.5
2	T	50	0.6	46.7	6	0.1	35.4	50	0.6	46.7	6	0.1	35.4
2	R				809	8.8	39.1				809	8.8	39.1
3	L				489	0.5	3.5				489	0.5	3.5
3	T	50	0.6	46.7	1239	13.1	38.1	50	0.6	46.7	1239	13.1	38.1
3	R				176	3.3	67.0				176	3.3	67.0
4	L				61	0.6	33.5				61	0.6	33.5
4	T	0	0.0		6	0.1	40.4	0	0.0		6	0.1	40.4
4	R				696	8.1	42.1				696	8.1	42.1
INT		150	2	46.7	5661	46	29.2	150	2	46.7	5661	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops PM Peak File = VICB

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			799	0.0	0.0	0	0.0	A	0	6
1	T	50	0.6	46.7	599	13.2	79.2	789	1.3	F	11	24
1	R				546	0.8	5.0	16	0.0	A	0	6
2	L				235	0.6	8.5	92	0.4	A	3	18
2	T	50	0.6	46.7	6	0.1	35.4	4	0.7	C	0	6
2	R				809	8.8	39.1	708	0.9	C	18	54
3	L				489	0.0	0.0	0	0.0	A	0	6
3	T	50	0.6	46.7	1239	2.6	7.7	0	0.0	A	0	6
3	R				176	0.0	0.0	0	0.0	A	0	6
4	L				61	0.6	33.5	45	0.7	C	1	12
4	T	0	0.0		6	0.1	40.4	5	0.8	C	0	6
4	R				696	8.1	42.1	621	0.9	D	16	54
INT		150	2	46.7	5661	35	22.1	2281	0.4	B		

TCS = 110 Isolated Operation Degree of Saturation for Business Peak VICB

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
1	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
1	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
2	L	0.07	47	0	16	0	6	0.07	47	0	16	0	6
2	T	0.44	15	2	342	5	18	0.44	15	2	342	5	18
2	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
3	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
3	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
3	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
4	L	0.15	22	0	60	1	6	0.15	22	0	60	1	6
4	T	0.51	13	2	359	5	18	0.51	13	2	359	5	18
4	R	0.40	5	1	92	2	6	0.40	5	1	92	2	6
INT		0.51	56					0.51	56				

TCS = 110 Pedestrian - Vehicle Delay Business Peak File = VICB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				102	0.2	5.3				102	0.2	5.3
1	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
1	R				108	0.7	24.1				108	0.7	24.1
2	L				102	0.0	0.8				102	0.0	0.8
2	T	25	0.2	22.3	457	2.2	17.1	25	0.2	22.3	457	2.2	17.1
2	R				108	0.7	24.1				108	0.7	24.1
3	L				102	0.2	5.3				102	0.2	5.3
3	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
3	R				108	0.7	24.1				108	0.7	24.1
4	L				102	0.3	11.2				102	0.3	11.2
4	T	0	0.0		457	2.4	18.8	0	0.0		457	2.4	18.8
4	R				108	0.7	24.2				108	0.7	24.2
INT		75	0	22.3	1768	8	16.6	75	0	22.3	1768	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops Business Peak File = VICB

------------ Delays & Stops after Co-ordinated Evaluation----------													
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS			
1	L				102	0.0	0.0	0	0.0	A	0	6	
1	T	25	0.2	22.3	7	0.0	0.4	2	0.3	A	0	6	
1	R				108	0.2	5.0	2	0.0	A	0	6	
2	L				102	0.0	0.8	16	0.2	A	0	6	
2	T	25	0.2	22.3	457	2.2	17.1	342	0.7	B	5	18	
2	R				108	0.7	24.1	91	0.8	B	1	6	
3	L				102	0.0	0.0	0	0.0	A	0	6	
3	T	25	0.2	22.3	7	0.0	0.0	0	0.0	A	0	6	
3	R				108	0.0	0.0	0	0.0	A	0	6	
4	L				102	0.3	11.2	60	0.6	A	1	6	
4	T	0	0.0		457	2.4	18.8	359	0.8	B	5	18	
4	R				108	0.7	24.2	92	0.9	B	1	6	
INT		75	0	22.3	1768	7	13.2	963	0.5	A			

TCS = 110 Isolated Operation Degree of Saturation for AM Peak VICB

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.20	134	0	15	1	6	0.20	107	0	20	1	6
1	T	0.68	80	9	1001	26	78	0.53	58	8	958	24	54
1	R	0.89	37	11	651	22	84	0.89	24	11	682	19	60
2	L	0.52	93	2	277	8	48	0.54	71	2	303	7	42
2	T	0.03	15	0	5	0	6	0.02	15	0	5	0	6
2	R	0.89	10	6	268	11	36	0.89	8	6	281	9	30
3	L	0.37	99	1	161	5	36	0.34	85	1	135	3	24
3	T	0.89	48	23	1556	47	96	0.89	39	19	1569	38	78
3	R	0.82	5	3	124	5	18	0.67	5	2	97	3	12
4	L	0.05	36	0	15	1	6	0.05	28	0	15	1	6
4	T	0.02	27	0	4	0	6	0.01	24	0	4	0	6
4	R	0.89	24	11	556	20	66	0.89	19	9	570	17	54
INT		0.89	140					0.89	113				

TCS = 110 Pedestrian - Vehicle Delay AM Peak File = VICB

Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			337	0.0	0.1				337	0.0	0.2
1	T	50	0.9	64.1 1585	9.3	21.1	50	0.7	50.7	1585	8.2	18.6
1	R			702	11.3	57.9				702	10.5	54.1
2	L			598	2.0	12.2				598	2.0	11.8
2	T	50	0.9	64.1 6	0.1	56.0	50	0.7	50.7	6	0.1	42.6
2	R			236	6.5	98.5				236	5.6	85.5
3	L			449	1.0	8.3				449	0.6	4.7
3	T	50	0.9	64.1 1787	22.9	46.2	50	0.7	50.7	1787	18.9	38.1
3	R			109	3.0	98.1				109	1.6	53.2
4	L			22	0.2	38.9				22	0.2	32.1
4	T	0	0.0	6	0.1	45.7	0	0.0		6	0.1	34.9
4	R			568	11.1	70.5				568	9.4	59.5
INT		150	3	64.1 6405	68	38.0	150	2	50.7	6405	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops AM Peak File = VICB

------------- Delays & Stops after Co-ordinated Evaluation--------------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			337	0.0	0.0	0	0.0	A	0	6
1	T	50	0.9	64.1 1585	33.1	75.1	1943	1.2	F	26	78
1	R			702	0.9	4.6	25	0.0	A	1	6
2	L			598	2.0	12.2	277	0.5	A	8	48
2	T	50	0.9	64.1 6	0.1	56.0	5	0.8	D	0	6
2	R			236	6.5	98.5	268	1.1	F	10	36
3	L			449	0.0	0.0	0	0.0	A	0	6
3	T	50	0.9	64.1 1787	4.6	9.2	0	0.0	A	0	6
3	R			109	0.0	0.0	0	0.0	A	0	6
4	L			22	0.2	38.9	15	0.7	C	1	6
4	T	0	0.0	6	0.1	45.7	4	0.7	D	0	6
4	R			568	11.1	70.5	556	1.0	F	20	66
INT		150	3	64.1 6405	59	32.9	3094	0.5	C		

Victoria Road Future with Development – VICF.DAT

```
SCATES Program Version: 2013  Date: 27-OCT-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: VICF
VICTORIA ROAD
2031 BITZIOS VOLUMES
```

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	15	1750	A	0	0.0	18	1750	A	0	0.0	102	1750	A	0	0.0
1T	2907	3710	A			1850	3710	A			7	3710	A		
1R	84	1850	S			78	1850	S			36	1850	S		
2L	28	1750	B			42	1750	B			102	1750	B		
2T	171	1750	B			112	1750	B			457	1750	B		
2R	132	1850	S			139	1850	S			36	1850	S		
3L	125	1750	A	0	0.0	142	1750	A	0	0.0	102	1750	A	0	0.0
3T	1856	5670	A	0	958	1831	5670	A	0	140	7	5670	A	0	108
3R	0	0	S			0	0	S			0	0	S		
4L	59	1750	B			41	1750	B			102	1750	B		
4T	141	3600	B			284	3600	B			457	1850	B		
4R	29	1850	S			39	1850	S			36	1850	S		

Type = COCO
File = VICF

TCS = 491

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
	1	22	4.0	0	0	0	0'	0	0
	2	5	4.0	0	0	0	0'	0	0
	3	5	4.0	0	0	0	0'	0	0
	4	24	4.0	0	0	0	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	40	40	20	6	16	0%	50	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	6	18	0%	50	100

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	347	1750	S	0	0.0	816	1750	S	0	0.0	102	1750	S	0	0.0
1T	1600	5880	A	0	449	609	5880	A	0	59	7	5880	A	72	0
1R	702	3700	G			546	3700	G			108	3700	G		
2L	588	1750	S			218	1750	S			102	1750	S		
2T	6	3920	E			6	3920	E			457	3920	E		
2R	228	3700	D			779	3700	D			108	3700	D		
3L	449	1750	S	0	0.0	476	1750	S	0	0.0	102	1750	S	0	0.0
3T	1787	5880	A			1229	5880	A			7	5880	A		
3R	109	3700	G			166	3700	G			108	3700	G		
4L	22	1750	GE			43	1750	GE			102	1750	GE		
4T	6	3920	E			6	3920	E			457	3920	E		
4R	564	3700	D			666	3700	D			108	3700	D		

Type = DODO

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD

File = VICF

TCS = 110

1	32	4.0	0	0	0	0	
2	30	4.0	0	0	0	0	
3	32	4.0	0	0	0	0	
4	5	4.0	0	0	0	0	

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	50	50	25	6	26	0%	50	100
2	50	50	25	6	24	0%	50	100
3	50	50	25	6	26	0%	50	100
4	0	0	0	0	0	0%	100	100

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	3	0	0	2	0	0	3	0	0	2	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	LT	9999	1750	LT	9999	1750	LT	9999	1750	LT	9999	1750
	2	T	9999	1960	R	9999	1850	T	9999	1960	TR	9999	1850
	3	R	35	1850				T	9999	1960			
	4												
	5												
	6												
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	35
Depart	0	0	0	0	0	0	0	0	0	0	0	40

File = VICF
Type = COCO TCS = 491

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
	N	0	6	0	0	4	0	0	6	0	0	4	0
Lane		Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
	1	L	50	1750	L	9999	1750	L	110	1750	L	65	1750
	2	T	9999	1960	T	9999	3920	T	9999	1960	T	9999	3920
	3	T	9999	1960	R	100	1850	T	9999	1960	R	9999	1850
	4	T	9999	1960	R	100	1850	T	9999	1960	R	120	1850
	5	R	70	1850				R	120	1850			
	6	R	70	1850				R	120	1850			
	7												
	8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0	0	0	0
Depart	0	0	0	0	0	0	0	0	0	0	0	0

