Proposed Commercial Office Development

89 George Street, Parramatta

TRAFFIC AND PARKING ASSESSMENT REPORT

28 January 2010

Ref 09205

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

Suite 6, 20 Young Street, Neutral Bay NSW 2089 - PO Box 1868, Neutral Bay NSW 2089
Ph: 9904 3224 Fax: 9904 3228, Email: varga@vtp.net.au

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LIST OF ILLUSTRATIONS

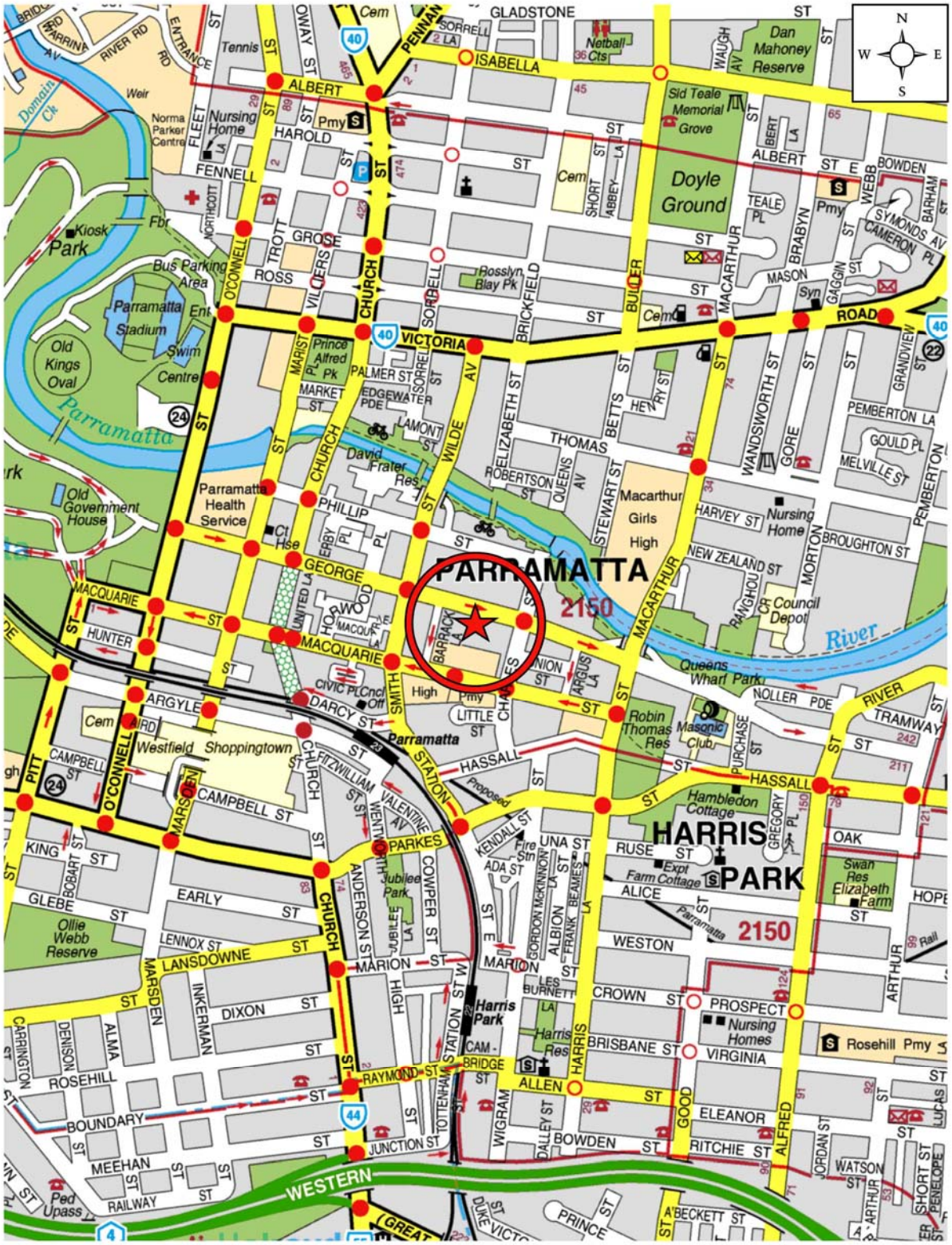
1. INTRODUCTION

This report has been prepared to accompany a Development Application to Parramatta City Council for a commercial office development proposal to be located at 89 George Street, Parramatta (Figures 1 and 2).

The proposed development will involve the demolition of the existing building on the site to facilitate the construction of a new high-rise commercial office development, with carparking to be provided in a multi-level basement carparking area in accordance with Council's requirements.

The purpose of this report is to assess the traffic and parking implications of the development proposal and to that end this report:

- describes the site and provides details of the development proposal
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- estimates the traffic generation potential of the development proposal, and assigns that traffic generation to the road network serving the site
- assesses the traffic implications of the development proposal in terms of road network capacity
- review the geometric design features of the proposed basement carparking facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street carparking provided on the site.



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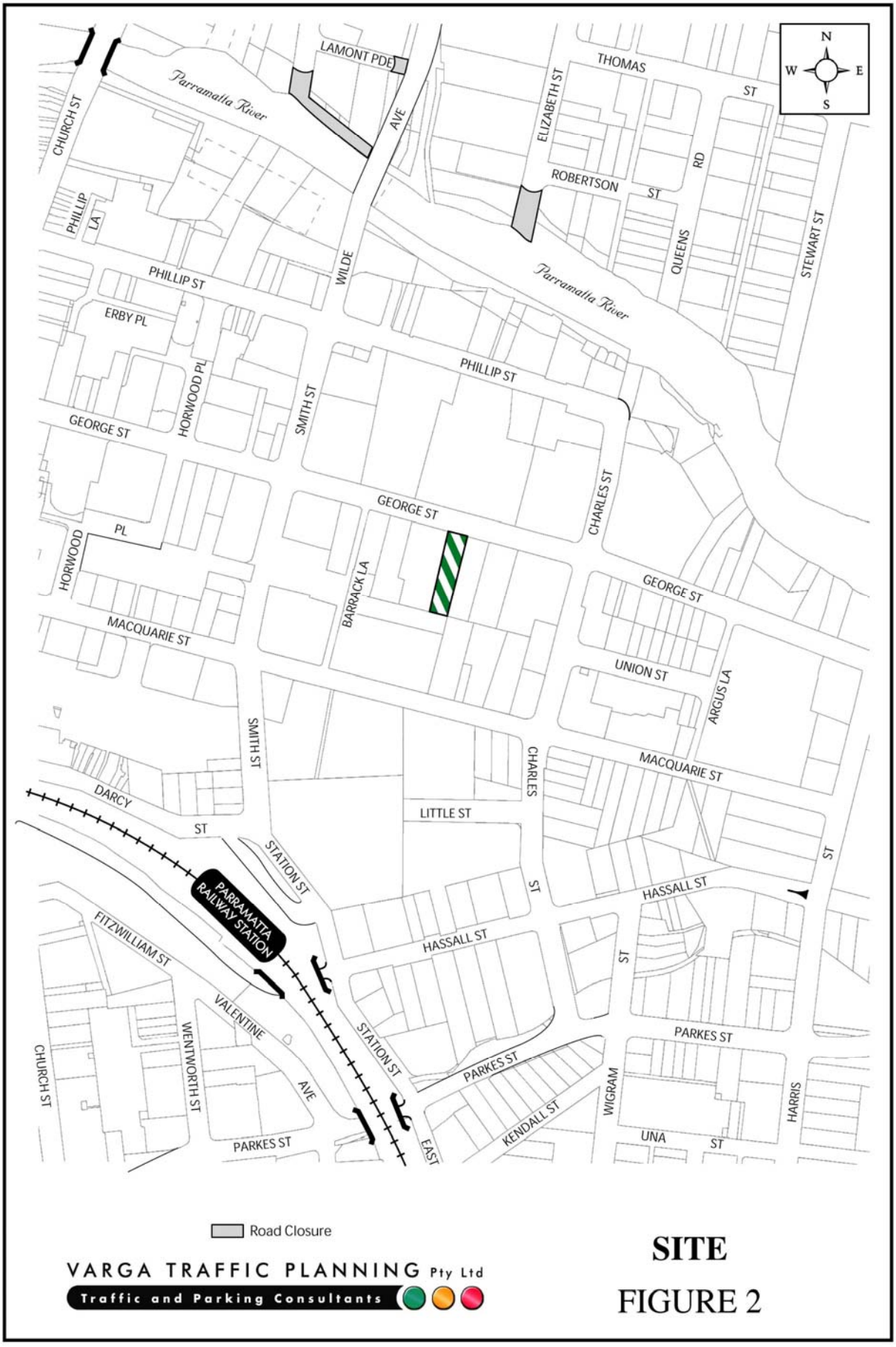
LOCATION
FIGURE 1


N
W
E
S
LAMONT PDE
Parramatta River
CHURCH ST
PHILLIP LA
PHILLIP ST
ERBY PL
WILDE AVE
THOMAS ST
ELIZABETH ST
ROBERTSON ST
QUEENS RD
STEWART ST
HORWOOD PL
SMITH ST
GEORGE ST
CHARLES ST
HORWOOD PL
BARRACK LA
MACQUARIE ST
UNION ST
ARGUS LA
DARCY ST
LITTLE ST
STATION ST
PARRAMATTA RAILWAY STATION
FITZWILLIAM ST
HASSALL ST
VALENTINE AVE
WENTWORTH ST
PARKES ST
KENDALL ST
WIGRAM ST
HARRIS ST
UNA ST
EAST
Road Closure
VARGA TRAFFIC PLANNING Pty Ltd
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SITE
FIGURE 2

2. PROPOSED DEVELOPMENT

Site

The subject site is located on the southern side of George Street, in between Barrack Lane and Charles Street. The site has a street frontage approximately 18m in length to George Street and occupies an area of approximately 1,353m^2.

The subject site is currently occupied by a single-storey industrial building containing a *Better Brakes* franchise and a small drycleaners.

Off-street parking is currently provided for approximately 20 cars in an informal arrangement with vehicular access via a single two-way driveway located towards the eastern end of the George Street frontage.

Proposed Development

The proposed development will involve the demolition of the existing industrial building on the site to facilitate the construction of a new commercial office building. The proposed new office building will have an ancillary café located on the ground floor level which will cater for the needs of local employees, mostly from within the building.

The proposed new office building will have a floor area of 11,567m^2 GFA as follows:

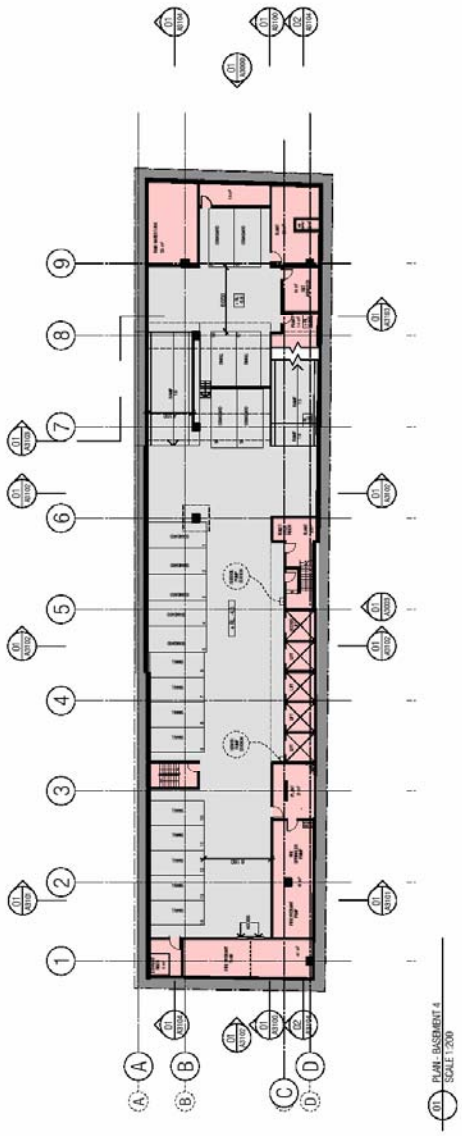
Commercial Office:	11,168m^2 GFA
Ancillary Café:	399m^2 GFA
TOTAL FLOOR AREA:	**11,567m^2 GFA**

Off-street carparking is proposed for a total of 63 cars in a four-level basement carparking area in accordance with Council's requirements. Vehicular access to the carparking facilities is to be provided via the existing two-way driveway located in George Street which is to be upgraded and widened.

