

PP2017/6
Planning Proposal for a
Proposed Mixed Use Development

**54-56 Anderson Street,
Chatswood**

TRAFFIC AND PARKING ASSESSMENT REPORT

4 February 2021

Ref 17499

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants 

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1. INTRODUCTION

This report has been prepared to accompany an amended planning proposal for a mixed use development to be located at 54-56 Anderson Street, Chatswood (Figures 1 and 2).

In June 2018, PP2017/6 was endorsed by Council for the rezoning of the land from *R3 – Medium Density Residential* to *B4 – Mixed Use*. The planning proposal envisaged the construction of 148 new residential apartments above a commercial/retail component located across the ground floor and podium levels of the proposed development.

Off-street parking was to be provided in a new basement car parking area located beneath the buildings and would ultimately be designed to comply with Council and *SEPP 65* requirements as well as the relevant Australian Standards. Vehicular access to the site was to be provided via a new entry/exit driveway located at the western end of the O'Brien Street site frontage.

Notwithstanding, the Department of Planning, Industry and Environment (DPIE) had also endorsed *The Chatswood CBD Planning and Urban Design Strategy 2036 (CCPUDS)*, subject to conditions listed by DPIE.

As a result of DPIE's letter, planning proposals previously supported by Council to proceed to The Gateway process (including public exhibition) were returned, subject to the preparation and consideration of further information.

This traffic report provides details of the amended scheme, based on the comments raised by DPIE and the subsequent refinements of the *CCPUDS* document by Council. It is noted that these changes incorporate the revised controls outlined for 54-56 Anderson Street.

The proposed modifications to the previously endorsed scheme, from a traffic and parking perspective, involve decreasing the total dwelling yield from 148 apartments to 114 apartments (i.e. *reduction* of 34 dwelling). Off-street parking is again to be provided in a new basement parking area located beneath the buildings and would ultimately be designed to comply with Council and *SEPP 65* requirements as well as the relevant Australian Standards.

The location of the proposed vehicular access driveway remains *unchanged*. Notwithstanding, loading/servicing for the proposed development has been amended to be provided within the upper basement parking area, with the *removal* of the previously proposed mechanical turntable.

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

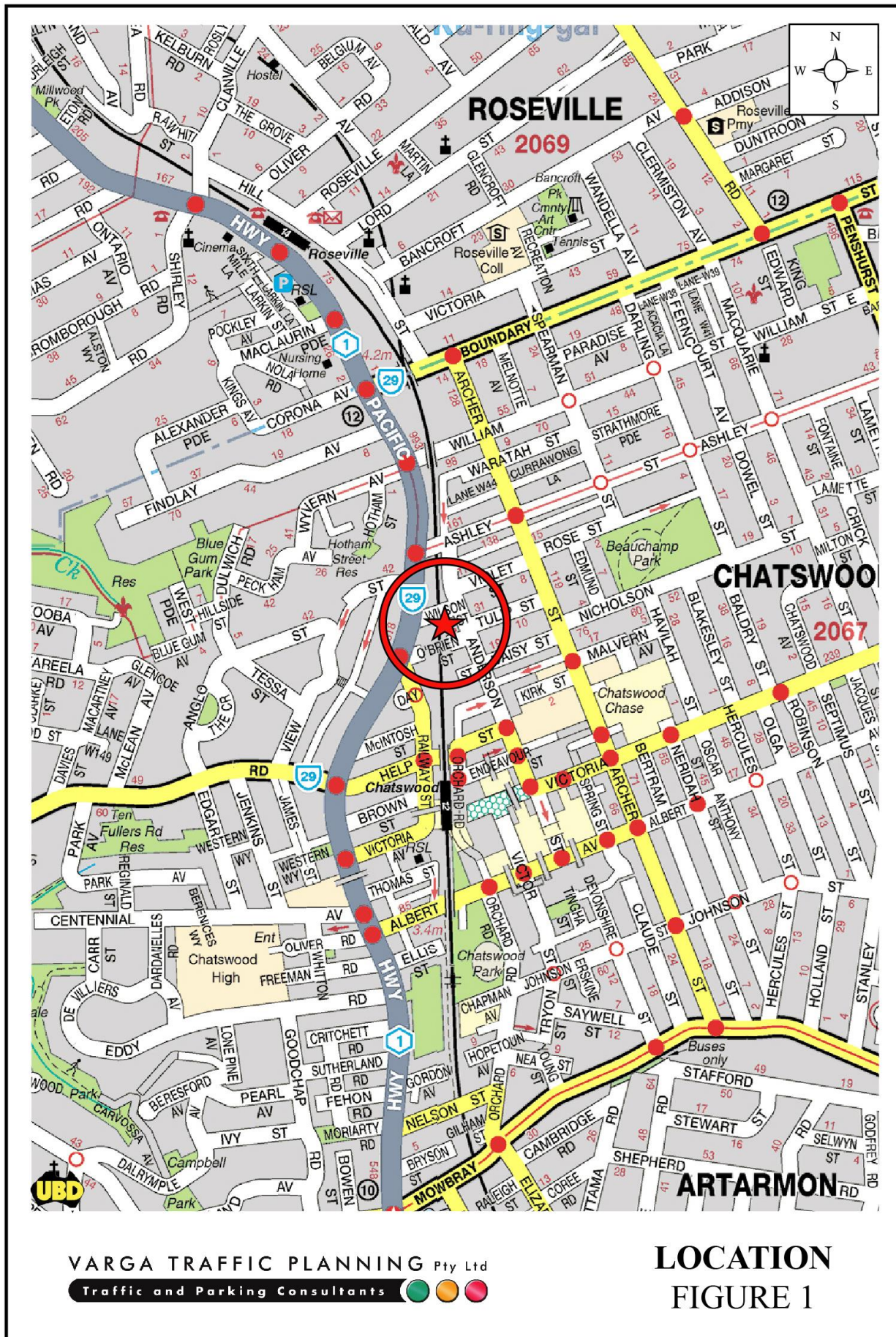
- describes the site and provides details of the amended planning proposal
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- reviews the public transport services available in the vicinity of the site
- estimates the traffic generation potential of the amended planning proposal and assigns that traffic generation to the road network serving the site
- assesses the traffic implications of the planning proposal in terms of road network capacity
- reviews the geometric design features of the proposed car parking and loading facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street car parking and loading provided on the site.