File = VICF
Type = DODO TCS = 110

Ph	AM PEAK				PM PEAK				BUSINESS			
	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL	GT% CORD	GT% ISOL	CL CORD	CL ISOL
A	82.9	82.9	140	140	72.8	72.8	105	105	26.8	26.8	56	56
B	17.1	17.1			27.2	27.2			73.2	73.2		
C												
D												
E												
F			dlay	dlay			dlay	dlay			dlay	dlay
G			0.7	0.7			0.5	0.5			0.1	0.1
Seq	AB	dlay	44	44	AB	dlay	17	17	AB	dlay	3	3
		Stps	4.0	4.0		Stps	2.5	2.5		Stps	0.7	0.7
Mode	1	DS	0.98	0.98	1	DS	0.75	0.75	1	DS	0.48	0.48

```
File = VICF                    A     Bay  Bay  Slip Slip          Type
                                     Req  Act  Req  Act
TCS =  491                     1      21   35   27    0           COCO
                               2                 11    0
                               3                 27    0
                               4      12    0    18    0
                                    Bays if all intersections are optimised
--------------------------------------------------------------------------------


              AM PEAK                    PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL    CL   GT%  GT%       CL    CL   GT%  GT%       CL    CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  36.9 37.6       140   112 29.8 29.8       105   105 34.8 34.8        56    56
  B
  C
  D  19.9 20.6                  30.0 30.0                 15.8 15.8
  E  13.6 17.0                  18.1 18.1                 33.6 33.6
  F                 dlay dlay                  dlay dlay                 dlay dlay
  G  29.6 24.8       2.7   2.1 22.1 22.1       1.9   1.9 15.8 15.8       0.5   0.5
 Seq     ADEG  dlay   67    57     ADEG  dlay   44    44     ADEG  dlay    8     8
               Stps  4.6   4.6           Stps  3.7   3.7           Stps  1.2   1.2
Mode    1       DS  0.89  0.89    1       DS  0.80  0.80    1       DS  0.51  0.51
File = VICF                    A     Bay  Bay  Slip Slip          Type
                                     Req  Act  Req  Act
TCS =  110                     1      90   70   20   50           DODO
                               2      99  100
                               3      27  120   47  110
                               4                 20   65
                                    Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

TCS = 491 Isolated Operation Degree of Saturation for PM Peak VICF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.45	72	0	7	0 6	0.45	72	0	7	0 6
1	T	0.73	72	5	1040	17 54	0.73	72	5	1040	17 54
1	R	0.75	72	1	67	1 6	0.75	72	1	67	1 6
2	L	0.38	25	0	32	1 24	0.38	25	0	32	1 24
2	T	0.38	25	1	85	3 24	0.38	25	1	85	3 24
2	R	0.75	25	2	133	3 24	0.75	25	2	133	3 24
3	L	0.50	72	0	61	1 42	0.50	72	0	61	1 42
3	T	0.50	72	4	784	17 42	0.50	72	4	784	17 42
3	R										
4	L	0.43	25	0	31	1 36	0.43	25	0	31	1 36
4	T	0.43	25	3	218	6 30	0.43	25	3	218	6 30
4	R	0.54	25	0	32	1 36	0.54	25	0	32	1 36
INT		0.75	105				0.75	105			

TCS = 491 Pedestrian - Vehicle Delay PM Peak File = VICF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				18	0.0	7.3				18	0.0	7.3
1	T	40	0.5	46.7	1850	5.2	10.2	40	0.5	46.7	1850	5.2	10.2
1	R				78	0.9	40.6				78	0.9	40.6
2	L				42	0.4	33.8				42	0.4	33.8
2	T	0	0.0		112	1.1	33.8	0	0.0		112	1.1	33.8
2	R				139	2.1	53.8				139	2.1	53.8
3	L				142	0.3	7.7				142	0.3	7.7
3	T	0	0.0		1831	3.9	7.7	0	0.0		1831	3.9	7.7
3	R												
4	L				41	0.4	34.3				41	0.4	34.3
4	T	0	0.0		284	2.7	34.3	0	0.0		284	2.7	34.3
4	R				39	0.5	44.7				39	0.5	44.7
INT		40	1	46.7	4576	17	13.8	40	1	46.7	4576	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops PM Peak File = VICF

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS	
1	L				18	0.0	2.0	0	0.0	A	0 6
1	T	40	0.5	46.7	1850	1.0	2.0	0	0.0	A	0 6
1	R				78	0.0	0.0	0	0.0	A	0 6
2	L				42	0.4	33.8	32	0.8	C	1 12
2	T	0	0.0		112	1.1	33.8	85	0.8	C	2 24
2	R				139	2.1	53.8	133	1.0	D	3 24
3	L				142	1.2	30.7	84	0.6	C	1 6
3	T	0	0.0		1831	15.6	30.7	1088	0.6	C	17 42
3	R										
4	L				41	0.4	34.3	31	0.8	C	1 6
4	T	0	0.0		284	2.7	34.3	218	0.8	C	6 30
4	R				39	0.5	44.7	32	0.8	D	1 6
INT		40	1	46.7	4576	25	19.6	1704	0.4	B	

TCS = 491 Isolated Operation Degree of Saturation for Business Peak VICF

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
1	T	0.02	11	0	5	0	6	0.02	11	0	5	0	6
1	R	0.13	11	0	26	0	6	0.13	11	0	26	0	6
2	L	0.48	37	0	46	1	24	0.48	37	0	46	1	24
2	T	0.48	37	1	205	2	24	0.48	37	1	205	2	24
2	R	0.24	37	0	28	0	6	0.24	37	0	28	0	6
3	L	0.30	11	1	78	1	6	0.30	11	1	78	1	6
3	T	0.01	11	0	5	0	6	0.01	11	0	5	0	6
3	R												
4	L	0.43	37	0	43	1	24	0.43	37	0	43	1	24
4	T	0.43	37	1	194	2	18	0.43	37	1	194	2	18
4	R	0.46	37	0	29	0	24	0.46	37	0	29	0	24
INT		0.48	56					0.48	56				

TCS = 491 Pedestrian - Vehicle Delay Business Peak File = VICF
Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			102	0.5	19.2				102	0.5	19.2
1	T	20	0.1	22.3 7	0.0	18.1	20	0.1	22.3	7	0.0	18.1
1	R			36	0.2	18.1				36	0.2	18.1
2	L			102	0.1	4.7				102	0.1	4.7
2	T	0	0.0	457	0.6	4.7	0	0.0		457	0.6	4.7
2	R			36	0.2	22.4				36	0.2	22.4
3	L			102	0.5	19.2				102	0.5	19.2
3	T	0	0.0	7	0.0	18.1	0	0.0		7	0.0	18.1
3	R											
4	L			102	0.1	4.5				102	0.1	4.5
4	T	0	0.0	457	0.6	4.5	0	0.0		457	0.6	4.5
4	R			36	0.2	22.9				36	0.2	22.9
INT		20	0	22.3 1444	3	8.0	20	0	22.3	1444	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops Business Peak File = VICF

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			102	0.0	0.2	0	0.0	A	0	6
1	T	20	0.1	22.3 7	0.0	0.2	0	0.0	A	0	6
1	R			36	0.0	0.0	0	0.0	A	0	6
2	L			102	0.1	4.7	46	0.4	A	1	6
2	T	0	0.0	457	0.6	4.7	205	0.4	A	2	24
2	R			36	0.2	22.4	28	0.8	B	0	6
3	L			102	0.0	0.4	2	0.0	A	0	6
3	T	0	0.0	7	0.0	0.4	0	0.0	A	0	6
3	R										
4	L			102	0.1	4.5	43	0.4	A	1	6
4	T	0	0.0	457	0.6	4.5	194	0.4	A	2	18
4	R			36	0.2	22.9	29	0.8	B	0	6
INT		20	0	22.3 1444	2	4.7	548	0.4	A		

TCS = 491 Isolated Operation Degree of Saturation for AM Peak VICF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.34	112	0	4	0	6	0.34	112	0	4	0	6
1	T	0.98	112	27	2836	38	126	0.98	112	27	2836	38	126
1	R	0.72	112	1	66	1	6	0.72	112	1	66	1	6
2	L	0.80	20	1	27	1	54	0.80	20	1	27	1	54
2	T	0.80	20	3	163	6	54	0.80	20	3	163	6	54
2	R	0.96	20	6	211	8	54	0.96	20	6	211	8	54
3	L	0.44	112	0	35	1	36	0.44	112	0	35	1	36
3	T	0.44	112	2	513	14	36	0.44	112	2	513	14	36
3	R												
4	L	0.45	20	1	49	2	30	0.45	20	1	49	2	30
4	T	0.45	20	2	116	5	30	0.45	20	2	116	5	30
4	R	0.75	20	1	29	1	30	0.75	20	1	29	1	30
INT		0.98	140					0.98	140				

TCS = 491 Pedestrian - Vehicle Delay AM Peak File = VICF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				15	0.0	3.8				15	0.0	3.8
1	T	40	0.7	64.1	2907	26.5	32.9	40	0.7	64.1	2907	26.5	32.9
1	R				84	1.0	42.8				84	1.0	42.8
2	L				28	0.5	69.1				28	0.5	69.1
2	T	0	0.0		171	3.2	68.4	0	0.0		171	3.2	68.4
2	R				132	6.3	170.9				132	6.3	170.9
3	L				125	0.1	4.3				125	0.1	4.3
3	T	0	0.0		1856	2.2	4.3	0	0.0		1856	2.2	4.3
3	R												
4	L				59	0.9	54.9				59	0.9	54.9
4	T	0	0.0		141	2.2	54.9	0	0.0		141	2.2	54.9
4	R				29	0.7	83.9				29	0.7	83.9
INT		40	1	64.1	5547	44	28.4	40	1	64.1	5547	0	0.0

TCS = 491 Pedestrian - Vehicle Delay - Stops AM Peak File = VICF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			15	0.1	32.7	0	0.0	C	0	6
1	T	40	0.7	64.1 2907	26.4	32.7	0	0.0	C	0	6
1	R			84	0.0	0.0	0	0.0	A	0	6
2	L			28	0.5	69.1	27	1.0	E	1	12
2	T	0	0.0	171	3.2	68.4	163	1.0	E	6	54
2	R			132	6.3	170.9	211	1.6	F	8	54
3	L			125	0.2	5.3	26	0.2	A	1	6
3	T	0	0.0	1856	2.7	5.3	383	0.2	A	14	36
3	R										
4	L			59	0.9	54.9	49	0.8	D	2	12
4	T	0	0.0	141	2.2	54.9	116	0.8	D	5	24
4	R			29	0.7	83.9	29	1.0	F	1	6
INT		40	1	64.1 5547	43	28.0	1004	0.2	C		

TCS = 110 Isolated Operation Degree of Saturation for PM Peak VICF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.50	98	0	95	2	12	0.50	98	0	95	2	12
1	T	0.27	41	4	375	11	24	0.27	41	4	375	11	24
1	R	0.80	19	7	495	14	42	0.80	19	7	495	14	42
2	L	0.20	67	0	82	2	18	0.20	67	0	82	2	18
2	T	0.02	19	0	4	0	6	0.02	19	0	4	0	6
2	R	0.80	27	8	676	17	54	0.80	27	8	676	17	54
3	L	0.35	82	0	131	3	24	0.35	82	0	131	3	24
3	T	0.80	27	13	1049	27	54	0.80	27	13	1049	27	54
3	R	0.80	6	3	176	5	18	0.80	6	3	176	5	18
4	L	0.12	22	0	31	1	6	0.12	22	0	31	1	6
4	T	0.02	13	0	5	0	6	0.02	13	0	5	0	6
4	R	0.80	23	8	590	16	48	0.80	23	8	590	16	48
INT		0.80	105					0.80	105				

TCS = 110 Pedestrian - Vehicle Delay PM Peak File = VICF

								Isolated Operation					
		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver		
1	L			816	0.1	0.5			816	0.1	0.5		
1	T	50	0.6	46.7 609	3.7	22.0	50	0.6	46.7 609	3.7	22.0		
1	R			546	6.9	45.2			546	6.9	45.2		
2	L			218	0.5	8.0			218	0.5	8.0		
2	T	50	0.6	46.7 6	0.1	35.3	50	0.6	46.7 6	0.1	35.3		
2	R			779	8.4	38.7			779	8.4	38.7		
3	L			476	0.5	3.6			476	0.5	3.6		
3	T	50	0.6	46.7 1229	12.8	37.5	50	0.6	46.7 1229	12.8	37.5		
3	R			166	3.0	65.0			166	3.0	65.0		
4	L			43	0.4	33.3			43	0.4	33.3		
4	T	0	0.0	6	0.1	40.4	0	0.0	6	0.1	40.4		
4	R			666	7.7	41.7			666	7.7	41.7		
INT		150	2	46.7 5560	44	28.5	150	2	46.7 5560	0	0.0		

TCS = 110 Pedestrian - Vehicle Delay - Stops PM Peak File = VICF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			816	0.0	0.0	0	0.0	A	0	6
1	T	50	0.6	46.7	609	13.3	78.5	795	1.3	F	11	24
1	R				546	0.8	5.0	16	0.0	A	0	6
2	L				218	0.5	8.0	82	0.4	A	2	18
2	T	50	0.6	46.7	6	0.1	35.3	4	0.7	C	0	6
2	R				779	8.4	38.7	676	0.9	C	17	54
3	L				476	0.0	0.0	0	0.0	A	0	6
3	T	50	0.6	46.7	1229	2.6	7.5	0	0.0	A	0	6
3	R				166	0.0	0.0	0	0.0	A	0	6
4	L				43	0.4	33.3	31	0.7	C	1	6
4	T	0	0.0		6	0.1	40.4	5	0.8	C	0	6
4	R				666	7.7	41.7	590	0.9	C	16	48
INT		150	2	46.7	5560	34	21.8	2199	0.4	B		

TCS = 110 Isolated Operation Degree of Saturation for Business Peak VICF

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
1	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
1	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
2	L	0.07	47	0	16	0	6	0.07	47	0	16	0	6
2	T	0.44	15	2	342	5	18	0.44	15	2	342	5	18
2	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
3	L	0.10	32	0	41	1	6	0.10	32	0	41	1	6
3	T	0.00	15	0	5	0	6	0.00	15	0	5	0	6
3	R	0.34	5	1	91	2	6	0.34	5	1	91	2	6
4	L	0.15	22	0	60	1	6	0.15	22	0	60	1	6
4	T	0.51	13	2	359	5	18	0.51	13	2	359	5	18
4	R	0.40	5	1	92	2	6	0.40	5	1	92	2	6
INT		0.51	56					0.51	56				

TCS = 110 Pedestrian - Vehicle Delay Business Peak File = VICF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				102	0.2	5.3				102	0.2	5.3
1	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
1	R				108	0.7	24.1				108	0.7	24.1
2	L				102	0.0	0.8				102	0.0	0.8
2	T	25	0.2	22.3	457	2.2	17.1	25	0.2	22.3	457	2.2	17.1
2	R				108	0.7	24.1				108	0.7	24.1
3	L				102	0.2	5.3				102	0.2	5.3
3	T	25	0.2	22.3	7	0.0	14.7	25	0.2	22.3	7	0.0	14.7
3	R				108	0.7	24.1				108	0.7	24.1
4	L				102	0.3	11.2				102	0.3	11.2
4	T	0	0.0		457	2.4	18.8	0	0.0		457	2.4	18.8
4	R				108	0.7	24.2				108	0.7	24.2
INT		75	0	22.3	1768	8	16.6	75	0	22.3	1768	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops Business Peak File = VICF

---------- Delays & Stops after Co-ordinated Evaluation----------													
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS			
1	L				102	0.0	0.0	0	0.0	A	0	6	
1	T	25	0.2	22.3	7	0.0	0.4	2	0.3	A	0	6	
1	R				108	0.2	5.0	2	0.0	A	0	6	
2	L				102	0.0	0.8	16	0.2	A	0	6	
2	T	25	0.2	22.3	457	2.2	17.1	342	0.7	B	5	18	
2	R				108	0.7	24.1	91	0.8	B	1	6	
3	L				102	0.0	0.0	0	0.0	A	0	6	
3	T	25	0.2	22.3	7	0.0	0.0	0	0.0	A	0	6	
3	R				108	0.0	0.0	0	0.0	A	0	6	
4	L				102	0.3	11.2	60	0.6	A	1	6	
4	T	0	0.0		457	2.4	18.8	359	0.8	B	5	18	
4	R				108	0.7	24.2	92	0.9	B	1	6	
INT		75	0	22.3	1768	7	13.2	963	0.5	A			

TCS = 110 Isolated Operation Degree of Saturation for AM Peak VICF

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.21	134	0	16	1	6	0.21	106	0	20	1	6
1	T	0.68	80	9	1012	27	78	0.54	57	8	973	24	54
1	R	0.89	37	11	650	22	84	0.89	24	11	684	19	60
2	L	0.51	93	2	269	8	48	0.53	71	2	295	7	42
2	T	0.03	15	0	5	0	6	0.02	15	0	5	0	6
2	R	0.89	10	6	261	10	36	0.89	8	6	276	9	30
3	L	0.37	99	1	162	5	36	0.34	84	1	135	3	24
3	T	0.89	48	23	1555	47	96	0.89	38	19	1572	38	78
3	R	0.82	5	3	124	5	18	0.66	5	2	97	3	12
4	L	0.05	37	0	15	1	6	0.05	28	0	15	1	6
4	T	0.02	27	0	4	0	6	0.01	24	0	4	0	6
4	R	0.89	24	11	552	20	66	0.89	19	9	569	17	54
INT		0.89	140					0.89	112				

TCS = 110 Pedestrian - Vehicle Delay AM Peak File = VICF

Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			347	0.0	0.1				347	0.0	0.2
1	T	50	0.9	64.1 1600	9.4	21.0	50	0.7	50.2	1600	8.3	18.6
1	R			702	11.3	57.7				702	10.5	54.0
2	L			588	2.0	12.0				588	1.9	11.6
2	T	50	0.9	64.1 6	0.1	56.0	50	0.7	50.2	6	0.1	42.1
2	R			228	6.3	99.4				228	5.5	86.9
3	L			449	1.0	8.3				449	0.6	4.6
3	T	50	0.9	64.1 1787	22.9	46.1	50	0.7	50.2	1787	18.9	38.0
3	R			109	3.0	98.1				109	1.6	52.7
4	L			22	0.2	38.7				22	0.2	31.6
4	T	0	0.0	6	0.1	45.6	0	0.0		6	0.1	34.4
4	R			564	11.0	70.5				564	9.3	59.7
INT		150	3	64.1 6408	67	37.8	150	2	50.2	6408	0	0.0

TCS = 110 Pedestrian - Vehicle Delay - Stops AM Peak File = VICF

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			347	0.0	0.0	0	0.0	A	0	6
1	T	50	0.9	64.1 1600	33.5	75.5	1961	1.2	F	27	78
1	R			702	0.9	4.6	25	0.0	A	1	6
2	L			588	2.0	12.0	269	0.5	A	8	48
2	T	50	0.9	64.1 6	0.1	56.0	5	0.8	D	0	6
2	R			228	6.3	99.4	261	1.1	F	10	36
3	L			449	0.0	0.0	0	0.0	A	0	6
3	T	50	0.9	64.1 1787	4.6	9.2	0	0.0	A	0	6
3	R			109	0.0	0.0	0	0.0	A	0	6
4	L			22	0.2	38.7	15	0.7	C	1	6
4	T	0	0.0	6	0.1	45.6	4	0.7	D	0	6
4	R			564	11.0	70.5	552	1.0	F	20	66
INT		150	3	64.1 6408	59	33.0	3092	0.5	C		

Church Street Existing – CHURCHX.DAT

