PROPOSED REZONING FOR BULKY GOODS DEVELOPMENT VICTORIA ROAD GLADESVILLE

Assessment of Traffic and Parking Implications

June 2012
(Revision B)

Reference 10192

TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
Transportation, Traffic and Design Consultants
Suite 502, Level 5
282 Victoria Avenue
CHATSWOOD 2067
Telephone (02) 411 5660
Facsimile (02) 904 6622
Email: ttpa@ttpa.com.au

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1. INTRODUCTION

This report has been prepared to accompany an application to Ryde City Council for a proposed rezoning of a large existing industrial site to permit Hardware/Building Supplies and Bulky Goods use on Victoria Road at Gladesville (Figure 1).

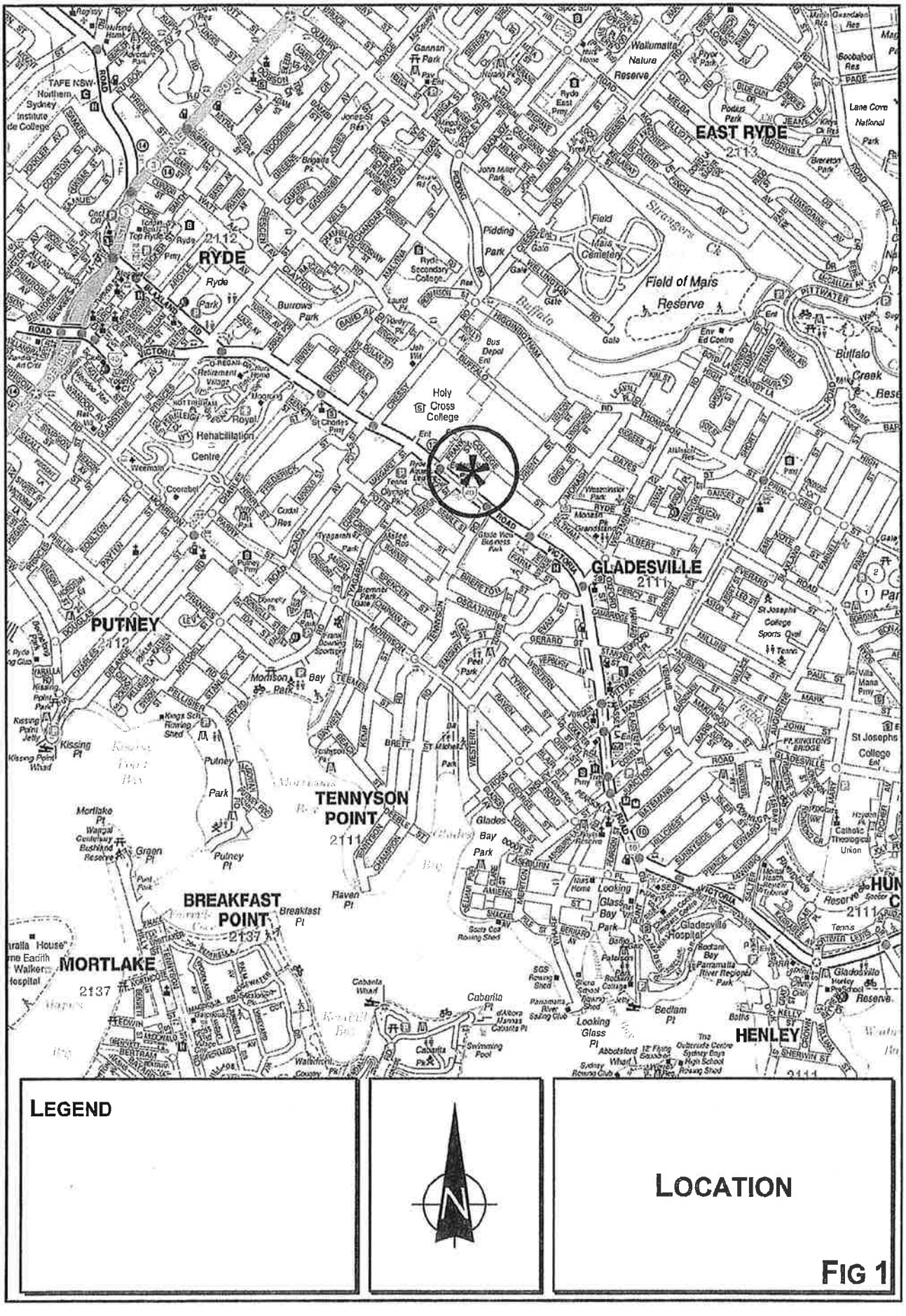
The site is known as 'Enterprise Park' and the existing uses comprise a mix of warehouse, manufacturing, office/commercial and services uses with a gym and a childcare centre. The site has ready access to the arterial road system and is strategically located in relation to access for the central Metropolitan Area where there are only a limited number of Bunnings outlets at present.

The envisaged development, subject to the rezoning, would comprise:

Bunnings	
Warehouse	
Trade Area	
Nursery, B/G's	
Total	**15,255m²**
Bulky Goods	**21,885m²**
Retained Building	**1,200m²**

The purpose of this report is to:

* describe the site, its context and the development proposal
* describe the road network serving the site and traffic conditions on that network
* describe the proposed road network development
* assess the traffic potential implications of the development
* assess the proposed access, internal circulation and servicing arrangements.


EAST RYDE
2113
RYDE
2112
GLADESVILLE
2111
PUTNEY
2112
TENNYSON POINT
2111
BREAKFAST POINT
2137
MORTLAKE
2137
HENLEY
Holy Cross College
Field of Mars Reserve
Field of Mars Cemetery
Pidding Park
Burrows Park
Morrison Bay Park
Glades Bay Park
Looking Glass Bay
Looking Glass Pl
Kissing Pt
Putney Park
Mortlake Pt
Green Pt
Putney Pt
Breakfast Pt
Raven Pt
Cabarita Pt
Cabarita Wharf
Swimming Pool
Bedlam Pt
Abbotsford Wharf
Gladesville Hospital
Parramatta River Regional Park
Wallumatta Nature Reserve
Buffalo Creek Reserve
Lane Cove National Park
Rehabilitation Centre
Bus Depot
Ryde Secondary College
TAFE NSW Northern Sydney Institute de College
St Josephs College
Catholic Theological Union
LEGEND
N
LOCATION
FIG 1

2. DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The site (Figure 2) is Lot 1 in DP 1008105 being a generally rectangular shaped area of some 3.8 ha with extensive frontages to Victoria Road, Frank Street and College Street located just to the west of the Gladesville Centre.

The site, which falls away sharply to the north (former quarry), is known as "Enterprise Park" and comprises:

* manufacturing
* showrooms
* office/commercial
* warehouse
* gym
* Child Care Centre

Total Floor Area 21,984m²

There are a number of access driveways along the College Street frontage and an access on Frank Street for the multi level building on the corner of Victoria Road.

The nearby uses comprise:

* the Ryde Aquatic and Leisure Centre located on the southern side of Victoria Road.
* the industrial uses along the western side of Frank Street and northern side of College Street.

LEGEND

SITE

FIG 2

* the mixed uses extending along Victoria Road including educational, commercial, retail, automotive and fast food.

* the surrounding residential areas.

2.2 ENVISAGED DEVELOPMENT

Due to the extreme level differences on the site the development scheme would involve a multi-level building complex as well as the retention of the greater part of the existing building on the corner of Victoria Road and Frank Street as follows:

Bunnings (2 levels)	
Warehouse	
Trade area	
Total	**15,255m^2**
Bulky Goods Retail (2 levels)	**21,885m^2**
Retained Building	**1,200m^2**

Parking for 895 cars will be provided on a two lower levels with vehicle accesses comprising:

* a combined ingress/egress on the Frank Street frontage

* a traffic signal controlled ingress/egress on Victoria Road integrated into the existing Victoria Road/Tennyson Road intersection

* a combined ingress/egress on the corner of Frank Street and College Street

Bunnings delivery vehicles will ingress through the Frank Street access, circulate to the docks and travel along the northern boundary to egress to Victoria Road at the signal controlled intersection while the Bulky Goods delivery vehicles will ingress form Victoria Road.

Details of the envisaged development are provided on the plan prepared by John R Brogan and Associates which accompany the Rezoning Application.

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the site (Figure 3) comprises:

* *Church Street/Delhi Road/Lane Cove Road* – a State Road and arterial route linking across the centre of the Metropolitan Area

* *Victoria Road* – a State Road and arterial route which links between the City and Parramatta

* *Pittwater Road* – a Regional Road and major collector route connecting between Victoria Road and Epping Road

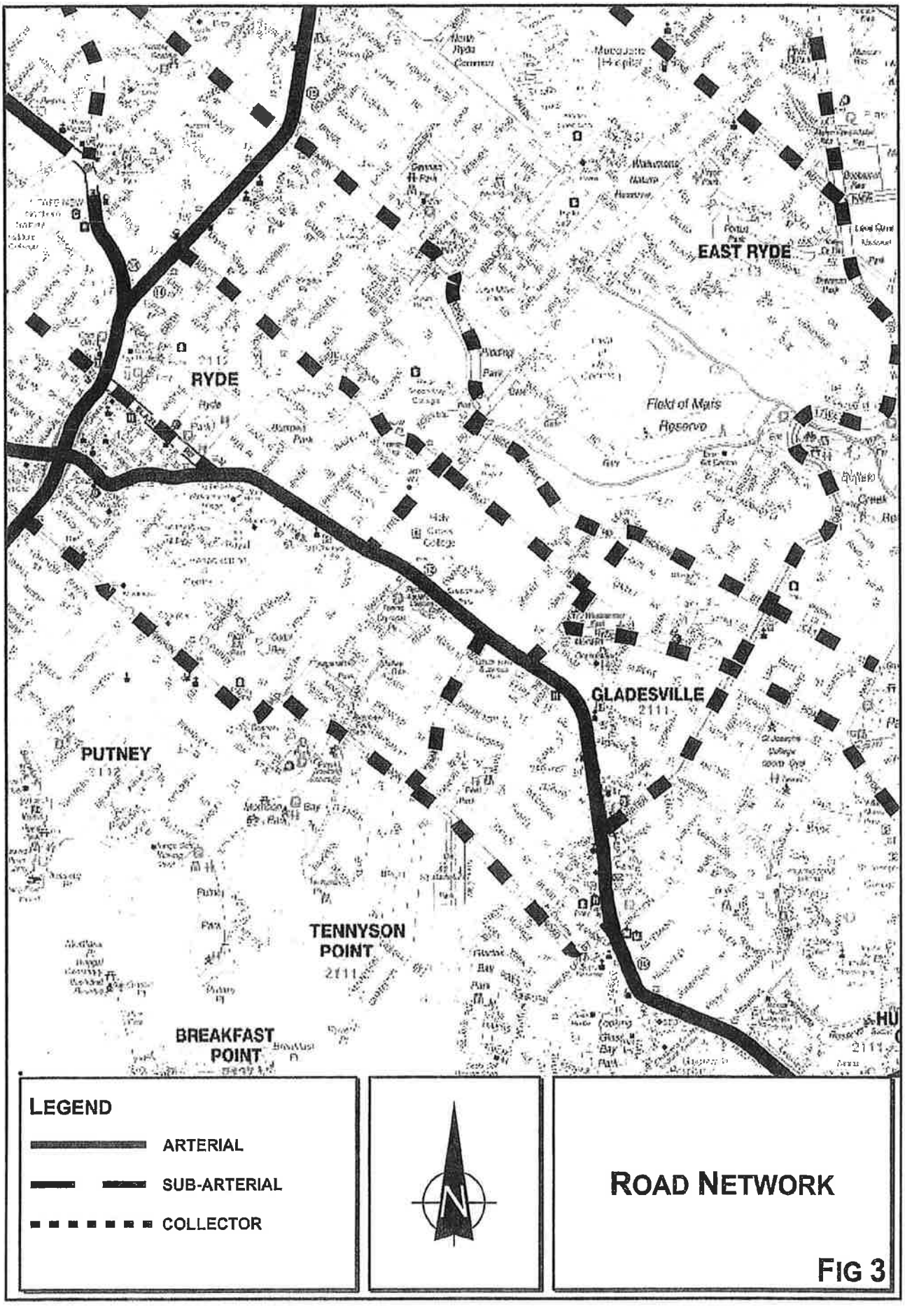
* *Morrison Road* – a collector road, linking between Church Street and Victoria Road

* *Monash Road-Ryde Road* – a Regional Road and collector road connecting between Victoria Road and Hunters Hill

* *Buffalo Road and Quarry Road/Paldais Road* – collector road routes connecting east-west across Lane Cove Road and Pittwater Road

* *Tennyson Road* – a minor collector road connecting to the south of Victoria Road

* *Frank Street/College Street* – a local road route linking between Victoria Road and Monash Road.


EAST RYDE
RYDE
Field of Mars
Reserve
GLADESVILLE
2111
PUTNEY
TENNYSON
POINT
2111
BREAKFAST
POINT
LEGEND
ARTERIAL
SUB-ARTERIAL
COLLECTOR
N
ROAD NETWORK
FIG 3

Victoria Road generally has three lanes in each direction. However, intersections where right-turn movements are permitted 'S' lanes have been formed by the elimination of a through lane. Locations in the vicinity of the site which incorporate this arrangement include Tennyson Road, Frank Street and Monash Road intersections, while the 'S lane' treatments also incorporates a Bus Stops on the southern side of Victoria Road opposite the site and between Tennyson Road and Monash Road.

Frank Street is relatively narrow while College Street has a standard 12.8m wide roadway.

3.2 TRAFFIC CONTROLS

The traffic controls on the road network in the vicinity of the site (Figure 4) comprise:

* the traffic control signals at the Victoria Road/Frank Street intersection which incorporate a phase for the right-turn movements into Frank Street. Details of this intersection are provided on the design plan reproduced in Appendix A.

* the traffic control signals on Victoria Road at the Tennyson Road and Monash Road intersections which incorporate right-turn phases. Details of these intersections are also provided in the images in Appendix A

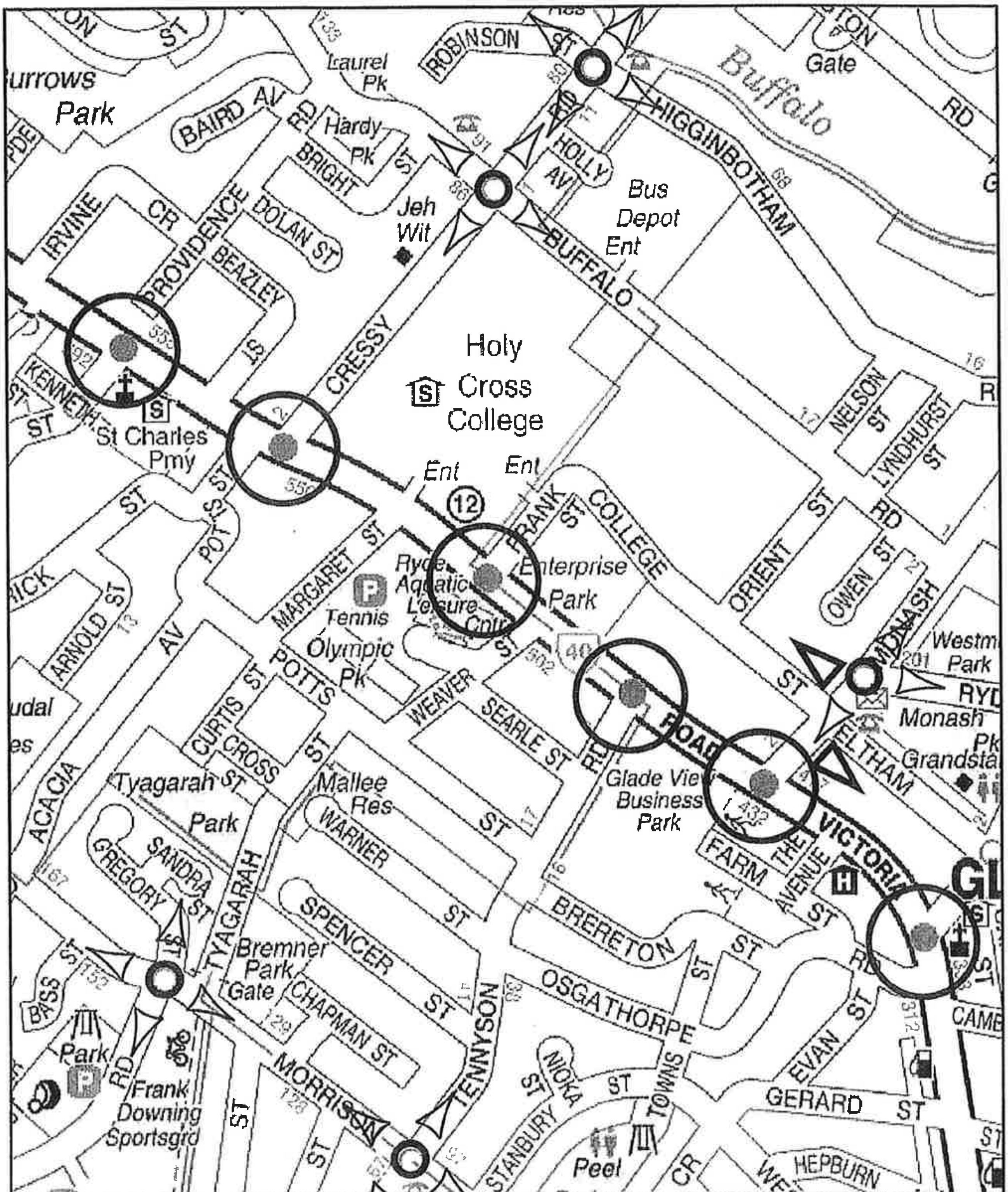
* the central median island along Victoria Road and the BUS LANE along the northern kerbside lane

* the roundabout at the Monash Road/Ryde Road intersection

* the 3 tonne LIGHT TRAFFIC restriction on Orient Street and Nelson Street

* the full time NO STANDING and peak period CLEARWAY restrictions on both sides of Victoria Road

* the BUS ZONES located on both sides of Victoria Road



Burrows Park
BAIRD AV
ROBINSON ST
Laurel Pk
Hardy Pk
BRIGHT ST
Gate
Buffalo
RD
HIGGINBOTHAM
HOLLY AV
Bus Depot Ent
BUFFALO
IRVINE
CR
PROVIDENCE
DOLAN ST
BEAZLEY
ST
Jeh Wit
CRESSY
Holy Cross College
KENNETH
ST
St Charles Pmy
Ent
Ent
12
FRANK
ST
COLLEGE
NELSON ST
LYNDHURST ST
ORIENT ST
RD
OWEN ST
MONASH
Westm Park
RYD
Monash Pk
Grandsta
ELTHAM
POTTS ST
MARGARET ST
Ryde Aquatic Leisure Cntr
Enterprise Park
Tennis
Olympic Pk
POTTS
CURTIS ST
CROSS
WEAVER
SEARLE ST
40
ROAD
Glade View Business Park
VICTORIA
FARM
THE AVENUE
ST
ARNOLD ST
AV
ACACIA
Tyagarah Park
ST
Mallee Res
WARNER
ST
GREGORY
SANDRA
ST
TYAGARAH
Bremner Park Gate
SPENCER
ST
BRERETON
OSGATHORPE
ST
EVAN ST
RD
ST
CAMB
BASS
Park
RD
Frank Downing Sportsgrd
CHAPMAN ST
MORRISON
TENNYSON
ST
NIOKA
ST
STANBURY
TOWNS
Peel
CR
GERARD ST
HEPBURN
ST

LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT
- GIVE WAY

TRAFFIC CONTROLS

FIG 4

* the approved B Double route along Victoria Road (but not along Frank Street, College Street or Monash Road).

3.3 TRAFFIC CONDITIONS

An indication of the prevailing traffic conditions on the road system serving the site is provided by data published by the RMS. A counting station located on Victoria Road indicates the following average annual daily traffic (AADT) flow information:

	AADT
Victoria Road east of Weaver Street	53,898

An extract of the published RMS Volume data is reproduced overleaf indicating that the total 2 way volume on Victoria Road during the week day morning and afternoon peaks is some 5,000 vph while the volume during the weekend midday peaks is only some 3,600 vph (72%).