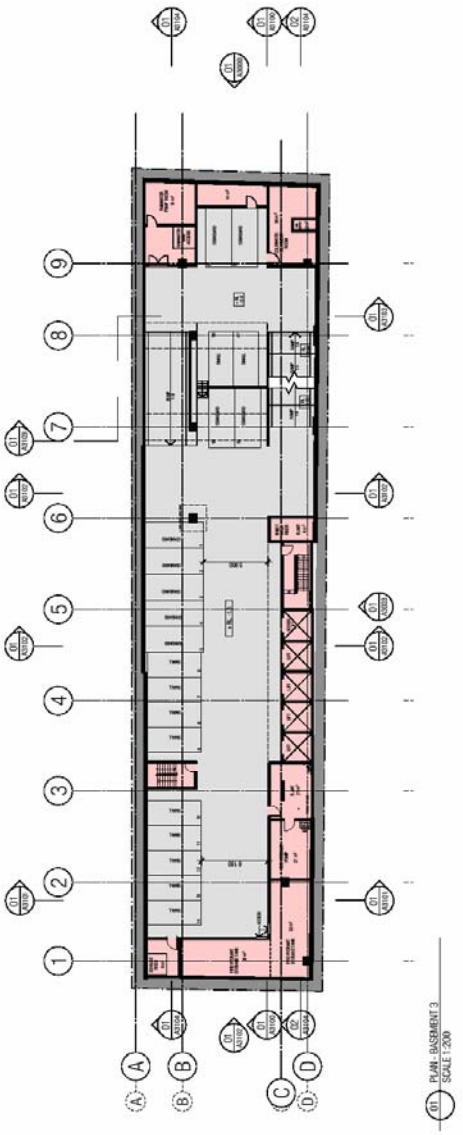
The proposed new office building is to be serviced by a variety of light commercial vehicles such as utilities, white vans and the like, and small trucks up to and including 6.4m long SRV

trucks. The loading dock is to be located towards the front of the building on the ground floor level with a truck turntable, allowing the service vehicles to enter and depart the site in a forward direction at all times.

Plans of the proposed development have been prepared by *Woods Bagot* and are reproduced in the following pages.



01 PLAN - BASEMENT 4
SCALE 1:200



01 PLAN - BASEMENT 3
SCALE 1:200

WOODS BAGOT.

DUXTON DEVELOPMENTS 89 GEORGE STREET FLOOR PLAN - BASEMENT 4 & 3

Project number 2-20-1342
Date generated 19-08-08
Scale 1:200 @ A1
Drawing number A2200
Revision P9
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DUXTON DEVELOPMENTS 89 GEORGE STREET FLOOR PLAN - BASEMENT 2 & 1
WOODS BAGOT.
Project number 2-20-1342
Date generated 18-08-08
Scale 1:200 @ A1
Drawing number A2201
Revision P9
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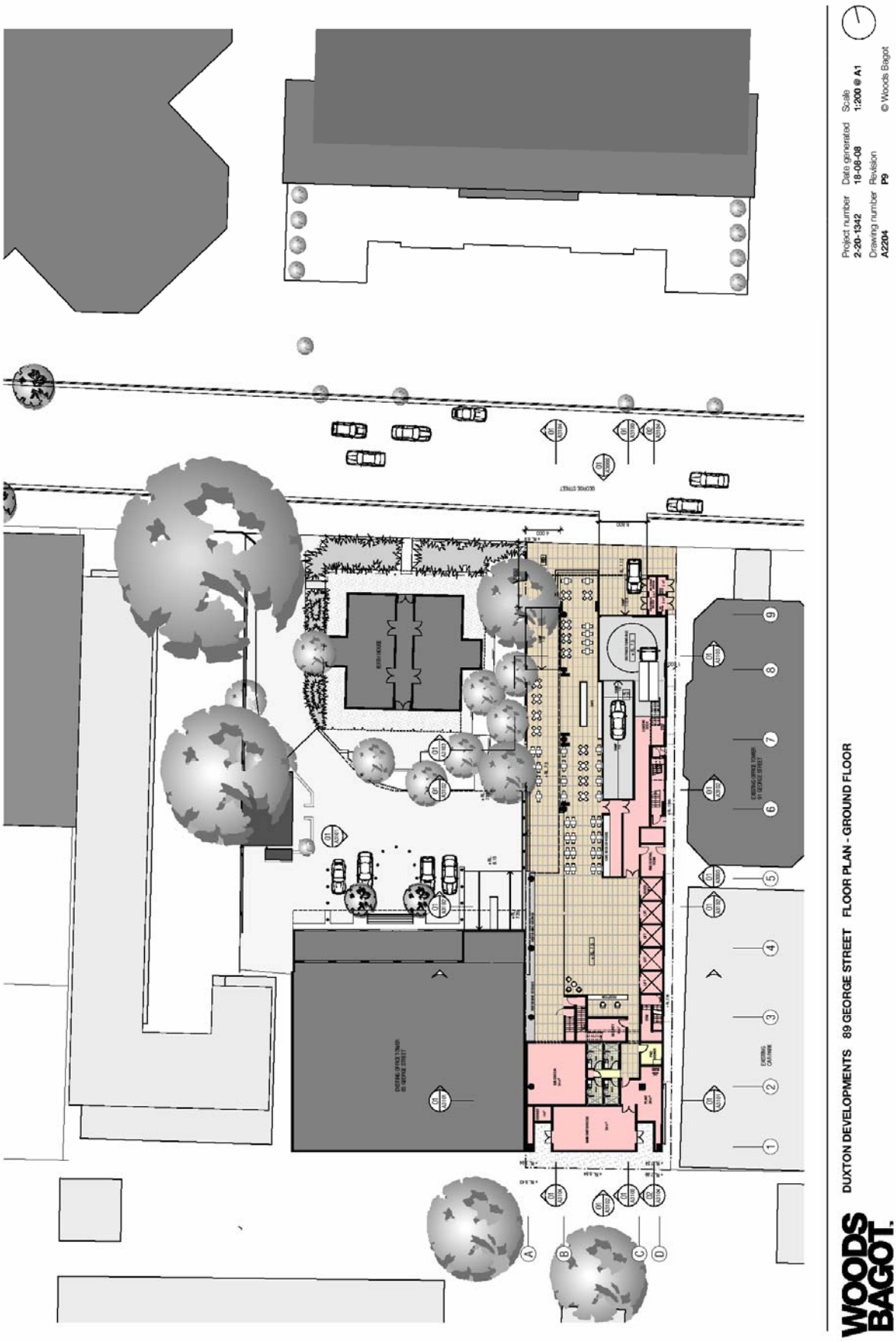
PLAN - BASEMENT 2
SCALE 1:200
PLAN - BASEMENT 1
SCALE 1:200


DUXTON DEVELOPMENTS 89 GEORGE STREET FLOOR PLAN - GROUND FLOOR
WOODS BAGOT
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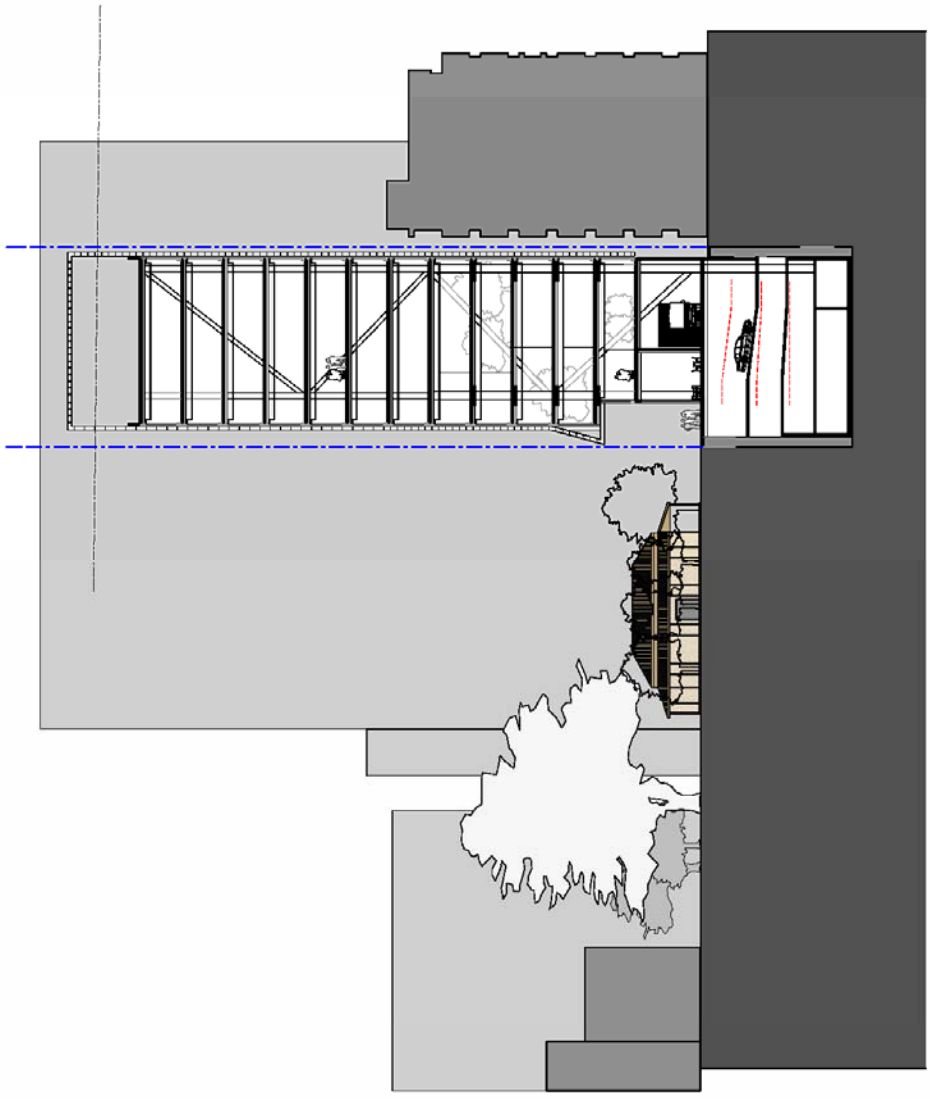
Revision P9
© Woods Bagot



WOODS BAGOT.