```
SCATES Program Version: 2013  Date: 02-NOV-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: CHURCHX
CHURCH STREET
2010 EXISTING VOLUMES


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L                    0  0.0                    0  0.0                    0  0.0
 1T  2974 5880    A           3010 5880    A           2094 5880    A
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3194 5880    A    0  152 3191 5880    A    0  125 2235 5880    A    0   97
 3R
 4L
 4T
 4R
Type = M                        A        Walk H%AM H%PM H%B
File = CHURCHX                  1                2    2    3
                                2          28
TCS =  1956                     3                2    2    3
                                4
         PEDESTRIAN VOLUME      WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App    P#AM    P#PM    P#B     Walk    Clear                   FACT     FACT
 1      0       0       0      0       0         0%             100      100
 2      30      30      30     6       22        0%             30       100
 3      0       0       0      0       0         0%             100      100
 4      20      20      20     6       22        0%             30       100
--------------------------------------------------------------------------------


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L    18 1750    A    0  0.0   64 1750    A    0  0.0   29 1750    A    0  0.0
 1T  2974 5670    A   18    0 3010 5670    A   65    0 2094 5670    A   30    0
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3194 5880    A    0  120 3191 5880   AB    0  103 2235 5880   AB    0   79
 3R     0 1800    S           0 1800    B           0 1800    B
 4L    67 1750    B          37 1750   BC          36 1750   BC
 4T       3600                 3600                 3600
 4R   152 3600    B          125 3600    C          97 3600    C
Type = T4                       A    Min  ELT H%AM H%PM H%B   L/S L-PD R-PD
```

```
File = CHURCHX                  1     22  4.0    2    2    3   0'    0
                                2
TCS =  448                      3      5  4.0    2    2    3   0'         0
                                4     28  4.0    0    0    0        0    0
          PEDESTRIAN VOLUME     WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App     P#AM     P#PM     P#B   Walk     Clear                  FACT     FACT
 1       50       50       30   6        16         0%           30       100
 2       0        0        0    0        0          0%           100      100
 3       0        0        0    0        0          0%           100      100
 4       50       50       30   6        22         0%           30       100
--------------------------------------------------------------------------------
```

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	9	1750	A	0	0.0	17	1750	A	0	0.0	9	1750	A	0	0.0
1T	3140	5560	A	112	0	3028	5560	A	0	1	2159	5560	A	40	0
1R	0	0	S			0	0	S			0	0	S		
2L	202	1750	B			182	1750	B			134	1750	B		
2T	192	1960	B			269	1960	B			162	1960	B		
2R	0	0	B			0	0	B			0	0	B		
3L	130	1750	A	0	0.0	202	1750	A	0	0.0	117	1750	A	0	0.0
3T	3112	5670	A			3112	5670	A			2179	5670	A		
3R	0	0	S			0	0	S			0	0	S		
4L	20	1750	B			26	1750	B			16	1750	B		
4T	217	1960	B			188	1960	B			142	1960	B		
4R	0	0	B			0	0	B			0	0	B		

Type = COCO
File = CHURCHX

TCS = 11

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
	1	5	4.0	2	2	3	0'	0	0
	2	5	4.0	1	1	2	0'	0	0
	3	5	4.0	2	2	3	0'	0	0
	4	5	4.0	1	1	2	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	0	0	0	0	0	0%	100	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	0	0	0%	100	100

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal		Lanes	Grade		Lanes	Grade		Lanes	Grade		Lanes	Grade
N		3	0					3	0			
Lane	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
1	T	9999	1960				T	9999	1960			
2	T	9999	1960				T	9999	1960			
3	T	9999	1960				T	9999	1960			
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0				0	0	0			
Depart	0	0	0				0	0	0			

File = CHURCHX
Type = M TCS = 1956

	APPROACH 1				APPROACH 2				APPROACH 3				APPROACH 4			
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Down	Lanes	Grade	Down	Down	Lanes	Grade		
N	0	3	0				0	0	3	0			2	0		
Lane	Type	Length	Sat	Type	Length	Sat	Type	Type	Length	Sat	Type	Type	Length	Sat		
1	LT	9999	1750				T	T	9999	1960	LR	LR	9999	1750		
2	T	9999	1960				T	T	9999	1960	R	R	9999	1850		

```
    3      T  9999  1960                        T  9999  1960
    4
    5
    6
    7
    8
           No Parking         No Parking         No Parking         No Parking
         AM     PM     BUS   AM     PM     BUS   AM     PM     BUS   AM     PM     BUS
 Apprch   0      0      0                        0      0      0      0      0      0
 Depart   0      0      0                        0      0      0      0      0      0
File = CHURCHX
Type = T4                TCS =  448
--------------------------------------------------------------------------------
```

```
           APPROACH 1        APPROACH 2        APPROACH 3        APPROACH 4
 Tidal  Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade
    N      0     3     0     0     2     0     0     3     0     0     2     0
 Lane   Type Length  Sat  Type Length  Sat  Type Length  Sat  Type Length  Sat
    1     LT  9999  1750     L    90  1750    LT  9999  1750     L  9999  1750
    2      T  9999  1960     T  9999  1960     T  9999  1960     T  9999  1960
    3      T  9999  1850                      T  9999  1960
    4
    5
    6
    7
    8
          No Parking        No Parking        No Parking        No Parking
        AM    PM    BUS   AM    PM    BUS   AM    PM    BUS   AM    PM    BUS
 Apprch    0     0     0     0     0     0     0     0     0     0     0     0
 Depart    0     0     0     0     0     0     0     0     0     0     0     0
File = CHURCHX
Type = COCO              TCS =   11
--------------------------------------------------------------------------------


             AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A   0.0  0.0       105  105  0.0  0.0       110  140  0.0  0.0       108  123
  B   28#  28#                 28#  28#                 28#  28#
  C
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 0.6  0.6                  0.7  0.9                  0.7  0.8
 Seq       AB  dlay   18   18       AB  dlay   18   14       AB  dlay    9    8
               Stps  3.7  3.7           Stps  3.6  2.8           Stps  1.9  1.7
Mode    0       DS  0.80 0.80    0       DS  0.78 0.72    0       DS  0.56 0.53
File = CHURCHX                    Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  1956                                                      M
--------------------------------------------------------------------------------


             AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  84.4 84.4       105  105 80.5 84.5       110  140 80.2 82.5       108  123
  B  15.6 15.6                 8.2  6.4                 8.3  7.3
  C                           11.3  9.1                11.5 10.2
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 1.3  1.3                  1.4  1.8                  0.8  0.9
 Seq       AB  dlay   10   10      ABC  dlay   10    9      ABC  dlay    6    6
               Stps  2.6  2.6           Stps  2.6  2.1           Stps  1.4  1.2
Mode    1       DS  0.69 0.69    1       DS  0.72 0.68    1       DS  0.51 0.49
File = CHURCHX                A     Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  448                    1                10    0              T4
```

```
                              2
                              3
                              4      23    0   20    0
                                   Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

```
              AM PEAK                    PM PEAK                    BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  80.9 80.9       105  105 78.9 78.9       110  110 80.8 77.7       108   48
  B  19.1 19.1                21.1 21.1                19.2 22.3
  C
  D
  E
  F                 dlay dlay                dlay dlay                dlay dlay
  G                  0.0  0.0                 0.0  0.0                 0.0  0.0
 Seq       AB  dlay   20   20       AB  dlay   23   23       AB  dlay   12    7
               Stps  3.8  3.8           Stps  4.0  4.0           Stps  2.0  2.5
Mode    0       DS  0.76 0.76    0       DS  0.80 0.80    0       DS  0.55 0.61
File = CHURCHX                A     Bay  Bay  Slip Slip           Type
                                    Req  Act  Req  Act
TCS =  11                     1                10    0            COCO
                              2                60   90
                              3                17    0
                              4
                                   Bays if all intersections are optimised
-------------------------------------------------------------------------------


TCS = 1956  Isolated Operation Degree of Saturation for PM Peak CHURCHX
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M   DS    GT   Delay Stops Queue Metre  DS    GT   Delay Stops Queue Metre
 1  L
 1  T   0.74    78     8  1682    27    60  0.68   108     7  1322    27    60
 1  R
 2  L
 2  T
 2  R
 3  L
 3  T   0.78    78     9  1909    29    60  0.72   108     7  1500    29    60
 3  R
 4  L
 4  T
 4  R
INT     0.78   110                         0.72   140
-------------------------------------------------------------------------------


TCS = 1956  Pedestrian  - Vehicle Delay PM Peak File = CHURCHX
                              Isolated Operation
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Peds  Delay  Aver  Veh  Delay  Aver
 1  L
 1  T     0   0.0        3070   8.3   9.7     0   0.0        3070   6.5   7.7
 1  R
 2  L
 2  T    30   0.4  49.2                   30   0.5  64.1
 2  R
 3  L
 3  T     0   0.0        3255   9.4  10.4     0   0.0        3255   7.4   8.2
 3  R
 4  L
```

4	T	20	0.3	49.2			20	0.4	64.1				
4	R												
INT		50	1	49.2	6325	18	10.1	50	1	64.1	6325	0	0.0

TCS = 1956 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L									
1	T	0	0.0	3070	0.0	0.0	0	0.0	A	0	6
1	R									
2	L									
2	T	30	0.4	49.2						
2	R									
3	L									
3	T	0	0.0	3255	10.3	11.4	1139	0.4	A	29	60
3	R									
4	L									
4	T	20	0.3	49.2						
4	R									
INT		50	1	49.2	6325	10	5.9	1139	0.2	A	

TCS = 1956 Isolated Operation Degree of Saturation for Business Peak CHURCHX

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.52	76	4	908	19 42	0.50	91	4	798	19 42
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.56	76	5	1009	20 42	0.53	91	4	886	20 42
3	R										
4	L										
4	T										
4	R										
INT		0.56	108				0.53	123			