Details of the traffic movements at intersections in the vicinity of the site (Fig 5) are provided for weekday morning, afternoon and weekend midday peak periods in Appendix B and summarized in the following:

		AM	**PM**	**WE Midday**
Victoria Road	Eastbound	2,207	2,126	1,767
	Left-turn	170	47	31
	Westbound	1,651	1,862	1,693
	Right-turn	45	25	7
Frank Street	Right-turn	100	174	38
	Left-turn	35	33	21
Victoria Road	Eastbound	2,091	1,991	1,637
	Right-turn	123	166	151
	Westbound	1,646	1,805	1,637
	Left-turn	57	132	88

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 31.111.E

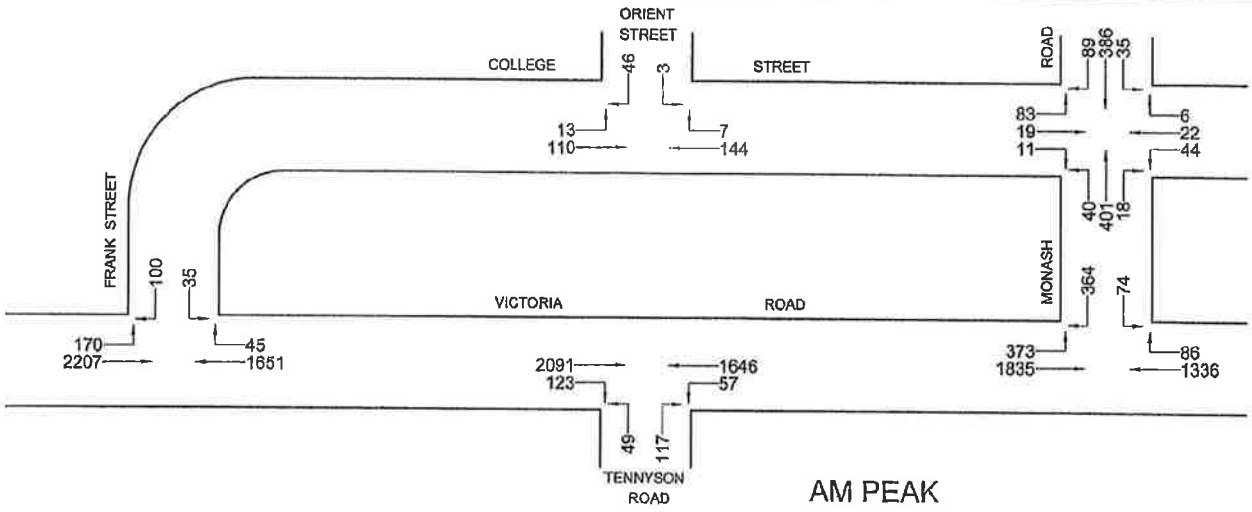
VICTORIA RD,MR165 HUNTLEYS PT-E OF HUNTLEYS POINT RD

								WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
HOUR	MON	TUE	WED	THU	FRI	SAT	SUN									
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	137	121	127	182	189	449	508	756	151	0.48	957	479	1.96	1713	245	0.83
1	57	55	58	81	100	272	355	351	70	0.22	627	314	1.28	978	140	0.47
2	53	67	77	85	112	205	216	394	79	0.25	421	211	0.86	815	116	0.39
3	89	87	82	113	134	104	209	504	101	0.32	393	197	0.80	897	128	0.43
4	167	192	158	174	185	183	169	876	175	0.55	352	176	0.72	1228	175	0.59
5	702	698	697	710	712	421	256	3519	704	2.22	677	339	1.39	4196	599	2.02
6	2113	2459	2476	2430	2346	984	379	11024	2365	7.45	1363	682	2.79	13187	1884	6.35
7	3207	3088	3046	3286	3110	1051	508	15737	3147	9.91	1559	780	3.19	17296	2471	8.33
8	2553	2525	2546	2467	2579	1428	783	12670	2534	7.98	2211	1106	4.53	14881	2126	7.17
9	2013	2270	2274	2245	2142	1691	1211	10944	2189	6.89	2902	1451	5.94	13846	1978	6.67
10	1783	1792	1813	1903	1736	1768	1531	9027	1805	5.69	3299	1650	6.76	12326	1761	5.94
11	1527	1707	1597	1686	1826	1587	1730	8343	1669	5.25	3317	1659	6.79	11660	1666	5.62
12	1500	1575	1626	1654	1642	1964	1972	7997	1599	5.04	3936	1968	8.06	11933	1705	5.75
13	1377	1473	1483	1544	1654	1837	1654	7531	1506	4.74	3491	1746	7.15	11022	1575	5.31
14	1452	1461	1548	1498	1559	1696	1526	7518	1504	4.73	3222	1611	6.60	10740	1534	5.17
15	1648	1725	1687	1676	1773	1541	1384	8509	1702	5.36	2925	1463	5.99	11434	1633	5.51
16	1756	1898	1897	1942	1909	1589	1439	9402	1880	5.92	3028	1514	6.20	12430	1776	5.99
17	2275	2409	2459	2475	2392	1880	1557	12010	2402	7.56	3437	1719	7.04	15447	2207	7.44
18	1908	1870	2134	2052	2266	1803	1192	10238	2048	6.45	2995	1498	6.13	13233	1890	6.37
19	1098	1287	1276	1329	1590	1603	860	6580	1316	4.14	2463	1232	5.04	9043	1292	4.36
20	791	877	908	937	1068	917	736	4581	916	2.89	1653	827	3.39	6234	891	3.00
21	724	882	855	920	868	835	592	4249	850	2.68	1427	714	2.92	5676	811	2.73
22	502	598	636	686	809	795	433	3231	646	2.03	1228	614	2.51	4459	637	2.15
23	267	304	351	376	692	729	221	1990	398	1.25	950	475	1.95	2940	420	1.42
DAY TOT	29699	31428	31811	32450	33393	27412	21421	158781	31756	100.00	48833	24417	100.00	207614	29659	100.00
MAX	3207	3088	3046	3286	3110	1964	1972	AWT =	31756		AWE =	24417		ADT =	29659	

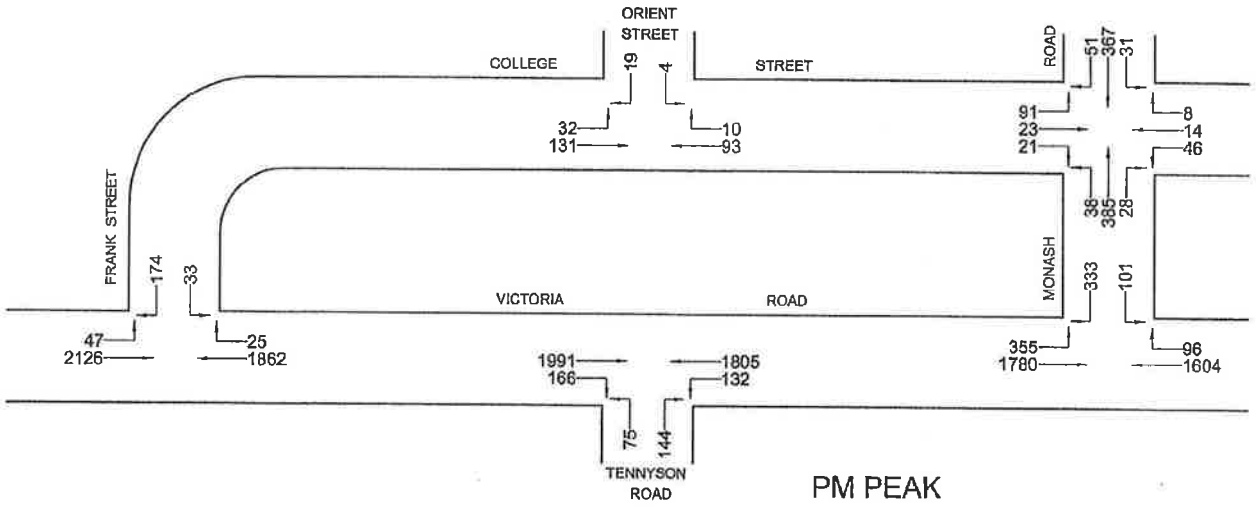
HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 31.111.W

VICTORIA RD,MR165 HUNTLEYS PT-E OF HUNTLEYS POINT RD

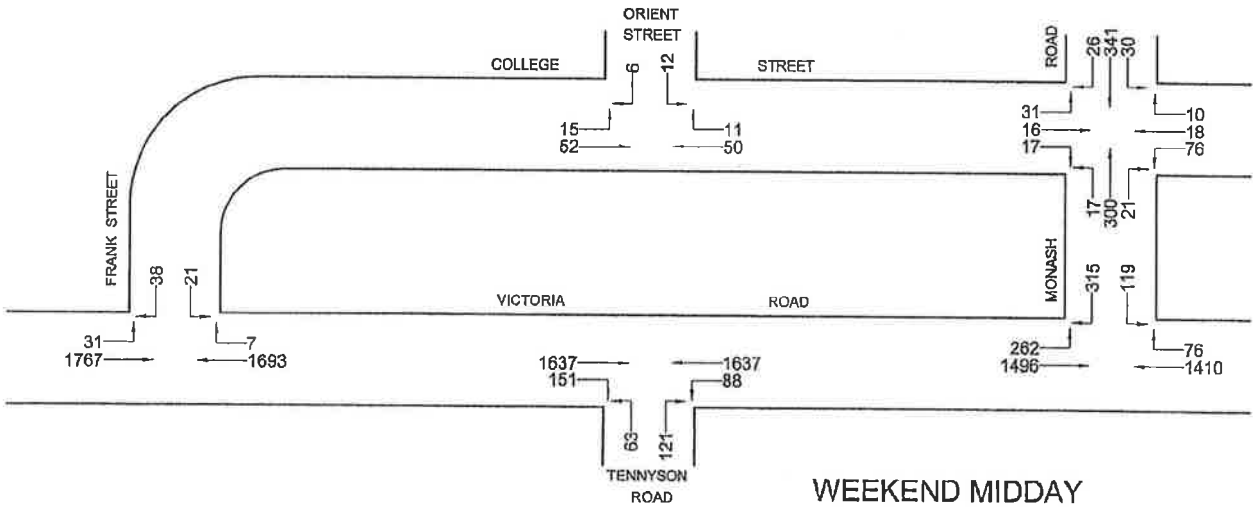
								WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
HOUR	MON	TUE	WED	THU	FRI	SAT	SUN									
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	215	218	256	311	328	728	920	1328	266	0.91	1648	824	3.60	2976	425	1.55
1	97	115	133	169	184	513	657	698	140	0.48	1170	585	2.55	1868	267	0.97
2	87	84	88	107	115	363	456	481	96	0.33	819	410	1.79	1300	186	0.68
3	81	65	77	93	119	268	336	435	87	0.30	604	302	1.32	1039	148	0.54
4	117	86	104	100	120	187	242	527	105	0.36	429	215	0.94	956	137	0.50
5	207	222	206	199	211	255	177	1045	209	0.71	432	216	0.94	1477	211	0.77
6	730	741	732	764	717	407	253	3684	737	2.52	660	330	1.44	4344	621	2.26
7	1933	1998	2005	1930	1847	704	372	9713	1943	6.64	1076	538	2.35	10789	1541	5.62
8	2407	2549	2395	2484	2350	1011	570	12185	2437	8.34	1581	791	3.45	13766	1967	7.17
9	1409	1439	1537	1495	1665	1220	821	7545	1509	5.16	2041	1021	4.45	9586	1369	4.99
10	1260	1340	1339	1401	1354	1433	1263	6694	1339	4.58	2696	1348	5.88	9390	1341	4.89
11	1314	1363	1372	1424	1434	1629	1311	6907	1381	4.72	2940	1470	6.41	9847	1407	5.13
12	1367	1491	1502	1492	1622	1584	1461	7474	1495	5.11	3045	1523	6.64	10519	1503	5.48
13	1478	1578	1540	1629	1598	1714	1407	7823	1565	5.35	3121	1561	6.81	10944	1563	5.70
14	1673	1817	1839	1896	1919	1727	1369	9144	1829	6.26	3096	1548	6.75	12240	1749	6.37
15	2184	2314	2290	2243	2361	1701	1546	11392	2278	7.79	3247	1624	7.08	14639	2091	7.62
16	2215	2338	2333	2402	2294	1786	1742	11582	2316	7.92	3528	1764	7.70	15110	2159	7.87
17	2515	2357	2533	2406	2455	1820	1599	12266	2453	8.39	3419	1710	7.46	15685	2241	8.17
18	2238	2213	2353	2186	2094	1304	1195	11084	2217	7.58	2499	1250	5.45	13583	1940	7.07
19	1292	1525	1567	1519	1413	1032	803	7316	1463	5.00	1835	918	4.00	9151	1307	4.77
20	885	1040	1024	1122	908	690	786	4979	996	3.41	1476	738	3.22	6455	922	3.36
21	808	956	930	967	829	708	695	4490	898	3.07	1403	702	3.06	5893	842	3.07
22	665	785	895	917	953	923	585	4215	843	2.88	1508	754	3.29	5723	818	2.98
23	422	469	580	644	1062	1155	411	3177	635	2.17	1566	783	3.42	4743	678	2.47
DAY TOT	27599	29103	29630	29900	29952	24862	20977	146184	29237	100.00	45839	22920	100.00	192023	27432	100.00
MAX	2515	2549	2533	2484	2455	1820	1742	AWT =	29237		AWE =	22920		ADT =	27432	



AM PEAK



PM PEAK



WEEKEND MIDDAY

LEGEND

EXISTING PEAK VOLUMES

FIG 5

Tennyson Road	Right-turn	117	144	121
	Left-turn	49	75	63
Victoria Road	Eastbound	1,835	1,780	1,496
	Left-turn	373	355	262
	Westbound	1,336	1,604	1,410
	Right-turn	86	96	76
Monash Road	Right-turn	367	333	315
	Left-turn	74	101	119

It can be seen that the existing right-turn movements into Frank Street and Monash Road are relatively light as are the movements out of Frank Street.

Traffic conditions in the area during the morning and afternoon peak periods are generally quite free flowing. There is some congestion to the west around the Devlin Street overpass intersection and to the east through the Gladesville Shopping Centre and more further to the east of Gladesville Bridge and through Drummoyne. Traffic conditions during the weekend days are quite satisfactory with no undue congestion or delay. The site benefits, in traffic terms, from:

* the flexibility of access via Frank Street/Victoria Road and College Street/ Monash Road
* the traffic signal controlled intersections on Victoria Road
* the absence of any other major traffic generation in the near vicinity.

3.4 FUTURE CIRCUMSTANCES

The RTA has a narrow road widening reservation along the northern side of Victoria Road which affects part of the site frontage. This reservation was created in 1999 just prior to the Olympic Games when schemes were being considered for modifying sections of Victoria Road to facilitate transport movements for the Games.

RMS have been investigating the opportunity to upgrade the BUS LANE provisions along Victoria Road and the Bunnings purchase of the large site has provided the potential opportunity to undertake road widening which would facilitate access for the envisaged development and additional BUS LANE provision.

A significant effort has been undertaken with survey, detail road design and cost estimating to support the negotiations with RMS. Details of the agreed upgrading works are provided in Appendix C and comprise:

- dedication and road widening along the northern side of Victoria Road
- provision of continuous BUS LANES along both sides of Victoria Road
- extended right turn lanes for the turns into Frank Street and Tennyson Road
- widening of Frank Street
- provision of an access road connecting at the Tennyson Road intersection
- modification of the intersection signals

4. TRAFFIC

The significant existing development on the site consists of a total floorspace of 21,984m² comprising:

- a child care centre
- a gym
- office and commercial
- manufacturing
- showrooms
- warehousing
- service industries

This a somewhat unusual combination of uses and since the on-street traffic surveys were undertaken a number of the units have become vacant as leases have not been renewed due to the impending redevelopment (ie survey of existing generation is not representative or practical). Indicative RMS generation rates for these uses are as follows:

- office/commercial	2.0 vtph per 100m²
- gym	9.0 vtph per 100m²
- childcare	8.0 vtph per 100m²
- manufacturing	1.0 vtph per 100m²
- showroom	1.2 vtph per 100m²
- warehouse	0.5 vtph per 100m²

A modest adopted overall generation rate of some 1.5 vtph per 100m² would indicate a total peak period traffic generation for the existing floorspace/use (21,984m²) of some 330 vtph. However in order to provide a robust assessment a 'discount' generation of 250 vtph has been adopted. There would be very little generation on weekends (say 50 vtph).

A guide to the traffic generation of 'Large Format Hardware' and 'Bulky Goods' developments is provided by recent RMS studies and other comparable assessments. The common feature of the traffic generation/floorspace/use relationship is that the larger the floorspace the lower the traffic generation rate is per 100m² and the proposal represents large contemporary floorspaces.

The RMS "Hardware" study surveyed sites ranging from 1,600m2 to 14,111m² while the "Bulky Goods" sites ranged from 600m² to 14,849m². A study undertaken by Project Planning Associates involved 11 sites ranging from 970m² to 18,000m² while a study by Transport and Urban Planning involved the Auburn Homemakers Centre of 21,000m.

The established RMS results (see Appendix D) for the large floorspace Hardware outlets (the lower rate per 100m²) are:

AM	0.60 vtph (say 1.0)
PM	2.05 vtph (say 2.5)
WEEKEND	3.15 vtph (say 3.5)

The established RMS rates for the large floorspace Bulky Goods outlets (see Appendix D) are:

AM	Nil
PM	1.21 vtph
WEEKEND	1.56 vtph

The results of the other consultant surveys are:

	PP A	T U P	AVG (3)
AM	-	-	-
PM	1.14	0.53	1.00
WEEKEND	2.12	2.12	2.00

Thus the proposed Bunnings of 15,255m² will have a projected generation (in isolation) of:

AM	@	1.0	160 vtph (say)
PM	@	2.5	400 vtph (say)
WEEKEND	@	3.5	560 vtph (say)

The proposed Bulky Goods of 21,885m² will have a projected generation (in isolation) of:

AM	@	-	-
PM	@	1.00	230 vtph (say)
WEEKEND	@	2.00	460 vtph (say)

The total generation would be discounted by a normal 20% dual visitation circumstance together with passing trade factors (Appendix E) as follows:

	-20% Dual Vis.	P/Trade		Distribution of Additional
160 vtph	0% 160 vtph	0% (-)	160 vtph	100 IN 60 OUT
664 vtph	530 vtph	20% (110)	420 vtph	180 IN 240 OUT
1090 vtph	870 vtph	25% (220)	650 vtph	330 IN 320 OUT

The assessed peak generation of existing uses on the site of 250 vtph is distributed as follows:

	AM*	PM
IN	200	50
OUT	50	200

** Note: The future morning peak generation will be less than the existing generation*

The projected distribution of future site generated traffic is as follows:

- west (Victoria) 35%
- east (Victoria) 35%
- north (Monash) 15%
- west (Buffalo) 10%
- south (Tennyson) 5%

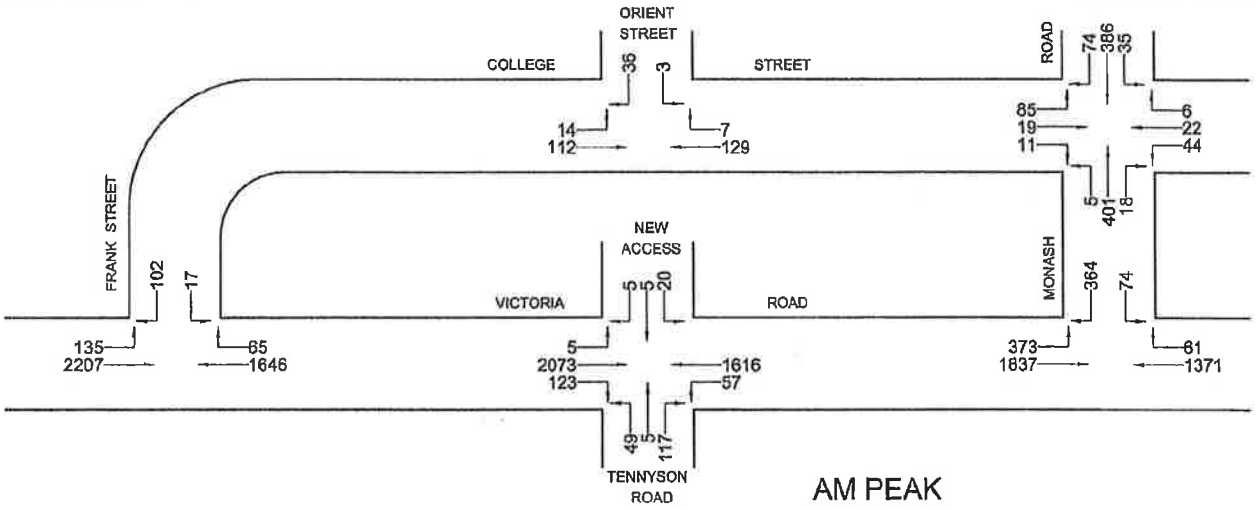
The future traffic circumstances have been 'constructed' with a process of:

- deleting the existing peak movements
- adjusting for passing trade access (on Victoria Road)
- adding the "additional" generated movements

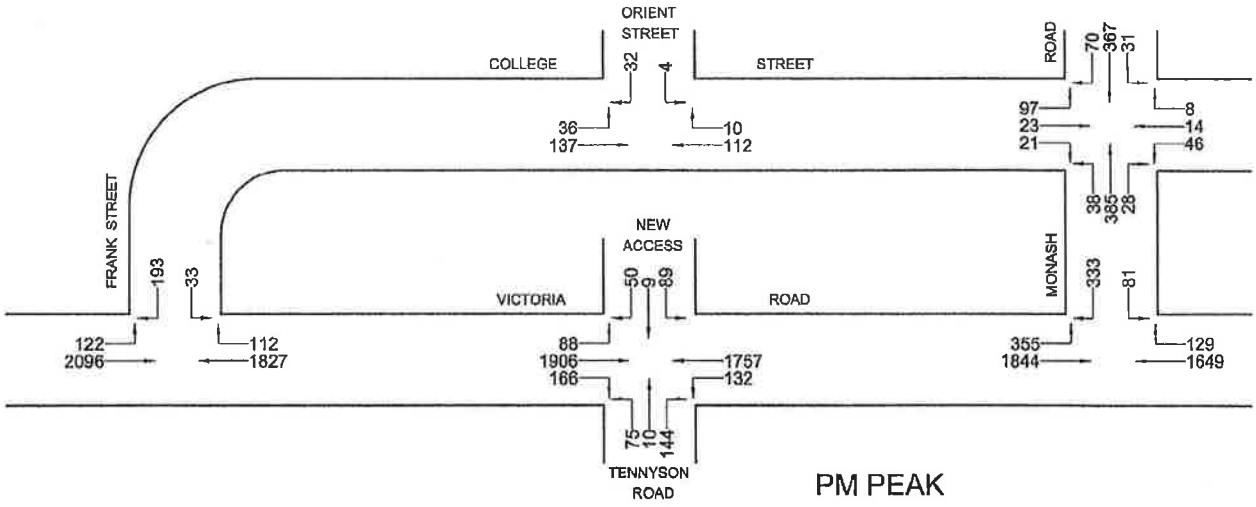
The projected future traffic volumes resultant to the proposed development (Figure 6) have been modelled using the SCATES program. For the proposed road geometry/intersection treatments as indicated on the Appendix C concept design. The results of this modelling indicating a satisfactory outcome are provided in Appendix F and are summarised in the following:

	AM		PM		WEMD	
	LOS	AVD	LOS	AVD	LOS	AVD
Victoria/Frank	A	6.9	A	12.7	A	10.8
Victoria/Tennyson	A	13.4	B	17.2	B	19.4
Victoria/Monash	B	15.0	A	13.8	B	17.3

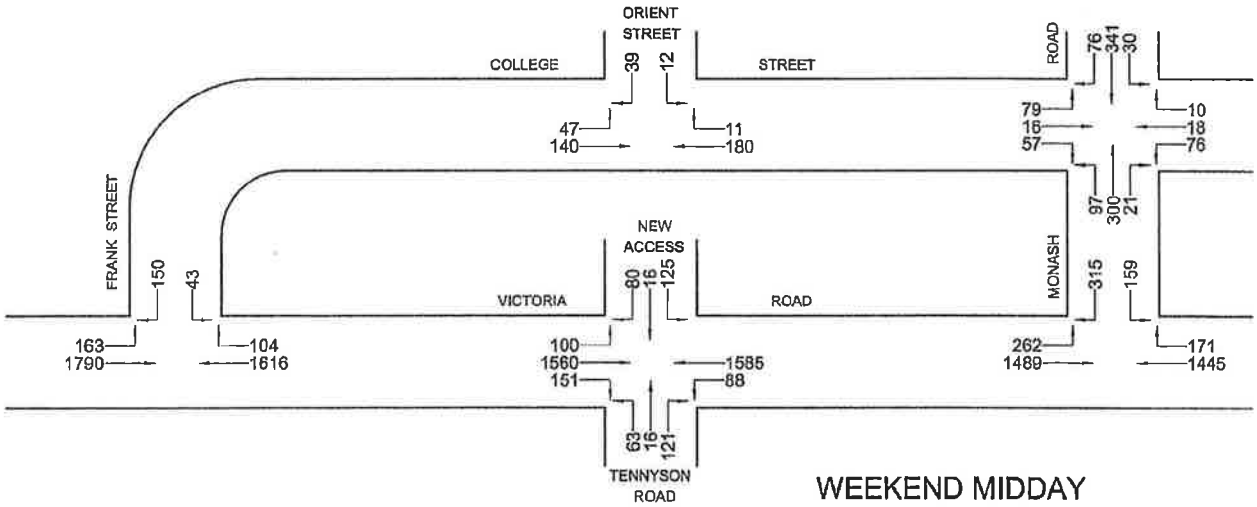
The SCATES file has been provided electronically to RMS (Gordon Trotter).



AM PEAK



PM PEAK



WEEKEND MIDDAY

LEGEND

PROJECTED FUTURE VOLUMES

FIG 6

5. PARKING

Ryde City Councils' Development Control Plan 2010 does not specify a parking provision for Hardware/Building Supplies or Bulky Goods use. RMS suggest parking provisions as follows:

Peak Parking (per 100 m²)

	Min	Max	Av
Larger Format Hardware	0.78	1.67	1.16
Bulky Goods		0.90	

Application of this criteria to the envisaged development would indicate the following:

Bunnings	15,255m² @ 1.67 spaces per 100m²	-	255 spaces
Bulky Goods	21,885m² @ 0.90 spaces per 100m²	-	198 spaces
	Total		**453 spaces**

It is proposed to provide a total of 895 spaces and this will be quite adequate to meet seasonal peak demands.

6. INTERNAL CIRCULATION AND SERVICING

Internal Circulation

Cars will access through the 3 available ingress/egress points and circulate through the central parking area. The design of the aisles and parking bays etc will accord with the design criteria of AS 2890.1 as well as Council's DCP and the circulation system will be very flexible due to the two-way traffic provisions.

Servicing

There will be internal circulation systems for cars and trucks which will largely be independent of each other. The larger trucks associated with the Bunnings Store and Bulky Goods will ingress through the access on Frank Street into the delivery areas. The departure route will follow along the northern side then through the general access to exit through the Access Road to the signal controlled Victoria Road intersection. The Bulky Goods deliveries will ingress by left turn from Victoria Road.

The design provisions for service vehicles will accord with the AS 2890.2 criteria and the requirements of all vehicles requiring to access the site.

7. ISSUES

Council has responded to the rezoning proposal and the documents which accompanied the application (including the Traffic and Parking Assessment Report) by letter dated 24.412. The issues contained in the letter were clarified during a meeting with Council Officers on 10 May 2012. Issues raised by Council in relation to Traffic Impact and Assessment and these are responded to in the following:

* *A traffic analysis of the local road network in the area. A traffic impact analysis that is limited to Victoria Road will not be acceptable to Council*

  This, unfortunately, is a misconception and indicates that the contents of this report were not fully recognised. Page 14 of the report identifies:

  - the projected distribution of generated traffic onto the both the arterial, collector and local roads which provide access to the site
  - the process in which the post development traffic volumes were established by deleting movements generated by the existing uses on the site and adding the movements generated by Bunnings

  The existing peak traffic movements (AM, PM and weekend) are identified on Figure 5 and include movements in Frank Street, Orient Street, Monash Road and Eltham Street. The comparative post development volumes are provided in Figure 6 for the same roads and intersections for the same peak periods (ie with the existing generated movements deleted and the Bunnings and Bulky Goods Retailing movements added).

  Comparison of this traffic volume data reveals that volumes on the local/collector road system will:

  - be less in the morning peak period
  - approximately the same in the afternoon peak

- somewhat more on the weekend peak

The volumes were not 'tracked' further afield (eg to Monash Road etc) as they are relatively minor and would simply dissipate further away from the site. There are three very relevant and important issues to consider in relation to the potential traffic impact on the local and collector road system namely:

- the existing development has its vehicle accesses (3) on Frank Street in the east-west section (west of Orient Street) whereas the proposed development will have no accesses in this area
- the existing development generates significant truck movements whereas Bunnings and Bulky Goods Retail components will have less truck movements and these will not travel along the east-west section of Frank Street or other local streets
- the existing development is only some 22,000m^2 whereas the "existing floorspace ratio controls of 1:1" would allow a redevelopment of up to 38,000m^2. Having regard to the permitted uses and the existing use "make up" an alternative redevelopment of the site could comprise:

Transport Logistics (60%) 22,800m^2 @ 0.5 per 100m^2	114 vtph
Office/Commercial (10%) 3,800m^2 @ 2.0 per 100m^2	76 vtph
Manufacturing Light Industry (10%) 3,800m^2 @1.0 per 100m^2	38 vtph
Gyms (10%) 3,800m^2 @ 6 per 100m^2	228 vtph
Child Care (5%) 1,900m^2 180 children @ 0.4	72 vtph
Vehicle Repair (5%) 1,900m^2 @ 1 per 100m^2	19 vtph
Total For AM and PM Peaks	**547 vtph**

This can be compared to the projected "additional" traffic generated by the proposed development of 160 vtph in the morning peak and 420 vtph in the evening peak. What is more this alternative development could retain all vehicle access on Frank Street the same as the existing development circumstances.

A "rule of thumb" approximation of "average daily traffic" flow is 10 times the average of the AM and PM flows. If this factor is applied to the existing and projected volumes (Figure 5 and 6) then the projected change in traffic flows will be as follows:

	Existing	Future
Orient Street	670	710 (+6%)
Frank Street (East of Orient Street)	2510	2570 (+2.4%)

In terms of "environmental capacity" these projected future volumes will not contravene the existing status of Orient Street (a local road) or Frank Street (a minor collector road). The outcome however with an alternative development scenario would be quite different and would most likely infringe the environmental capacity limits because the AADT traffic generation of the alternative development scenario would be much higher (ie the generation of Bunnings and Bulky Goods is quite low in the morning peak).

* *Consideration of the cumulative impacts of local traffic generating activities such as Ryde Aquatic Centre, Holy Cross College and the bus depot.*
The traffic impacts of local traffic generating activities including Ryde Aquatic Centre, Holy Cross College, the Bus Depot and the other existing uses are all reflected in the "base" traffic surveys relative to the peak Bunnings trading times. Some local activities may have higher traffic generation at other times however the highest cumulative impact is reflected in the periods where Bunnings and the on-street traffic peaks occur (eg PM commuter peak)

* *It must be demonstrated that the proposed traffic solution can be achieved at Tennyson Road intersection without the need encroach on the easement burdening 459 Victoria Road (adjoining car wash) or details of how the use of the easement will be obtained to facilitate the operation of this traffic solution.*
It is understood that this issue has arisen due to a comment offered by RMS. However there is no impediment (easement or otherwise) which would constrain the identified traffic solution for this intersection

* *The Catchment Area of the site to be further defined.*

Studies of existing Bunnings outlets have been undertaken to identify customer origins by questionnaire recording of Postcode place of residence. The results established a very unexpected diverse pattern which to some extent is explained by the "passing trade" element which is very similar in Bulky Goods retailing.

The Gladesville site has significant barriers for road access being the Parramatta River to the south and Lane Cove River and National Park to the north and east. The assessed distribution of generated traffic took some advice from the retail assessment for the site feasibility analysis however the assessed distribution was driven by:

- the nature and geography of the various access routes
- the "passing trade" characteristics (ie along Victoria Road)
- the barriers to the north, south and east
- the directness and ease of movement along the various access routes and the relative size of the "population pools" accessed
- the location of the site access points

The assessed route distribution is documented on page 13 of the report and if anything the distribution to/from Victoria Road is understated.

* *Consideration of the use of a Paramics model to be explored.*

It is understood that Council has had some recent experience with Paramics modeling and its complexities in relation to the developing North Ryde – Macquarie area. The Paramics model does not distribute traffic in itself, it either as Guide by "Journey to work data" or a prescribed distribution with factoring in relation to the nature and capacity of roads/intersections.

The circumstances for the proposed development are quite different particularly as the development will have adequate and traffic signal controlled access to/from Victoria Road. If the assessed distribution parameters were input to a

Paramics model, the output would essentially be no different to the assessment undertaken given:

- the simplicity of the assignment
- the absence of any constraints which would cause indirect diversion
- the strong 'passing trade' influence
- the absence of any specific origin/destination data for traffic which would be generated

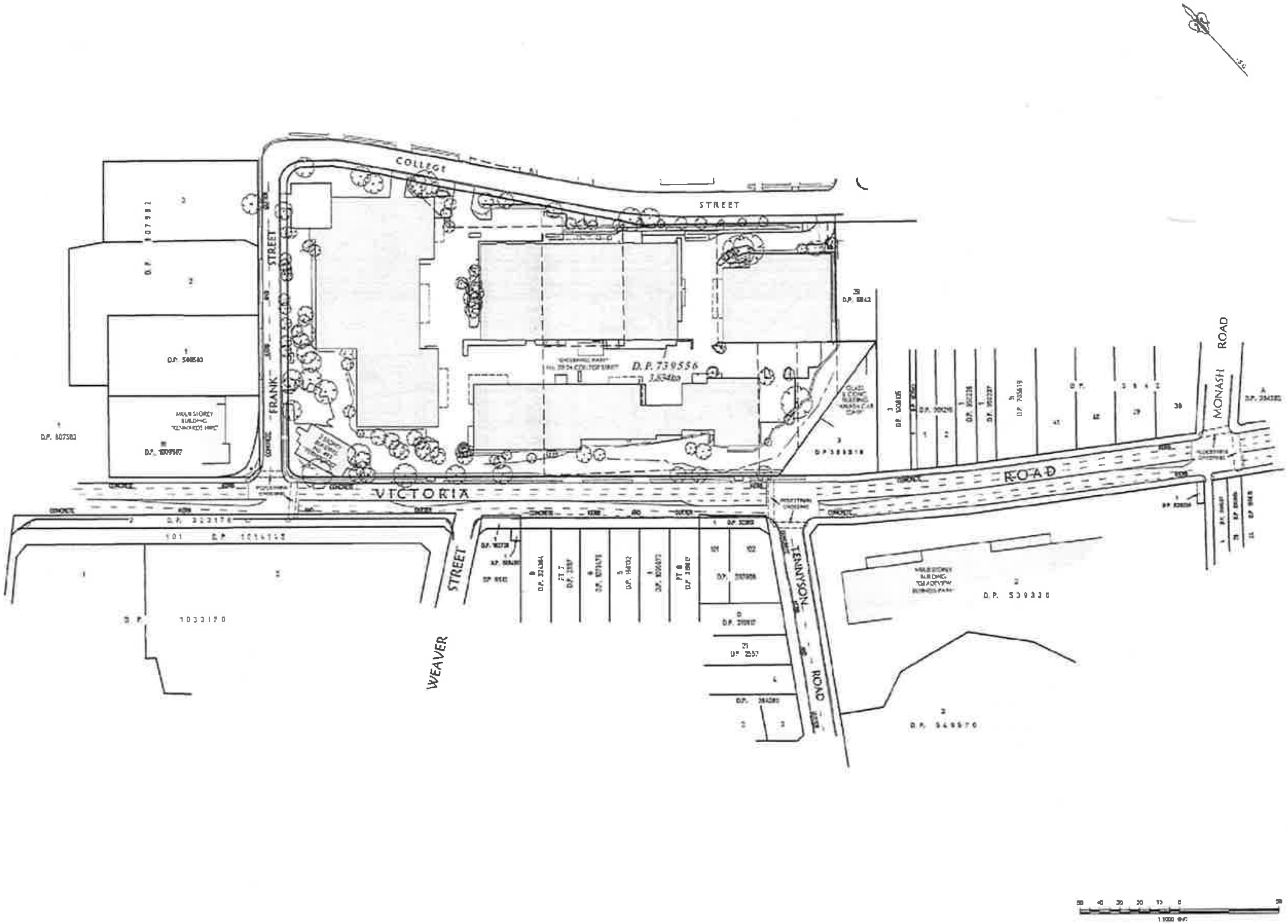
8. CONCLUSION

The proposed rezoning to permit Hardware/Building Supplies and Bulky Goods development at Gladesville will utilise the relatively large site which has convenient access to the arterial road system. This assessment has concluded that the envisaged development in terms of vehicle access, circulation, parking and servicing is appropriate and that there will not be any adverse traffic impacts on the road system serving the site.

Appendix A

EXISTING ROAD AND INTERSECTION ARRANGEMENTS

A1



Notes:

PLAN SHOWING APPROXIMATE LOCATION OF KERBS AND BOUNDARIES ALONG VICTORIA ROAD, FRANK STREET AND TENNYSON ROAD, GLADESVILLE

A.J.W. SECURITIES

Scale 1:1000 | Date 12.01.2011 | L.G.A. RYDE

Drawn R.H. | Checked D.B.