DUXTON DEVELOPMENTS 89 GEORGE STREET SECTION - SECTION DD

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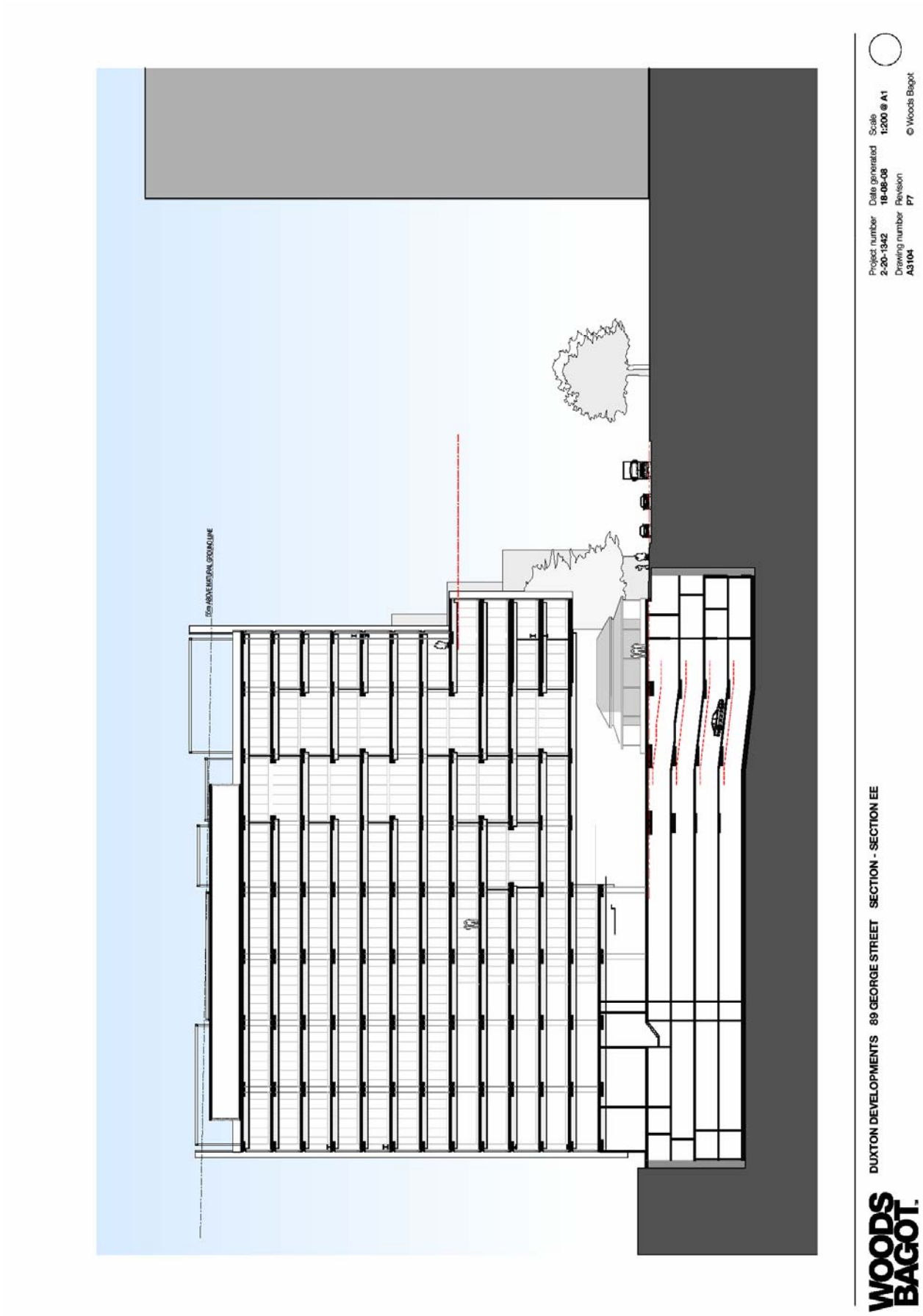
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DUXTON DEVELOPMENTS 89 GEORGE STREET SECTION - SECTION EE
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3. TRAFFIC ASSESSMENT

Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Traffic Authority is illustrated on Figure 3.

Victoria Road and the M4 Motorway are classified by the RTA as *State Roads* and provide the key east-west road links in the area, linking Parramatta to Rozelle and the Blue Mountains to Concord respectively. They typically carry 3 traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a centre median island.

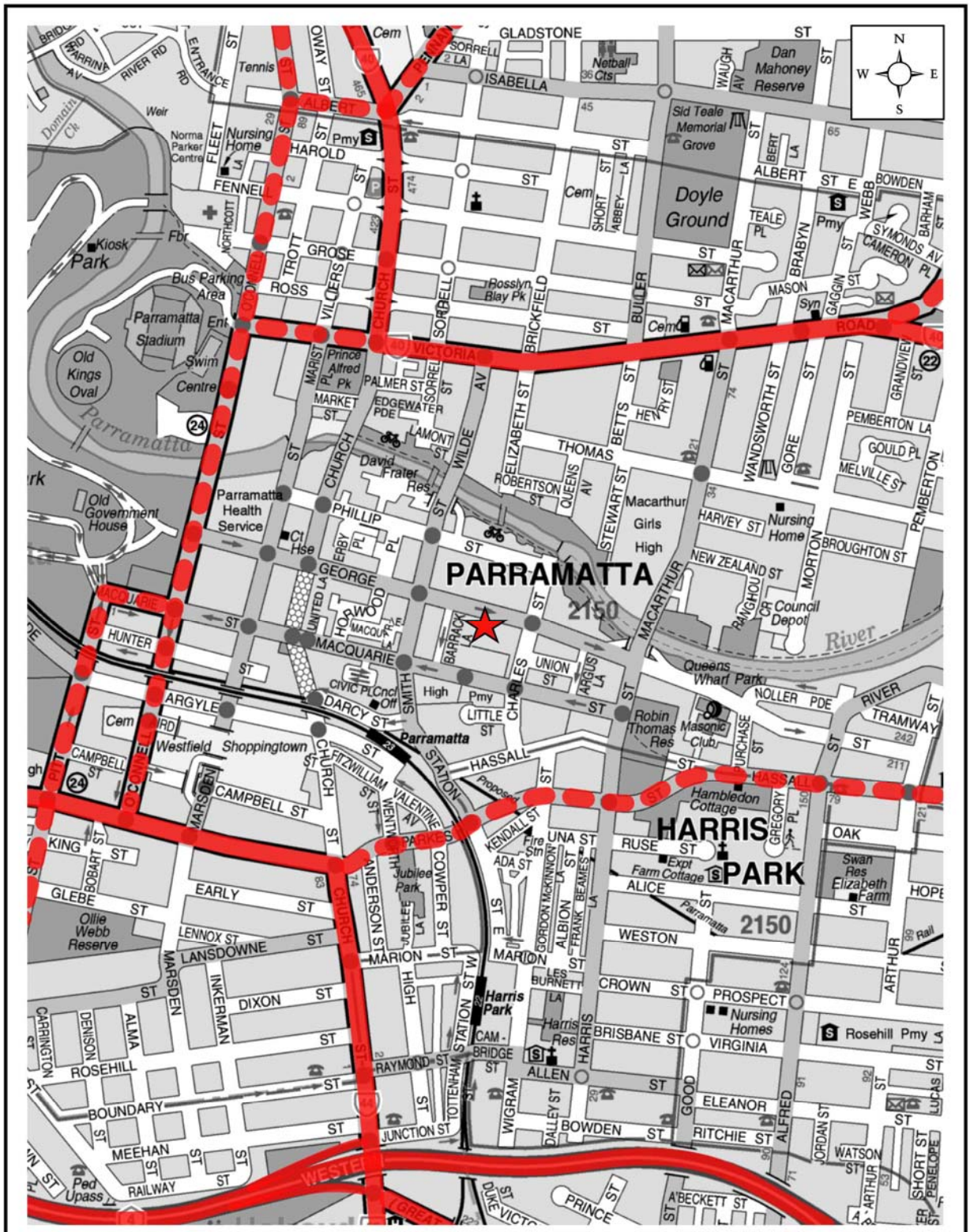
Church Street (south of Parkes Street and north of Victoria Road) is also classified by the RTA as a *State Road* and provides the key north-south road link in the area, linking the M4 Motorway to James Ruse Drive. It typically carries 2-3 traffic lanes in each direction in the vicinity of the site with turning bays provided at key locations.

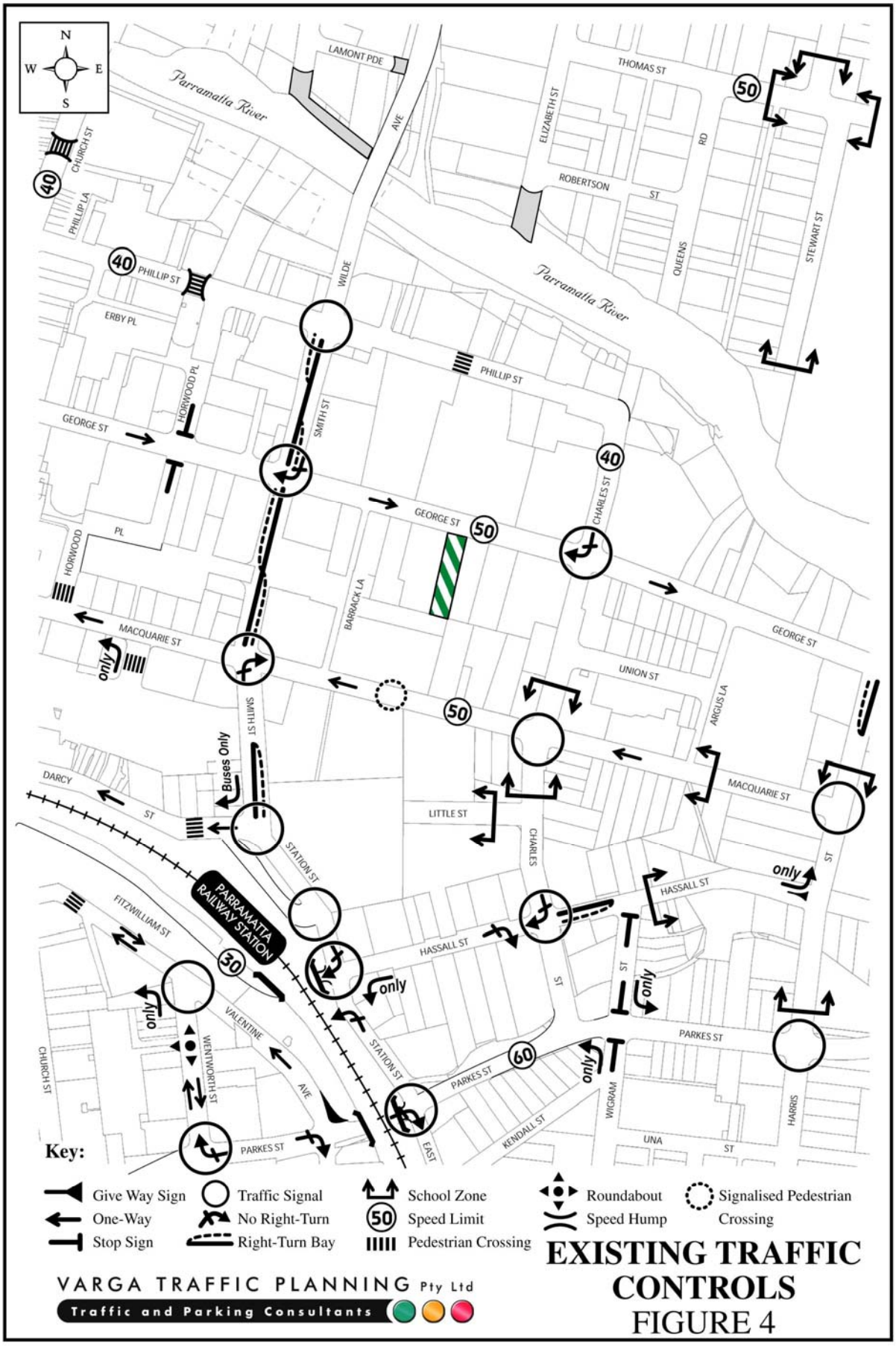
George Street is a local, unclassified, one-way eastbound road which is primarily used to provide vehicular and pedestrian access to frontage properties. Kerbside parking is generally permitted on both sides of the road.

Existing Traffic Controls

The existing traffic controls which apply to the road network in the vicinity of the site are illustrated on Figure 4. Key features of those traffic controls are:

- a 40 km/h SPEED LIMIT which applies to Charles Street and Phillip Street
- a 50 km/h SPEED LIMIT which applies to George Street, Macquarie Street
- TRAFFIC SIGNALS in George Street where it intersects with Smith Street and also Charles Street
- a ONE-WAY eastbound restriction in George Street.