TCS = 1956 Pedestrian - Vehicle Delay Business Peak File = CHURCHX

					Isolated Operation								
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----						
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver		
1	L												
1	T	0	0.0	2157	4.5	7.5	0	0.0	2157	3.9	6.6		
1	R												
2	L												
2	T	30	0.4	48.2			30	0.5	55.6				
2	R												
3	L												
3	T	0	0.0	2302	5.0	7.8	0	0.0	2302	4.4	6.8		
3	R												
4	L												
4	T	20	0.3	48.2			20	0.3	55.6				
4	R												
INT		50	1	48.2	4459	9 7.6	50	1	55.6	4459	0	0.0	

```
TCS = 1956  Pedestrian  - Vehicle Delay - Stops Business Peak File = CHURCHX
------------ Delays & Stops after Co-ordinated Evaluation-------------
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Stops  Aver  LOS
 1  L
 1  T     0   0.0        2157   0.0   0.0     0   0.0    A      0     6
 1  R
 2  L
 2  T    30   0.4  48.2
 2  R
 3  L
 3  T     0   0.0        2302   0.0   0.0     0   0.0    A      0     6
 3  R
 4  L
 4  T    20   0.3  48.2
 4  R
INT      50     1  48.2  4459     0   0.0     0   0.0    A
--------------------------------------------------------------------------
```

TCS = 1956 Isolated Operation Degree of Saturation for AM Peak CHURCHX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.74	73	8	1718	27	54	0.74	73	8	1718	27	54
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.80	73	10	2004	29	60	0.80	73	10	2004	29	60
3	R										
4	L										
4	T										
4	R										
INT		0.80	105				0.80	105					

TCS = 1956 Pedestrian - Vehicle Delay AM Peak File = CHURCHX

					--- Co-ordinated Cycle Length --- Isolated Operation					----- Isolated Cycle Length -----			
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L												
1	T	0	0.0		3033	8.5	10.1	0	0.0		3033	8.5	10.1
1	R												
2	L												
2	T	30	0.4	46.7				30	0.4	46.7			
2	R												
3	L												
3	T	0	0.0		3258	9.9	10.9	0	0.0		3258	9.9	10.9
3	R												
4	L												
4	T	20	0.3	46.7				20	0.3	46.7			
4	R												
INT		50	1	46.7	6291	18	10.5	50	1	46.7	6291	0	0.0

TCS = 1956 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHX

---------- Delays & Stops after Co-ordinated Evaluation----------												
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS		
1	L											
1	T	0	0.0		3033	0.0	0.0	0	0.0	A	0	6
1	R											
2	L											
2	T	30	0.4	46.7								
2	R											
3	L											
3	T	0	0.0		3258	1.5	1.7	265	0.1	A	8	18
3	R											
4	L											
4	T	20	0.3	46.7								
4	R											
INT		50	1	46.7	6291	2	0.9	265	0.0	A		

TCS = 448 Isolated Operation Degree of Saturation for PM Peak CHURCHX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.72	85	0	31	0	6	0.67	114	0	24	0	48
1	T	0.72	85	6	1436	22	48	0.68	114	5	1143	22	48
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.65	94	2	985	15	30	0.63	123	2	789	15	36
3	R												
4	L	0.36	17	0	30	1	6	0.45	18	1	31	1	12
4	T												
4	R	0.56	8	2	109	4	18	0.68	9	2	110	5	18
INT		0.72	110					0.68	140				

TCS = 448 Pedestrian - Vehicle Delay PM Peak File = CHURCHX

Isolated Operation

A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
1	L				65	0.1	7.1				65	0.1	5.3
1	T	50	0.7	49.2	3070	5.6	6.6	50	0.9	64.1	3070	4.5	5.3
1	R												
2	L												
2	T	0	0.0					0	0.0				
2	R												
3	L												
3	T	0	0.0		3255	2.5	2.8	0	0.0		3255	2.0	2.3
3	R												
4	L				37	0.4	41.3				37	0.6	56.6
4	T	50	0.7	49.2				50	0.9	64.1			
4	R				125	1.7	49.0				125	2.2	64.3
INT		100	1	49.2	6552	10	5.7	100	2	64.1	6552	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHX

A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS		
		---------- Delays & Stops after Co-ordinated Evaluation----------										
1	L				65	0.0	0.0	0	0.0	A	0	6
1	T	50	0.7	49.2	3070	0.0	0.0	12	0.0	A	0	6
1	R											
2	L											
2	T	0	0.0									
2	R											
3	L											
3	T	0	0.0		3255	0.4	0.5	97	0.0	A	3	6
3	R											
4	L				37	0.4	41.3	30	0.8	C	1	6
4	T	50	0.7	49.2								
4	R				125	1.7	49.0	109	0.9	D	3	18
INT		100	1	49.2	6552	3	1.4	248	0.0	A		

TCS = 448 Isolated Operation Degree of Saturation for Business Peak CHURCHX

A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
1	L	0.50	83	0	10	0	18	0.49	97	0	9	0	36
1	T	0.51	83	3	747	15	36	0.49	97	3	659	15	36
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.47	92	1	520	10	24	0.46	106	1	460	11	24
3	R												
4	L	0.30	17	0	29	1	6	0.34	18	0	29	1	12
4	T												
4	R	0.44	8	1	83	3	12	0.49	9	1	84	3	18
INT		0.51	108					0.49	123				

TCS = 448 Pedestrian - Vehicle Delay Business Peak File = CHURCHX

Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				30	0.0	4.9				30	0.0	4.3
1	T	30	0.4	48.2	2157	2.9	4.9	30	0.5	55.6	2157	2.6	4.3
1	R												
2	L												
2	T	0	0.0					0	0.0				
2	R												
3	L												
3	T	0	0.0		2302	1.3	2.1	0	0.0		2302	1.2	1.8
3	R												
4	L				36	0.4	39.9				36	0.5	47.5
4	T	30	0.4	48.2				30	0.5	55.6			
4	R				97	1.3	47.5				97	1.5	55.1
INT		60	1	48.2	4622	6	4.6	60	1	55.6	4622	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			30	0.0	0.0	0	0.0	A	0	6
1	T	30	0.4	48.2 2157	0.0	0.0	0	0.0	A	0	6
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	2302	0.1	0.2	36	0.0	A	1	6
3	R										
4	L			36	0.4	39.9	29	0.8	C	1	6
4	T	30	0.4	48.2							
4	R			97	1.3	47.5	83	0.9	D	3	12
INT		60	1	48.2 4622	2	1.4	148	0.0	A		

TCS = 448 Isolated Operation Degree of Saturation for AM Peak CHURCHX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.39	85	0	5	0 6	0.39	85	0	5	0 6
1	T	0.67	85	4	1155	17 42	0.67	85	4	1155	17 42
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.69	85	4	1286	18 42	0.69	85	4	1286	18 42
3	R										
4	L	0.69	12	1	59	2 12	0.69	12	1	59	2 12
4	T										
4	R	0.46	12	2	128	4 18	0.46	12	2	128	4 18
INT		0.69	105				0.69	105			

TCS = 448 Pedestrian - Vehicle Delay AM Peak File = CHURCHX

							Isolated Operation					
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver	
1	L			18	0.0	2.9			18	0.0	2.9	
1	T	50	0.6	46.7 3033	3.6	4.3	50	0.6	46.7 3033	3.6	4.3	
1	R											
2	L											
2	T	0	0.0				0	0.0				
2	R											
3	L											
3	T	0	0.0	3258	4.1	4.5	0	0.0	3258	4.1	4.5	
3	R											
4	L			67	0.9	45.9			67	0.9	45.9	
4	T	50	0.6	46.7			50	0.6	46.7			
4	R			152	1.8	43.2			152	1.8	43.2	
INT		100	1	46.7 6528	10	5.7	100	1	46.7 6528	0	0.0	

TCS = 448 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
					Delays & Stops after Co-ordinated Evaluation					
1	L			18	0.0	4.9	4	0.2	A	0	6
1	T	50	0.6	46.7 3033	4.1	4.9	715	0.2	A	17	42
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	3258	0.0	0.0	0	0.0	A	0	6
3	R										
4	L			67	0.9	45.9	59	0.9	D	2	12
4	T	50	0.6	46.7							
4	R			152	1.8	43.2	128	0.8	D	4	18
INT		100	1	46.7 6528	7	3.8	906	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for PM Peak CHURCHX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.40	83	0	5	0 6	0.40	83	0	5	0 6
1	T	0.75	83	7	1568	23 54	0.75	83	7	1568	23 54
1	R										
2	L	0.60	19	2	153	5 30	0.60	19	2	153	5 30
2	T	0.80	19	4	258	7 48	0.80	19	4	258	7 48
2	R										
3	L	0.80	83	1	119	2 54	0.80	83	1	119	2 54
3	T	0.80	83	7	1763	24 54	0.80	83	7	1763	24 54
3	R										
4	L	0.09	19	0	20	1 6	0.09	19	0	20	1 6
4	T	0.56	19	2	156	5 30	0.56	19	2	156	5 30
4	R										
INT		0.80	110				0.80	110			

TCS = 11 Pedestrian - Vehicle Delay PM Peak File = CHURCHX

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			17	0.0	4.8				17	0.0	4.8
1	T	0	0.0	3089	6.6	7.7	0	0.0		3089	6.6	7.7
1	R											
2	L			184	2.1	41.9				184	2.1	41.9
2	T	0	0.0	272	3.9	51.7	0	0.0		272	3.9	51.7
2	R											
3	L			206	0.6	10.6				206	0.6	10.6
3	T	0	0.0	3174	7.4	8.4	0	0.0		3174	7.4	8.4
3	R											
4	L			26	0.3	38.0				26	0.3	38.0
4	T	0	0.0	190	2.2	41.5	0	0.0		190	2.2	41.5
4	R											
INT				7158	23	11.6				7158	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHX

------------ Delays & Stops after Co-ordinated Evaluation----------									
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS
1	L			17	0.0	1.6	2	0.1	A
1	T	0	0.0	3089	1.4	1.6	345	0.1	A
1	R								
2	L			184	2.1	41.9	153	0.8	C
2	T	0	0.0	272	3.9	51.7	258	0.9	D
2	R								
3	L			206	0.1	1.6	0	0.0	A
3	T	0	0.0	3174	1.4	1.6	0	0.0	A
3	R								
4	L			26	0.3	38.0	20	0.8	C
4	T	0	0.0	190	2.2	41.5	156	0.8	C
4	R								
INT				7158	11	5.7	933	0.1	A

TCS = 11 Isolated Operation Degree of Saturation for Business Peak CHURCHX

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.24	83	0	2	0	6	0.26	33	0	3	0	6
1	T	0.53	83	3	771	15	36	0.58	33	2	1030	9	24
1	R												
2	L	0.51	17	2	113	3	24	0.56	7	1	115	2	12
2	T	0.55	17	2	137	4	30	0.61	7	1	140	2	12
2	R												
3	L	0.54	83	0	43	1	102	0.60	33	0	57	0	24
3	T	0.55	83	3	799	15	36	0.61	33	2	1067	9	24
3	R												
4	L	0.06	17	0	12	0	6	0.07	7	0	13	0	6
4	T	0.48	17	2	119	4	24	0.53	7	1	121	2	12
4	R												
INT		0.55	108					0.61	48				

TCS = 11 Pedestrian - Vehicle Delay Business Peak File = CHURCHX

Isolated Operation

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			9	0.0	3.5				9	0.0	2.8
1	T	0	0.0	2224	2.9	4.8	0	0.0		2224	2.3	3.8
1	R											
2	L			137	1.6	41.8				137	0.7	19.3
2	T	0	0.0	165	1.9	42.1	0	0.0		165	0.9	19.4
2	R											
3	L			120	0.2	4.9				120	0.1	3.9
3	T	0	0.0	2244	3.1	4.9	0	0.0		2244	2.4	3.9
3	R											
4	L			16	0.2	38.9				16	0.1	17.9
4	T	0	0.0	145	1.7	41.6	0	0.0		145	0.8	19.2
4	R											
INT				5060	12	8.2				5060	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHX

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			9	0.0	1.0	1	0.1	A	0	6
1	T	0	0.0	2224	0.6	1.0	176	0.1	A	5	12
1	R										
2	L			137	1.6	41.8	113	0.8	C	3	24
2	T	0	0.0	165	1.9	42.1	137	0.8	D	4	30
2	R										
3	L			120	0.0	0.9	0	0.0	A	0	6
3	T	0	0.0	2244	0.6	0.9	0	0.0	A	0	6
3	R										
4	L			16	0.2	38.9	12	0.8	C	0	6
4	T	0	0.0	145	1.7	41.6	119	0.8	C	4	24
4	R										
INT				5060	7	4.7	558	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for AM Peak CHURCHX

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.24	81	0	2	0	6	0.24	81	0	2	0	6
1	T	0.75	81	6	1576	21	48	0.75	81	6	1576	21	48
1	R												
2	L	0.76	16	3	192	5	36	0.76	16	3	192	5	36
2	T	0.65	16	2	164	5	30	0.65	16	2	164	5	30
2	R												
3	L	0.76	81	0	69	1	48	0.76	81	0	69	1	48
3	T	0.76	81	6	1583	21	48	0.76	81	6	1583	21	48
3	R												
4	L	0.07	16	0	15	0	6	0.07	16	0	15	0	6
4	T	0.73	16	3	196	6	36	0.73	16	3	196	6	36
4	R												
INT		0.76	105					0.76	105				