CRAIG & RHODES
SURVEYORS PLANNERS CIVIL & STRUCTURAL ENGINEERS

191-10

191074 [00]

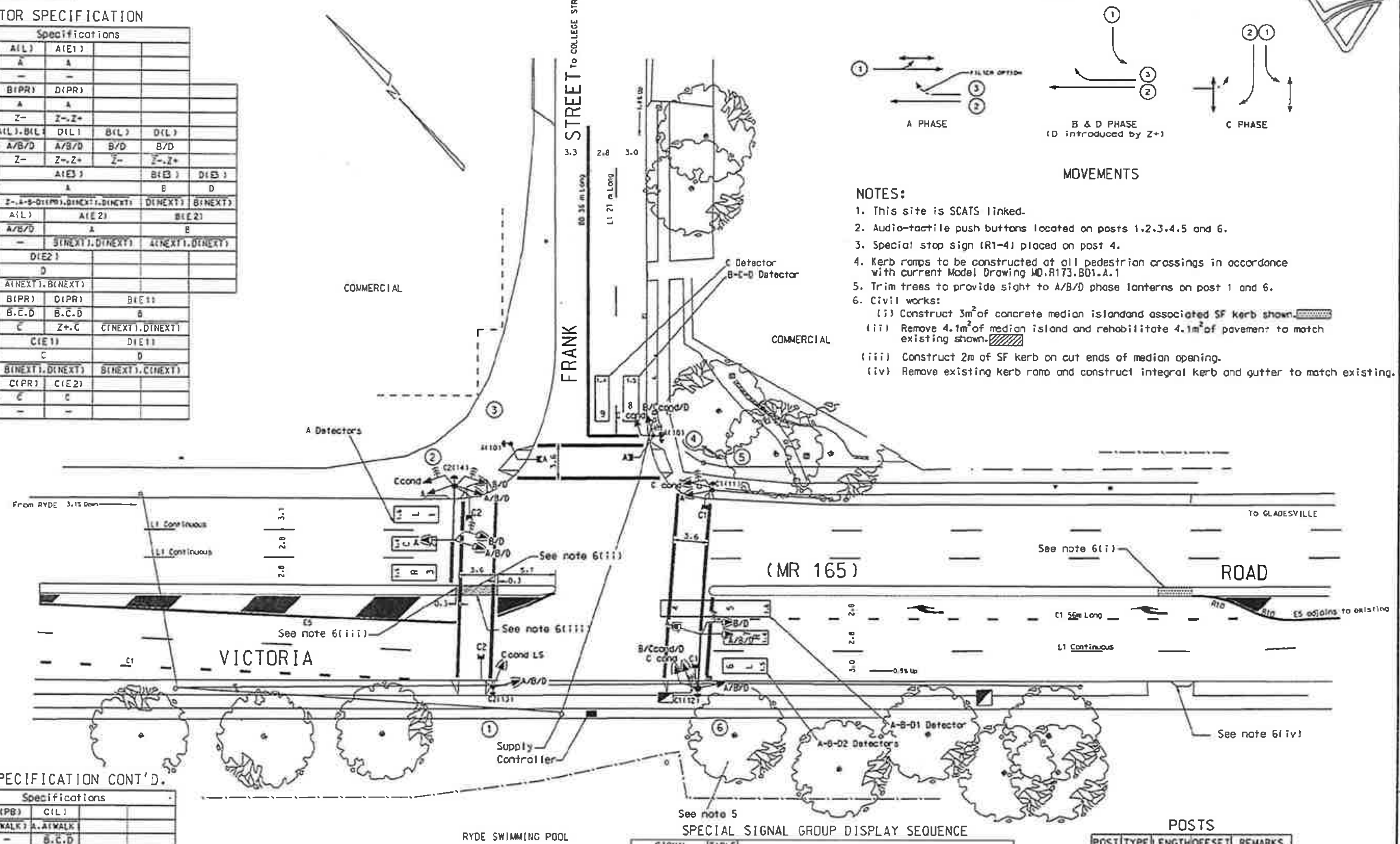
DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 28/09/62

RTA

DETECTOR SPECIFICATION

Detector		Specifications				
A	FN	A(L)	A(E1)			
	SG/PS	A	A			
	DS	–	–			
A-B-D1 Depart. & Approach	FN	B(PR)	D(PR)			
	SG/PS	A	A			
	DS	Z–	Z–.Z+			
A-B-D1 Approach	FN	A(L).B(L)	D(L)	B(L)	D(L)	
	SG/PS	A/B/D	A/B/D	B/D	B/D	
	DS	Z–	Z–.Z+	Z–	Z–.Z+	
cont. A-B-D1 Approach	FN	A(E3)			B(E3)	D(E3)
	SG/PS	A			B	D
	DS	Z–.A-B-D1(PR).D(NEXT).D(NEXT)			D(NEXT)	B(NEXT)
A-B-D2	FN	A(L)	A(E2)		B(E2)	
	SG/PS	A/B/D	A		B	
	DS	–	B(NEXT).D(NEXT)		A(NEXT).D(NEXT)	
cont. A-B-D2	FN	D(E2)				
	SG/PS	D				
	DS	A(NEXT).B(NEXT)				
B-C-D	FN	B(PR)	D(PR)	B(E1)		
	SG/PS	B.C.D	B.C.D	B		
	DS	C	Z+.C	C(NEXT).D(NEXT)		
cont. B-C-D	FN	C(E1)		D(E1)		
	SG/PS	C		D		
	DS	B(NEXT).D(NEXT)		B(NEXT).C(NEXT)		
C	FN	C(PR)	C(E2)			
	SG/PS	C	C			
	DS	–	–			



NOTES:

1. This site is SCATS linked.
2. Audio-tactile push buttons located on posts 1.2.3.4.5 and 6.
3. Special stop sign (R1-4) placed on post 4.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with current Model Drawing MD.R173.B01.A.1
5. Trim trees to provide sight to A/B/D phase lanterns on post 1 and 6.
6. Civil works:
   - (i) Construct 3m² of concrete median islandand associated SF kerb shown.
   - (ii) Remove 4.1m² of median island and rehabilitate 4.1m² of pavement to match existing shown.
   - (iii) Construct 2m of SF kerb on cut ends of median opening.
   - (iv) Remove existing kerb ramp and construct integral kerb and gutter to match existing.

DETECTOR SPECIFICATION CONT'D.

Detector		Specifications	
A P.B.	FN	A(PB)	C(L)
	SG/PS	A(WALK)	A.A(WALK)
	DS	–	B.C.D
C1 P.B.	FN	C(PB)	A(L)
	SG/PS	C1(WALK)	C.C1(WALK)
	DS	–	A.B.D
C2 P.B.	FN	C(PB)	A(L)
	SG/PS	C2(WALK)	C.C2(WALK)
	DS	–	A.B.D

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/D	3	—
B/D (RT)	35	Timed R.A. protection for A peds. Z- Filter option.
B/C Cond/D(LT)	77	Timed R.A. protection for C1 pedestrians. Δ
C Cond (LT)	23	Timed R.A. protection for A peds.
Cond	74	Timed red aspect protection for C2 pedestrian. ≠

Δ Pushbutton on post 5 extends R.A. subject to timer.
≠ Pushbutton on post 2 extends R.A. subject to timer.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	5XL	–	1.0	EXISTING
3	2	3.2	1.0	EXISTING
4	2	4.1	0.6	EXISTING
5	2	4.1	0.6	EXISTING
6	5XL	–	1.0	EXISTING

DESIGN APPROVAL — APPROVED — MANAGER PROJECT DESIGN SERVICES — DATE 27.12.04
RTA ACCEPTANCE — RECOMMENDED — ACCEPTED
DESIGN PREPARED BY PROJECT DESIGN SERVICES RTA OPERATIONS
DESIGNED: D. STEFANOVSKI
CHECKED: A. IRONSIDE

Roads and Traffic Authority.N.S.W

RYDE COUNCIL AREA
TRAFFIC SIGNALS AT
VICTORIA ROAD (MR 165) AND FRANK STREET
RYDE

DESIGN LAYOUT — TCS No 1987

EXISTING ☒ PROPOSED ☐
CADD FILE: vv1987_9D.dgn
SCALE 1:200
FILE 387 TS 300 — SUPERSEDES SHEET/ISSUE 9C
ISSUE D
REGN. 0165.387.VV.1987 — SHEET 9

A ORIGINAL ISSUE

0165.387.VV.1987

Date in Service 24-4-85

LOCALITY SKETCH

NOT TO SCALE

POST CHART

POST	TYPE	LENGTH	REMARKS
1	2	4·1	EXISTING
2	2	4·1	EXISTING
3	2	4·1	EXISTING
4	2	4·1	EXISTING
5	2	4·1	EXISTING
6	2	4·1	EXISTING
7	2	4·1	EXISTING
8	2	3·2	EXISTING

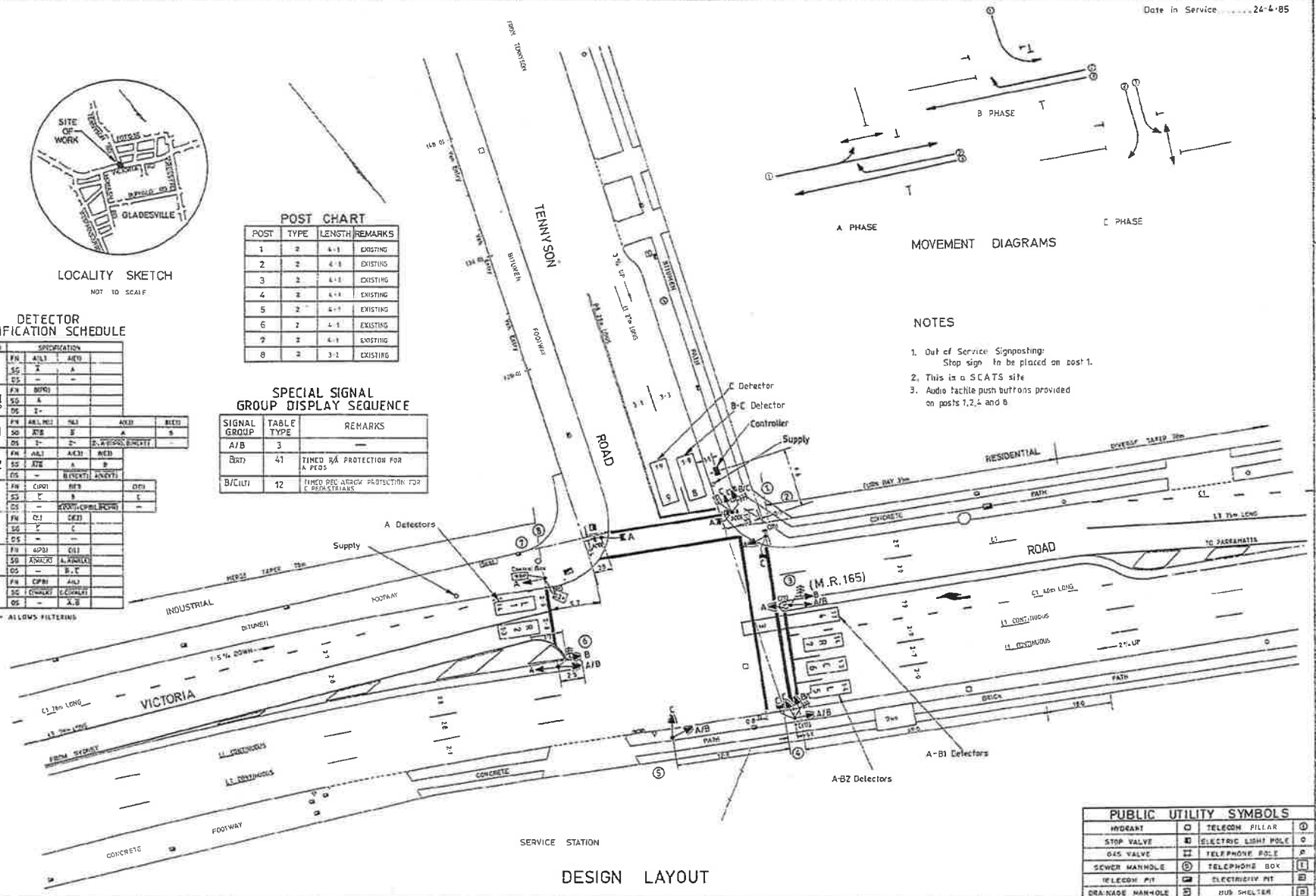
SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B	3	—
B(1T)	41	TIMED R/A PROTECTION FOR A PEDS
B/C(1T)	12	TIMED REC ARROW PROTECTION FOR C PEDESTRIANS

DETECTOR SPECIFICATION SCHEDULE

DETECTOR	SPECIFICATION				
A	PN	A(1)	A(1)		
	SG	2	A		
	OS	—	—		
A-B1 APP. DEP	PN	B(PD)			
	SG	A			
	OS	2*			
A-B1 APP.	PN	A&B(1)	B(1)	A&B	B(1)
	SG	A/B	B	A	B
	OS	2*	2*	2*, A-B DOUBLE DIRECTN	—
A-B2	PN	A&B	A(2)	B(2)	
	SG	A/B	A	B	
	OS	—	B (VEHT)	A (VEHT)	
B-C	PN	C(PD)	B(1)		D(1)
	SG	C	B		C
	OS	—	B (VEHT) + C(PED)		—
C	PN	C(1)	D(2)		
	SG	C	C		
	OS	—	—		
A PR	PN	A(PB)	D(1)		
	SG	A (MACRO)	A, A (MACRO)		
	OS	—	B, C		
C PD	PN	C(PB)	A&B		
	SG	C (MACRO)	C, C (MACRO)		
	OS	—	A, B		

2* ALLOWS FILTERING



MOVEMENT DIAGRAMS

NOTES

1. Out of Service Signposting: Stop sign to be placed on post 1.
2. This is a SCATS site
3. Audio tactile push buttons provided on posts 1, 2, 4 and 8

DESIGN LAYOUT

PUBLIC UTILITY SYMBOLS

HYDRANT		TELECOM PILLAR	
STOP VALVE		ELECTRIC LIGHT POLE	
G&S VALVE		TELEPHONE POLE	
SEWER MANHOLE		TELEPHONE BOX	
TELECOM PIT		ELECTRICITY PIT	
DRAINAGE MANHOLE		BUS SHELTER	

A ORIGINAL ISSUE

REFERENCE PLANS		SURVEYOR R.V. RYAN
Tyndale & Ada	10000-6	PLD. ex. DET.18 2970
Gladesville Pad	10000-8	U.S.D. 827 ex. I.S.
Det. Pit Modules (1 ea)	10001-7	DESIGNED D. HELFAN
		CHECKED
		PASSED

THESE DRAWINGS HAVE BEEN TAKEN TO SUIT SITE OF THE WORK AND ARE RECOMMENDED

SUPERVISING ENGINEER

DATE 24/10/84

APPROVED

DIVISIONAL ENGINEER

DATE 24/10/84

ROADS & TRAFFIC AUTHORITY OF N.S.W.

MUNICIPALITY OF RYDE
VICTORIA ROAD
AND
TENNYSON ROAD
GLADESVILLE

CENTRAL REGION

FILE N°	N° OF SHEETS	SHEET N°	SUPERSEDES
387.TS.143		1	ISSUE

SCALE 1:700

Reg N° 0165.387.VV.1677

SD 9238 - TRAFFIC CONTROL SYSTEM LAYOUT DRAWING SHEET ISSUED FEB 1977

VV 1677

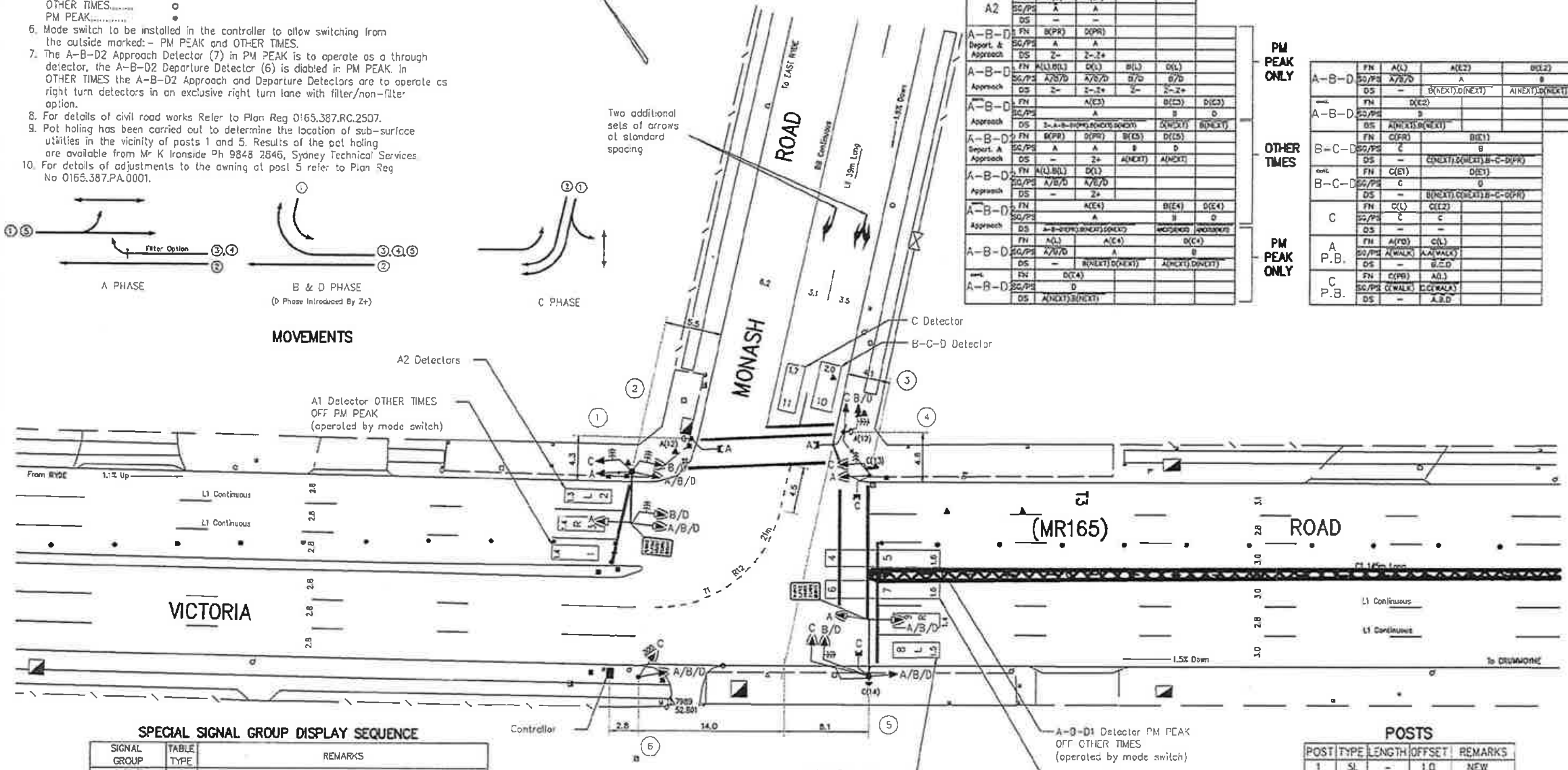
SHEET 2.

DRAWN BY CADD
DO NOT AMEND MANUALLY

NOTES

1. This site is SCATS linked.
2. Push buttons on posts 4 and 5 are audio tactile.
3. Special stop sign (R1–202) placed on post 3.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with fig 8 of AS 1428.1–1993. tactile ground tiles to be excluded from the ramps.
5. Candy bar locations shown as:–
   OTHER TIMES........ o
   PM PEAK........... •
6. Mode switch to be installed in the controller to allow switching from the outside marked:– PM PEAK and OTHER TIMES.
7. The A–B–D2 Approach Detector (7) in PM PEAK is to operate as a through detector, the A–B–D2 Departure Detector (6) is diabled in PM PEAK. In OTHER TIMES the A–B–D2 Approach and Departure Detectors are to operate as right turn detectors in an exclusive right turn lane with filter/non–filter option.
8. For details of civil road works Refer to Plan Reg 0165.387.RC.2507.
9. Pot holing has been carried out to determine the location of sub-surface utilities in the vicinity of posts 1 and 5. Results of the pot holing are available from Mr K Ironside Ph 9848 2846, Sydney Technical Services
10. For details of adjustments to the awning at post 5 refer to Plan Reg No 0165.387.PA.0001.