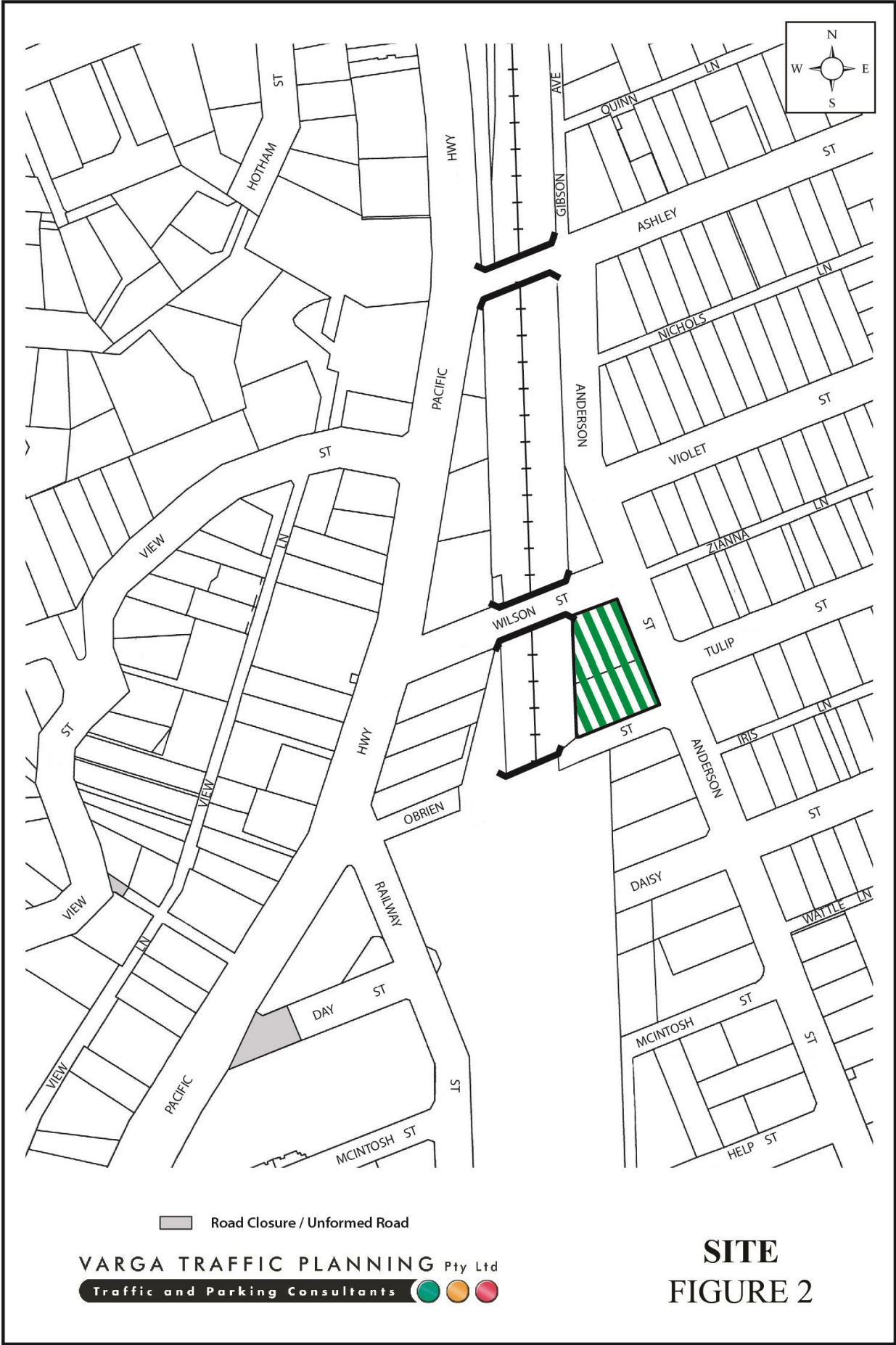
This planning proposal is consistent with the population growth envisaged by the *Chatswood CBD Planning and Urban Design Strategy 2036 (CCPUDS)*. It is noted in this regard that the “*Future Conditions Report*” undertaken by Arup in collaboration with Willoughby City Council and TfNSW compared the growth scenarios presented in the *CCPUDS* to the TfNSW base forecast to ascertain the likely impact on the future transport network. The “*Future Conditions Report*” found that:

- travel demand in Chatswood will increase significantly over the next 20 years

- Sydney Metro is a key driver for travel patterns in future years, leading to *increased public transport mode shares* and a *significant uplift in the number of passengers using Chatswood Interchange*
- despite the mode shift towards public transport, private vehicle trips will also increase in the horizon years, however results suggest that the road network has the capacity to accommodate the uplift
- the differences between the base and uplift scenarios on the road network occurred predominantly on the internal road network within the CBD, and
- the base and uplift scenarios had similar impacts on the surrounding arterial roads, such as the Pacific Highway and Mowbray Road.

In summary, the future conditions report found that the *CCPUDS* will have an impact in the same order of magnitude as the current TfNSW base forecast, and that the future transport network will be able to accommodate this demand.