TCS = 11 Pedestrian - Vehicle Delay AM Peak File = CHURCHX

Isolated Operation

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			9	0.0	3.4				9	0.0	3.4
1	T	0	0.0	3203	5.9	6.6	0	0.0		3203	5.9	6.6
1	R											
2	L			204	2.8	49.4				204	2.8	49.4
2	T	0	0.0	194	2.3	41.8	0	0.0		194	2.3	41.8
2	R											
3	L			133	0.3	8.1				133	0.3	8.1
3	T	0	0.0	3174	5.9	6.7	0	0.0		3174	5.9	6.7
3	R											
4	L			20	0.2	38.1				20	0.2	38.1
4	T	0	0.0	219	2.8	45.5	0	0.0		219	2.8	45.5
4	R											
INT				7156	20	10.1				7156	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHX

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			9	0.0	4.7	4	0.4	A	0	6
1	T	0	0.0	3203	4.2	4.7	1247	0.4	A	21	48
1	R										
2	L			204	2.8	49.4	192	0.9	D	5	36
2	T	0	0.0	194	2.3	41.8	164	0.8	C	5	30
2	R										
3	L			133	0.0	1.3	0	0.0	A	0	6
3	T	0	0.0	3174	1.1	1.3	0	0.0	A	0	6
3	R										
4	L			20	0.2	38.1	15	0.8	C	0	6
4	T	0	0.0	219	2.8	45.5	196	0.9	D	6	36
4	R										
INT				7156	13	6.8	1818	0.3	A		

Church Street Future without Development – CHURCHB.DAT

```
SCATES Program Version: 2013  Date: 02-NOV-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: CHURCHB
CHURCH STREET
2031 BITZIOS BASE VOLUMES


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L                    0  0.0                    0  0.0                    0  0.0
 1T  3087 5880    A           3825 5880    A           2419 5880    A
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3490 5880    A    0  261 3695 5880    A    0  165 2515 5880    A    0  149
 3R
 4L
 4T
 4R
Type = M                        A        Walk H%AM H%PM H%B
File = CHURCHB                  1                2    2    3
                                2          28
TCS =  1956                     3                2    2    3
                                4
         PEDESTRIAN VOLUME      WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App    P#AM    P#PM    P#B     Walk    Clear                   FACT     FACT
 1      0       0       0      0       0         0%             100      100
 2      30      30      30     6       22        0%             30       100
 3      0       0       0      0       0         0%             100      100
 4      20      20      20     6       22        0%             30       100
--------------------------------------------------------------------------------


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L    19 1750    A    0  0.0  101 1750    A    0  0.0   42 1750    A    0  0.0
 1T  3068 5670    A    0    1 3715 5670    A    0    9 2374 5670    A    0    4
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3492 5880    A  180    0 3727 5880   AB  418    0 2526 5880   AB  211    0
 3R     0 1800    S             0 1800    B             0 1800    B
 4L   112 1750    B            39 1750   BC            53 1750   BC
 4T       3600                    3600                    3600
 4R   259 3600    B           132 3600    C           137 3600    C
Type = T4                       A    Min  ELT H%AM H%PM H%B   L/S L-PD R-PD
```

```
File = CHURCHB                  1     22  4.0    2    2    3   0'    0
                                2
TCS =  448                      3      5  4.0    2    2    3   0'         0
                                4     28  4.0    0    0    0        0    0
          PEDESTRIAN VOLUME     WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App     P#AM     P#PM     P#B     Walk     Clear                FACT     FACT
 1       50       50       30     6        16         0%          30       100
 2       0        0        0      0        0          0%          100      100
 3       0        0        0      0        0          0%          100      100
 4       50       50       30     6        22         0%          30       100
--------------------------------------------------------------------------------
```

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	4	1750	A	0	0.0	14	1750	A	0	0.0	6	1750	A	0	0.0
1T	3115	5560	A	0	60	3019	5560	A	0	735	2147	5560	A	0	281
1R	0	0	S			0	0	S			0	0	S		
2L	197	1750	B			184	1750	B			133	1750	B		
2T	225	1960	B			279	1960	B			176	1960	B		
2R	0	0	B			0	0	B			0	0	B		
3L	134	1750	A	0	0.0	212	1750	A	0	0.0	121	1750	A	0	0.0
3T	3121	5670	A			3135	5670	A			2189	5670	A		
3R	0	0	S			0	0	S			0	0	S		
4L	18	1750	B			22	1750	B			14	1750	B		
4T	207	1960	B			178	1960	B			134	1960	B		
4R	0	0	B			0	0	B			0	0	B		

Type = COCO
File = CHURCHB

TCS = 11

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
	1	5	4.0	2	2	3	0'	0	0
	2	5	4.0	1	1	2	0'	0	0
	3	5	4.0	2	2	3	0'	0	0
	4	5	4.0	1	1	2	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	0	0	0	0	0	0%	100	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	0	0	0%	100	100

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal		Lanes	Grade		Lanes	Grade		Lanes	Grade		Lanes	Grade
N		3	0					3	0			
Lane	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
1	T	9999	1960				T	9999	1960			
2	T	9999	1960				T	9999	1960			
3	T	9999	1960				T	9999	1960			
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0				0	0	0			
Depart	0	0	0				0	0	0			

File = CHURCHB
Type = M TCS = 1956

	APPROACH 1				APPROACH 2				APPROACH 3				APPROACH 4			
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	
N	0	3	0				0	3	0		2	0				
Lane	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	
1	LT	9999	1750				T	9999	1960	LR	9999	1750				
2	T	9999	1960				T	9999	1960	R	9999	1850				

```
    3      T  9999  1960                        T  9999  1960
    4
    5
    6
    7
    8
          No Parking         No Parking         No Parking         No Parking
        AM    PM    BUS    AM    PM    BUS    AM    PM    BUS    AM    PM    BUS
 Apprch   0     0     0                        0     0     0     0     0     0
 Depart   0     0     0                        0     0     0     0     0     0
File = CHURCHB
Type = T4                TCS =  448
--------------------------------------------------------------------------------
```

```
           APPROACH 1        APPROACH 2        APPROACH 3        APPROACH 4
 Tidal  Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade
    N      0     3     0     0     2     0     0     3     0     0     2     0
 Lane   Type Length  Sat  Type Length  Sat  Type Length  Sat  Type Length  Sat
    1     LT  9999  1750     L    90  1750    LT  9999  1750     L  9999  1750
    2      T  9999  1960     T  9999  1960     T  9999  1960     T  9999  1960
    3      T  9999  1850                      T  9999  1960
    4
    5
    6
    7
    8
          No Parking        No Parking        No Parking        No Parking
        AM    PM    BUS   AM    PM    BUS   AM    PM    BUS   AM    PM    BUS
 Apprch    0     0     0     0     0     0     0     0     0     0     0     0
 Depart    0     0     0     0     0     0     0     0     0     0     0     0
File = CHURCHB
Type = COCO              TCS =   11
--------------------------------------------------------------------------------


             AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A   0.0  0.0       105  105  0.0  0.0       128  140  0.0  0.0       101  109
  B   28#  28#                 28#  28#                 28#  28#
  C
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 0.6  0.6                  0.8  0.9                  0.6  0.7
 Seq       AB  dlay   21   21       AB  dlay   25   22       AB  dlay   13   12
               Stps  4.3  4.3           Stps  5.0  4.5           Stps  2.6  2.4
Mode    0       DS  0.87 0.87    0       DS  0.88 0.86    0       DS  0.64 0.62
File = CHURCHB                    Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  1956                                                      M
--------------------------------------------------------------------------------


             AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  79.1 79.1       105  105 83.3 84.7       128  140 78.8 79.8       101  109
  B  20.9 20.9                 7.0  6.4                 8.9  8.3
  C                            9.7  8.9                12.3 12.0
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 1.3  1.3                  1.6  1.8                  0.7  0.8
 Seq       AB  dlay   19   19      ABC  dlay   15   14      ABC  dlay    8    8
               Stps  3.9  3.9           Stps  3.6  3.4           Stps  1.9  1.8
Mode    1       DS  0.81 0.81    1       DS  0.86 0.84    1       DS  0.59 0.58
File = CHURCHB                A     Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  448                   1                10    0              T4
```

```
                              2
                              3
                              4      37    0   32    0
                                   Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

```
              AM PEAK                    PM PEAK                    BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  81.0 81.0       105  105 78.8 78.4       128  105 79.5 76.5       101   46
  B  19.0 19.0                 21.2 21.6                 20.5 23.5
  C
  D
  E
  F                 dlay dlay                 dlay dlay                 dlay dlay
  G                  0.0  0.0                  0.0  0.0                  0.0  0.0
 Seq        AB  dlay   20   20       AB  dlay   26   23       AB  dlay   12    8
                Stps  3.8  3.8           Stps  4.0  4.2           Stps  2.1  2.7
Mode    0       DS  0.76 0.76    0       DS  0.80 0.81    0       DS  0.56 0.62
File = CHURCHB                 A     Bay  Bay  Slip Slip           Type
                                     Req  Act  Req  Act
TCS =  11                      1                10    0            COCO
                               2                58   90
                               3                18    0
                               4
                                    Bays if all intersections are optimised
--------------------------------------------------------------------------------


TCS = 1956  Isolated Operation Degree of Saturation for PM Peak CHURCHB
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M   DS    GT   Delay Stops Queue Metre  DS    GT   Delay Stops Queue Metre
 1  L
 1  T   0.88    96    13  2608    35    72  0.86   108    12  2384    35    72
 1  R
 2  L
 2  T
 2  R
 3  L
 3  T   0.85    96    12  2362    34    72  0.83   108    11  2160    34    72
 3  R
 4  L
 4  T
 4  R
INT     0.88   128                         0.86   140
--------------------------------------------------------------------------------


TCS = 1956  Pedestrian  - Vehicle Delay PM Peak File = CHURCHB
                              Isolated Operation
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Peds  Delay  Aver  Veh  Delay  Aver
 1  L
 1  T     0   0.0        3901  12.9  11.9     0   0.0        3901  11.8  10.9
 1  R
 2  L
 2  T    30   0.5  58.1                  30   0.5  64.1
 2  R
 3  L
 3  T     0   0.0        3769  11.7  11.1     0   0.0        3769  10.7  10.2
 3  R
 4  L
```

4	T	20	0.3	58.1				20	0.4	64.1			
4	R												
INT		50	1	58.1	7670	25	11.5	50	1	64.1	7670	0	0.0

TCS = 1956 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHB

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L									
1	T	0	0.0	3901	0.0	0.0	0	0.0	A	0	6
1	R									
2	L									
2	T	30	0.5	58.1						
2	R									
3	L									
3	T	0	0.0	3769	11.9	11.3	1325	0.4	A	34	72
3	R									
4	L									
4	T	20	0.3	58.1						
4	R									
INT		50	1	58.1	7670	12	5.6	1325	0.2	A	

TCS = 1956 Isolated Operation Degree of Saturation for Business Peak CHURCHB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.62	69	6	1233	22 48	0.60	77	6	1143	22 48
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.64	69	7	1320	23 48	0.62	77	6	1223	23 48
3	R										
4	L										
4	T										
4	R										
INT		0.64	101				0.62	109			

TCS = 1956 Pedestrian - Vehicle Delay Business Peak File = CHURCHB

							Isolated Operation					
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver	
1	L											
1	T	0	0.0	2492	6.1	8.8	0	0.0	2492	5.6	8.2	
1	R											
2	L											
2	T	30	0.4	44.7			30	0.4	48.7			
2	R											
3	L											
3	T	0	0.0	2590	6.5	9.1	0	0.0	2590	6.0	8.4	
3	R											
4	L											
4	T	20	0.2	44.7			20	0.3	48.7			
4	R											
INT		50	1	44.7	5082	13 8.9	50	1	48.7	5082	0	0.0