DATE IN SERVICE : 23/12/65



DETECTOR SPECIFICATION

Detector		Specifications					
A1	FN	A(L)	A(C5)				OTHER TIMES
	SG/PS	A	A				
	DS	–	–				
A2	FN	A(L)	A(E1)				
	SG/PS	A	A				
	DS	–	–				
A–B–D1 Depart. & Approach	FN	B(PR)	D(PR)				PM PEAK ONLY
	SG/PS	A	A				
	DS	Z–	Z–,Z+				
A–B–D1 Approach	FN	A(L),B(L)	D(L)	B(L)	D(L)		
	SG/PS	A/B/D	A/B/D	B/D	B/D		
	DS	Z–	Z–,Z+	Z–	Z–,Z+		
A–B–D1 Approach	FN	A(C3)			B(C3)	D(C3)	
	SG/PS	A			B	D	
	DS	Z–,A–B–D1(PR),B(NEXT),D(NEXT)			D(NEXT)	B(NEXT)	
A–B–D2 Depart. & Approach	FN	B(PR)	D(PR)	B(C5)	D(C5)		OTHER TIMES
	SG/PS	A	A	B	D		
	DS	–	Z+	A(NEXT)	A(NEXT)		
A–B–D2 Approach	FN	A(L),B(L)	D(L)				
	SG/PS	A/B/D	A/B/D				
	DS	–	Z+				
A–B–D2 Approach	FN	A(E4)			B(E4)	D(E4)	
	SG/PS	A			B	D	
	DS	A–B–D1(PR),B(NEXT),D(NEXT)			A(NEXT),B(NEXT)	A(NEXT),D(NEXT)	
A–B–D2	FN	A(L)	A(C4)		D(C4)		PM PEAK ONLY
	SG/PS	A/B/D	A		B		
	DS	–	B(NEXT),D(NEXT)		A(NEXT),D(NEXT)		
A–B–D2	FN	D(C4)					
	SG/PS	D					
	DS	A(NEXT),B(NEXT)					
A–B–D3	FN	A(L)	A(E2)		D(E2)		PM PEAK ONLY
	SG/PS	A/B/D	A		B		
	DS	–	B(NEXT),D(NEXT)		A(NEXT),D(NEXT)		
A–B–D3	FN	D(E2)					
	SG/PS	D					
	DS	A(NEXT),B(NEXT)					
B–C–D	FN	C(FR)	B(E1)				OTHER TIMES
	SG/PS	C	B				
	DS	–	C(NEXT),D(NEXT),B–C–D(FR)				
B–C–D	FN	C(E1)	D(E1)				
	SG/PS	C	D				
	DS	–	B(NEXT),C(NEXT),B–C–D(FR)				
C	FN	C(L)	C(E2)				
	SG/PS	C	C				
	DS	–	–				
A P.B.	FN	A(FD)	C(L)				PM PEAK ONLY
	SG/PS	A(WALK)	A,A(WALK)				
	DS	–	B,C,D				
C P.B.	FN	C(PB)	A(L)				
	SG/PS	C(WALK)	C,C(WALK)				
	DS	–	A,B,D				

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/D	3	—
B/D (RT)	39	Timed R.A. protection for 'A' pedestrians. Z– filter option.
B/D (LT)	12	Timed R.A. protection for 'C' pedestrians. P.B. on post 5 extends protection subject to timer.
C (LT)	21	Timed R.A. protection for 'A' pedestrians.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	SL	–	1.0	NEW
2	2	3.2	0.6	NEW
3	2	4.1	0.8	EXIST
4	2	4.1	0.6	EXIST
5	SXL	–	1.0	NEW
6	2	4.1	1.0	EXIST

A ORIGINAL ISSUE

APPROVED
NAME F. D. REID
MANAGER URBAN
POSITION CIVIL DESIGN
DATE 6/3/2000

THIS DRAWING IS RECOMMENDED FOR ACCEPTANCE
NETWORK OPERATIONS TEAM LEADER
ACCEPTED
DATE 6/3/2000

DESIGNED S.HANLEY
CHECKED K.IRONSIDE
SITE CHECKED
RECOMMENDED A.DOUTCHOIK
SURVEYOR G.F.VANDERBURG

Roads and Traffic Authority,N.S.W

RYDE COUNCIL AREA
TRAFFIC SIGNALS AT
VICTORIA (MR165) ROAD AND MONASH ROAD
GLADESVILLE

DESIGN LAYOUT — TCS No. 366

DESIGN OFFICE PARRAMATTA – SYDNEY TECHNICAL SERVICES
CADD FILE: VV0366_10A.dgn
SCALE (1:200)
FILE 387 TS 142
ISSUE A
REGN 0165.387.VV.0366
SHEET 10

0165.387.VV.0366

Appendix B

TRAFFIC SURVEY RESULTS

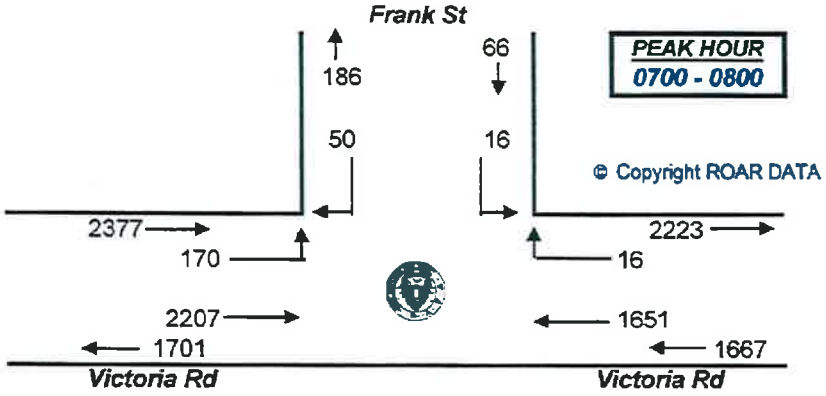
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A
Job No/Name : 3737 GLADESVILLE Traffic Counts
Day/Date : Monday 29th August 2011

All Vehicles	WEST		NORTH		EAST		
	Victoria Rd		*Frank St*		*Victoria Rd*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0700 - 0715	49	615	5	1	345	3	**1018**
0715 - 0730	53	562	11	4	416	5	**1051**
0730 - 0745	37	573	16	5	457	3	**1091**
0745 - 0800	31	457	18	6	433	5	**950**
0800 - 0815	41	473	19	3	401	10	**947**
0815 - 0830	53	481	26	10	388	10	**968**
0830 - 0845	32	450	34	12	393	20	**941**
0845 - 0900	37	483	21	12	346	7	**906**
Period End	**333**	**4094**	**150**	**53**	**3179**	**63**	**7872**

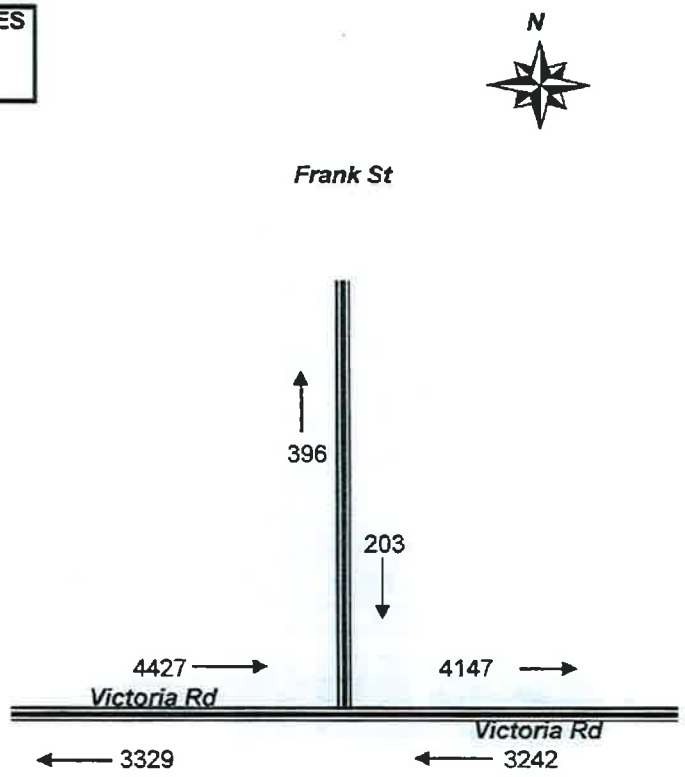
	WEST		NORTH		EAST		
	Victoria Rd		*Frank St*		*Victoria Rd*		
Peak Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0700 - 0800	170	2207	50	16	1651	16	**4110**
0715 - 0815	162	2065	64	18	1707	23	**4039**
0730 - 0830	162	1984	79	24	1679	28	**3956**
0745 - 0845	157	1861	97	31	1615	45	**3806**
0800 - 0900	163	1887	100	37	1528	47	**3762**

PEAK HR	**170**	**2207**	**50**	**16**	**1651**	**16**	**4110**



PEAK HOUR
0700 - 0800

TOTAL VOLUMES FOR COUNT PERIODS



R.O.A.R. DATA

Reliable, Original & Authentic Results

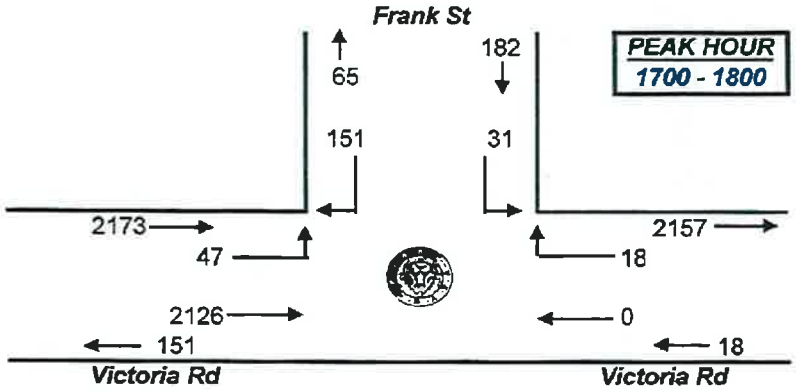
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.
Job No/Name : 3259 GLADESVILLE Victoria Rd
Day/Date : Friday 27th & Saturday 28th August 2010

All Vehicles — FRI

Time Per	WEST Victoria Rd L	WEST Victoria Rd T	NORTH Frank St R	NORTH Frank St L	EAST Victoria Rd T	EAST Victoria Rd R	TOTAL
1530 - 1545	19	337	38	10		4	408
1545 - 1600	10	400	32	6		5	453
1600 - 1615	12	419	46	13		3	493
1615 - 1630	9	461	25	4		1	500
1630 - 1645	13	481	37	6		2	539
1645 - 1700	14	483	30	10		6	543
1700 - 1715	12	512	63	10		3	600
1715 - 1730	12	570	44	7		3	636
1730 - 1745	8	527	22	11		5	573
1745 - 1800	15	517	22	3		7	564
1800 - 1815	17	480	36	4		8	545
1815 - 1830	20	477	19	4		5	525
Period End	161	5664	414	88	0	52	6379

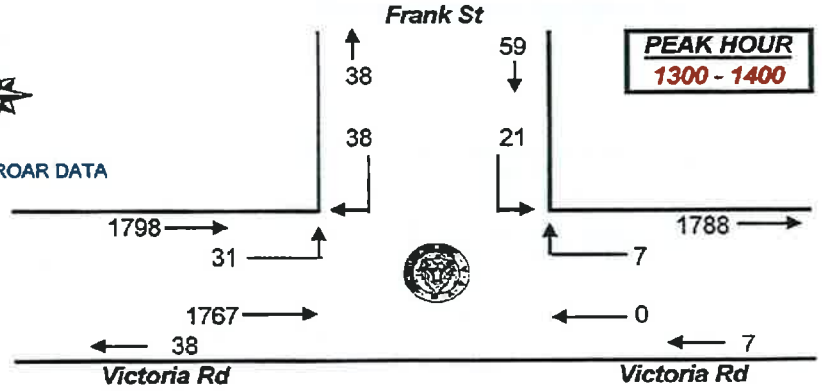
Peak Per	WEST Victoria Rd L	WEST Victoria Rd T	NORTH Frank St R	NORTH Frank St L	EAST Victoria Rd T	EAST Victoria Rd R	TOTAL
1530 - 1630	50	1617	141	33	0	13	1854
1545 - 1645	44	1761	140	29	0	11	1985
1600 - 1700	48	1844	138	33	0	12	2075
1615 - 1715	48	1937	155	30	0	12	2182
1630 - 1730	51	2046	174	33	0	14	2318
1645 - 1745	46	2092	159	38	0	17	2352
1700 - 1800	47	2126	151	31	0	18	2373
1715 - 1815	52	2094	124	25	0	23	2318
1730 - 1830	60	2001	99	22	0	25	2207
PEAK HR	47	2126	151	31	0	18	2373



All Vehicles — SAT

Time Per	WEST Victoria Rd L	WEST Victoria Rd T	NORTH Frank St R	NORTH Frank St L	EAST Victoria Rd T	EAST Victoria Rd R	TOTAL
1200 - 1215	8	444	13	5		2	472
1215 - 1230	10	458	15	6		2	491
1230 - 1245	9	438	5	7		0	459
1245 - 1300	7	415	4	7		4	437
1300 - 1315	10	432	7	6		0	455
1315 - 1330	7	456	6	1		3	473
1330 - 1345	8	445	10	6		1	470
1345 - 1400	6	434	15	8		3	466
1400 - 1415	11	402	15	7		0	435
1415 - 1430	2	432	4	4		3	445
1430 - 1445	11	429	8	6		2	456
1445 - 1500	11	415	12	3		0	441
Period End	100	5200	114	66	0	20	5500

Peak Per	WEST Victoria Rd L	WEST Victoria Rd T	NORTH Frank St R	NORTH Frank St L	EAST Victoria Rd T	EAST Victoria Rd R	TOTAL
1200 - 1300	34	1755	37	25	0	8	1859
1215 - 1315	36	1743	31	26	0	6	1842
1230 - 1330	33	1741	22	21	0	7	1824
1245 - 1345	32	1748	27	20	0	8	1835
1300 - 1400	31	1767	38	21	0	7	1864
1315 - 1415	32	1737	46	22	0	7	1844
1330 - 1430	27	1713	44	25	0	7	1816
1345 - 1445	30	1697	42	25	0	8	1802
1400 - 1500	35	1678	39	20	0	5	1777
PEAK HR	31	1767	38	21	0	7	1864



R.O.A.R. DATA

Reliable, Original & Authentic Results

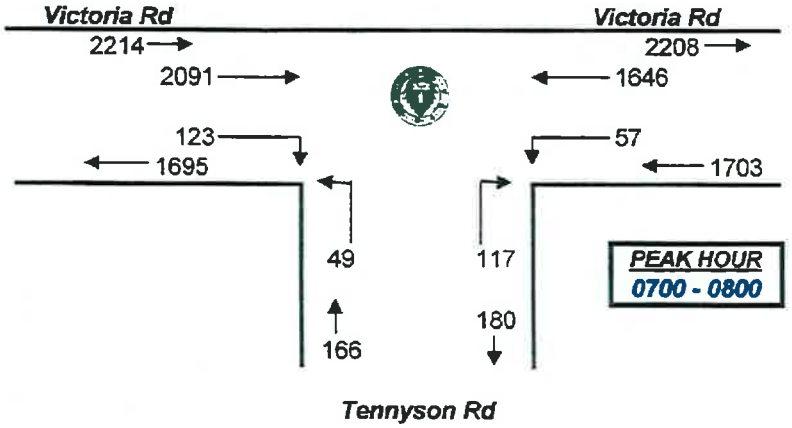
Ph.88196847, Fax 88196849, Mob.0418-239019

Client	: T.T.P.A
Job No/Name	: 3737 GLADESVILLE Traffic Counts
Day/Date	: Monday 29th August 2011

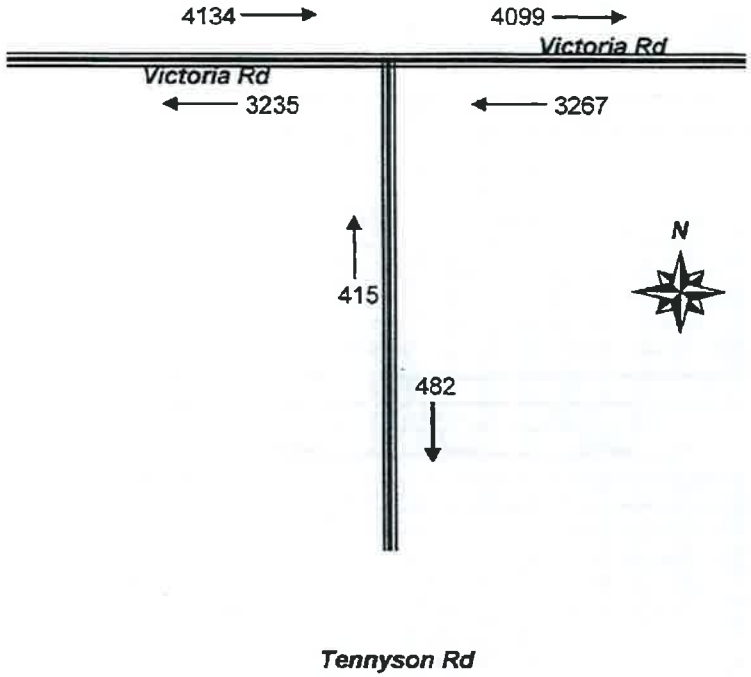
All Vehicles	WEST		SOUTH		EAST		
	Victoria Rd		*Tennyson Rd*		*Victoria Rd*		
Time Per	**T**	**R**	**L**	**R**	**L**	**T**	**TOTAL**
0700 - 0715	544	25	7	28	10	388	**1002**
0715 - 0730	558	32	17	33	11	392	**1043**
0730 - 0745	535	24	14	31	14	429	**1047**
0745 - 0800	454	42	11	25	22	437	**991**
0800 - 0815	439	40	17	40	23	384	**943**
0815 - 0830	426	42	20	41	24	356	**909**
0830 - 0845	430	56	26	40	24	391	**967**
0845 - 0900	423	64	13	52	29	333	**914**
Period End	**3809**	**325**	**125**	**290**	**157**	**3110**	**7816**

	WEST		SOUTH		EAST		
	Victoria Rd		*Tennyson*		*Victoria Rd*		
Peak Per	**T**	**R**	**L**	**R**	**L**	**T**	**TOTAL**
0700 - 0800	2091	123	49	117	57	1646	**4083**
0715 - 0815	1986	138	59	129	70	1642	**4024**
0730 - 0830	1854	148	62	137	83	1606	**3890**
0745 - 0845	1749	180	74	146	93	1568	**3810**
0800 - 0900	1718	202	76	173	100	1464	**3733**

PEAK HR	**2091**	**123**	**49**	**117**	**57**	**1646**	**4083**



TOTAL VOLUMES FOR COUNT PERIODS



R.O.A.R. DATA

Reliable, Original & Authentic Results

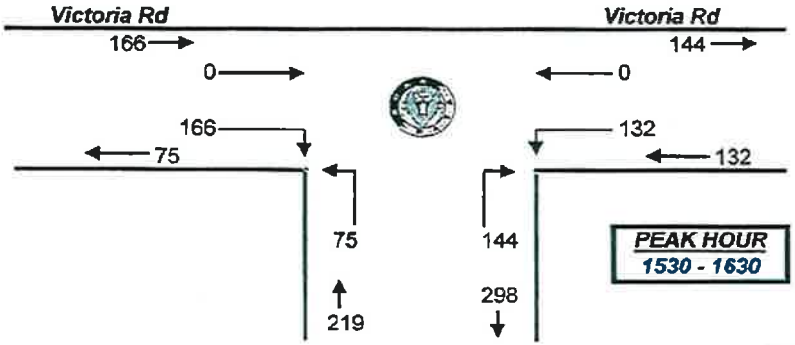
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.
Job No/Name : 3259 GLADESVILLE Victoria Rd
Day/Date : Friday 27th & Saturday 28th August 2010

All Vehicles

	WEST		SOUTH		EAST		
	Victoria Rd		Tennyson		Victoria Rd		FRI
Time Per	R	T	L	R	T	L	TOTAL
1530 - 1545	44		27	30		35	136
1545 - 1600	44		12	34		39	129
1600 - 1615	46		19	45		31	141
1615 - 1630	32		17	35		27	111
1630 - 1645	37		25	35		24	121
1645 - 1700	45		25	39		21	130
1700 - 1715	20		25	35		25	105
1715 - 1730	38		25	33		33	129
1730 - 1745	28		19	46		26	119
1745 - 1800	41		18	38		30	127
1800 - 1815	35		12	39		19	105
1815 - 1830	29		16	39		25	109
Period End	439	0	240	448	0	335	1462

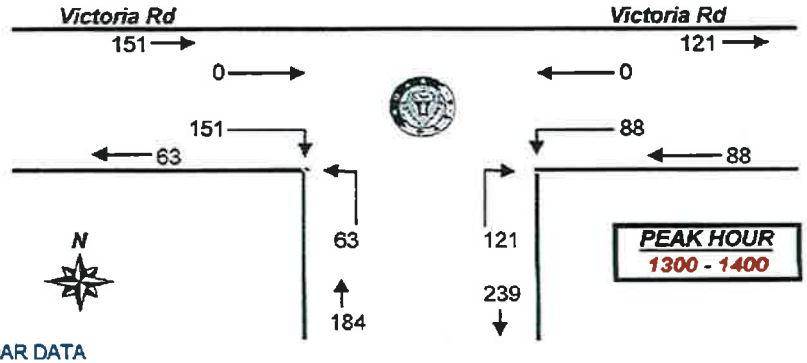
	WEST		SOUTH		EAST		
	Victoria Rd		Tennyson		Victoria Rd		
Peak Per	R	T	L	R	T	L	TOTAL
1530 - 1630	166	0	75	144	0	132	517
1545 - 1645	159	0	73	149	0	121	502
1600 - 1700	160	0	86	154	0	103	503
1615 - 1715	134	0	92	144	0	97	467
1630 - 1730	140	0	100	142	0	103	485
1645 - 1745	131	0	94	153	0	105	483
1700 - 1800	127	0	87	152	0	114	480
1715 - 1815	142	0	74	156	0	108	480
1730 - 1830	133	0	65	162	0	100	460
PEAK HR	166	0	75	144	0	132	517



All Vehicles

	WEST		SOUTH		EAST		
	Victoria Rd		Tennyson		Victoria Rd		SAT
Time Per	R	T	L	R	T	L	TOTAL
1200 - 1215	26		16	45		24	111
1215 - 1230	25		12	38		21	96
1230 - 1245	29		18	32		19	98
1245 - 1300	23		9	34		27	93
1300 - 1315	34		17	30		20	101
1315 - 1330	34		17	27		19	97
1330 - 1345	40		14	26		33	113
1345 - 1400	43		15	38		16	112
1400 - 1415	22		11	19		17	69
1415 - 1430	26		11	24		15	76
1430 - 1445	27		14	33		14	88
1445 - 1500	33		13	35		23	104
Period End	362	0	167	381	0	248	1158