2. PLANNING PROPOSAL

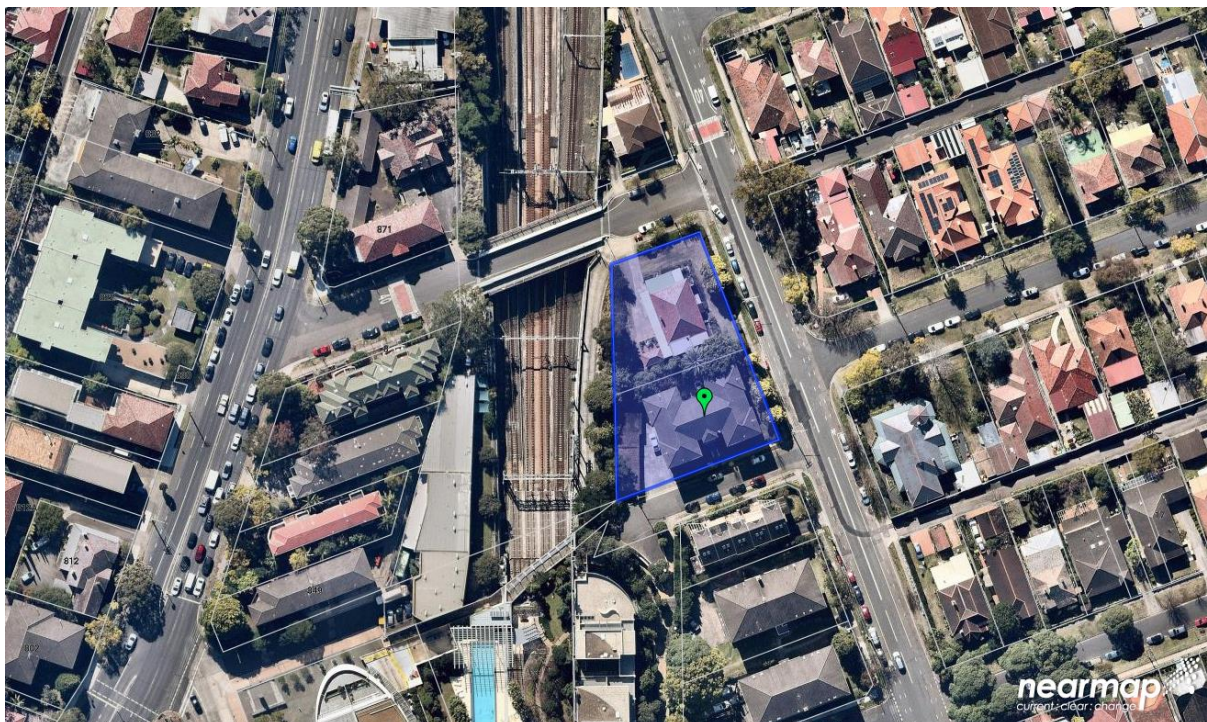
Site

The subject site is located on the western side of Anderson Street, bounded by O'Brien Street, Wilson Street and the North Shore Railway Line which runs directly along the western boundary of the site. The site has street frontages approximately 60 in length to Anderson Street, 25m in length to Wilson Street and 47m in length to O'Brien Street. The site occupies an area of 2,216m².

The site is currently zoned *R3 – Medium Density Residential* and is located approximately 600m walking distance north of Chatswood Railway Station & Bus Interchange.

The subject site is currently occupied by two residential apartment buildings with off-street parking and vehicular access provided via respective driveways located off each respective frontage, including an at-grade hardstand parking area with detached garages located along the western end of the O'Brien Street site frontage for Lot 54.

A recent aerial image of the site and its surroundings is reproduced below.



Source: Nearmap

Existing Planning Controls

The primary instrument that governs the mass and scale of the development on the site are contained within the *Willoughby Local Environment Plan 2012 (WLEP 2012)*. The subject site is currently zoned *R3 – Medium Density Residential* and subject to a maximum FSR of 0.9:1, with the scale of any development on the site currently limited to a building height of 12m.

It is therefore envisaged that a four-storey townhouse development comprising 6 x 1 bedroom and 24 x 2 bedroom apartments is achievable under the existing planning controls for the site.

Planning Proposal

The proposed modifications, from a traffic and parking perspective, involve decreasing the total dwelling yield from 148 apartments to 114 apartments (i.e. *reduction* of 34 dwellings), resulting in a revised unit mix as follows:

1 bedroom apartments:	24
2 bedroom apartments:	70
3 bedroom apartments:	20
TOTAL APARTMENTS:	114

A number of commercial/retail tenancies are proposed on the ground floor and podium levels of the new residential tower building. The cumulative floor area of the commercial/retail suites for the site is approximately 1,775m².

Off-street parking will be provided in a new basement car parking area and will ultimately be designed to comply with Council and *SEPP* requirements, as well as the relevant Australian Standards. Vehicular access to the site is to be provided via a new entry/exit driveway located at the southern end of the O'Brien Street site frontage.

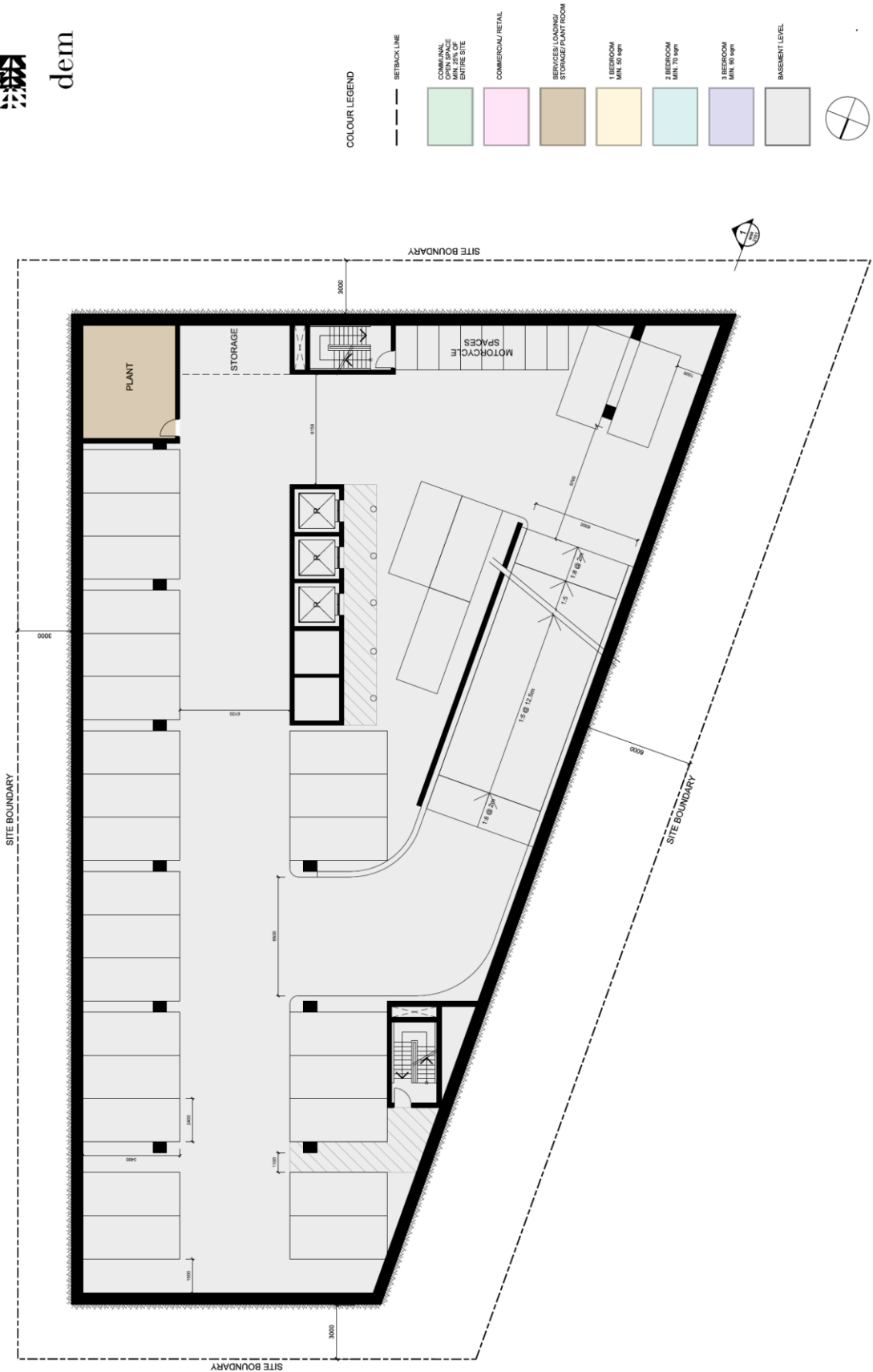
Loading/servicing for the proposed development is expected to be undertaken by a variety of commercial vehicles up to and including 8.8m long medium rigid trucks. The service area is to be located at the bottom of the basement access ramp, with vehicular access to the loading

dock provided via the abovementioned two-way basement access driveway located off the O'Brien Street site frontage.