```
TCS = 1956  Pedestrian  - Vehicle Delay - Stops Business Peak File = CHURCHB
------------ Delays & Stops after Co-ordinated Evaluation-------------
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Stops  Aver  LOS
 1  L
 1  T      0   0.0        2492   0.0   0.0     0   0.0    A      0     6
 1  R
 2  L
 2  T     30   0.4  44.7
 2  R
 3  L
 3  T      0   0.0        2590   0.1   0.1    12   0.0    A      0     6
 3  R
 4  L
 4  T     20   0.2  44.7
 4  R
INT       50     1  44.7  5082     0   0.1    12   0.0    A
--------------------------------------------------------------------------
```

TCS = 1956 Isolated Operation Degree of Saturation for AM Peak CHURCHB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.77	73	9	1860	28	60	0.77	73	9	1860	28	60
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.87	73	12	2476	32	66	0.87	73	12	2476	32	66
3	R										
4	L										
4	T										
4	R										
INT		0.87	105				0.87	105			

TCS = 1956 Pedestrian - Vehicle Delay AM Peak File = CHURCHB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L												
1	T	0	0.0		3149	9.2	10.5	0	0.0		3149	9.2	10.5
1	R												
2	L												
2	T	30	0.4	46.7				30	0.4	46.7			
2	R												
3	L												
3	T	0	0.0		3560	12.2	12.4	0	0.0		3560	12.2	12.4
3	R												
4	L												
4	T	20	0.3	46.7				20	0.3	46.7			
4	R												
INT		50	1	46.7	6709	21	11.5	50	1	46.7	6709	0	0.0

TCS = 1956 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHB

---------- Delays & Stops after Co-ordinated Evaluation----------										
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS
1	L									
1	T	0	0.0		3149	0.0	0.0	0	0.0	A
1	R									
2	L									
2	T	30	0.4	46.7						
2	R									
3	L									
3	T	0	0.0		3560	2.2	2.2	364	0.1	A
3	R									
4	L									
4	T	20	0.3	46.7						
4	R									
INT		50	1	46.7	6709	2	1.2	364	0.1	A

TCS = 448 Isolated Operation Degree of Saturation for PM Peak CHURCHB

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.86	103	0	62	1	36	0.84	115	0	56	1	60
1	T	0.86	103	9	2182	27	60	0.84	115	8	1995	27	60
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.75	112	3	1252	17	36	0.74	124	3	1145	17	36
3	R												
4	L	0.44	17	1	32	1	12	0.48	17	1	33	1	12
4	T												
4	R	0.68	8	2	116	4	18	0.75	8	3	131	5	24
INT		0.86	128					0.84	140				

TCS = 448 Pedestrian - Vehicle Delay PM Peak File = CHURCHB

Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				103	0.3	12.1				103	0.3	10.7
1	T	50	0.8	58.1	3789	8.6	8.1	50	0.9	64.1	3789	7.8	7.4
1	R												
2	L												
2	T	0	0.0					0	0.0				
2	R												
3	L												
3	T	0	0.0		3802	3.2	3.0	0	0.0		3802	2.9	2.7
3	R												
4	L				39	0.6	50.8				39	0.6	57.1
4	T	50	0.8	58.1				50	0.9	64.1			
4	R				132	2.1	58.5				132	2.8	76.9
INT		100	2	58.1	7865	15	6.8	100	2	64.1	7865	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHB

------------- Delays & Stops after Co-ordinated Evaluation--------------										
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS
1	L				103	0.0	1.6	12	0.1	A
1	T	50	0.8	58.1	3789	1.7	1.6	441	0.1	A
1	R									
2	L									
2	T	0	0.0							
2	R									
3	L									
3	T	0	0.0		3802	0.3	0.3	138	0.0	A
3	R									
4	L				39	0.6	50.8	32	0.8	D
4	T	50	0.8	58.1						
4	R				132	2.1	58.5	116	0.9	E
INT		100	2	58.1	7865	5	2.2	740	0.1	A

TCS = 448 Isolated Operation Degree of Saturation for Business Peak CHURCHB													
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----						
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.59	76	0	17	0	30	0.58	83	0	16	0	42
1	T	0.59	76	4	992	17	42	0.58	83	4	943	18	42
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.53	85	2	686	12	24	0.53	92	2	662	12	30
3	R												
4	L	0.40	17	1	42	1	12	0.42	18	1	43	1	12
4	T												
4	R	0.58	8	2	119	4	18	0.58	9	2	119	4	18
INT		0.59	101					0.58	109				

TCS = 448 Pedestrian - Vehicle Delay Business Peak File = CHURCHB

Isolated Operation

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				43	0.1	5.7				43	0.1	5.6
1	T	30	0.4	44.7	2445	3.9	5.7	30	0.4	48.7	2445	3.8	5.6
1	R												
2	L												
2	T	0	0.0					0	0.0				
2	R												
3	L												
3	T	0	0.0		2602	1.7	2.4	0	0.0		2602	1.7	2.4
3	R												
4	L				53	0.5	37.2				53	0.6	40.7
4	T	30	0.4	44.7				30	0.4	48.7			
4	R				137	1.7	44.6				137	1.8	48.1
INT		60	1	44.7	5280	8	5.4	60	1	48.7	5280	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHB

		---------- Delays & Stops after Co-ordinated Evaluation----------									
A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS			
1	L			43	0.0	1.1	3	0.1	A	0	6
1	T	30	0.4	44.7 2445	0.8	1.1	195	0.1	A	5	12
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	2602	0.2	0.2	62	0.0	A	2	6
3	R										
4	L			53	0.5	37.2	42	0.8	C	1	12
4	T	30	0.4	44.7							
4	R			137	1.7	44.6	119	0.9	D	3	18
INT		60	1	44.7 5280	3	2.2	422	0.1	A		

TCS = 448 Isolated Operation Degree of Saturation for AM Peak CHURCHB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.43	79	0	6	0 6	0.43	79	0	6	0 6
1	T	0.74	79	6	1575	23 48	0.74	79	6	1575	23 48
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.81	79	8	2026	26 54	0.81	79	8	2026	26 54
3	R										
4	L	0.81	18	2	111	3 24	0.81	18	2	111	3 24
4	T										
4	R	0.54	18	3	213	6 30	0.54	18	3	213	6 30
INT		0.81	105				0.81	105			

TCS = 448 Pedestrian - Vehicle Delay AM Peak File = CHURCHB

							Isolated Operation					
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver	
1	L			19	0.0	4.7			19	0.0	4.7	
1	T	50	0.6	46.7 3129	6.3	7.3	50	0.6	46.7 3129	6.3	7.3	
1	R											
2	L											
2	T	0	0.0				0	0.0				
2	R											
3	L											
3	T	0	0.0	3562	8.1	8.2	0	0.0	3562	8.1	8.2	
3	R											
4	L			112	1.7	53.5			112	1.7	53.5	
4	T	50	0.6	46.7			50	0.6	46.7			
4	R			259	2.9	39.8			259	2.9	39.8	
INT		100	1	46.7 7081	19	9.6	100	1	46.7 7081	0	0.0	

TCS = 448 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHB

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
					Delays & Stops after Co-ordinated Evaluation					
1	L			19	0.0	6.7	5	0.3	A	0	6
1	T	50	0.6	46.7 3129	5.9	6.7	785	0.3	A	23	48
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	3562	1.8	1.8	576	0.2	A	17	36
3	R										
4	L			112	1.7	53.5	111	1.0	D	3	24
4	T	50	0.6	46.7							
4	R			259	2.9	39.8	213	0.8	C	6	30
INT		100	1	46.7 7081	12	6.2	1690	0.2	A		

TCS = 11 Isolated Operation Degree of Saturation for PM Peak CHURCHB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.34	97	0	4	0 6	0.35	78	0	4	0 6
1	T	0.74	97	7	1527	27 60	0.75	78	7	1596	23 54
1	R										
2	L	0.59	23	2	154	5 36	0.60	19	2	154	4 30
2	T	0.80	23	5	263	9 54	0.81	19	4	273	8 48
2	R										
3	L	0.80	97	1	124	2 102	0.81	78	1	131	2 54
3	T	0.80	97	8	1770	28 66	0.81	78	8	1851	24 54
3	R										
4	L	0.07	23	0	16	1 6	0.07	19	0	16	1 6
4	T	0.51	23	2	146	5 36	0.52	19	2	147	4 30
4	R										
INT		0.80	128				0.81	105			

TCS = 11 Pedestrian - Vehicle Delay PM Peak File = CHURCHB

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			14	0.0	5.1				14	0.0	4.6
1	T	0	0.0	3079	7.3	8.6	0	0.0		3079	6.6	7.7
1	R											
2	L			186	2.5	48.1				186	2.1	39.7
2	T	0	0.0	282	4.6	58.3	0	0.0		282	4.0	51.4
2	R											
3	L			216	0.7	11.8				216	0.7	11.3
3	T	0	0.0	3198	8.5	9.6	0	0.0		3198	7.6	8.6
3	R											
4	L			22	0.3	43.5				22	0.2	35.9
4	T	0	0.0	180	2.4	47.4	0	0.0		180	2.0	39.1
4	R											
INT				7177	26	13.2				7177	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHB

------------ Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			14	0.0	0.3	0	0.0	A	0	6
1	T	0	0.0	3079	0.2	0.3	67	0.0	A	2	6
1	R										
2	L			186	2.5	48.1	154	0.8	D	5	36
2	T	0	0.0	282	4.6	58.3	263	0.9	E	9	54
2	R										
3	L			216	0.1	1.8	0	0.0	A	0	6
3	T	0	0.0	3198	1.6	1.8	0	0.0	A	0	6
3	R										
4	L			22	0.3	43.5	16	0.7	D	1	6
4	T	0	0.0	180	2.4	47.4	146	0.8	D	5	36
4	R										
INT				7177	12	5.8	646	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for Business Peak CHURCHB

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.17	76	0	2	0	6	0.19	31	0	2	0	6
1	T	0.53	76	3	812	15	36	0.59	31	2	1071	9	24
1	R												
2	L	0.47	17	1	111	3	24	0.53	7	1	113	1	12
2	T	0.56	17	2	149	4	30	0.62	7	1	152	2	12
2	R												
3	L	0.56	76	0	48	1	96	0.62	31	0	63	1	24
3	T	0.56	76	3	859	15	36	0.62	31	3	1132	9	24
3	R												
4	L	0.05	17	0	11	0	6	0.05	7	0	11	0	6
4	T	0.43	17	1	111	3	24	0.47	7	1	113	1	12
4	R												
INT		0.56	101					0.62	46				

TCS = 11 Pedestrian - Vehicle Delay Business Peak File = CHURCHB
Isolated Operation

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			6	0.0	3.5				6	0.0	2.7
1	T	0	0.0	2211	3.1	5.0	0	0.0		2211	2.4	4.0
1	R											
2	L			136	1.4	38.2				136	0.7	18.1
2	T	0	0.0	180	1.9	38.8	0	0.0		180	0.9	18.4
2	R											
3	L			125	0.2	5.2				125	0.1	4.1
3	T	0	0.0	2255	3.3	5.2	0	0.0		2255	2.6	4.1
3	R											
4	L			14	0.1	35.5				14	0.1	16.8
4	T	0	0.0	137	1.4	37.9	0	0.0		137	0.7	18.0
4	R											
INT				5064	12	8.2				5064	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHB

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			6	0.0	0.1	0	0.0	A	0	6
1	T	0	0.0	2211	0.1	0.1	29	0.0	A	1	6
1	R										
2	L			136	1.4	38.2	111	0.8	C	3	24
2	T	0	0.0	180	1.9	38.8	149	0.8	C	4	30
2	R										
3	L			125	0.0	1.0	0	0.0	A	0	6
3	T	0	0.0	2255	0.6	1.0	0	0.0	A	0	6
3	R										
4	L			14	0.1	35.5	11	0.8	C	0	6
4	T	0	0.0	137	1.4	37.9	111	0.8	C	3	24
4	R										
INT				5064	6	4.0	410	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for AM Peak CHURCHB

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L												
1	T	0.74	81	6	1534	21	48	0.74	81	6	1534	21	48
1	R												
2	L	0.75	16	3	184	5	36	0.75	16	3	184	5	36
2	T	0.76	16	3	212	6	42	0.76	16	3	212	6	42
2	R												
3	L	0.76	81	0	71	1	48	0.76	81	0	71	1	48
3	T	0.76	81	6	1587	21	48	0.76	81	6	1587	21	48
3	R												
4	L	0.07	16	0	14	0	6	0.07	16	0	14	0	6
4	T	0.70	16	3	182	5	36	0.70	16	3	182	5	36
4	R												
INT		0.76	105					0.76	105				

TCS = 11 Pedestrian - Vehicle Delay AM Peak File = CHURCHB

Isolated Operation

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			4	0.0	0.0				4	0.0	0.0
1	T	0	0.0	3177	5.7	6.4	0	0.0		3177	5.7	6.4
1	R											
2	L			199	2.7	48.1				199	2.7	48.1
2	T	0	0.0	227	3.1	48.9	0	0.0		227	3.1	48.9
2	R											
3	L			137	0.3	8.1				137	0.3	8.1
3	T	0	0.0	3183	5.9	6.6	0	0.0		3183	5.9	6.6
3	R											
4	L			18	0.2	38.2				18	0.2	38.2
4	T	0	0.0	209	2.5	43.5	0	0.0		209	2.5	43.5
4	R											
INT				7154	20	10.2				7154	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHB

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			4	0.0	3.0	1	0.2	A	0	6
1	T	0	0.0	3177	2.6	3.0	539	0.2	A	16	36
1	R										
2	L			199	2.7	48.1	184	0.9	D	5	36
2	T	0	0.0	227	3.1	48.9	212	0.9	D	6	42
2	R										
3	L			137	0.0	0.0	0	0.0	A	0	6
3	T	0	0.0	3183	0.0	0.0	0	0.0	A	0	6
3	R										
4	L			18	0.2	38.2	14	0.8	C	0	6
4	T	0	0.0	209	2.5	43.5	182	0.9	D	5	36
4	R										
INT				7154	11	5.6	1131	0.2	A		

Church Street Future with Development – CHURCHF.DAT

```
SCATES Program Version: 2013  Date: 02-NOV-12  Time:
Registered User Name. - Road Delay Solutions Pty Ltd
Registered User No.   -     0
Data File: CHURCHF
CHURCH STREET
2031 BITZIOS VOLUMES


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L                    0  0.0                    0  0.0                    0  0.0
 1T  3086 5880    A           3708 5880    A           2378 5880    A
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3507 5880    A    0  254 3673 5880    A    0  165 2513 5880    A    0  147
 3R
 4L
 4T
 4R
Type = M                        A        Walk H%AM H%PM H%B
File = CHURCHF                  1                2    2    3
                                2          28
TCS =  1956                     3                2    2    3
                                4
         PEDESTRIAN VOLUME      WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App    P#AM    P#PM    P#B     Walk    Clear                   FACT     FACT
 1      0       0       0      0       0         0%             100      100
 2      30      30      30     6       22        0%             30       100
 3      0       0       0      0       0         0%             100      100
 4      20      20      20     6       22        0%             30       100
--------------------------------------------------------------------------------


             AM PEAK                    PM PEAK                    BUSINESS
 AM   Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers  Vol  Sat Phse MocV Pers
                    Gain Loss                  Gain Loss                  Gain Loss
 1L    19 1750    A    0  0.0   74 1750    A    0  0.0   33 1750    A    0  0.0
 1T  3067 5670    A    0    1 3634 5670    A    0    0 2346 5670    A    1    0
 1R
 2L
 2T
 2R
 3L                    0  0.0                    0  0.0                    0  0.0
 3T  3492 5880    A  184    0 3704 5880   AB  420    0 2518 5880   AB  213    0
 3R     0 1800    S             0 1800    B             0 1800    B
 4L   119 1750    B            39 1750   BC            55 1750   BC
 4T       3600                  3600                    3600
 4R   269 3600    B           133 3600    C           141 3600    C
Type = T4                       A    Min  ELT H%AM H%PM H%B   L/S L-PD R-PD
```