	WEST		SOUTH		EAST		
	Victoria Rd		Tennyson		Victoria Rd		
Peak Per	R	T	L	R	T	L	TOTAL
1200 - 1300	103	0	55	149	0	91	398
1215 - 1315	111	0	56	134	0	87	388
1230 - 1330	120	0	61	123	0	85	389
1245 - 1345	131	0	57	117	0	99	404
1300 - 1400	151	0	63	121	0	88	423
1315 - 1415	139	0	57	110	0	85	391
1330 - 1430	131	0	51	107	0	81	370
1345 - 1445	118	0	51	114	0	62	345
1400 - 1500	108	0	49	111	0	69	337
PEAK HR	151	0	63	121	0	88	423



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

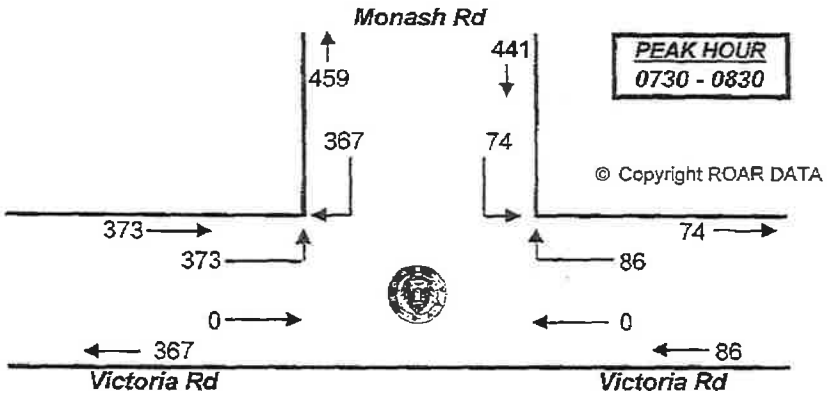
Client : T.T.P.A
Job No/Name : 3784 GLADESVILLE College St
Day/Date : Friday 23rd September 2011

All Vehicles

	WEST		NORTH		EAST		
	Victoria Rd		*Monash Rd*		*Victoria Rd*		
Time Per	L	T	R	L	T	R	TOTAL
0700 - 0715	109		59	18		14	200
0715 - 0730	87		83	19		25	214
0730 - 0745	97		103	23		16	239
0745 - 0800	101		82	10		26	0
0800 - 0815	95		87	19		19	220
0815 - 0830	80		95	22		25	222
0830 - 0845	83		91	27		30	231
0845 - 0900	82		68	21		23	194
Period End	734	0	668	159	0	178	1520

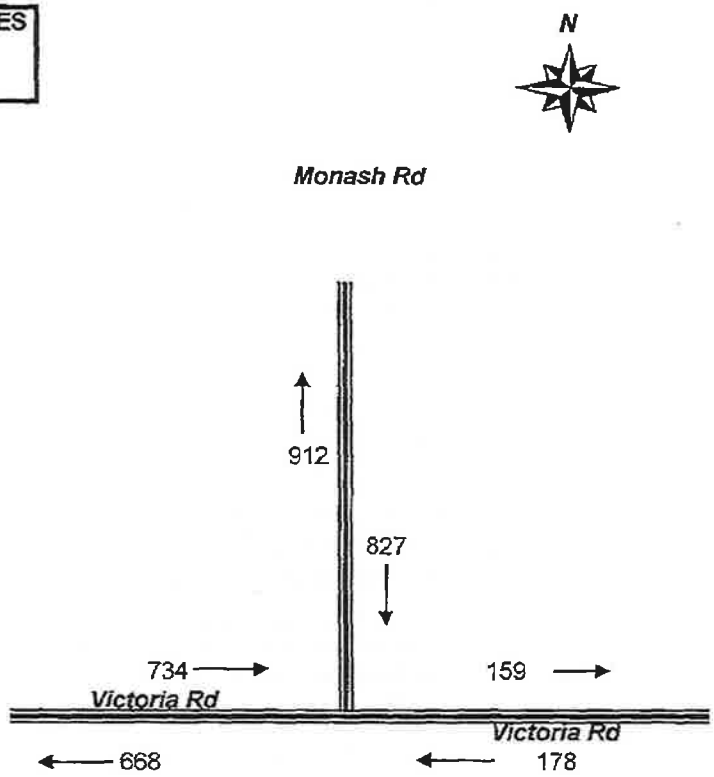
	WEST		NORTH		EAST		
	Victoria Rd		*Monash Rd*		*Victoria Rd*		
Peak Per	L	T	R	L	T	R	TOTAL
0700 - 0800	394	0	327	70	0	81	872
0715 - 0815	380	0	355	71	0	86	892
0730 - 0830	373	0	367	74	0	86	900
0745 - 0845	359	0	355	78	0	100	892
0800 - 0900	340	0	341	89	0	97	867

PEAK HR	373	0	367	74	0	86	900



PEAK HOUR
0730 - 0830

TOTAL VOLUMES FOR COUNT PERIODS



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.

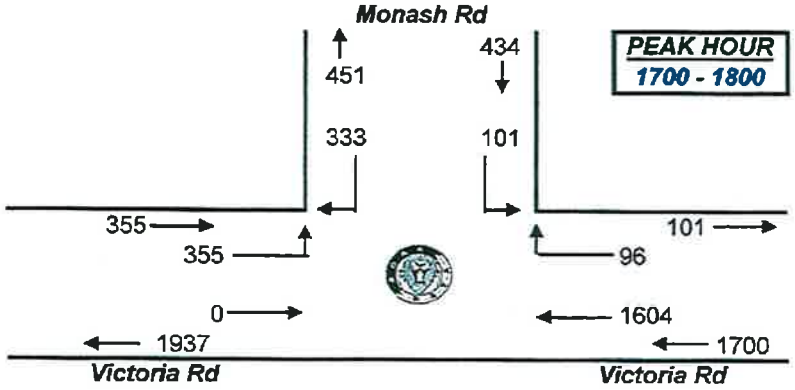
Job No/Name : 3259 GLADESVILLE Victoria Rd

Day/Date : Friday 27th & Saturday 28th August 2010

All Vehicles

	WEST		NORTH		EAST		
	Victoria Rd		Monash Rd		Victoria Rd		FRI
Time Per	L	T	R	L	T	R	TOTAL
1530 - 1545	81		85	28	358	43	595
1545 - 1600	73		67	31	351	36	558
1600 - 1615	101		85	29	411	44	670
1615 - 1630	67		68	24	413	36	608
1630 - 1645	78		62	17	316	12	485
1645 - 1700	80		77	19	391	15	582
1700 - 1715	92		81	24	394	30	621
1715 - 1730	101		89	29	412	20	651
1730 - 1745	75		79	18	349	24	545
1745 - 1800	87		84	30	449	22	672
1800 - 1815	91		68	28	371	15	573
1815 - 1830	98		82	29	417	26	652
Period End	1024	0	927	306	4632	323	7212

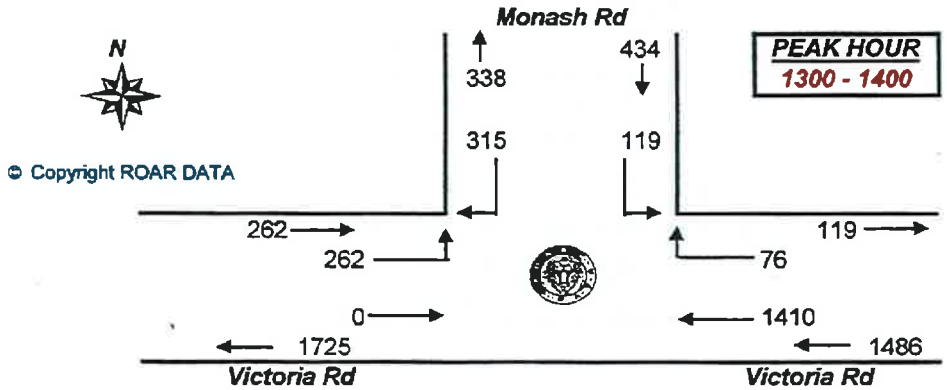
	WEST		NORTH		EAST		
	Victoria Rd		Monash Rd		Victoria Rd		
Peak Per	L	T	R	L	T	R	TOTAL
1530 - 1630	322	0	305	112	1533	159	2431
1545 - 1645	319	0	282	101	1491	128	2321
1600 - 1700	326	0	292	89	1531	107	2345
1615 - 1715	317	0	288	84	1514	93	2296
1630 - 1730	351	0	309	89	1513	77	2339
1645 - 1745	348	0	326	90	1546	89	2399
1700 - 1800	355	0	333	101	1604	96	2489
1715 - 1815	354	0	320	105	1581	81	2441
1730 - 1830	351	0	313	105	1586	87	2442
PEAK HR	**355**	**0**	**333**	**101**	**1604**	**96**	**2489**



All Vehicles

	WEST		NORTH		EAST		
	Victoria Rd		Monash Rd		Victoria Rd		SAT
Time Per	L	T	R	L	T	R	TOTAL
1200 - 1215	74		85	45	371	24	599
1215 - 1230	74		79	43	337	24	557
1230 - 1245	49		97	32	274	23	475
1245 - 1300	71		93	23	301	21	509
1300 - 1315	54		75	35	314	23	501
1315 - 1330	68		89	26	393	17	593
1330 - 1345	69		75	30	366	19	559
1345 - 1400	71		76	28	337	17	529
1400 - 1415	55		63	19	325	19	481
1415 - 1430	51		89	34	340	13	507
1430 - 1445	69		66	28	365	16	544
1445 - 1500	70		85	24	370	26	575
Period End	775	0	952	367	4093	242	6429

	WEST		NORTH		EAST		
	Victoria Rd		Monash Rd		Victoria Rd		
Peak Per	L	T	R	L	T	R	TOTAL
1200 - 1300	268	0	354	143	1283	92	2140
1215 - 1315	248	0	344	133	1226	91	2042
1230 - 1330	242	0	354	116	1282	84	2078
1245 - 1345	262	0	332	114	1374	80	2162
1300 - 1400	262	0	315	119	1410	76	2182
1315 - 1415	263	0	303	103	1421	72	2162
1330 - 1430	246	0	283	111	1368	68	2076
1345 - 1445	246	0	274	109	1367	65	2061
1400 - 1500	245	0	283	105	1400	74	2107
PEAK HR	**262**	**0**	**315**	**119**	**1410**	**76**	**2182**



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A

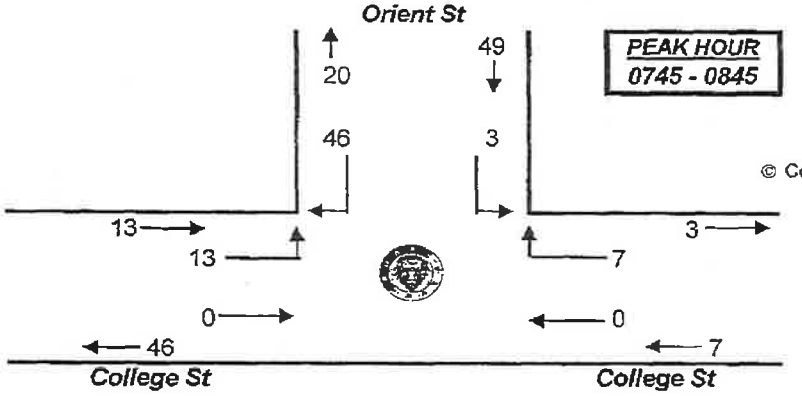
Job No/Name : 3784 GLADESVILLE College St

Day/Date : Friday 23rd September 2011

All Vehicles

	WEST		NORTH		EAST		
	College St		Orient St		College St		
Time Per	L	T	R	L	T	R	TOTAL
0700 - 0715	1		10	1		2	14
0715 - 0730	1		12	1		1	15
0730 - 0745	4		8	1		1	14
0745 - 0800	2		13	1		1	17
0800 - 0815	3		8	0		2	13
0815 - 0830	1		8	1		3	13
0830 - 0845	7		17	1		1	26
0845 - 0900	3		7	2		0	12
Period End	22	0	83	8	0	11	124

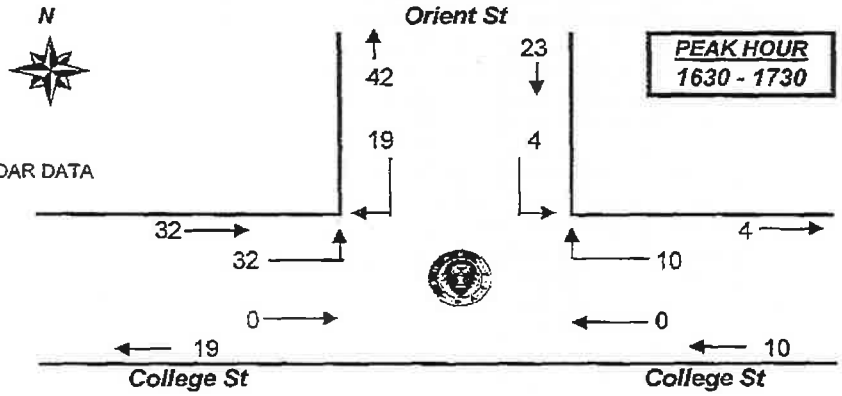
	WEST		NORTH		EAST		
	College St		Orient St		College St		
Peak Per	L	T	R	L	T	R	TOTAL
0700 - 0800	8	0	43	4	0	5	60
0715 - 0815	10	0	41	3	0	5	59
0730 - 0830	10	0	37	3	0	7	57
0745 - 0845	13	0	46	3	0	7	69
0800 - 0900	14	0	40	4	0	6	64
PEAK HR	13	0	46	3	0	7	69



All Vehicles

	WEST		NORTH		EAST		
	College St		Orient St		College St		
Time Per	L	T	R	L	T	R	TOTAL
1600 - 1615	12		5	0		2	19
1615 - 1630	5		4	0		3	12
1630 - 1645	7		6	3		3	19
1645 - 1700	6		4	0		4	14
1700 - 1715	12		5	0		0	17
1715 - 1730	7		4	1		3	15
1730 - 1745	7		4	1		3	15
1745 - 1800	5		2	0		2	9
Period End	61	0	34	5	0	20	120

	WEST		NORTH		EAST		
	College St		Orient St		College St		
Peak Per	L	T	R	L	T	R	TOTAL
1600 - 1700	30	0	19	3	0	12	64
1615 - 1715	30	0	19	3	0	10	62
1630 - 1730	32	0	19	4	0	10	65
1645 - 1745	32	0	17	2	0	10	61
1700 - 1800	31	0	15	2	0	8	56
PEAK HOUR	32	0	19	4	0	10	65



R.O.A.R. DATA

Reliable, Original & Authentic Results

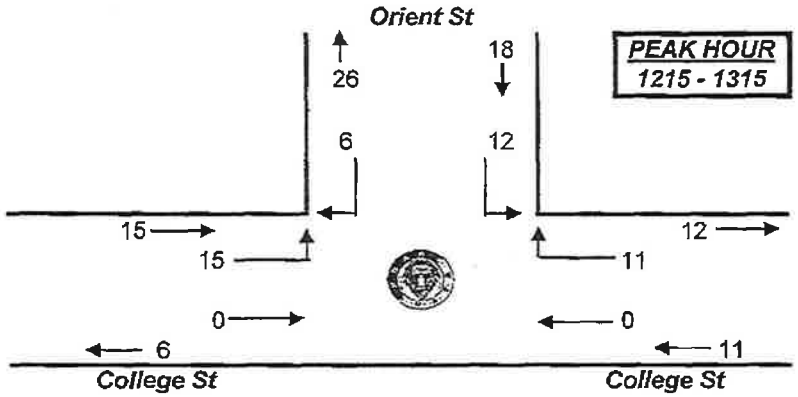
Ph.88196847, Fax 88196849, Mob.0418-239019

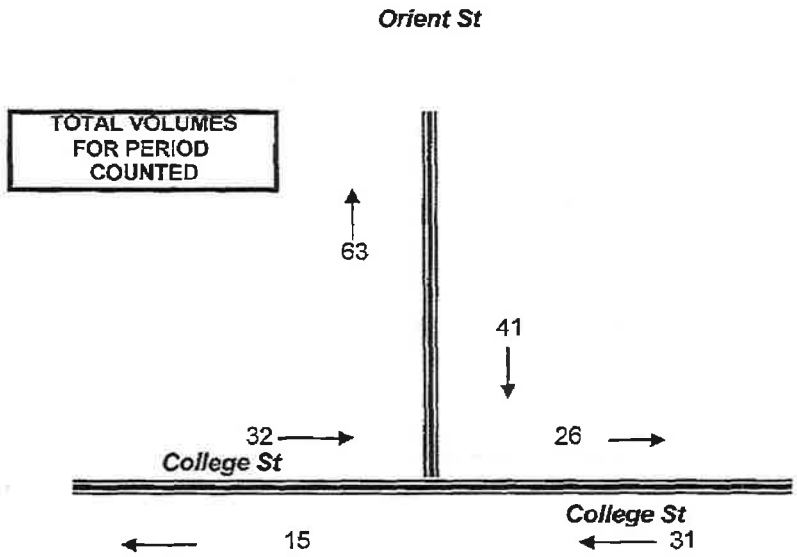
Client : T.T.P.A.
Job No/Name : 3784 GLADESVILLE College St
Day/Date : Saturday 24th September 2011

All Vehicles

Time Per	WEST College St L	WEST College St T	NORTH Orient St R	NORTH Orient St L	EAST College St T	EAST College St R	TOTAL
1200 - 1215	3		1	1		2	7
1215 - 1230	4		1	1		3	9
1230 - 1245	1		2	3		1	7
1245 - 1300	5		1	3		5	14
1300 - 1315	5		2	5		2	14
1315 - 1330	2		1	1		1	5
1330 - 1345	3		2	0		3	8
1345 - 1400	3		0	1		1	5
1400 - 1415	0		0	3		3	6
1415 - 1430	1		0	3		3	7
1430 - 1445	5		3	1		4	13
1445 - 1500	0		2	4		3	9
Period End	32	0	15	26	0	31	104

Peak Per	WEST College St L	WEST College St T	NORTH Orient St R	NORTH Orient St L	EAST College St T	EAST College St R	TOTAL
1200 - 1300	13	0	5	8	0	11	37
1215 - 1315	15	0	6	12	0	11	44
1230 - 1330	13	0	6	12	0	9	40
1245 - 1345	15	0	6	9	0	11	41
1300 - 1400	13	0	5	7	0	7	32
1315 - 1415	8	0	3	5	0	8	24
1330 - 1430	7	0	2	7	0	10	26
1345 - 1445	9	0	3	8	0	11	31
1400 - 1500	6	0	5	11	0	13	35
PEAK HR	**15**	**0**	**6**	**12**	**0**	**11**	**44**





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

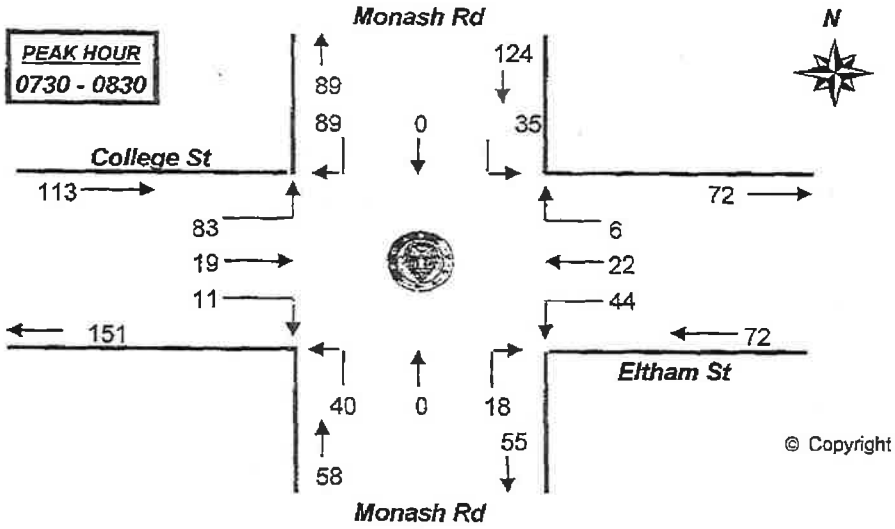
Client : T.T.P.A.
Job No/Name : 3784 GLADESVILLE College St
Day/Date : Friday 23rd September 2011