Concept plans of the updated planning proposal have been prepared by *DEM (Aust) Pty Ltd* and are reproduced in the following pages.



dem



54-56 Anderson Street

Reference Concept Design
Typical Basement Plan

Planning, urban design, architecture,
landscape architecture, interior design
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www.varga.com.au

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A01

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Basement 1 Plan

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Reference Concept Design
Level 1 Plan

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e: aydney@dem.com.au

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e: sydney@dam.com.au

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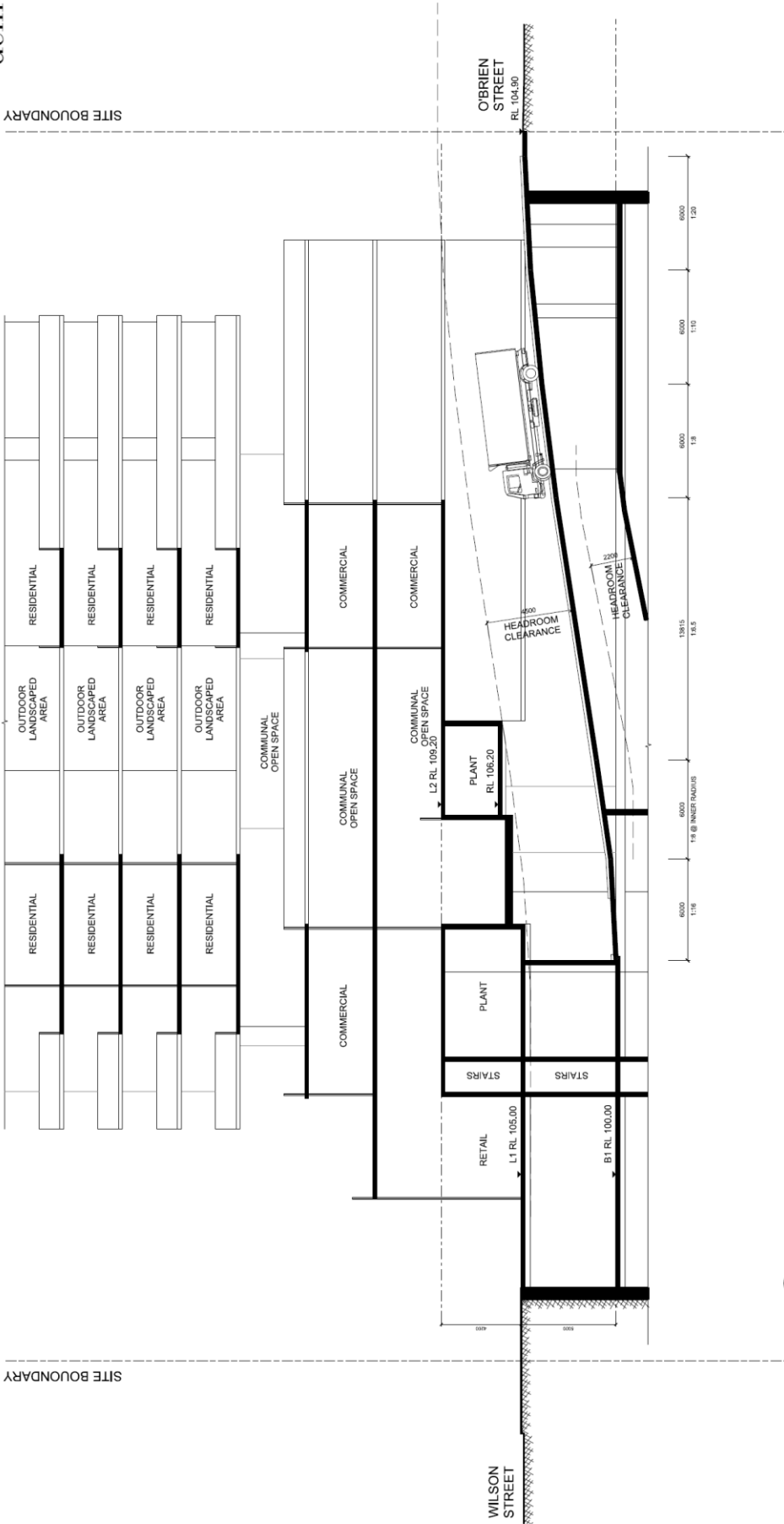
54-56 Anderson Street

Reference Concept Design
Lower Typical Floor Plan (L5-L16)

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54-56 Anderson Street

Reference Concept Design

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landscape architecture, interior design
t: (02) 8966 6000 f: (02) 8966 6111
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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 Maritime Services is illustrated on Figure 3.

The Pacific Highway is classified by the RMS as a *State Road* and provides the key north-south road link in the area, linking North Sydney to Hornsby and beyond. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway restrictions apply during commuter peak periods.