```
File = CHURCHF                  1     22  4.0    2    2    3   0'    0
                                2
TCS =  448                      3      5  4.0    2    2    3   0'         0
                                4     28  4.0    0    0    0        0    0
          PEDESTRIAN VOLUME     WALK-CLEARANCE    TRAM DATA     PEDEST   TRAM
App     P#AM     P#PM     P#B     Walk     Clear                FACT     FACT
 1       50       50       30     6        16         0%          30       100
 2       0        0        0      0        0          0%          100      100
 3       0        0        0      0        0          0%          100      100
 4       50       50       30     6        22         0%          30       100
--------------------------------------------------------------------------------
```

	AM PEAK					PM PEAK					BUSINESS				
AM	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss	Vol	Sat	Phse	MocV Gain	Pers Loss
1L	9	1750	A	0	0.0	17	1750	A	0	0.0	9	1750	A	0	0.0
1T	3140	5560	A	0	35	3028	5560	A	0	640	2159	5560	A	0	238
1R	0	0	S			0	0	S			0	0	S		
2L	202	1750	B			182	1750	B			134	1750	B		
2T	224	1960	B			275	1960	B			175	1960	B		
2R	0	0	B			0	0	B			0	0	B		
3L	130	1750	A	0	0.0	202	1750	A	0	0.0	117	1750	A	0	0.0
3T	3112	5670	A			3112	5670	A			2179	5670	A		
3R	0	0	S			0	0	S			0	0	S		
4L	20	1750	B			26	1750	B			16	1750	B		
4T	217	1960	B			188	1960	B			142	1960	B		
4R	0	0	B			0	0	B			0	0	B		

Type = COCO
File = CHURCHF

TCS = 11

	A	Min	ELT	H%AM	H%PM	H%B	L/S	L-PD	R-PD
	1	5	4.0	2	2	3	0'	0	0
	2	5	4.0	1	1	2	0'	0	0
	3	5	4.0	2	2	3	0'	0	0
	4	5	4.0	1	1	2	0'	0	0

	PEDESTRIAN VOLUME			WALK-CLEARANCE		TRAM DATA	PEDEST	TRAM
App	P#AM	P#PM	P#B	Walk	Clear		FACT	FACT
1	0	0	0	0	0	0%	100	100
2	0	0	0	0	0	0%	100	100
3	0	0	0	0	0	0%	100	100
4	0	0	0	0	0	0%	100	100

	APPROACH 1			APPROACH 2			APPROACH 3			APPROACH 4		
Tidal		Lanes	Grade		Lanes	Grade		Lanes	Grade		Lanes	Grade
N		3	0					3	0			
Lane	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat
1	T	9999	1960				T	9999	1960			
2	T	9999	1960				T	9999	1960			
3	T	9999	1960				T	9999	1960			
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0				0	0	0			
Depart	0	0	0				0	0	0			

File = CHURCHF
Type = M TCS = 1956

	APPROACH 1				APPROACH 2				APPROACH 3				APPROACH 4			
Tidal	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	
N	0	3	0				0	3	0		2	0				
Lane	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	Type	Length	Sat	
1	LT	9999	1750				T	9999	1960	LR	9999	1750				
2	T	9999	1960				T	9999	1960	R	9999	1850				

```
    3      T  9999  1960                        T  9999  1960
    4
    5
    6
    7
    8
          No Parking        No Parking        No Parking        No Parking
        AM    PM    BUS   AM    PM    BUS   AM    PM    BUS   AM    PM    BUS
 Apprch  0     0     0                       0     0     0     0     0     0
 Depart  0     0     0                       0     0     0     0     0     0
File = CHURCHF
Type = T4               TCS =  448
--------------------------------------------------------------------------------
```

```
           APPROACH 1        APPROACH 2        APPROACH 3        APPROACH 4
 Tidal  Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade Down  Lanes Grade
    N      0     3     0     0     2     0     0     3     0     0     2     0
 Lane   Type Length  Sat  Type Length  Sat  Type Length  Sat  Type Length  Sat
    1     LT  9999  1750     L    90  1750    LT  9999  1750     L  9999  1750
    2      T  9999  1960     T  9999  1960     T  9999  1960     T  9999  1960
    3      T  9999  1850                      T  9999  1960
    4
    5
    6
    7
    8
          No Parking        No Parking        No Parking        No Parking
        AM    PM    BUS   AM    PM    BUS   AM    PM    BUS   AM    PM    BUS
 Apprch    0     0     0     0     0     0     0     0     0     0     0     0
 Depart    0     0     0     0     0     0     0     0     0     0     0     0
File = CHURCHF
Type = COCO              TCS =   11
--------------------------------------------------------------------------------


              AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A   0.0  0.0       105  105  0.0  0.0       128  140  0.0  0.0        99   99
  B   28#  28#                 28#  28#                 28#  28#
  C
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 0.6  0.6                  0.8  0.9                  0.6  0.6
 Seq       AB  dlay   22   22       AB  dlay   23   21       AB  dlay   13   13
               Stps  4.4  4.4           Stps  4.7  4.3           Stps  2.6  2.6
Mode    0       DS  0.88 0.88    0       DS  0.86 0.83    0       DS  0.65 0.65
File = CHURCHF                    Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  1956                                                      M
--------------------------------------------------------------------------------


              AM PEAK                   PM PEAK                   BUSINESS
 Ph   GT%  GT%       CL   CL   GT%  GT%       CL   CL   GT%  GT%       CL   CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  78.5 78.5       105  105 83.3 84.7       128  140 78.4 78.4        99   99
  B  21.5 21.5                 7.0  6.4                 9.1  9.1
  C                            9.7  8.9                12.5 12.5
  D
  E
  F                dlay dlay                 dlay dlay                 dlay dlay
  G                 1.3  1.3                  1.6  1.8                  0.7  0.7
 Seq       AB  dlay   20   20      ABC  dlay   14   14      ABC  dlay    8    8
               Stps  4.0  4.0           Stps  3.4  3.2           Stps  1.9  1.9
Mode    1       DS  0.82 0.82    1       DS  0.84 0.82    1       DS  0.59 0.59
File = CHURCHF                A     Bay  Bay  Slip Slip           Type
                                  Req  Act  Req  Act
TCS =  448                   1                10    0              T4
```

```
                              2
                              3
                              4      38    0   34    0
                                   Bays if all intersections are optimised
--------------------------------------------------------------------------------
```

```
              AM PEAK                    PM PEAK                    BUSINESS
 Ph   GT%  GT%       CL    CL   GT%  GT%       CL    CL   GT%  GT%       CL    CL
     CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL CORD ISOL      CORD ISOL
  A  80.9 80.9       105   105 78.9 78.5       128   105 79.6 76.6        99    46
  B  19.1 19.1                 21.1 21.5                 20.4 23.4
  C
  D
  E
  F                 dlay dlay                 dlay dlay                 dlay dlay
  G                  0.0  0.0                  0.0  0.0                  0.0  0.0
 Seq       AB  dlay   21   21       AB  dlay   26   23       AB  dlay   11    8
               Stps  3.8  3.8           Stps  4.0  4.1           Stps  2.1  2.7
Mode    0       DS  0.76 0.76    0       DS  0.79 0.80    0       DS  0.56 0.62
File = CHURCHF                A     Bay  Bay  Slip Slip           Type
                                    Req  Act  Req  Act
TCS =  11                     1                10    0            COCO
                              2                60   90
                              3                17    0
                              4
                                   Bays if all intersections are optimised
-------------------------------------------------------------------------------


TCS = 1956  Isolated Operation Degree of Saturation for PM Peak CHURCHF
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M   DS    GT   Delay Stops Queue Metre  DS    GT   Delay Stops Queue Metre
 1  L
 1  T   0.86    96    12  2385    34    72  0.83   108    11  2181    34    72
 1  R
 2  L
 2  T
 2  R
 3  L
 3  T   0.85    96    11  2322    33    72  0.83   108    10  2123    33    72
 3  R
 4  L
 4  T
 4  R
INT     0.86   128                         0.83   140
-------------------------------------------------------------------------------


TCS = 1956  Pedestrian  - Vehicle Delay PM Peak File = CHURCHF
                              Isolated Operation
        --- Co-ordinated Cycle Length ---   ----- Isolated Cycle Length -----
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Peds  Delay  Aver  Veh  Delay  Aver
 1  L
 1  T     0   0.0        3782  11.8  11.2     0   0.0        3782  10.8  10.2
 1  R
 2  L
 2  T    30   0.5  58.1                  30   0.5  64.1
 2  R
 3  L
 3  T     0   0.0        3746  11.5  11.0     0   0.0        3746  10.5  10.1
 3  R
 4  L
```

```
 4  T      20    0.3  58.1                        20    0.4  64.1
 4  R
INT       50      1  58.1  7528    23  11.1      50      1  64.1  7528     0   0.0
--------------------------------------------------------------------------------
```

TCS = 1956 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
		Delays & Stops after Co-ordinated Evaluation								
1	L									
1	T	0	0.0	3782	0.0	0.0	0	0.0	A	0	6
1	R									
2	L									
2	T	30	0.5	58.1						
2	R									
3	L									
3	T	0	0.0	3746	10.8	10.4	1203	0.3	A	33	72
3	R									
4	L									
4	T	20	0.3	58.1						
4	R									
INT		50	1	58.1	7528	11	5.2	1203	0.2	A	

TCS = 1956 Isolated Operation Degree of Saturation for Business Peak CHURCHF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.62	67	6	1221	22 48	0.62	67	6	1221	22 48
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.65	67	7	1345	23 48	0.65	67	7	1345	23 48
3	R										
4	L										
4	T										
4	R										
INT		0.65	99				0.65	99			

TCS = 1956 Pedestrian - Vehicle Delay Business Peak File = CHURCHF

					Isolated Operation								
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----						
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver		
1	L												
1	T	0	0.0	2449	6.0	8.9	0	0.0	2449	6.0	8.9		
1	R												
2	L												
2	T	30	0.4	43.7			30	0.4	43.7				
2	R												
3	L												
3	T	0	0.0	2588	6.6	9.2	0	0.0	2588	6.6	9.2		
3	R												
4	L												
4	T	20	0.2	43.7			20	0.2	43.7				
4	R												
INT		50	1	43.7	5037	13	9.1	50	1	43.7	5037	0	0.0