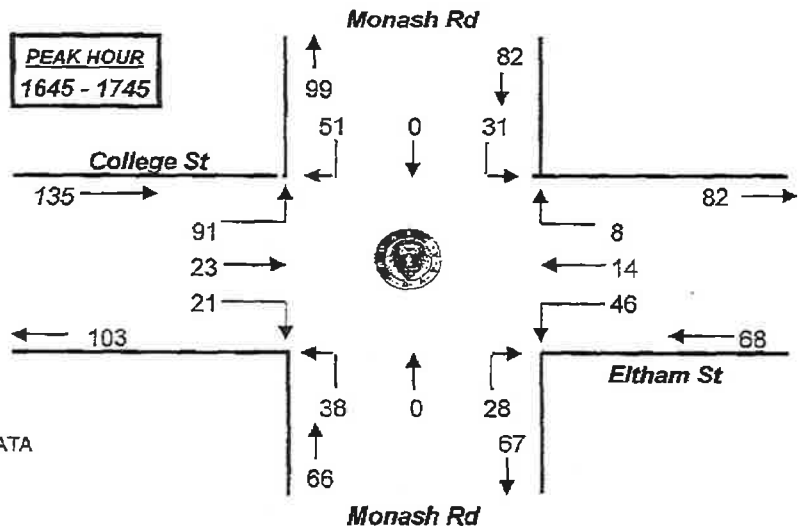
All Vehicles	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0700 - 0715	5		3	21	2	6	8		6	5	3	1	60
0715 - 0730	8		18	18	3	2	8		5	11	2	1	76
0730 - 0745	12		16	23	10	2	6		6	14	5	1	95
0745 - 0800	6		27	20	6	3	9		5	11	2	3	92
0800 - 0815	9		19	15	1	3	14		4	8	9	1	83
0815 - 0830	8		27	25	2	3	11		3	11	6	1	97
0830 - 0845	5		31	22	2	3	11		6	5	3	2	90
0845 - 0900	7		18	18	5	9	19		6	4	5	2	93
Period End	60	0	159	162	31	31	86	0	41	69	35	12	686

All Vehicles	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1615	5		8	13	4	6	9		7	10	7	2	71
1615 - 1630	2		11	10	2	12	4		9	7	5	2	64
1630 - 1645	8		12	16	6	6	8		3	16	6	1	82
1645 - 1700	6		17	17	7	9	15		7	6	5	1	90
1700 - 1715	8		13	27	4	3	7		10	12	1	3	88
1715 - 1730	12		9	26	6	2	6		6	14	1	2	84
1730 - 1745	5		12	21	6	7	10		5	14	7	2	89
1745 - 1800	10		11	17	6	3	4		5	12	4	2	74
Period End	56	0	93	147	41	48	63	0	52	91	36	15	642

	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0700 - 0800	31	0	64	82	21	13	31	0	22	41	12	6	323
0715 - 0815	35	0	80	76	20	10	37	0	20	44	18	6	346
0730 - 0830	35	0	89	83	19	11	40	0	18	44	22	6	367
0745 - 0845	28	0	104	82	11	12	45	0	18	35	20	7	362
0800 - 0900	29	0	95	80	10	18	55	0	19	28	23	6	363
PEAK HOUR	35	0	89	83	19	11	40	0	18	44	22	6	367

	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1700	21	0	48	56	19	33	36	0	26	39	23	6	307
1615 - 1715	24	0	53	70	19	30	34	0	29	41	17	7	324
1630 - 1730	34	0	51	86	23	20	36	0	26	48	13	7	344
1645 - 1745	31	0	51	91	23	21	38	0	28	46	14	8	351
1700 - 1800	35	0	45	91	22	15	27	0	26	52	13	9	335
PEAK HOUR	31	0	51	91	23	21	38	0	28	46	14	8	351





R.O.A.R. DATA

Reliable, Original & Authentic Results

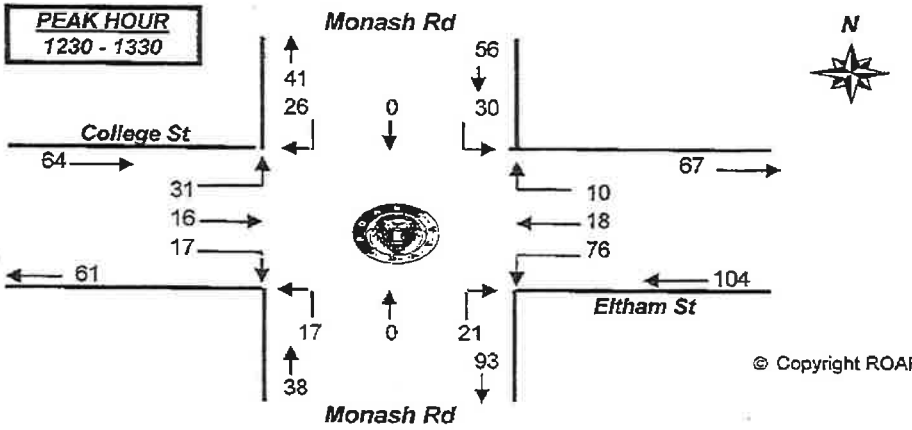
Ph.88196847, Fax 88196849, Mob.0418-239019

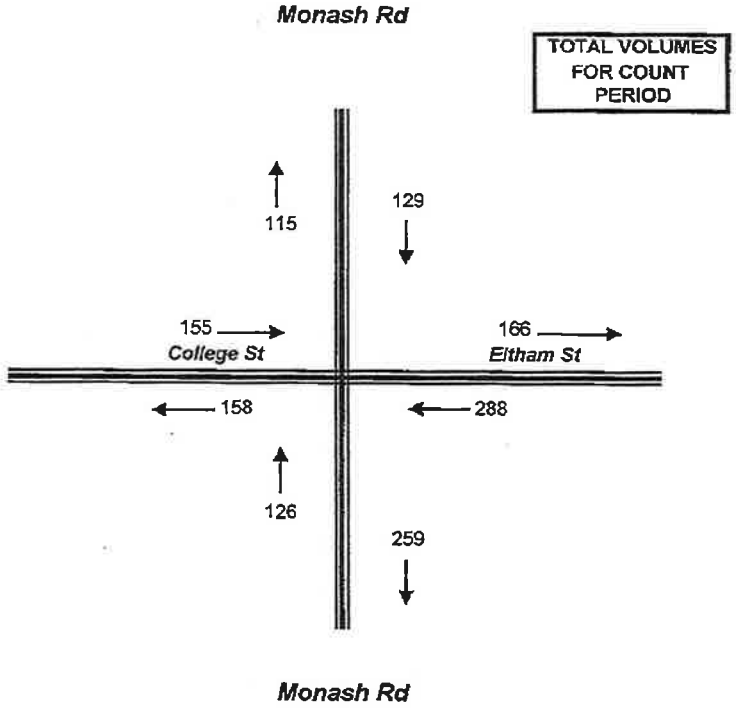
Client : T.T.P.A.
Job No/Name : 3784 GLADESVILLE College St
Day/Date : Saturday 24th September 2011

All Vehicles

Time Per	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1200 - 1215	5		9	14	1	9	7		9	23	3	5	85
1215 - 1230	4		6	5	1	6	6		2	17	1	5	53
1230 - 1245	6		5	7	3	5	2		2	17	7	5	59
1245 - 1300	6		5	6	2	1	5		9	24	3	2	63
1300 - 1315	8		9	10	8	8	5		5	19	5	2	79
1315 - 1330	10		7	8	3	3	5		5	16	3	1	61
1330 - 1345	2		0	3	0	0	2		5	23	3	3	41
1345 - 1400	3		10	3	4	2	3		7	14	1	1	48
1400 - 1415	8		2	5	1	4	4		5	19	3	5	56
1415 - 1430	3		1	5	1	4	4		8	11	4	4	45
1430 - 1445	8		4	8	2	5	8		5	14	6	3	63
1445 - 1500	3		5	3	2	3	3		10	12	2	2	45
Period End	66	0	63	77	28	50	54	0	72	209	41	38	698

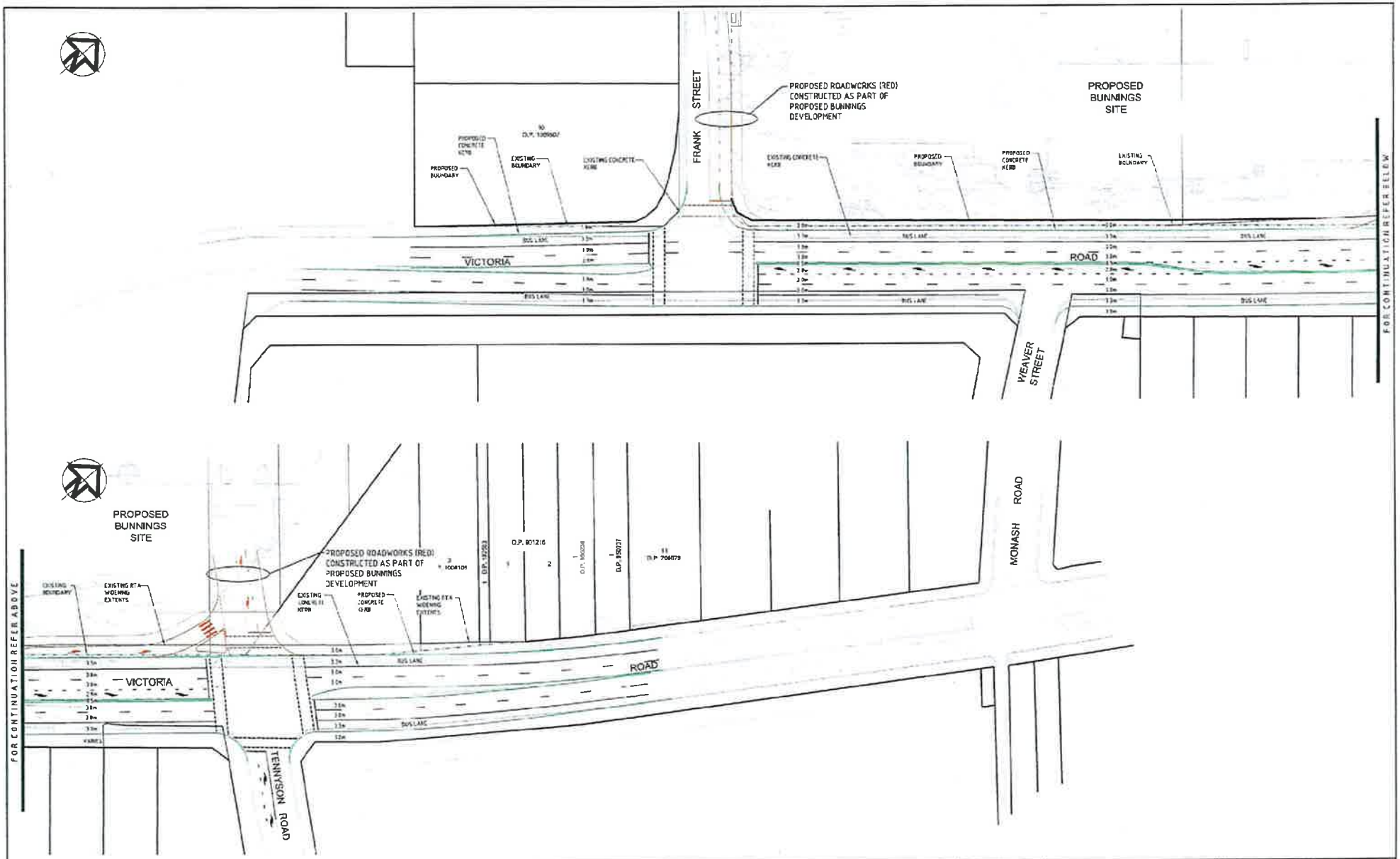
Peak Time	NORTH Monash Rd			WEST College St			SOUTH Monash Rd			EAST Eltham St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1200 - 1300	21	0	25	32	7	21	20	0	22	81	14	17	260
1215 - 1315	24	0	25	28	14	20	18	0	18	77	16	14	254
1230 - 1330	30	0	26	31	16	17	17	0	21	76	18	10	262
1245 - 1345	26	0	21	27	13	12	17	0	24	82	14	8	244
1300 - 1400	23	0	26	24	15	13	15	0	22	72	12	7	229
1315 - 1415	23	0	19	19	8	9	14	0	22	72	10	10	206
1330 - 1430	16	0	13	16	6	10	13	0	25	67	11	13	190
1345 - 1445	22	0	17	21	8	15	19	0	25	58	14	13	212
1400 - 1500	22	0	12	21	6	16	19	0	28	56	15	14	209
PEAK HOUR	30	0	26	31	16	17	17	0	21	76	18	10	262





Appendix C

PROPOSED ROAD AND INTERSECTION ARRANGEMENTS



P1	ISSUE FOR INFORMATION	11.04.11
Issue	Description	Date

Bar Scales

1 : 500

Client: BUNNINGS GROUP LIMITED

Scales	1 : 500	Drawn	MM
		Designed	MM
Grid		Checked	
Height Datum	AHD	Approved	

Project: BUNNINGS WAREHOUSE GLADESVILLE

Title: PROPOSED RTA ROADWORKS PLAN OPTION 3

Civil Engineers and Project Managers
Suite 702, 6A Glen Street
Milsons Point NSW 2061
ABN 96 130 882 405
Tel: 02 9020 2468
Fax: 02 9922 5102
www.atl.net.au
info@atl.net.au

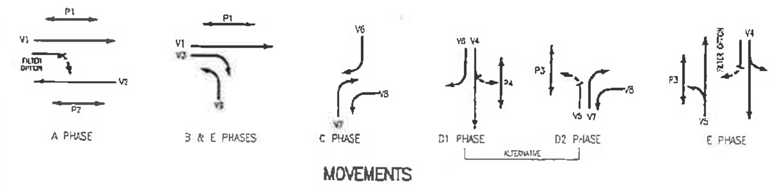
Status: PRELIMINARY ONLY NOT TO BE USED FOR CONSTRUCTION

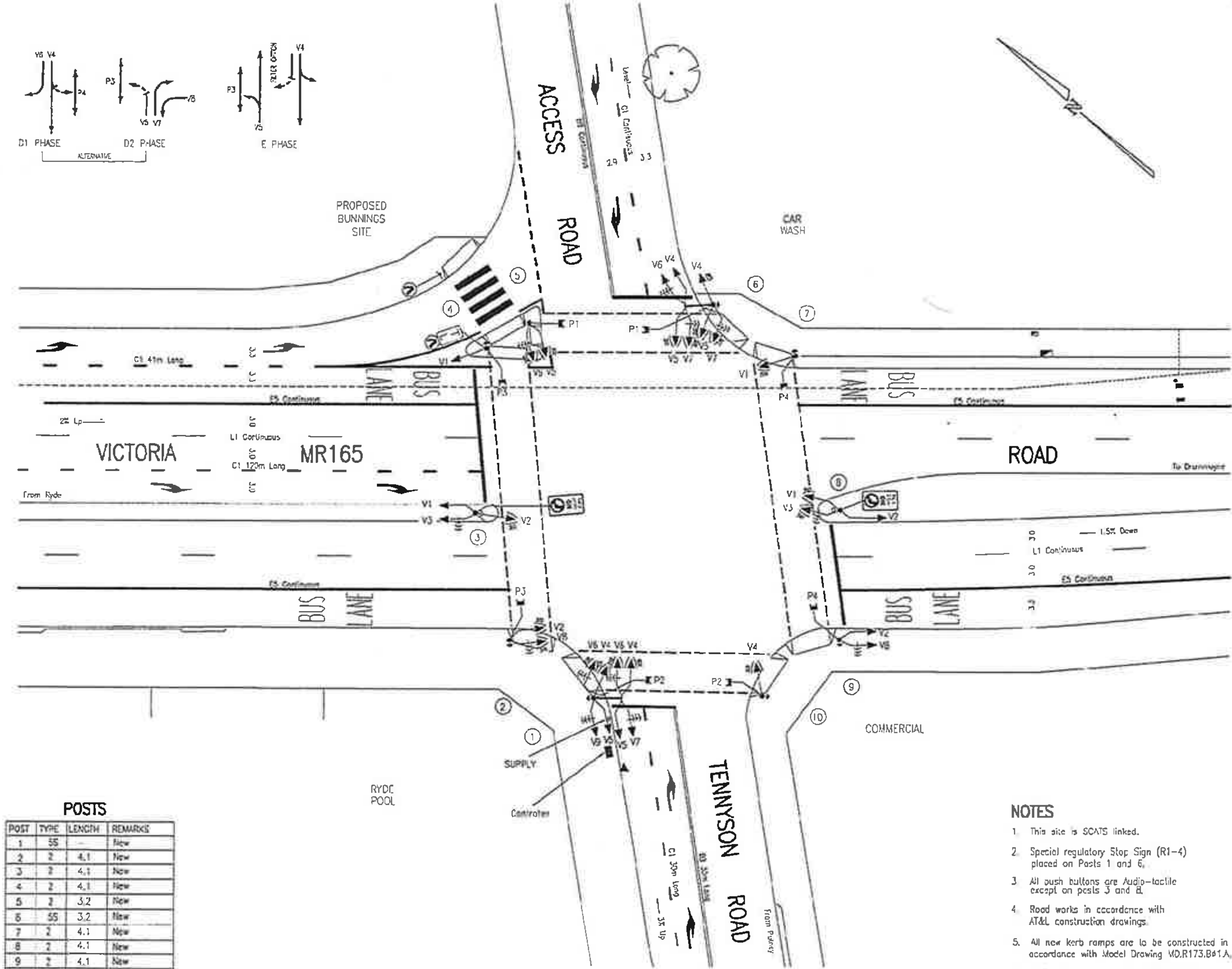
A1

Drawing No.	Project No.	Issue
SKC07	11-58	P1

DRAWN BY CADD
DO NOT AMEND MANUALLY

Date in Service 00/00/00





POSTS

POST	TYPE	LENGTH	REMARKS
1	55	–	New
2	2	4.1	New
3	2	4.1	New
4	2	4.1	New
5	2	3.2	New
6	55	3.2	New
7	2	4.1	New
8	2	4.1	New
9	2	4.1	New
10	2	4.1	Existing

NOTES

1. This site is SCATS linked.
2. Special regulatory Stop Sign (R1–4) placed on Posts 1 and 6.
3. All push buttons are Audio–tactile except on posts 3 and 8.
4. Road works in accordance with AT&L construction drawings.
5. All new kerb ramps are to be constructed in accordance with Model Drawing VD.R173.B01.A.1.
6. Red colored pavement on BUS LANE in accordance with specification R110 and T.D. 99/9.
7. Single Diamond overlap in accordance with Standard Drawing VD018–5.

CONCEPT DESIGN

Roads and Traffic Authority, N.S.W

RYDE CITY COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF
VICTORIA ROAD (MR165), TENNYSON ROAD
AND ACCESS ROAD
GLADESVILLE

DESIGN LAYOUT — TCS No. 1677

EXISTING ☐ PROPOSED ☑

CADD FILE: W1677-7.DGN

SCALE (1:200)

FILE: 387 TS 143 — SUPERSEDES SHEET/ISSUE 7B — ISSUE ?

REGN. 0165.387.W.1677 — SHEET ?