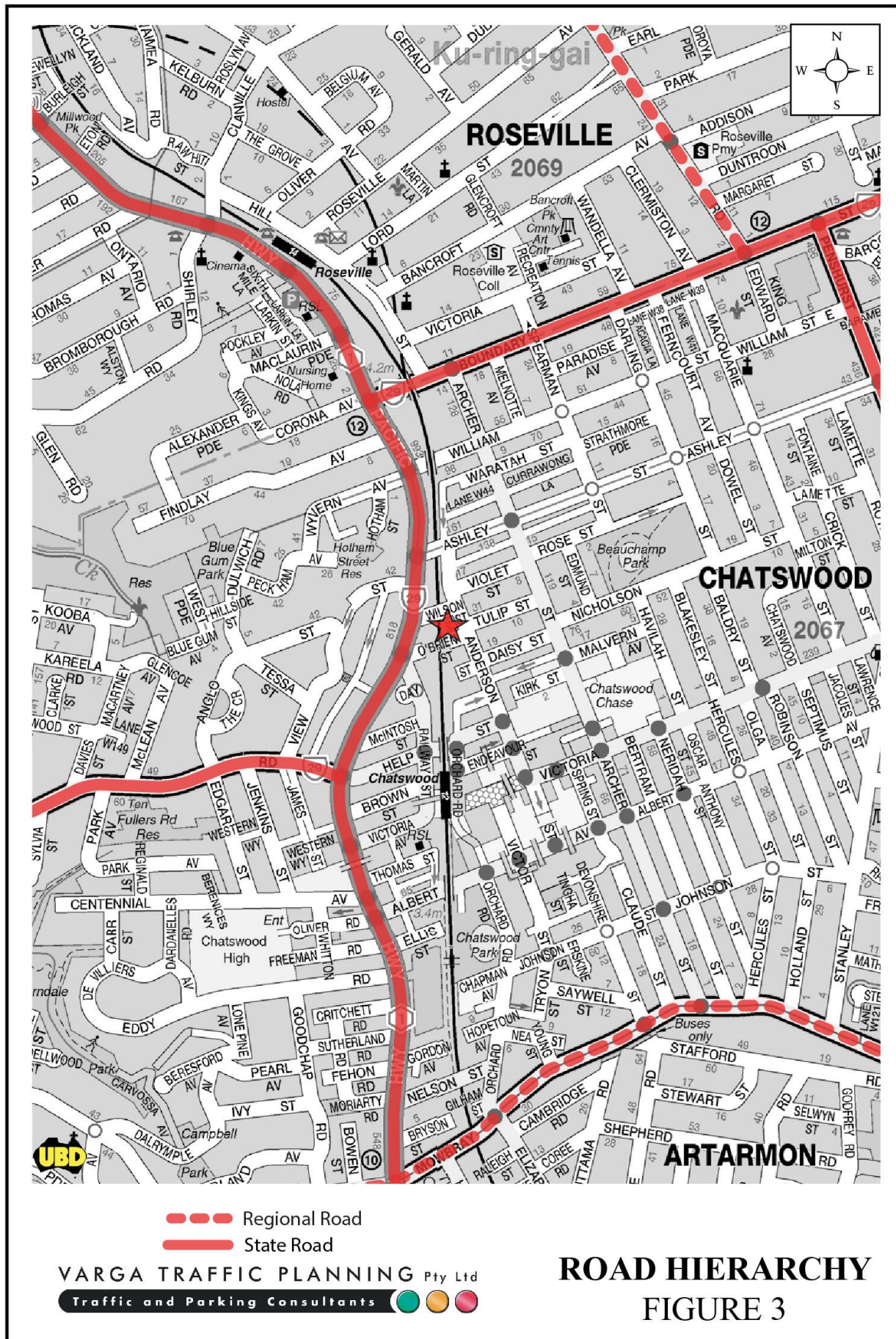
Boundary Road is also classified by the RMS as a *State Road* which provide the key east-west *collector route* in the local area, linking Chatswood to Roseville. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway restrictions apply along both sides of the road during commuter peak periods.

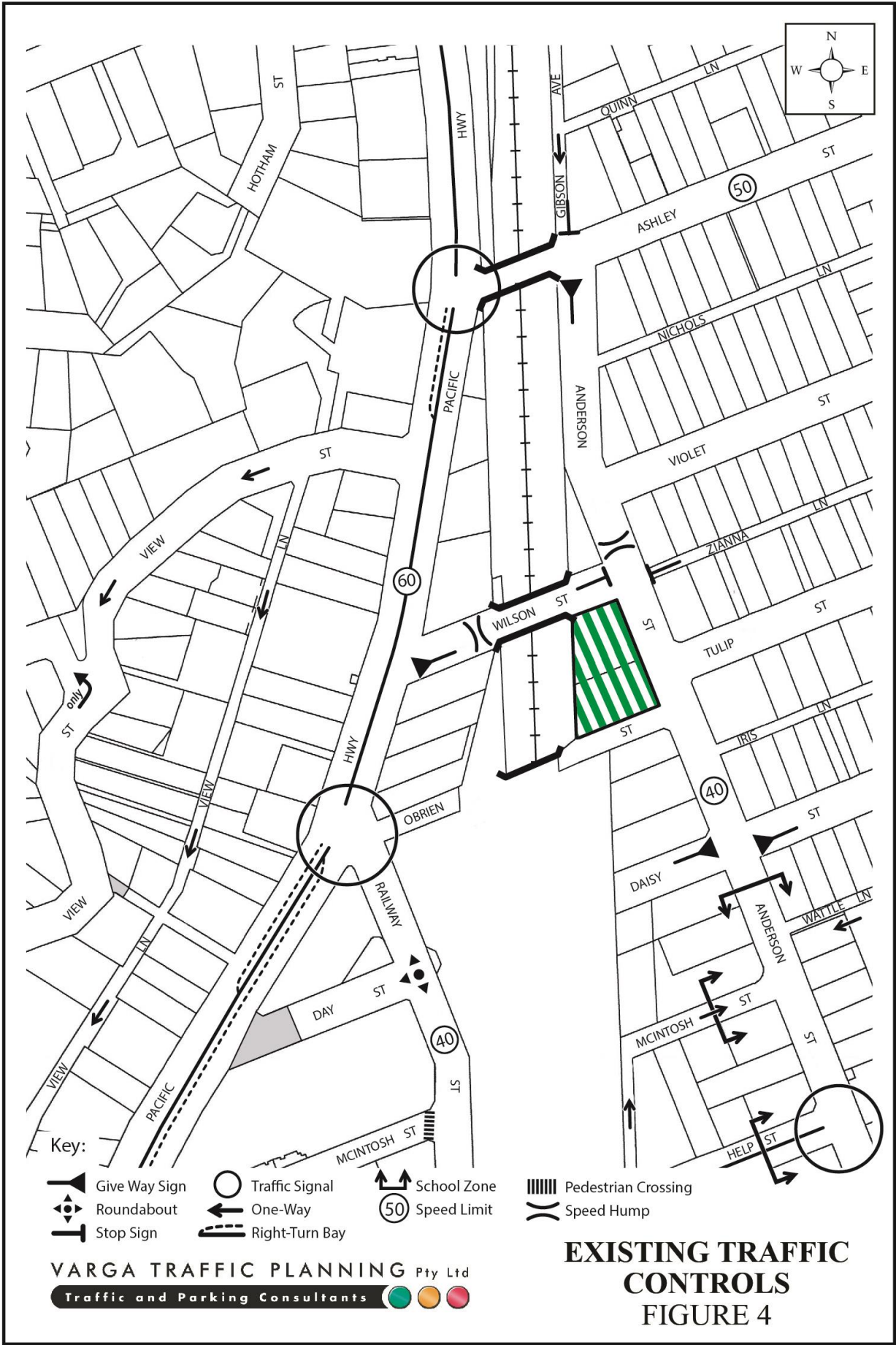
Anderson Street, Wilson Street and O'Brien Street are local, unclassified roads which are primarily used to provide vehicular and pedestrian access to frontage properties. Kerbside parking are generally permitted on both sides of these roads.