PARRAMATTA
2150
HARRIS PARK
2150
Key:
State Road
Regional Road
VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants
ROAD HIERARCHY
FIGURE 3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Parramatta River
LAMONT PDE
AVE
THOMAS ST
ELIZABETH ST
RD
ROBERTSON
ST
QUEENS
STEWART ST
CHURCH ST
PHILLIP LA
PHILLIP ST
WILDE
ERBY PL
HORWOOD PL
SMITH ST
GEORGE ST
CHARLES ST
HORWOOD
PL
BARRACK LA
MACQUARIE ST
only
UNION ST
ARGUS LA
Buses Only
DARCY
ST
LITTLE ST
CHARLES
STATION ST
PARRAMATTA RAILWAY STATION
FITZWILLIAM ST
HASSALL ST
VALENTINE
WENTWORTH ST
AVE
PARKES ST
WIGRAM
HARRIS
KENDALL ST
UNA
EAST
Key:
Give Way Sign
One-Way
Stop Sign
Traffic Signal
No Right-Turn
Right-Turn Bay
School Zone
Speed Limit
Pedestrian Crossing
Roundabout
Speed Hump
Signalised Pedestrian Crossing
VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants
EXISTING TRAFFIC CONTROLS
FIGURE 4

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys undertaken as part of this traffic study. The traffic surveys were undertaken in George Street where it intersects with the existing site access driveway on Tuesday 24th June, 2008. The results of the traffic surveys are reproduced in full in Appendix A and reveal that:

- one-way eastbound traffic flows in George Street are typically in the order of 530 vehicles per hour (vph) during the *morning* peak period, increasing to 700 vph during the *afternoon* peak period

- two-way traffic flows in/out of the existing site are typically in the order of 20 vph during the *morning* peak period (ie. 18 trips IN & 2 trips OUT), and 17 vph during the *afternoon* peak period (ie. 1 trip IN & 16 trips OUT).

Alternate Transport Options

The proposed office building is fortunate to be located in an area where there is an extensive variety of alternate transport options available such as train, bus, ferry, cycling and walking, as detailed below.

Public Transport

Parramatta Railway Station is located between Station Street and Argyle Street, approximately 580m south from the proposed office building (ie. a 7 to 8min walk). The Railway Station is a major railway interchange which services three train lines – The Blue Mountains Line, the Western Line and the Cumberland Line.

The Cumberland Line operates Monday to Friday only and offers two morning services and three afternoon services between Campbelltown and Blacktown. The Blue Mountains Line operates 7 days per week between Lithgow and Central, with generally one service per hour during off-peak periods, increasing to one service every 20-30min during peak periods. The Western Line operates 7 days per week between Emu Plains/Richmond and North Sydney/

North Shore, with generally one service approximately every 15min during off-peak periods, increasing to one service approximately every 5-10min during peak periods.

A major bus interchange is also located at Parramatta Railway Station which, as previously mentioned, is approximately 580m south from the proposed office building (ie. a 7 to 8min walk).

Bus stops are also located on both sides of Smith Street, approximately 170m west of the site (ie. a 2 to 2½min walk). The Smith Street bus stops are serviced by most of the buses routes proceeding to the Parramatta Railway Station services from the north and north-east of the CBD.

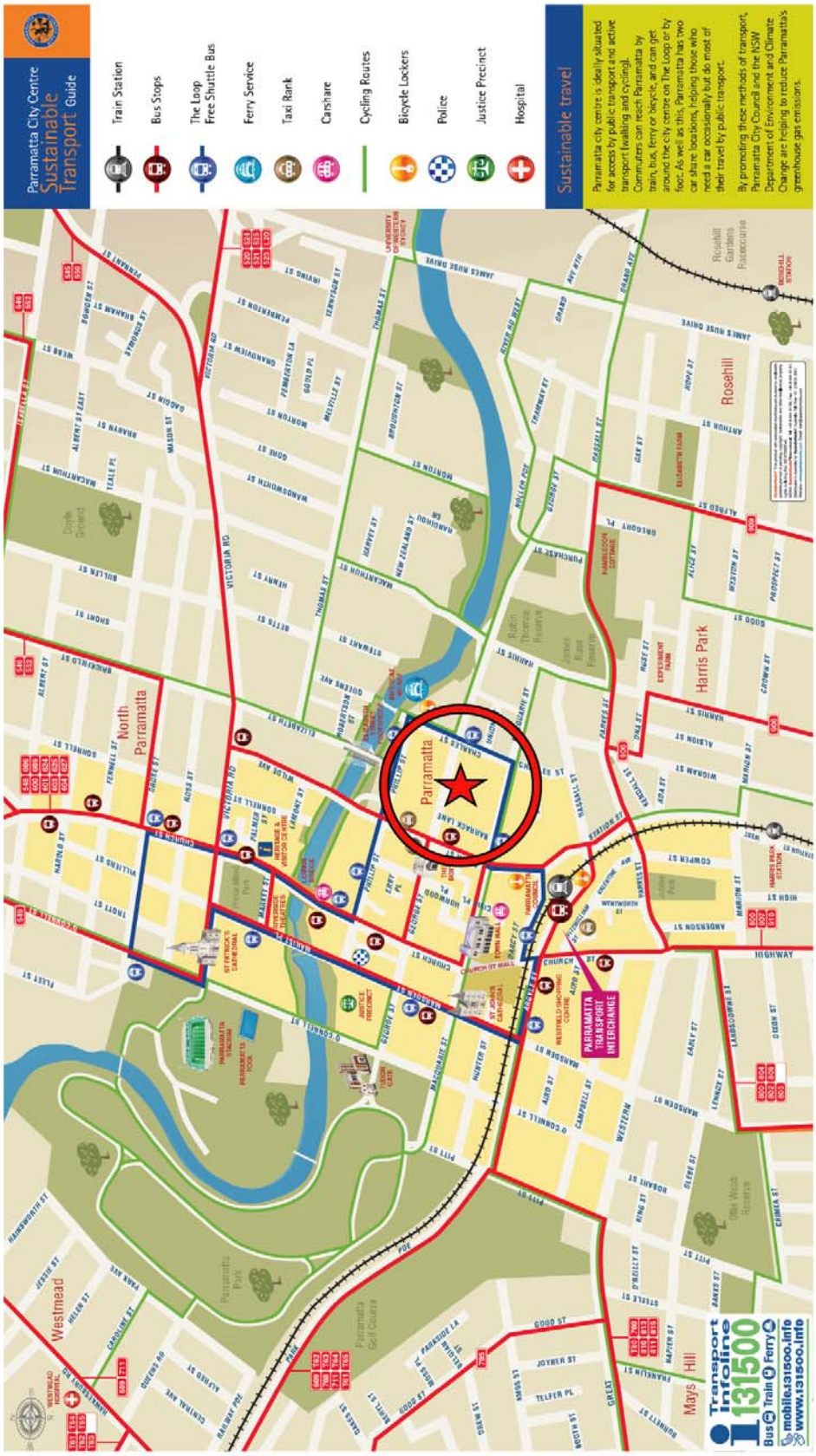
In addition to the extensive range of train and bus services available in the Parramatta area, the Parramatta Rivercat Ferry service provides *express-only* services every hour between Circular Quay and Parramatta, 7 days per week. The Parramatta wharf is located at the northern end of Charles Street, approximately 340m from the proposed office building (ie. 4 to 4 ½min walk).

The primary bus routes serving the Parramatta CBD are summarised on Figure 5. More detailed information on individual bus routes accessing the Parramatta CBD are reproduced in Appendix B.

Also shown on Figure 5 is the route of a free shuttle bus loop around the CBD, the location of the Parramatta Rivercat Ferry Wharf, and various cycling routes (see below) serving the Parramatta CBD.

Bicycle and Pedestrian Routes

There are a number of cycleways and shared pedestrian paths providing convenient access into and out of the Parramatta CBD for those employees who do not wish to drive or use public transport, and who live relatively near the CBD. Studies have shown that in Sydney, over 50% of trips are less than 5km.



SUMMARY OF ALTERNATE TRANSPORT OPTIONS

FIGURE 5

The longest cycleway into and out of the Parramatta CBD is the 17km long Parramatta to Liverpool *Rail Trail.* Other cycleways include the *Parramatta Valley Cycleway* which starts at Morrisan Bay Park in Ryde and heads west along dedicated bike paths, quiet streets and the river foreshore onto the Parramatta CBD. There is also the shared pedestrian and cycle path out to Rouse Hill, adjacent to Old Windsor Road.

A 3km radius from the proposed office building includes such suburbs as Holroyd, Harris Park, Westmead and North Parramatta. At an average walking pace of say, 5km/h, an employee of the proposed office building could walk the 3km distance in 36min.

The Federal Government has recently committed to $1.5million funding to assist in upgrading Parramatta cycleways, including the Parramatta to Blacktown cycleway.

Projected Traffic Generation

An indication of the traffic generation potential of the development proposal is provided by reference to the Roads and Traffic Authority's publication *Guide to Traffic Generating Developments, Section 3 - Landuse Traffic Generation (October 2002).*

The RTA *Guidelines* are based on extensive surveys of a wide range of land uses and nominates the following traffic generation rates which are applicable to the development proposal:

> **Commercial Premises**
> 2.0 peak hour vehicle trips per 100m^2 GFA

Application of the above traffic generation rates to the total floor area of 11,567m^2 of commercial office space and ancillary café as outlined in the development proposal yields a traffic generation potential of approximately 231 vehicle trips per hour during commuter peak periods.

However, it must be emphasised that, in practice, the traffic generation potential of proposed development is likely to be considerably *less* than is suggested by the RTA *Guidelines* because:

- the traffic generation rates nominated in the RTA Guidelines assume that parking is provided on an *unrestrained* basis. Where the provision of parking is *"constrained"* or reduced, it is reasonable to assume that the peak hour traffic generation potential of the site would also be reduced

- in this instance, the parking to be provided on the site in accordance with Council's Parking Code requirements equates to approximately 22% of the rates suggested by the RTA *Guidelines*

- in addition, it is noted that the site is ideally located in close proximity to Parramatta Railway Station, the bus/rail interchange and cycling and shared pedestrian paths to facilitate the public and alternate transport needs of the commercial office employees.

Accordingly, on a pro-rata basis the traffic generation potential of the proposed development is expected to be in the order of 51 peak hour vehicle trips when the *"constrained"* or reduced parking provision is taken into account.

That projected future level of traffic activity should however, be offset or *discounted* by the volume of traffic which could reasonably be expected to be generated by the existing uses of the site, in order to determine the *nett increase (or decrease)* in traffic flows expected to occur as a consequence of the development proposal.

The traffic survey results undertaken at the existing site indicate a traffic generation rate of approximately 20 peak hour vehicle trips.

Accordingly, it is likely that the proposed development will result in an *increase* in the level of traffic activity generated by the site of approximately 31 vph as set out below:

Projected Nett Increase in Peak Hour Traffic Activity
as a consequence of the development proposal

Projected Future Traffic Flows:	51 vehicle trips
Existing Traffic Flows:	20 vehicle trips
NETT INCREASE IN TRAFFIC FLOWS:	**31 vehicle trips**

That projected increase in traffic activity as a consequence of the development proposal is minimal and will clearly not have any unacceptable traffic implications in terms of road network capacity, as is demonstrated by the following section of this report.

Traffic Implications - Road Network Capacity

The traffic implications of development proposals primarily concern the effects that any *additional* traffic flows may have on the operational performance of the nearby road network. Those effects can be assessed using the INTANAL program which is widely used by the RTA and many LGA's for this purpose. Criteria for evaluating the results of INTANAL analysis are reproduced in the following pages.

The results of the INTANAL analysis of the George Street & Site Access Driveway intersection are summarised on Table 3.1 below, revealing that:

- the George Street & Site Access Driveway intersection currently operates at *Level of Service "A"* under the existing traffic demands with total average vehicle delays in the order of 4 seconds/vehicle

- under the projected future traffic demands expected to be generated by the development proposal, the George Street & Site Access Driveway intersection will continue to operate at *Level of Service "A",* with increases in average vehicle delays of ***less than*** 1 second/vehicle.

In the circumstances, it is clear that the proposed development will not have any unacceptable traffic implications in terms of road network capacity. In particular it is noted that no road/intersection upgrades will be required.