DESIGN APPROVAL — APPROVED — POSITION DIRECTOR — DATE 26.05.11

DESIGN PREPARED BY TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE — RECOMMENDED — ACCEPTED

DESIGNED VCT — CHECKED JS — SITE CHECKED — RECOMMENDED

A ORIGINAL ISSUE

0165.387.W.1677

DRAWN BY CADD
DO NOT AMEND MANUALLY

0165.387.VV.1987

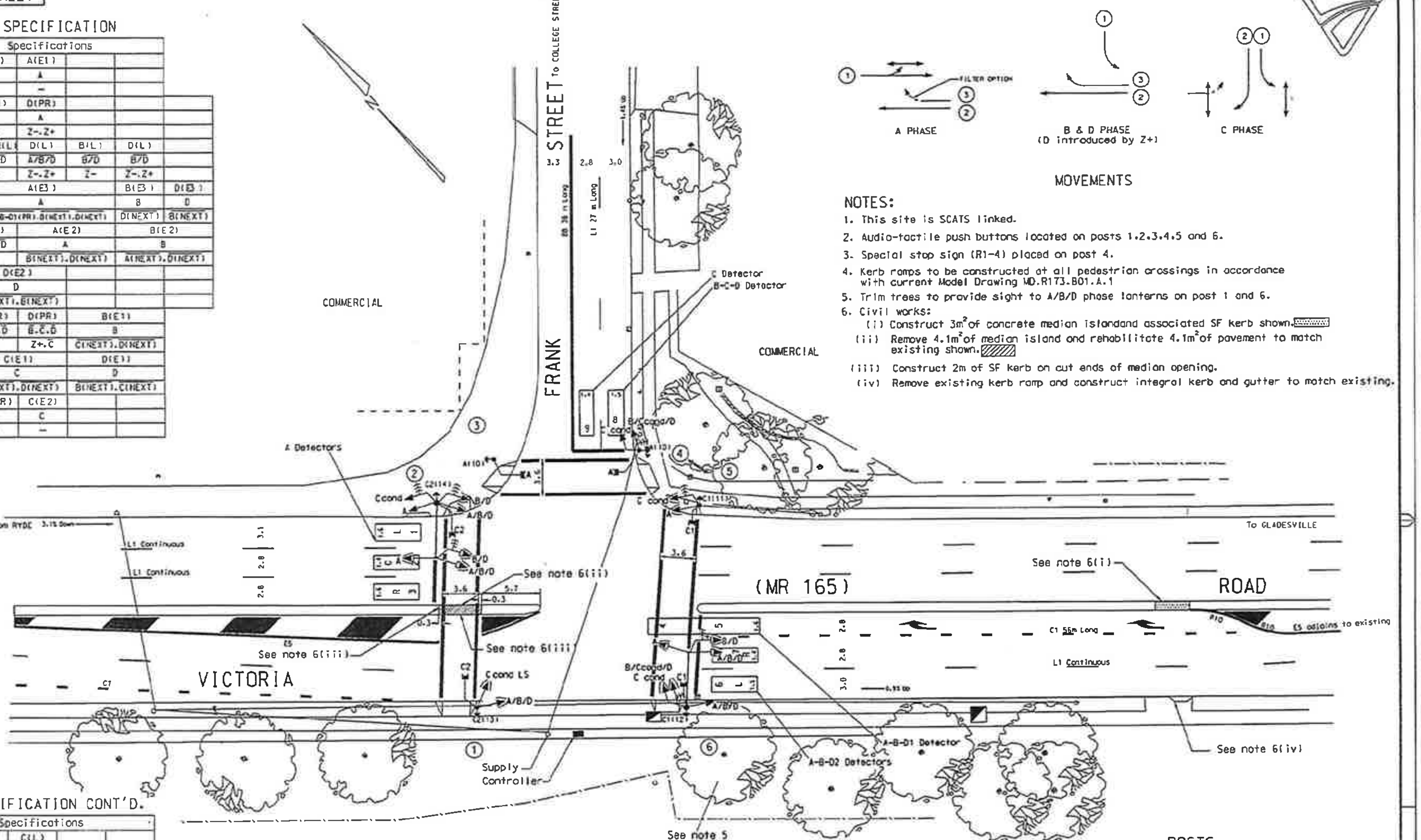
DATE IN SERVICE : 28/09/62

RTA

FILTER OPTION
A PHASE
B & D PHASE
(D introduced by Z+)
C PHASE

MOVEMENTS

NOTES:
1. This site is SCATS linked.
2. Audio-tactile push buttons located on posts 1,2,3,4,5 and 6.
3. Special stop sign (R1-4) placed on post 4.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with current Model Drawing MD.R173.B01.A.1
5. Trim trees to provide sight to A/B/D phase lanterns on post 1 and 6.
6. Civil works:
(i) Construct 3m² of concrete median islandand associated SF kerb shown.
(ii) Remove 4.1m² of median island and rehabilitate 4.1m² of pavement to match existing shown.
(iii) Construct 2m of SF kerb on cut ends of median opening.
(iv) Remove existing kerb ramp and construct integral kerb and gutter to match existing.



DETECTOR SPECIFICATION

Detector		Specifications			
A	FN	A(L)	A(E1)		
	SG/PS	A	A		
	DS	–	–		
A-B-D1 Depart. & Approach	FN	B(PR)	D(PR)		
	SG/PS	A	A		
	DS	Z–	Z–,Z+		
A-B-D1 Approach	FN	A(L),B(L)	D(L)	B(L)	D(L)
	SG/PS	A/B/D	A/B/D	B/D	B/D
	DS	Z–	Z–,Z+	Z–	Z–,Z+
cont. A-B-D1 Approach	FN	A(E3)		B(E3)	D(E3)
	SG/PS	A		B	D
	DS	Z–,A-B-D1(PR),B(NEXT),D(NEXT)		D(NEXT)	B(NEXT)
A-B-D2	FN	A(L)	A(E2)	B(E2)	
	SG/PS	A/B/D	A	B	
	DS	–	B(NEXT),D(NEXT)	A(NEXT),D(NEXT)	
cont. A-B-D2	FN	D(E2)			
	SG/PS	D			
	DS	A(NEXT),B(NEXT)			
B-C-D	FN	B(PR)	D(PR)	B(E1)	
	SG/PS	B,C,D	B,C,D	B	
	DS	C	Z+,C	C(NEXT),D(NEXT)	
cont. B-C-D	FN	C(E1)		D(E1)	
	SG/PS	C		D	
	DS	B(NEXT),D(NEXT)		B(NEXT),C(NEXT)	
C	FN	C(PR)	C(E2)		
	SG/PS	C	C		
	DS	–	–		

DETECTOR SPECIFICATION CONT'D.

Detector		Specifications	
A P.B.	FN	A(PB)	C(L)
	SG/PS	A(WALK)	A,A(WALK)
	DS	–	B,C,D
C1 P.B.	FN	C(PB)	A(L)
	SG/PS	C1(WALK)	C,C1(WALK)
	DS	–	A,B,D
C2 P.B.	FN	C(PB)	A(L)
	SG/PS	C2(WALK)	C,C2(WALK)
	DS	–	A,B,D

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/D	3	–
B/D (RT)	39	Timed R.A. protection for A peds. Z- Filter option.
B/C Cond/D(LT)	77	Timed R.A. protection for C1 pedestrians. Δ
C Cond (LT)	23	Timed R.A. protection for A peds.
Cond	74	Timed red aspect protection for C2 pedestrian. #

Δ Pushbutton on post 6 extends R.A. subject to timer.
\# Pushbutton on post 2 extends R.A. subject to timer.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	5XL	–	1.0	EXISTING
3	2	3.2	1.0	EXISTING
4	2	4.1	0.6	EXISTING
5	2	4.1	0.6	EXISTING
6	5XL	–	1.0	EXISTING

A ORIGINAL ISSUE

DESIGN APPROVAL

RTA ACCEPTANCE

Roads and Traffic Authority, N.S.W

RYDE COUNCIL AREA
TRAFFIC SIGNALS AT
VICTORIA ROAD (MR 165) AND FRANK STREET
RYDE

DESIGN LAYOUT

TCS No 1987

EXISTING ☒ PROPOSED ☐

CADD FILE: vv1987_9D.dgn

SCALE 1:200

ISSUE D

FILE 387 TS 300

SUPERSEDES SHEET/ISSUE 9C

REGN. 0165.387.VV.1987

SHEET 9

Appendix D

BUNNINGS TRAFFIC CHARACTERISTICS

Halcrow

Hardware

Table 3-2 Trips Rate Summary – Hardware/DIY

Trips/ 100m² GFA	Sydney Metropolitan Area HW1 to HW5			Non-Metropolitan Area HW6 to HW9			All Survey Sites HW1 to HW9			Avg Non-metro / Metro %
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	
Weekdays										
Person-based Trips										
- Site Peak Hour	4.00	5.77	5.06	3.95	6.40	5.49	3.95	6.40	5.25	108.6%
- Vehicle Network AM Peak	0.65	2.72	2.01	1.28	4.75	2.97	0.65	4.75	2.43	147.9%
- Vehicle Network PM Peak	2.48	4.89	3.50	2.79	4.65	3.78	2.48	4.89	3.63	108.0%
Daily Total Person Trips	32.88	53.26	42.42	29.22	43.40	38.34	29.22	53.26	40.61	90.4%
Vehicle-based Trips										
- Site Peak Hour	3.15	4.67	4.03	2.74	5.60	4.41	2.74	5.60	4.20	109.6%
- Network AM Peak	0.60	2.22	1.68	1.09	3.88	2.50	0.60	3.88	2.05	148.7%
- Network PM Peak	2.05	3.56	2.70	1.99	3.80	3.03	1.99	3.80	2.85	112.5%
Daily Total LV Trips	25.21	38.25	30.59	20.66	35.90	30.30	20.66	38.25	30.46	99.0%
Daily Total HV Trips	0.99	6.17	2.40	0.69	2.25	1.49	0.69	6.17	2.00	62.0%
Daily Total Vehicle Trips	26.80	39.75	32.99	21.35	38.15	31.79	21.35	39.75	32.46	96.4%
Peak Parking Accumulation	0.78	1.67	1.16	1.05	1.90	1.48	0.78	1.90	1.30	127.8%

Halcrow

Bulky Goods

Table 3-4 Traffic Results Summary – Bulky Goods

	Sydney Metropolitan Area			Non-Metropolitan Area		
Site ID	**BG1**	**BG2**	**BG3**	**BG4**	**BG5**	**BG6**
Gross floor area (m2)	**4,300**	**14,849**	**600**	**6,029**	**1,200**	**1,700**
Weekdays						
Person-based Trips						
- Site Peak Hour	104	531	42	159	94	61
Trips/ 100m² GFA	2.42	3.58	7.00	2.64	7.83	3.59
- Vehicle Network AM Peak	Network AM peak is outside of opening hours					
Trips/ 100m² GFA						
- Vehicle Network PM Peak	57	301	Outside of	104	55	45
Trips/ 100m² GFA	1.33	2.03	opening hrs	1.72	4.58	2.65
Daily Total Person Trips	683	3,169	218	1,315	599	330
Trips/ 100m² GFA	15.88	21.34	36.33	21.81	49.92	19.41
Vehicle-based Trips						
- Site Peak Hour	61	232	26	118	57	35
Trips/ 100m² GFA	1.42	1.56	4.33	1.96	4.75	2.06
- Network AM Peak	Network AM peak is outside of opening hours					
Trips/ 100m² GFA						
- Network PM Peak	35	180	Outside of	70	27	19
Trips/ 100m² GFA	0.81	1.21	opening hrs	1.16	2.25	1.12
Daily Total LV Trips	437	1743	133	898	319	170
Trips/ 100m² GFA	10.16	11.74	22.17	14.89	26.58	10.00
Daily Total HV Trips	9	0	18	12	28	4
Trips/ 100m² GFA	0.21	0.00	3.00	0.20	2.33	0.24
Daily Total Vehicle Trips	446	1,743	151	910	347	174
Trips/ 100m² GFA	10.37	11.74	25.17	15.09	28.92	11.60
% HV	2.0%	0.0%	11.9%	1.3%	8.1%	2.3%
Peak Parking Accumulation	28	133	19	41	24	7
Peak Parking/ 100m² GFA	0.65	0.90	3.17	0.68	2.00	0.41

Appendix E

DIVERTED TRIP RESEARCH

Appendix F: Linked trips

Traffic generation data for movements in and out of certain development types is readily available. However, there is a need to understand how much of the generated traffic is new and how much is already on the road network prior to opening of the development.

Historically, traffic impact assessments conservatively assumed that all generated traffic was new. More recently, 'discounts' have been applied to generated traffic to account for the 'drop in' component, which is not new traffic to the network.

Research undertaken on this subject has concluded that it is appropriate to make adjustments to generated traffic due to linked trips.

Trips can be broadly categorised into the following types:

Linked Trip	A journey where there is a chain of stops from origin to ultimate destination. A trip from home to work with stops at school and the post office comprises three linked trips: home to school; school to post office; and post office to work.
Unlinked Trip	A journey with no intermediate stops (generally referred to as New Trips in the RIA)

For the purposes of an RIA, the following three types of trips are commonly used:

New Trip	In traffic impact studies, unlinked trips are generally referred to as new trips. These are trips attracted to the development and without the development would not have been made – hence a new trip.
Diverted Drop In Trips	A linked trip from an origin to a destination that has made a significant network diversion to use the new development.
Undiverted Drop In Trips	A linked trip from an origin to a destination that previously passed the development site. This is also referred to as a 'pass by' trip and the new development is an intermediate stop on a trip that is made from an origin to a destination.

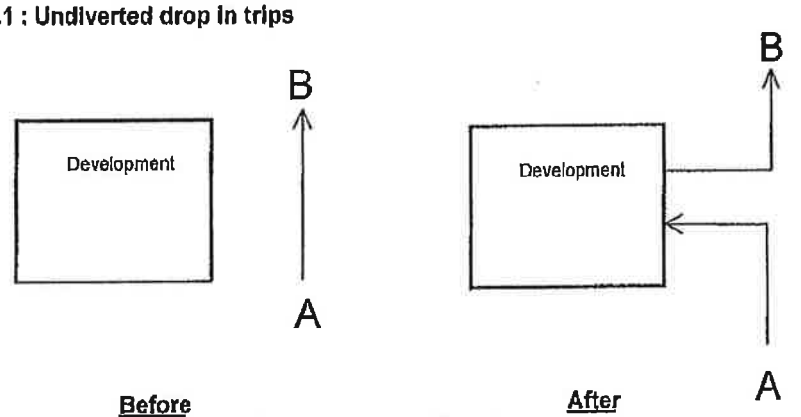
The diverted and undiverted drop-in trips are considered to be trips that are already part of the existing flows on the road network.

The treatment of the different trip types varies with the level of assessment. Hallam (1988) provides a reasoned basis for separating assessment into three levels:

- Regional Assessment – consideration of the impact of a development in the context of the total urban area;
- Local Assessment – consideration of the effect of a development over a substantial area focussed on the development; and
- Access Level – micro level assessment.

At the regional level, insertion of a new development could be considered to only increase travel by the new trips proportion of generation. Diverted and undiverted drop in trips would already be on the network.

Figure: F.1 : Undiverted drop in trips



Before
Trip passes development site on route from A to B.

After
Trip which was previously passing the site drops in to development on route from A to B

Note: One original pass by trip becomes 2 drop in trips (1 in and 1 out)

An RIA is usually conducted over a limited part of the network. At a local level, both the new trips and diverted drop-in trips are introduced into the area and represent additional trips on the local network. This local network may contain roads of regional significance. The undiverted drop-in trips to developments on roads of regional significance can be regarded as already on the local network. It is important that these trips are considered. They must be rerouted from movements past the development to movements into and out of the development. For every two development trips assigned as undiverted drop-in trips (one in / one out), one through trip should be removed from passing traffic.

In 1995, Eppell Olsen & Partners carried out surveys for Main Roads to segment traffic generation for specific developments. The results of these surveys are documented in the report, *Development Traffic Surveys: Linked / Unlinked Trips*.

The segmentation of traffic generation for shopping centres and fast food outlets is shown below:

Table F.1

Development	Trip Segmentation		
	New (%)	Diverted Drop In (%)	Undiverted Drop In (%)
Shopping Centres >20 000 m^2	63	18	19
Shopping Centre 3 000 m^2 – 20 000 m^2	50	22	28
Shopping Centres <3 000 m^2	50	32	18
Fast Food Outlets	40	25	35

Shopping Centres

The traffic generated by shopping centres is most influenced by the proximity of other centres. On site facilities such as cinemas, restaurants etc. can also have a significant impact on generation rates.

Thursday design generation rates are shown on Figure 2A.4 while Saturday rates are included as Figure 2A.5. Survey results indicate that during these peak hour periods the in/out proportion is approximately 50/50.

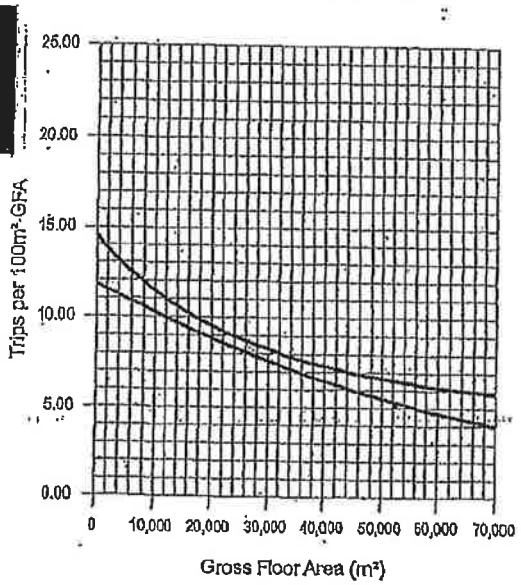


Figure 2A.1 SEQ Shopping Centre Generation (Thursday Afternoon peak)

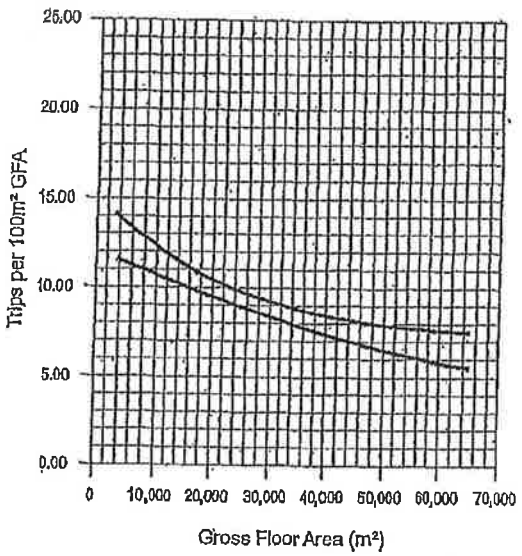


Figure 2A.2 SEQ Shopping Centre Generation (Saturday peak)

Considering the adjacent road network, three shopping centre trip types have been defined as follows:

- New Trips

Trips that would not have appeared on the immediate approaches, local street network or shopping centre. These trips only appear as a consequence of the opening of the centre.

- Diverted Trips

Linked trips (i.e. in conjunction with another trip purpose) which are diverted off the regional road network to access the shopping centre.

- Drop-In Trips

Linked trips that would have appeared in the local road network irrespective of the presence of the shopping centre.

Research undertaken by Hallam that developed the rates shown in Table 2A.7 for estimating the proportion of drop-in and diverted trips.

Table 2A.7 Proportion of Drop-In and Diverted Trips

Trip Type	Proportion of Trips	
	Thursday	Saturday
New Trip	50%	68%
Diverted Trip	30%	20%
Drop-In Trip	20%	12%

Studies undertaken in the USA suggest the factors in Table 2A.8 are applicable to the above percentages to accommodate different diverted pattern trips for different sized centres.

Table 2A.8 Factors in Drop-in and Diverted Trips

Shopping Centre Size	Factors to be Applied to Proportion of Drop-In and Diverted Trips
0 - 10,000 m²	1.2
10,000 - 35,000 m²	1.0
> 35,000 m²	0.8

Upon determining the proportion of drop-in and diverted trips the traffic discounts in Table 2A.9 would be applicable.

Table 2A.9 Trip Discounts

Road Network Element	Trip Discounts Applicable
Immediate approach and site access	None
Local Road Network	Drop-in Trips
Regional Road Network	Drop-in + Diverted Trips

Appendix F

SCATES RESULTS

Intersection with Victoria Road		SCATES ANAYSIS – VICTORIA ROAD, GLADESVILLE ~~Comparison – Proposed changes with~~ cycle length minimum 120 seconds		
		AM	PM	Weekend
Frank Street # 1987	LOS	A	A	A
	DS	0.71	0.71	0.54
	AVD	6.9	12.7	10.8
Tennyson Road # 1677	LOS	A	B	B
	DS	0.69	0.75	0.61
	AVD	13.4	17.2	19.4
Monash Road # 366	LOS	B	A	B
	DS	0.82	0.61	0.58
	AVD	15.0	13.8	17.3
Filename		VICAM1EX	VICPM1EX	VICWE1EX

Notes:

1. To simulate bus lane operation in this system, it was necessary to remove the bus lane and subsequent recorded bus numbers converted to PCU'S for the peak direction of bus lane in AM and PM only.
2. left turning vehicles adjacent bus lane were then provided with a dummy 30m left turn lane at each affected intersection.