```
TCS = 1956  Pedestrian  - Vehicle Delay - Stops Business Peak File = CHURCHF
------------ Delays & Stops after Co-ordinated Evaluation-------------
 A  M  Peds  Delay  Aver Vehs  Delay  Aver Stops  Aver  LOS
 1  L
 1  T     0   0.0        2449   0.0   0.0     0   0.0    A      0     6
 1  R
 2  L
 2  T    30   0.4  43.7
 2  R
 3  L
 3  T     0   0.0        2588   0.0   0.0     0   0.0    A      0     6
 3  R
 4  L
 4  T    20   0.2  43.7
 4  R
INT      50     1  43.7  5037     0   0.0     0   0.0    A
--------------------------------------------------------------------------
```

TCS = 1956 Isolated Operation Degree of Saturation for AM Peak CHURCHF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L										
1	T	0.77	73	9	1858	28 60	0.77	73	9	1858	28 60
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.88	73	12	2507	32 66	0.88	73	12	2507	32 66
3	R										
4	L										
4	T										
4	R										
INT		0.88	105				0.88	105			

TCS = 1956 Pedestrian - Vehicle Delay AM Peak File = CHURCHF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L												
1	T	0	0.0		3148	9.2	10.5	0	0.0		3148	9.2	10.5
1	R												
2	L												
2	T	30	0.4	46.7				30	0.4	46.7			
2	R												
3	L												
3	T	0	0.0		3577	12.4	12.5	0	0.0		3577	12.4	12.5
3	R												
4	L												
4	T	20	0.3	46.7				20	0.3	46.7			
4	R												
INT		50	1	46.7	6725	22	11.6	50	1	46.7	6725	0	0.0

TCS = 1956 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHF

------------ Delays & Stops after Co-ordinated Evaluation----------										
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Stops	Aver	LOS
1	L									
1	T	0	0.0		3148	0.0	0.0	0	0.0	A
1	R									
2	L									
2	T	30	0.4	46.7						
2	R									
3	L									
3	T	0	0.0		3577	2.1	2.1	368	0.1	A
3	R									
4	L									
4	T	20	0.3	46.7						
4	R									
INT		50	1	46.7	6725	2	1.1	368	0.1	A

TCS = 448 Isolated Operation Degree of Saturation for PM Peak CHURCHF

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.81	103	0	40	1	30	0.80	115	0	36	1	60
1	T	0.84	103	8	2008	26	60	0.82	115	7	1836	26	60
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.74	112	3	1230	17	36	0.73	124	3	1125	17	36
3	R												
4	L	0.44	17	1	32	1	12	0.48	17	1	33	1	12
4	T												
4	R	0.69	8	2	118	4	18	0.75	8	3	133	5	24
INT		0.84	128					0.82	140				

TCS = 448 Pedestrian - Vehicle Delay PM Peak File = CHURCHF

Isolated Operation

A	M	Peds	Delay	Aver Vehs	Co-ordinated Cycle Length Delay	Aver	Peds	Isolated Cycle Length Delay	Aver	Veh	Delay	Aver
1	L			75	0.2	9.8				75	0.2	8.7
1	T	50	0.8	58.1 3707	7.9	7.6	50	0.9	64.1	3707	7.2	7.0
1	R											
2	L											
2	T	0	0.0				0	0.0				
2	R											
3	L											
3	T	0	0.0	3778	3.1	3.0	0	0.0		3778	2.8	2.7
3	R											
4	L			39	0.6	50.8				39	0.6	57.1
4	T	50	0.8	58.1			50	0.9	64.1			
4	R			133	2.2	59.3				133	2.9	78.2
INT		100	2	58.1 7732	14	6.5	100	2	64.1	7732	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHF

Delays & Stops after Co-ordinated Evaluation

A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			75	0.0	1.5	8	0.1	A	0	6
1	T	50	0.8	58.1 3707	1.5	1.5	409	0.1	A	15	36
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	3778	0.4	0.4	137	0.0	A	5	12
3	R										
4	L			39	0.6	50.8	32	0.8	D	1	12
4	T	50	0.8	58.1							
4	R			133	2.2	59.3	118	0.9	E	4	18
INT		100	2	58.1 7732	5	2.2	705	0.1	A		

TCS = 448 Isolated Operation Degree of Saturation for Business Peak CHURCHF

A	M	DS	GT	Co-ordinated Cycle Length Delay	Stops	Queue	Metre	DS	GT	Isolated Cycle Length Delay	Stops	Queue	Metre
1	L	0.58	74	0	14	0	36	0.58	74	0	14	0	36
1	T	0.59	74	4	989	17	42	0.59	74	4	989	17	42
1	R												
2	L												
2	T												
2	R												
3	L												
3	T	0.53	83	2	697	12	24	0.53	83	2	697	12	24
3	R												
4	L	0.41	17	1	44	1	12	0.41	17	1	44	1	12
4	T												
4	R	0.59	8	2	122	4	18	0.59	8	2	122	4	18
INT		0.59	99					0.59	99				

TCS = 448 Pedestrian - Vehicle Delay Business Peak File = CHURCHF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver	Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L				34	0.1	5.7				34	0.1	5.7
1	T	30	0.4	43.7	2416	3.9	5.8	30	0.4	43.7	2416	3.9	5.8
1	R												
2	L												
2	T	0	0.0					0	0.0				
2	R												
3	L												
3	T	0	0.0		2594	1.8	2.5	0	0.0		2594	1.8	2.5
3	R												
4	L				55	0.6	36.2				55	0.6	36.2
4	T	30	0.4	43.7				30	0.4	43.7			
4	R				141	1.7	43.6				141	1.7	43.6
INT		60	1	43.7	5240	8	5.5	60	1	43.7	5240	0	0.0

TCS = 448 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
				Delays & Stops after Co-ordinated Evaluation						
1	L			34	0.0	1.1	3	0.1	A	0	6
1	T	30	0.4	43.7 2416	0.8	1.1	195	0.1	A	5	12
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	2594	0.2	0.2	63	0.0	A	2	6
3	R										
4	L			55	0.6	36.2	44	0.8	C	1	12
4	T	30	0.4	43.7							
4	R			141	1.7	43.6	122	0.9	D	3	18
INT		60	1	43.7 5240	3	2.2	427	0.1	A		

TCS = 448 Isolated Operation Degree of Saturation for AM Peak CHURCHF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.43	78	0	6	0 6	0.43	78	0	6	0 6
1	T	0.75	78	7	1614	23 54	0.75	78	7	1614	23 54
1	R										
2	L										
2	T										
2	R										
3	L										
3	T	0.82	78	9	2078	26 54	0.82	78	9	2078	26 54
3	R										
4	L	0.82	19	2	118	3 24	0.82	19	2	118	3 24
4	T										
4	R	0.55	19	3	221	6 30	0.55	19	3	221	6 30
INT		0.82	105				0.82	105			

TCS = 448 Pedestrian - Vehicle Delay AM Peak File = CHURCHF

							Isolated Operation					
		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver Peds	Delay	Aver	Veh	Delay	Aver	
1	L			19	0.0	5.0			19	0.0	5.0	
1	T	50	0.6	46.7 3128	6.6	7.6	50	0.6	46.7 3128	6.6	7.6	
1	R											
2	L											
2	T	0	0.0				0	0.0				
2	R											
3	L											
3	T	0	0.0	3562	8.5	8.6	0	0.0	3562	8.5	8.6	
3	R											
4	L			119	1.8	53.7			119	1.8	53.7	
4	T	50	0.6	46.7			50	0.6	46.7			
4	R			269	2.9	39.3			269	2.9	39.3	
INT		100	1	46.7 7097	20	10.1	100	1	46.7 7097	0	0.0	

TCS = 448 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
					Delays & Stops after Co-ordinated Evaluation					
1	L			19	0.0	6.8	5	0.3	A	0	6
1	T	50	0.6	46.7 3128	5.9	6.8	794	0.3	A	23	54
1	R										
2	L										
2	T	0	0.0								
2	R										
3	L										
3	T	0	0.0	3562	1.8	1.8	588	0.2	A	17	36
3	R										
4	L			119	1.8	53.7	118	1.0	D	3	24
4	T	50	0.6	46.7							
4	R			269	2.9	39.3	221	0.8	C	6	30
INT		100	1	46.7 7097	12	6.3	1726	0.2	A		

TCS = 11 Isolated Operation Degree of Saturation for PM Peak CHURCHF

		--- Co-ordinated Cycle Length ---					----- Isolated Cycle Length -----				
A	M	DS	GT	Delay	Stops	Queue Metre	DS	GT	Delay	Stops	Queue Metre
1	L	0.39	97	0	5	0 6	0.40	78	0	6	0 6
1	T	0.74	97	7	1536	27 60	0.75	78	7	1606	23 54
1	R										
2	L	0.59	23	2	152	5 36	0.59	19	2	152	4 30
2	T	0.79	23	4	257	9 54	0.80	19	4	266	7 48
2	R										
3	L	0.79	97	1	116	2 102	0.80	78	1	122	2 54
3	T	0.79	97	8	1726	27 66	0.80	78	7	1805	23 54
3	R										
4	L	0.08	23	0	19	1 6	0.08	19	0	20	1 6
4	T	0.54	23	3	155	6 36	0.55	19	2	156	5 30
4	R										
INT		0.79	128				0.80	105			

TCS = 11 Pedestrian - Vehicle Delay PM Peak File = CHURCHF

Isolated Operation

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			17	0.0	5.4				17	0.0	4.8
1	T	0	0.0	3089	7.3	8.6	0	0.0		3089	6.6	7.7
1	R											
2	L			184	2.5	48.1				184	2.0	39.7
2	T	0	0.0	278	4.4	57.4	0	0.0		278	3.9	50.3
2	R											
3	L			206	0.6	11.3				206	0.6	10.8
3	T	0	0.0	3174	8.3	9.4	0	0.0		3174	7.4	8.4
3	R											
4	L			26	0.3	43.7				26	0.3	36.1
4	T	0	0.0	190	2.5	47.7	0	0.0		190	2.1	39.4
4	R											
INT				7164	26	13.1				7164	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops PM Peak File = CHURCHF

---------- Delays & Stops after Co-ordinated Evaluation----------											
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Stops	Aver	LOS		
1	L			17	0.0	0.2	0	0.0	A	0	6
1	T	0	0.0	3089	0.2	0.2	30	0.0	A	1	6
1	R										
2	L			184	2.5	48.1	152	0.8	D	5	36
2	T	0	0.0	278	4.4	57.4	257	0.9	E	9	54
2	R										
3	L			206	0.1	1.8	0	0.0	A	0	6
3	T	0	0.0	3174	1.6	1.8	0	0.0	A	0	6
3	R										
4	L			26	0.3	43.7	19	0.7	D	1	6
4	T	0	0.0	190	2.5	47.7	155	0.8	D	6	36
4	R										
INT				7164	12	5.8	614	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for Business Peak CHURCHF

		--- Co-ordinated Cycle Length ---						----- Isolated Cycle Length -----					
A	M	DS	GT	Delay	Stops	Queue	Metre	DS	GT	Delay	Stops	Queue	Metre
1	L	0.24	75	0	2	0	6	0.27	31	0	3	0	6
1	T	0.54	75	3	823	15	36	0.60	31	2	1081	9	24
1	R												
2	L	0.48	16	1	112	3	24	0.53	7	1	114	1	12
2	T	0.56	16	2	147	4	30	0.62	7	1	150	2	12
2	R												
3	L	0.56	75	0	46	1	96	0.62	31	0	60	0	24
3	T	0.56	75	3	853	15	36	0.62	31	3	1119	9	24
3	R												
4	L	0.06	16	0	12	0	6	0.06	7	0	12	0	6
4	T	0.45	16	2	118	3	24	0.50	7	1	120	2	12
4	R												
INT		0.56	99					0.62	46				

TCS = 11 Pedestrian - Vehicle Delay Business Peak File = CHURCHF
Isolated Operation

A	M	Peds	Delay	Aver Vehs	Co-ordinated Cycle Length --- Delay	Aver	Peds	Isolated Cycle Length ----- Delay	Aver Veh	Delay	Aver
1	L			9	0.0	3.6			9	0.0	2.9
1	T	0	0.0	2224	3.1	5.0	0	0.0	2224	2.5	4.0
1	R										
2	L			137	1.4	37.5			137	0.7	18.1
2	T	0	0.0	178	1.9	38.1	0	0.0	178	0.9	18.4
2	R										
3	L			120	0.2	5.1			120	0.1	4.1
3	T	0	0.0	2244	3.2	5.1	0	0.0	2244	2.6	4.1
3	R										
4	L			16	0.2	34.9			16	0.1	16.9
4	T	0	0.0	145	1.5	37.4	0	0.0	145	0.7	18.1
4	R										
INT				5073	11	8.1			5073	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops Business Peak File = CHURCHF

A	M	Peds	Delay	Aver Vehs	Delays & Stops after Co-ordinated Evaluation Delay	Aver	Stops	Aver	LOS		
1	L			9	0.0	0.1	0	0.0	A	0	6
1	T	0	0.0	2224	0.1	0.1	30	0.0	A	1	6
1	R										
2	L			137	1.4	37.5	112	0.8	C	3	24
2	T	0	0.0	178	1.9	38.1	147	0.8	C	4	30
2	R										
3	L			120	0.0	1.0	0	0.0	A	0	6
3	T	0	0.0	2244	0.6	1.0	0	0.0	A	0	6
3	R										
4	L			16	0.2	34.9	12	0.8	C	0	6
4	T	0	0.0	145	1.5	37.4	118	0.8	C	3	24
4	R										
INT				5073	6	4.0	419	0.1	A		

TCS = 11 Isolated Operation Degree of Saturation for AM Peak CHURCHF

A	M	DS	GT	Co-ordinated Cycle Length --- Delay	Stops	Queue	Metre	DS	GT	Isolated Cycle Length ----- Delay	Stops	Queue	Metre
1	L	0.24	81	0	2	0	6	0.24	81	0	2	0	6
1	T	0.75	81	6	1576	21	48	0.75	81	6	1576	21	48
1	R												
2	L	0.76	16	3	192	5	36	0.76	16	3	192	5	36
2	T	0.76	16	3	208	6	36	0.76	16	3	208	6	36
2	R												
3	L	0.76	81	0	69	1	48	0.76	81	0	69	1	48
3	T	0.76	81	6	1583	21	48	0.76	81	6	1583	21	48
3	R												
4	L	0.07	16	0	15	0	6	0.07	16	0	15	0	6
4	T	0.73	16	3	196	6	36	0.73	16	3	196	6	36
4	R												
INT		0.76	105					0.76	105				

TCS = 11 Pedestrian - Vehicle Delay AM Peak File = CHURCHF

Isolated Operation

		--- Co-ordinated Cycle Length ---				----- Isolated Cycle Length -----					
A	M	Peds	Delay	Aver Vehs	Delay	Aver	Peds	Delay	Aver	Veh	Delay	Aver
1	L			9	0.0	3.4				9	0.0	3.4
1	T	0	0.0	3203	5.9	6.6	0	0.0		3203	5.9	6.6
1	R											
2	L			204	2.8	49.4				204	2.8	49.4
2	T	0	0.0	226	3.0	47.7	0	0.0		226	3.0	47.7
2	R											
3	L			133	0.3	8.1				133	0.3	8.1
3	T	0	0.0	3174	5.9	6.7	0	0.0		3174	5.9	6.7
3	R											
4	L			20	0.2	38.1				20	0.2	38.1
4	T	0	0.0	219	2.8	45.5	0	0.0		219	2.8	45.5
4	R											
INT				7188	21	10.4				7188	0	0.0

TCS = 11 Pedestrian - Vehicle Delay - Stops AM Peak File = CHURCHF

A	M	Peds	Delay	Aver Vehs	Delay	Aver Stops	Aver	LOS		
						Delays & Stops after Co-ordinated Evaluation				
1	L			9	0.0	2.7	1	0.2	A	0	6
1	T	0	0.0	3203	2.4	2.7	508	0.2	A	15	36
1	R										
2	L			204	2.8	49.4	192	0.9	D	5	36
2	T	0	0.0	226	3.0	47.7	208	0.9	D	6	36
2	R										
3	L			133	0.0	0.0	0	0.0	A	0	6
3	T	0	0.0	3174	0.0	0.0	0	0.0	A	0	6
3	R										
4	L			20	0.2	38.1	15	0.8	C	0	6
4	T	0	0.0	219	2.8	45.5	196	0.9	D	6	36
4	R										
INT				7188	11	5.6	1120	0.2	A		