TABLE 3.1 - RESULTS OF INTANAL ANALYSIS OF GEORGE STREET & SITE ACCESS DRIVEWAY					
Key Indicators		**Existing Traffic Demand**		**Projected Development Traffic Demand**	
		AM	**PM**	**AM**	**PM**
Level of Service		A	A	A	A
Degree of Saturation		0.00	0.01	0.01	0.05
Average Vehicle Delay (secs/veh)					
George Street (west)	T	0.0	0.0	0.0	3.7
	R	3.7	3.7	3.7	0.0
Site Access Driveway (south)	R	4.2	4.3	4.2	4.4
TOTAL AVERAGE VEHICLE DELAY		**3.7**	**4.2**	**3.8**	**4.3**
		GEO_ACCX		GEO_ACCP	

Construction Traffic Management

Construction activities are expected to be undertaken over a duration of approximately 18 months and will involve between 3 and 20 staff as set out below. Working hours are proposed from 7:00am to 5:00pm Monday-Friday and 8:00am-12 noon on Saturday, subject to DA consent conditions. No work is to be carried out on Sundays or Public Holidays.

CONSTRUCTION PROGRAM – DURATION AND STAFFING LEVELS			
Stage	**Work**	**Duration**	**Number of Staff**
1	Demolition	2 weeks	3 - 8
2	Excavation	4 weeks	3 - 8
3	Construction	16 months	3 - 20

During construction of the proposed office building, a hoarding is to be installed along the site frontage incorporating overhead protection for pedestrians and cyclists.

Works Zone

A Works Zone is proposed to be installed along the southern side of George Street between the existing site access driveway and the western boundary of the site. The Works Zone is proposed to facilitate unloading of deliveries to the site during construction, and is not intended to be used by construction employees' private vehicles.

Loading/Unnloading

All materials being delivered to the site will be unloaded either within the site or using the abovementioned Works Zone which is to be installed directly in front of the site.

Construction Truck Routes

All heavy vehicles involved in the demolition, excavation and construction of the proposed development will approach the site via the classified RTA road network and then either George Street or Smith Street when approaching the site. Upon departure, all heavy vehicles will return to the classified RTA road network via either Macarthur Street or Harris Street and Parkes Street.

Traffic Controllers

It is proposed to utilise the services of an authorised traffic controller during the demolition and excavation phases of the project. The key responsibilities of the *authorised traffic controller* will include:

- to ensure the safety of pedestrian movements along the footpath where it crosses the driveway to be used by demolition or excavation vehicles, and

- to control the safe movement of demolition/excavation vehicles when departing the site. The *authorised traffic controller* should wait for a suitable and safe gap in the passing traffic flows in George Street before allowing heavy vehicles to exit the site.

Criteria for Interpreting Results of Intanal Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by traffic signals[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a roundabout or GIVE WAY or STOP signs, satisfactory intersection operation is indicated by a DS of 0.8 or less.

[1] *The values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs.*

4. PARKING IMPLICATIONS

Existing Kerbside Parking Restrictions

The existing kerbside parking restrictions which apply to the road network in the vicinity of the site are illustrated on Figure 6 and comprise:

- NO STOPPING restrictions in George Street in the vicinity of the Smith Street and also Charles Street intersections

- NO STOPPING restrictions in George Street along the site's vehicular access driveway

- sections of ½ HOUR / 4 HOUR TICKET PARKING along both sides of George Street

- sections of 1 HOUR / 4 HOUR TICKET PARKING along both sides of George Street including along the site frontage

- BUS ZONES located at various locations in George Street, Smith Street and Phillip Street.

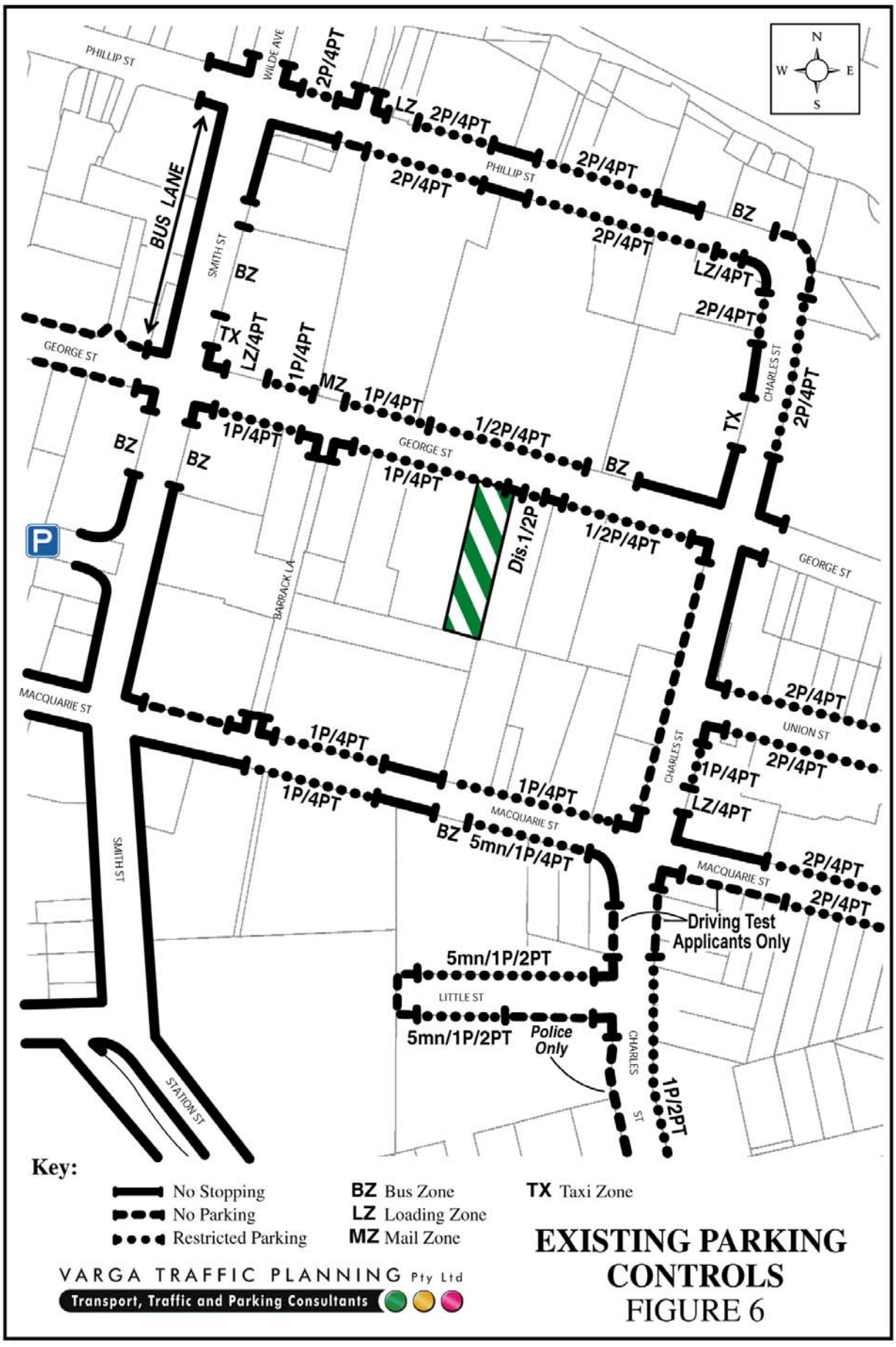
Off-Street Parking Provisions

The off-street parking rates applicable to the development proposal are specified in the NSW Government's *Sydney Regional Environmental Plan No. 28 – Parramatta – Division 3, Car Parking* document in the following terms:

Commercial Premises
10 car spaces per 1,000m^2 GFA (Maximum)

Shops
1 space per 30m^2 GFA

The above parking rates specify the *maximum* number of off-street carparking spaces which may be provided on the site. Application of the above parking rates to the proposed development proposal yields a *maximum* permissible off-street parking provision of approximately 120 parking spaces.


PHILLIP ST
WILDE AVE
2P/4PT
LZ
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PHILLIP ST
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BZ
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BUS LANE
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GEORGE ST
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GEORGE ST
BARRACK LA
MACQUARIE ST
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UNION ST
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MACQUARIE ST
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SMITH ST
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Key:
No Stopping
No Parking
Restricted Parking
BZ Bus Zone
LZ Loading Zone
MZ Mail Zone
TX Taxi Zone
VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants
EXISTING PARKING CONTROLS
FIGURE 6

The above requirements are satisfied by the proposed provision of 63 off-street carparking spaces and 10 motorcycle spaces in a four-level basement carparking area.

The geometric design layout of the proposed vehicular access and carparking facilities have been designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 1 - Off-Street Carparking AS2890.1* in respect of parking bay dimensions, ramp and aisle widths and overhead clearances.

Loading/Servicing Provisions

The proposed new office building is expected to be serviced by a variety of light commercial vehicles such as utilities and white vans, and small trucks up to and including 6.4m long SRV trucks. The loading dock is to be located towards the front of the building on the ground floor level with a truck turntable, allowing the service vehicles to enter and depart the site in a forward direction at all times.

The geometric design layout of the proposed carparking facilities have been designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 2 - Off-Street Commercial Vehicle Facilities AS2890.2* in respect of loading dock dimensions and service area requirements for SRV trucks.

Bicycle Parking Provisions

The bicycle parking requirements applicable to the development proposal are specified in the Council's *Development Control Plan 2005 – Bicycle Parking* document in the following terms:

> **Commercial Premises**
> 1 bicycle space per 20 motor vehicle spaces

Application of the above bicycle parking rates to the 63 motor vehicle spaces provided as outlined in the development proposal yields a bicycle parking requirement of 3 spaces. The above requirements are satisfied by the proposed provision of 75 bicycle parking spaces in a bicycle parking area located on basement level 1.

In summary, the proposed parking, servicing and bicycle facilities satisfy the relevant requirements specified in NSW Government Legislation, Council's Code and the Australian Standards and it is therefore concluded that the proposed development will not have any unacceptable parking, servicing and bicycle implications.

APPENDIX A

TRAFFIC SURVEY DATA

R.O.A.R. DATA

Reliable, Original & Authentic Results

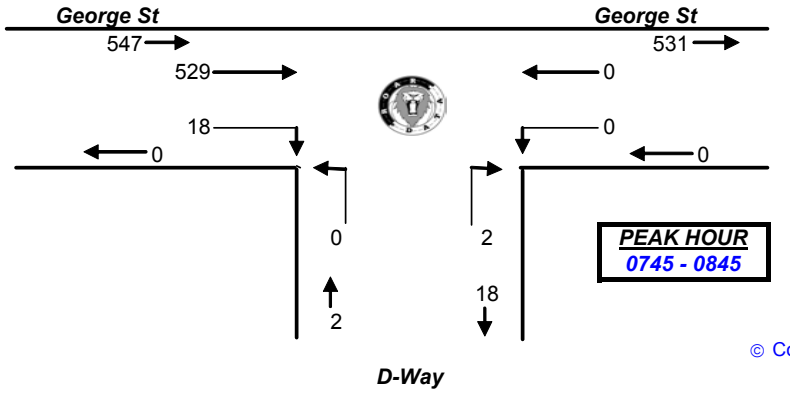
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 2316 PARAMATTA 89 George St
Day/Date : Tuesday 24th June 08

All Vehicles

Time Per	WEST George St R	WEST George St T	SOUTH D-Way L	SOUTH D-Way R	EAST George St T	EAST George St L	TOTAL
0630 - 0645	0	43		0			43
0645 - 0700	1	66		0			67
0700 - 0715	0	63		0			63
0715 - 0730	1	98		0			99
0730 - 0745	0	123		0			123
0745 - 0800	8	141		1			150
0800 - 0815	5	138		0			143
0815 - 0830	3	117		1			121
0830 - 0845	2	133		0			135
0845 - 0900	2	126		0			128
0900 - 0915	1	89		1			91
0915 - 0930	2	100		0			102
Period End	**25**	**1237**	**0**	**3**	**0**	**0**	**1265**