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 60 km/h SPEED LIMIT which applies to the Pacific Highway
- a 50 km/h SPEED LIMIT which applies to Anderson Street (north of Violet Street), and all other local roads in the area





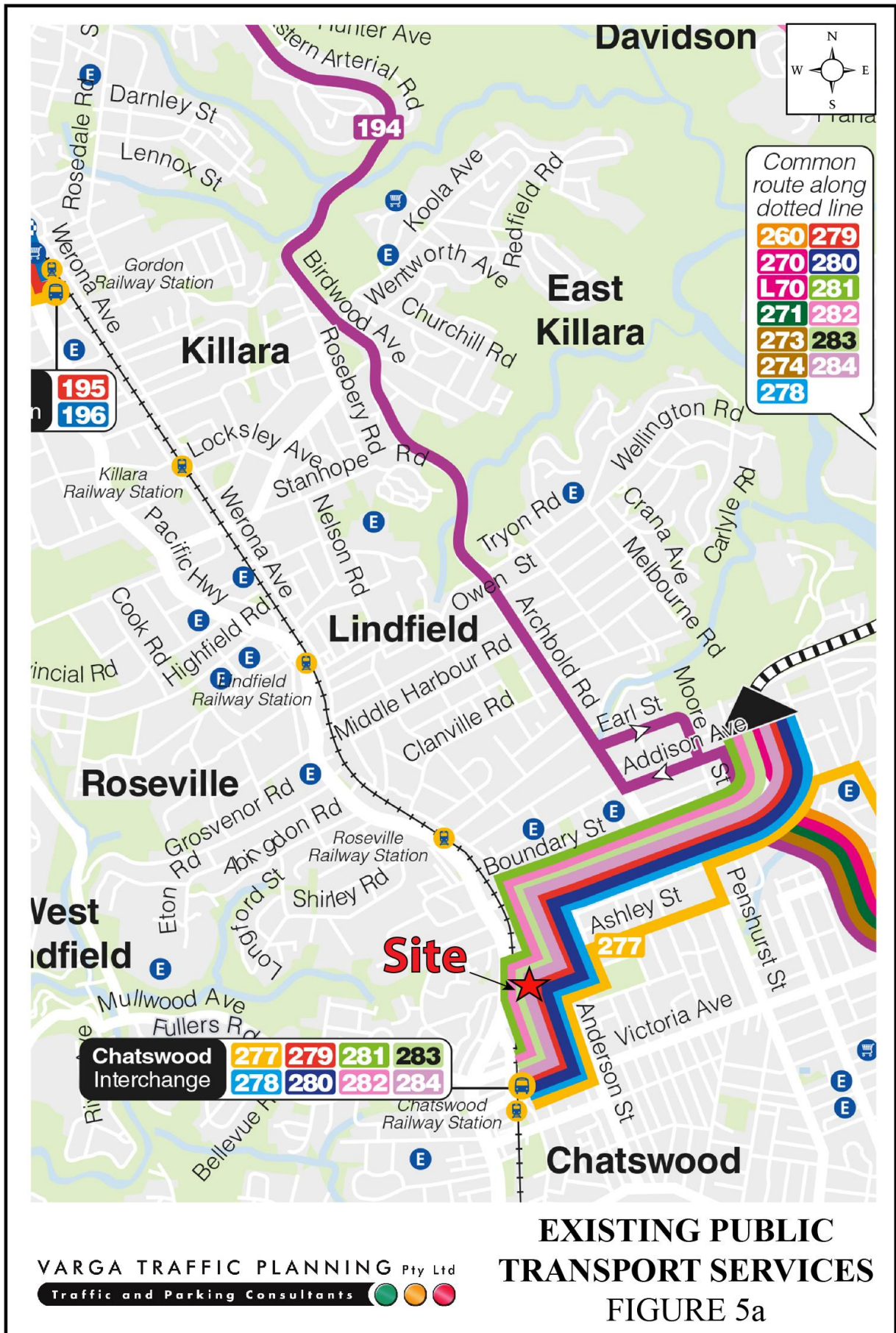
- a 40 km/h SPEED LIMIT which applies to Anderson Street (south of Violet Street), Wilson Street, O'Brien Street and all other local roads in the vicinity of Chatswood CBD
- TRAFFIC SIGNALS in the Pacific Highway where it intersects with Ashley Street and also O'Brien Street
- TRAFFIC SIGNALS in Anderson Street where it intersects with Help Street
- SPEED HUMP located in Anderson Street, immediately north of Wilson Street intersection, directly along Lot 58 site frontage
- STOP SIGN restrictions located along Wilson Street/Zianna Lane where it intersects with Anderson Street
- GIVE WAY restrictions located along Anderson Street where it intersects with Ashley Street
- GIVE WAY restrictions located along Wilson Street where it intersects with the Pacific Highway.

Existing Public Transport Services

The existing public transport services available within the vicinity of the subject site are illustrated on Figures 5a & 5b.

The subject site is conveniently located within approximately 600m walking distance north of Chatswood Railway Station which lies on the T1 North Shore, Northern & Western Line, linking Berowra, Hornsby, Epping, Richmond and Emu Plains.

In addition to the train services, a major bus interchange is available outside of the Chatswood Railway Station servicing an extensive range of bus routes, including the M40, 136, 137, 257, L60, 267, 275 and 343 bus services.





Notably, route M40 is part of the Sydney's *Metrobus* network that provides high-frequency, high-capacity links between key employment and growth centres across Sydney. The M40 links between Chatswood, Willoughby, Naremburn, Sydney City, Darlinghurst, Paddington, Woollahra and Bondi Junction, operating at 10 minute intervals during commuter peak periods, 15 minute intervals during the day and 20 minute intervals at other times.

Furthermore, there are also an extensive range of bus services available which operates along Anderson Street, with the closest bus stops located directly adjacent to the site frontage.

A summary of those bus services are provided in the table below, revealing that there are more than 270 bus services per day travelling near the site on weekdays, decreasing to approximately 140 bus services per day on Saturdays and approximately 100 bus services per day on Sundays, as set out in the table below.