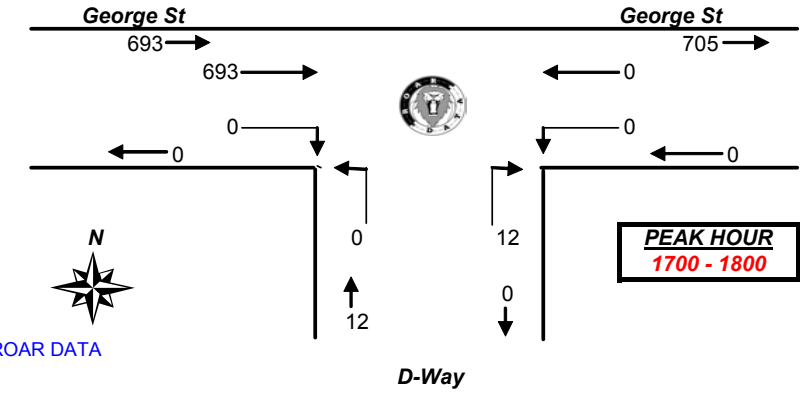
Peak Per	WEST George St R	WEST George St T	SOUTH D-Way L	SOUTH D-Way R	EAST George St T	EAST George St L	TOTAL
0630 - 0730	2	270	0	0	0	0	272
0645 - 0745	2	350	0	0	0	0	352
0700 - 0800	9	425	0	1	0	0	435
0715 - 0815	14	500	0	1	0	0	515
0730 - 0830	16	519	0	2	0	0	537
0745 - 0845	18	529	0	2	0	0	549
0800 - 0900	12	514	0	1	0	0	527
0815 - 0915	8	465	0	2	0	0	475
0830 - 0930	7	448	0	1	0	0	456
PEAK HR	**18**	**529**	**0**	**2**	**0**	**0**	**549**



All Vehicles

Time Per	WEST George St R	WEST George St T	SOUTH D-Way L	SOUTH D-Way R	EAST George St T	EAST George St L	TOTAL
1530 - 1545	0	122		0			122
1545 - 1600	2	100		2			104
1600 - 1615	0	134		1			135
1615 - 1630	0	106		2			108
1630 - 1645	1	147		1			149
1645 - 1700	1	155		4			160
1700 - 1715	0	189		6			195
1715 - 1730	0	154		3			157
1730 - 1745	0	174		3			177
1745 - 1800	0	176		0			176
1800 - 1815	0	151		0			151
1815 - 1830	0	106		0			106
Period End	**4**	**1714**	**0**	**22**	**0**	**0**	**1740**

Peak Per	WEST George St R	WEST George St T	SOUTH D-Way L	SOUTH D-Way R	EAST George St T	EAST George St L	TOTAL
1530 - 1630	2	462	0	5	0	0	469
1545 - 1645	3	487	0	6	0	0	496
1600 - 1700	2	542	0	8	0	0	552
1615 - 1715	2	597	0	13	0	0	612
1630 - 1730	2	645	0	14	0	0	661
1645 - 1745	1	672	0	16	0	0	689
1700 - 1800	0	693	0	12	0	0	705
1715 - 1815	0	655	0	6	0	0	661
1730 - 1830	0	607	0	3	0	0	610
PEAK HR	**0**	**693**	**0**	**12**	**0**	**0**	**705**



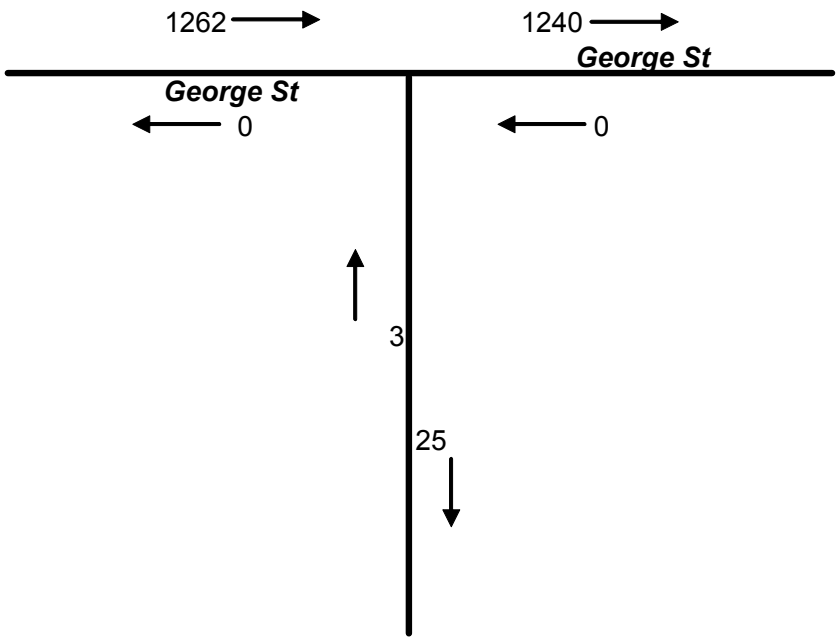
R.O.A.R DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

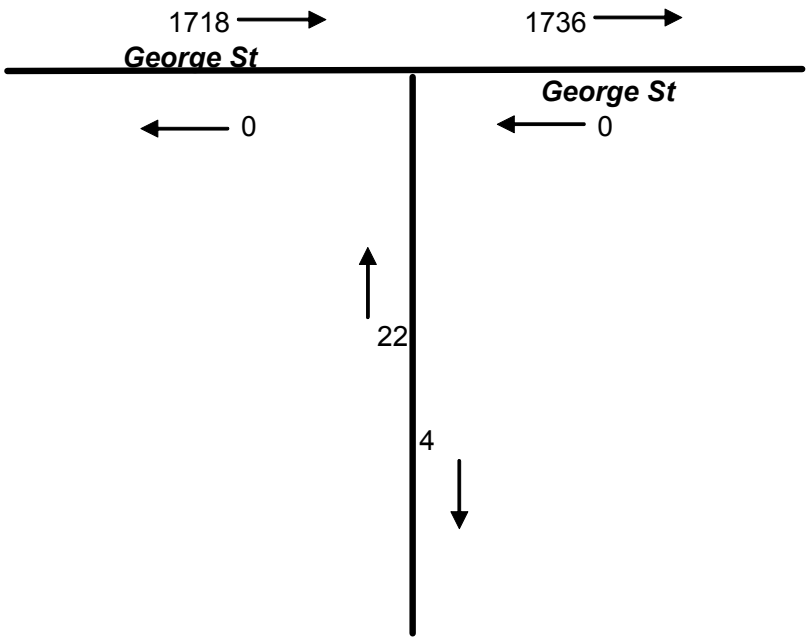
Client : Varga Traffic Planning
Job No/Name : 2316 PARAMATTA 89 George St
Day/Date : Tuesday 24th June 08

AM

TOTAL VOLUMES FOR COUNT PERIOD

PM



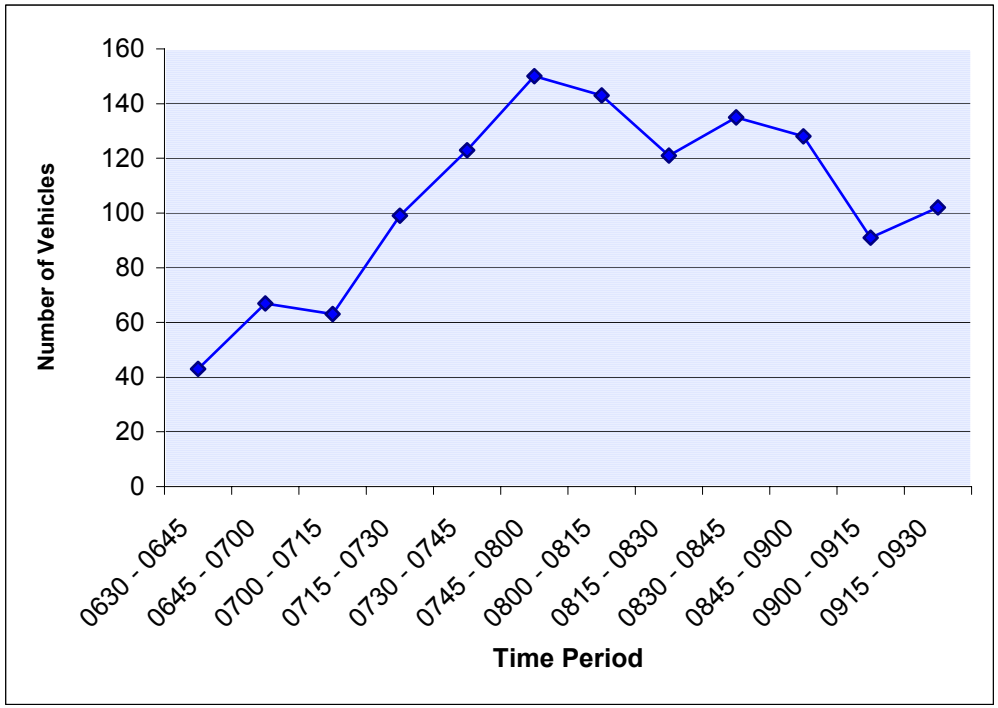


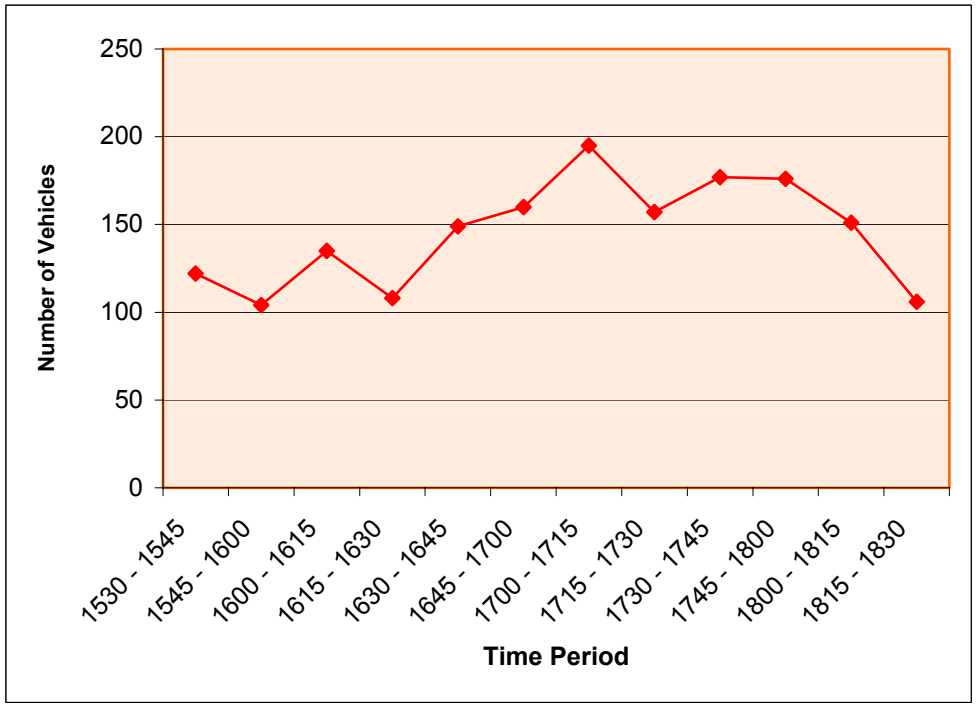
R.O.A.R DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 2316 PARAMATTA 89 George St
Day/Date : Tuesday 24th June 08