Bus Routes and Frequencies

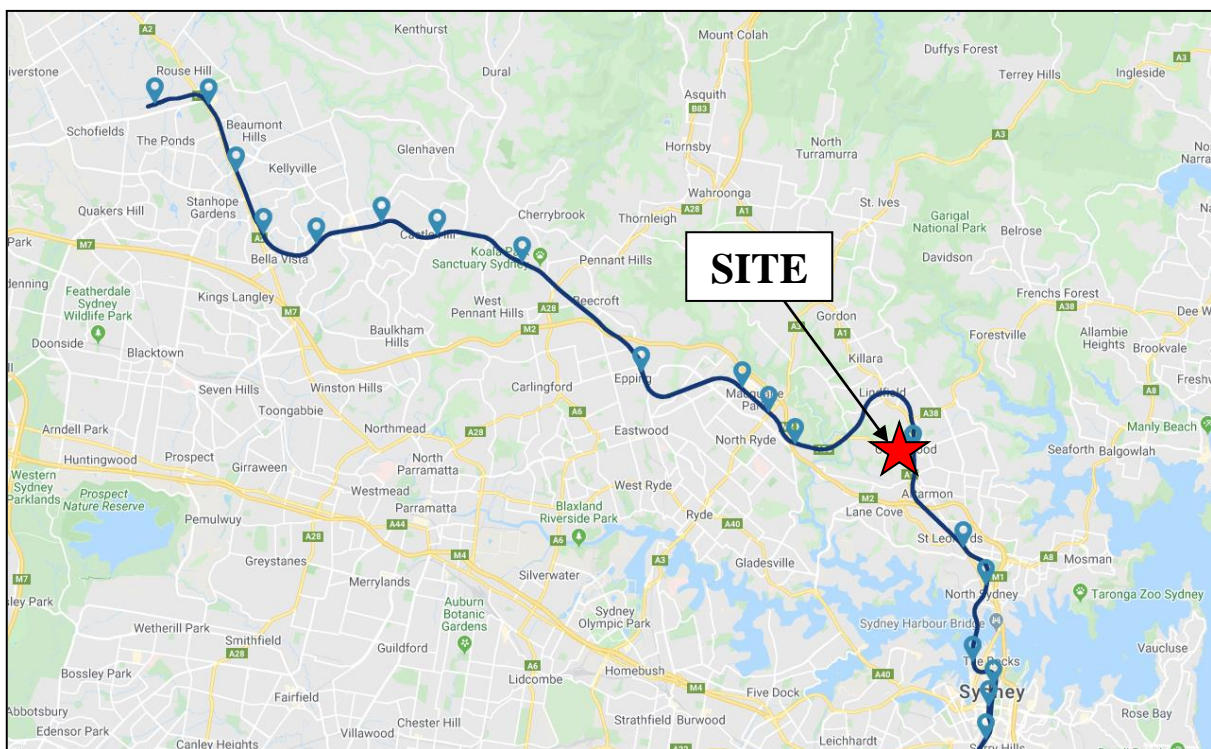
Route No.	Route	Weekday		Saturday		Sunday	
		In	Out	In	Out	In	Out
277	Chatswood to Castle Cove	17	17	5	5	-	-
278	Chatswood to Killarney Heights	23	25	-	-	-	-
279	Chatswood to Frenches Forest	3	2	-	-	-	-
280	Chatswood to Warringah Mall	30	34	19	21	19	21
281	Chatswood to Davidson	21	19	18	16	10	10
282	Chatswood to Davidson & Belrose	1	6	3	5	7	7
283	Chatswood to Belrose	24	22	19	16	9	9
284	Terrey Hills & Chatswood to Duffys Forest	8	7	2	2	3	1
558	Chatswood to Lindfield	11	8	5	5	-	-
TOTAL		138	140	71	70	48	48

The site is also located within easy walking distance of the Chatswood CBD which includes a wide range of essential shops and services including licenced clubs, banks, supermarkets, gymnasiums, restaurants and specialty stores.

On the above basis it is clear that the site is extremely well served by existing public transport and essential services, all within easy walking distance of the site.

Sydney Metro

Sydney Metro is Australia's biggest public transport project. This new standalone railway will ultimately deliver 31 metro stations and more than 66 kilometres of new metro rail, revolutionising the way Australia's biggest city travels. North West Sydney Metro Map has been reproduced below.



Metro means a new generation of world-class fast, safe and reliable trains easily connecting customers to where they want to go. Customers don't need timetables – they just turn up and go, with a train every four minutes in the peak. Technology keeps customers connected at all stages of their journey, including smart phone travel apps and real time journey information at metro stations and on board trains.

When Sydney Metro is extended into the Sydney CBD and beyond in 2024, metro rail will run from Sydney's booming North West region under Sydney Harbour, through new underground stations in the CBD, and beyond to the south west.

Sydney's new metro railway will have a metro train every two minutes in each direction with a target capacity of about 40,000 customers per hour, similar to other metro systems worldwide. Sydney's current suburban system can reliably carry 24,000 people an hour per line.

Sydney Metro, together with signalling and infrastructure upgrades across the existing Sydney rail network, will increase the capacity of train services entering the Sydney CBD – from about 120 an hour today to up to 200 services beyond 2024.

On the above basis it is clear that the site is extremely well served by existing public transport and essential services and is ideally located to encourage reduced private car usage and an increased use of public transport and active forms of transport such as walking and cycling.

Chatswood is one of five current railway stations that has been upgraded to metro standards as part of the first stage of Sydney Metro. This upgrade includes platform screen doors installed along the full length of the platforms to keep people and objects away from the tracks, improving customer safety and allowing trains to get in and out of stations much faster.

The number of train services between Epping and Chatswood has increased to approximately 15 an hour in the peak – almost four times as many trains as previously. Customers will also have a new direct metro service to Crows Nest, Barangaroo and Martin Place when Sydney Metro City & Southwest opens in 2024.

Existing Pedestrian Paths

A dedicated pedestrian footpath which generally follows the alignment of the railway has been constructed to the south of the site to provide direct pedestrian access from O'Brien Street to Chatswood Station. It is proposed to extend this pedestrian path further to the north to Wilson Street as part of this development proposal.

The site is also located within easy walking distance of the Chatswood CBD located to the south of the subject site.