AM ***PM***

George St & Driveway



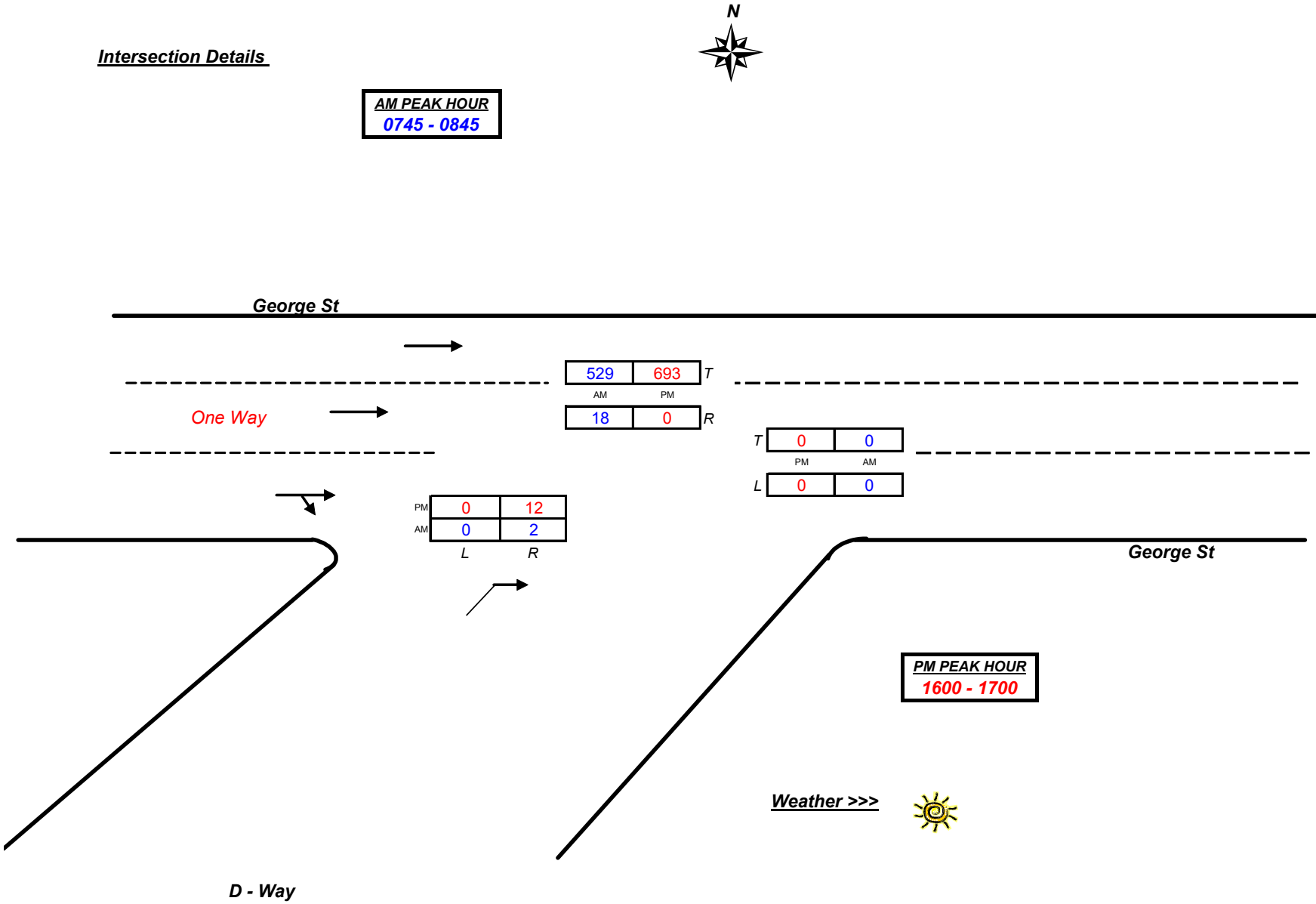


R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 2316 PARAMATTA 89 George St
Day/Date : Tuesday 24th June 08

Intersection Details

AM PEAK HOUR
0745 - 0845



PM PEAK HOUR
1600 - 1700

Weather >>>

APPENDIX B

INDIVIDUAL BUS ROUTES ACCESSING PARRAMATTA CBD

Hills District
Bus Guide

Effective from:
11 May 2009

hillsbus

Glenorie
Arcadia
Berrilee
Kenthurst
Galston
Annangrove
Dural
Round Corner
Glenhaven
Cherrybrook
Rouse Hill
Kellyville
Stanhope Gardens
Acacia Gardens
Parklea
Glenwood
Bella Vista
Kings Langley
Kings Park
Castle Hill
Pennant Hills
West Pennant Hills
Beecroft
Cheltenham
Epping
Baulkham Hills
Blacktown
Lalor Park
Seven Hills
Toongabbie
Prospect
Girraween
Winston Hills
North Rocks
Carlingford
Mobbs Hill
Northmead
North Parramatta
Old Toongabbie
Telopea
Oatlands
Westmead
Wentworthville
Pendle Hill
Parramatta
Mays Hill
Harris Park

Castle Hill Local Area

Hornsby
Waitara
Normanhurst
Thornleigh

Parramatta Local Area

Blacktown Local Area

Map Legend

Train station · Train line · Hospital · School · Dural Transfer Point
Shopping centre · University/TAFE · Occasional journey · Bus Route number
0m 500m 1km
N

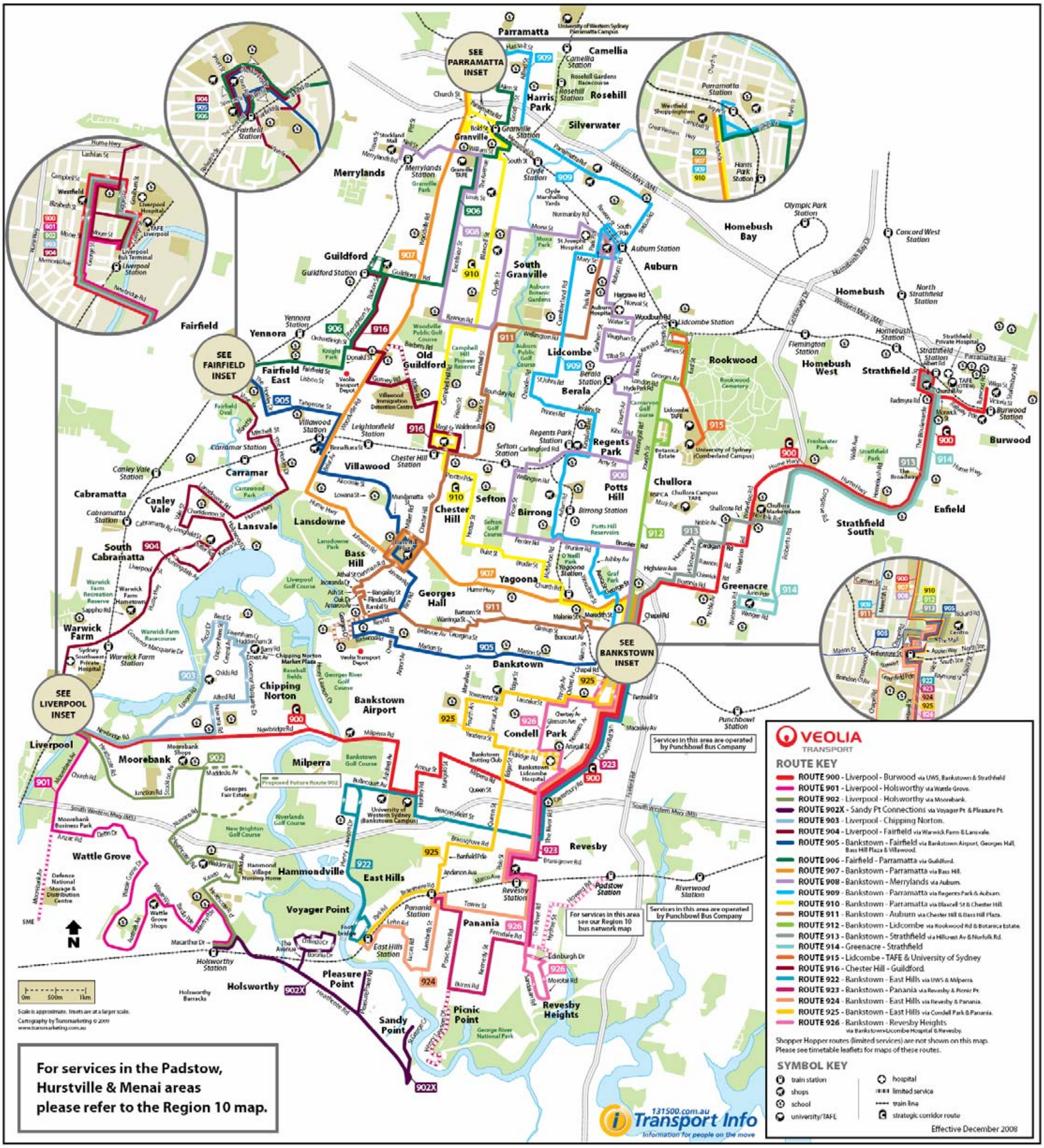
Epping to Lane Cove Area

North Epping
Epping
Marsfield
Eastwood
Macquarie Park
East Ryde
Chatswood West
Chatswood
Willoughby
Artarmon
Lane Cove West
Lane Cove
Crows Nest
Osborne Park
Northwood
Greenwich
Wollstonecraft

North Sydney/CBD Area

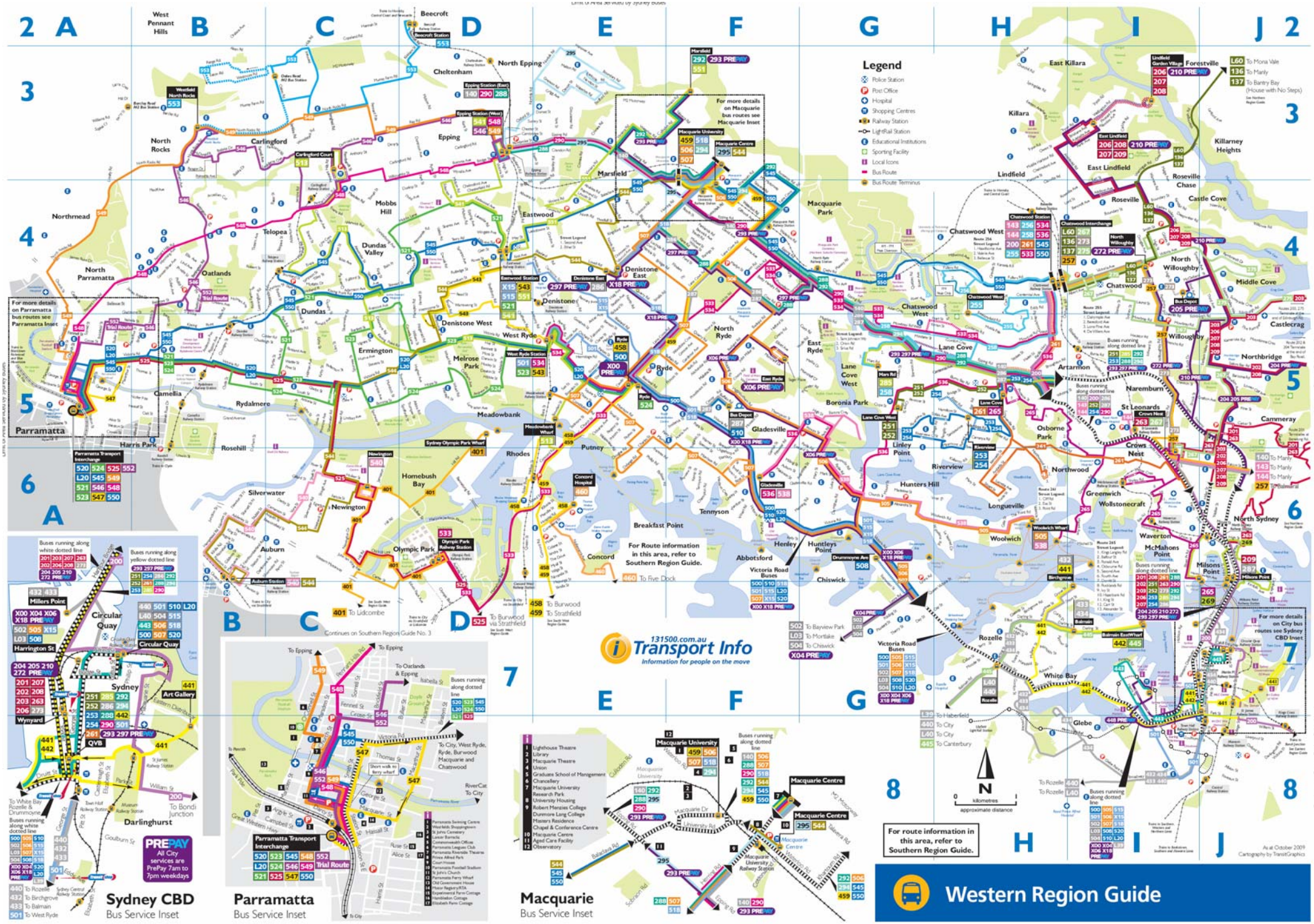
Artarmon
St Leonards
Cammeray
Osborne Park
Crows Nest
North Sydney
Milsons Point
Wynyard
Sydney CBD

Regional bus network
Region 13



Phone: 8700 0555

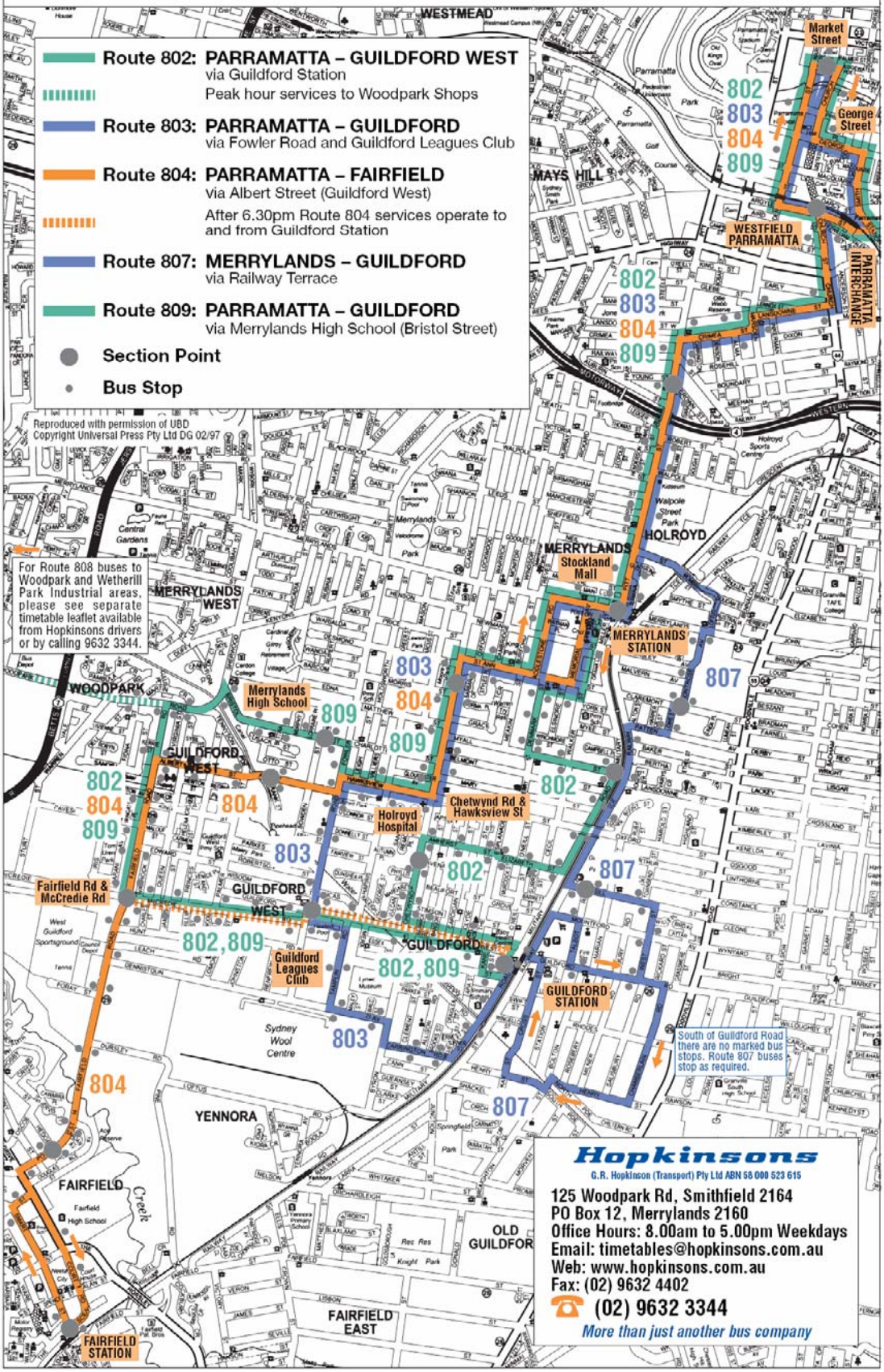
www.veoliatransportnsw.com.au


Legend
Police Station
Post Office
Hospital
Shopping Centres
Railway Station
LightRail Station
Educational Institutions
Sporting Facility
Local Icons
Bus Route
Bus Route Terminus
Transport Info
131500.com.au
Information for people on the move
For route information in this area, refer to Southern Region Guide.
For more details on Parramatta bus routes see Parramatta Inset
For more details on Macquarie bus routes see Macquarie Inset
For more details on City bus routes see Sydney CBD Inset
Continues on Southern Region Guide No. 3
Continues on Northern Region Guide No. 2
Continues on Eastern Region Guide No. 4
Sydney CBD
Bus Service Inset
Parramatta
Bus Service Inset
Macquarie
Bus Service Inset
PREPAY
All City services are PrePay 7am to 7pm weekdays
Western Region Guide
As at October 2009
Cartography by TransitGraphics

Hopkinsons

MetroBus Network Map

PARRAMATTA – MERRYLANDS – GUILDFORD – FAIRFIELD



Hopkinsons

G.R. Hopkinson (Transport) Pty Ltd ABN 58 000 523 615

125 Woodpark Rd, Smithfield 2164
PO Box 12, Merrylands 2160
Office Hours: 8.00am to 5.00pm Weekdays
Email: timetables@hopkinsons.com.au
Web: www.hopkinsons.com.au
Fax: (02) 9632 4402
(02) 9632 3344

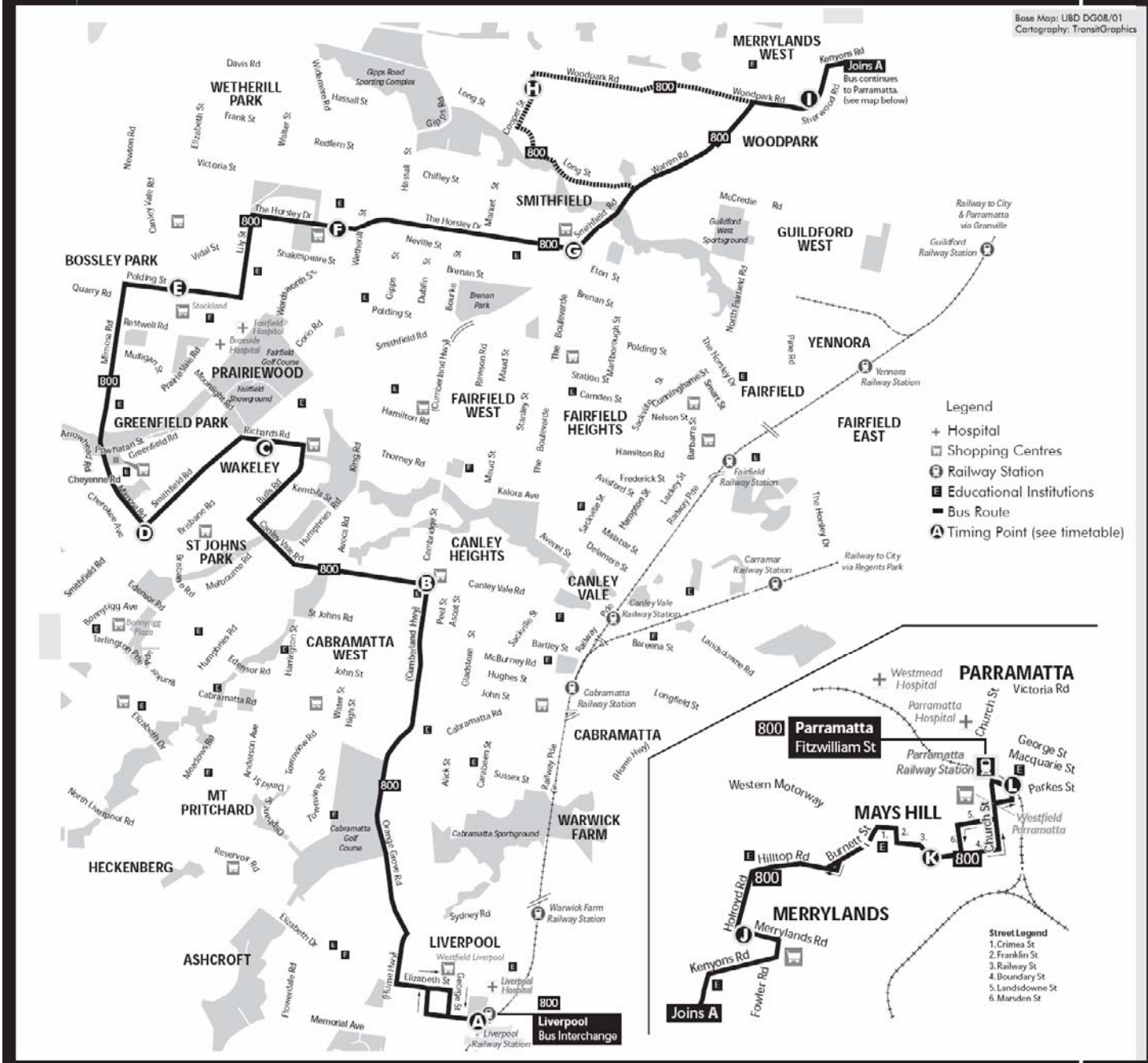
More than just another bus company

Bus Route Map

800

Liverpool to Parramatta via Canley Heights, St Johns Park, Wakeley, Greenfield Park, Bossley Park, Smithfield, Woodpark, Merrylands West and Mays Hill.

westbus



Route **810**

Bus Route Map

westbus

Route 811/813/815 Bus Route Map

westbus

Legend

- Bus Route
- Railway Line
- Section Point
- Bus Route Number
- Educational Institution
- Shopping Centre
- Hospital

Base Map: UBD DG08/01

Section Point Legend

Bus Route 811

01 Merrylands Station
02 Merrylands Rd & Ruth St
03 Merrylands Rd & Ringrose Ave
04 Jonathan St & Virgil St
05 Whalans Rd & Kippax St
06 Pemulwuy Shops
07 Beresford Rd & Old Prospect Rd
08 Ringrose Ave & Old Prospect Rd
09 Allen St & Richmond St
10 Coleman St & Great Western Hwy
11 Houison St & Great Western Hwy
12 Parramatta Station

Section Point Legend

Bus Route 813

01 Merrylands Station
02 Merrylands Rd & Ruth St
03 Merrylands Rd & Ringrose Ave
04 Daffodil St & Tulip St
05 Dahlia St & Hibiscus St
06 Gipps Rd & Munro St
07 Kippax St & Whalans Rd
08 Pemulwuy Shops
09 Beresford Rd & Old Prospect Rd
10 Ringrose Ave & Old Prospect Rd
11 Allen St & Richmond St
12 Coleman St & Great Western Hwy
13 Houison St & Great Western Hwy
14 Parramatta Station

Section Point Legend

Bus Route 815

01 Merrylands Station
02 Merrylands Rd & Ruth St
03 Merrylands Rd & Ringrose Ave
04 Macquarie Rd (West of Bayfield Rd)
05 Alpha Rd & Macquarie Rd
06 Kippax St & Whalans Rd
07 Pemulwuy Shops
08 Beresford Rd & Old Prospect Rd
09 Ringrose Ave & Old Prospect Rd
10 Allen St & Richmond St
11 Coleman St & Great Western Hwy
12 Houison St & Great Western Hwy
13 Parramatta Station