Local Bicycle Routes

The existing bicycle routes located in the vicinity of the site are illustrated on Figure 6. The bicycle routes are readily accessible from the subject site and provide a number of off-road bicycle links through the local area, including the following routes:

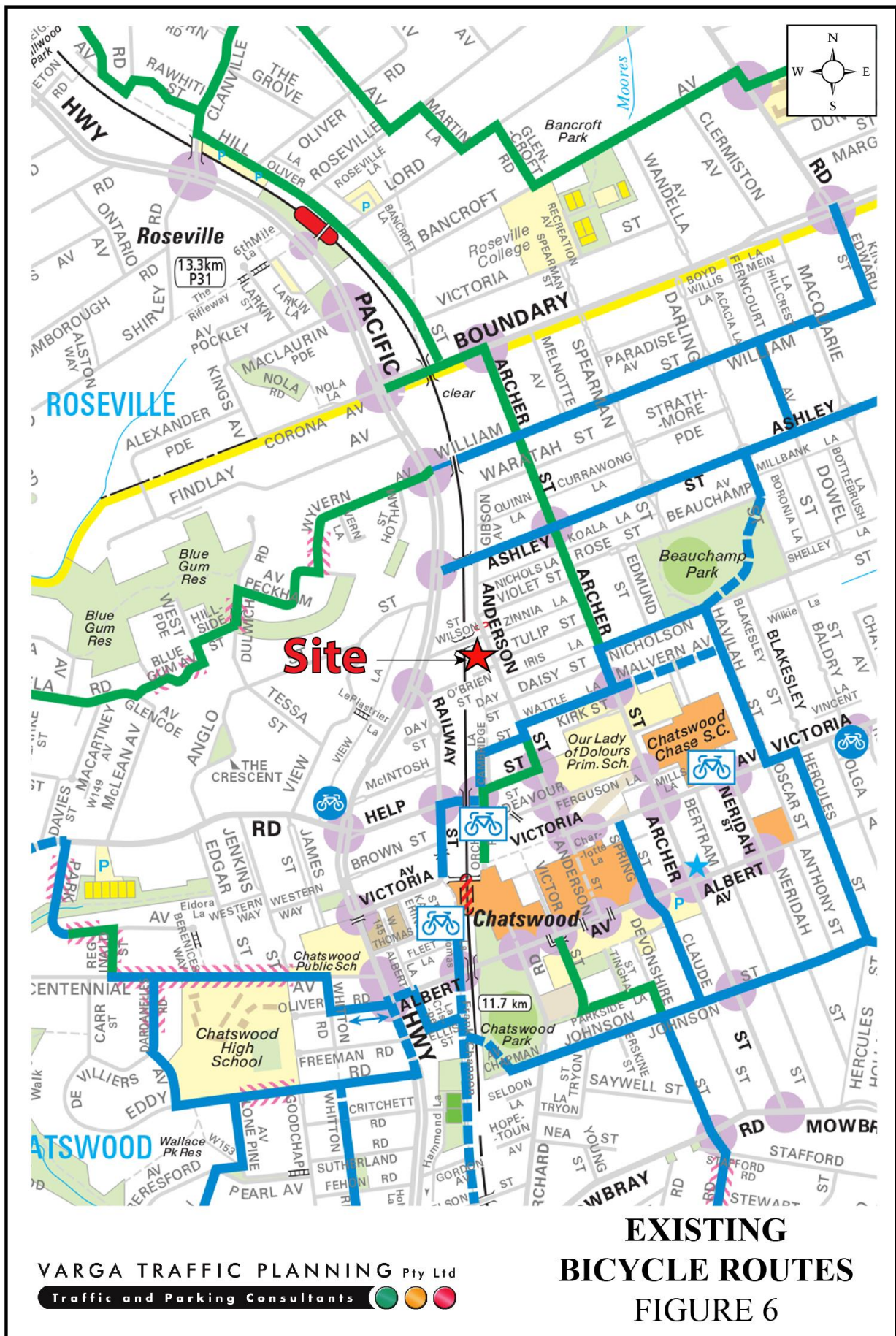
- Chatswood CBD via Anderson Street
- Chatswood Chase Shopping Centre via Anderson Street, Wattle Lane and Archer Street
- Beauchamp Park via Nicholson Street
- Willoughby via Ashley Street
- Roseville via Archer Street and Corona Avenue
- Chatswood High School via Anderson Street and Albert Avenue

The proposed development makes provision for a bicycle parking area which is to be located on the ground floor and basement levels, which can easily be accessible from Wilson Street and will enhance the *active* transport options available to future occupants of the site.

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 a previous traffic study on the site. The traffic surveys were undertaken at the Pacific Highway and Wilson Street intersection as well as the Anderson Street and Wilson Street/Zinnia Lane intersection. The results of the traffic surveys are reproduced in full in Appendix A and reveal that:

- southbound traffic flows in the Pacific Highway are typically in the order of 3,200 vehicles per hour (vph) during the *morning* commuter peak period, increasing to approximately 1,700 vph during the *afternoon* commuter peak period
- two-way traffic flows in Anderson Street are typically in the order of 400-500 vehicles per hour (vph) during peak periods
- two-way traffic flows in Wilson Street are significantly lower, typically in the order of 30-60 vph during commuter peak periods.



Projected Traffic Generation

An indication of the traffic generation potential of the planning proposal is provided by reference to the Roads and Maritime Services publication *Guide to Traffic Generating Developments, Section 3 - Landuse Traffic Generation (October 2002)* and the updated traffic generation rates in the recently published RMS *Technical Direction (TDT 2013/04a)* document.

The *TDT 2013/04a* document specifies that it replaces those sections of the RMS *Guidelines* indicated, and that it must be followed when RMS is undertaken trip generation and/or parking demand assessments.

The RMS *Guidelines* and the updated *TDT 2013/04a* are based on extensive surveys of a wide range of land uses and nominate the following traffic generation rates which are applicable to the development proposal:

High Density Residential Flat Dwellings

AM: 0.19 peak hour vehicle trips per unit

PM: 0.15 peak hour vehicle trips per unit

Office Blocks

AM: 1.6 peak hour vehicle trips per 100m² GFA

PM: 1.2 peak hour vehicle trips per 100m² GFA

The RMS *Guidelines* do not nominate a traffic generation rate for small, local shops, referring only to major regional shopping centres incorporating supermarkets and department stores. For the purpose of this assessment therefore, the abovementioned traffic generation rate for *office blocks* has been adopted in respect of the retail component of the development proposal.

Application of the above traffic generation rates to the various components of the planning proposal yields a traffic generation potential of approximately 50 vph during the *morning* commuter peak period and approximately 38 vph during the *afternoon* commuter peak period as set out below:

Planning Proposal Projected Future Traffic Generation Potential		
	AM	PM
Residential (114 apartments):	21.7 vph	17.1 vph
Commercial/retail (1,775m ²):	28.4 vph	21.3 vph
TOTAL TRAFFIC GENERATION POTENTIAL:	50.1 vph	38.4 vph

That projected future traffic generation potential which could occur as a consequence of the planning proposal should however, be offset or *discounted* by the volume of traffic which could reasonably be expected to be generated by a development permitted under the current *WLEP 2012* planning controls.

The RMS *Guidelines* nominates the following traffic generation rates which are applicable to the existing residential development:

Medium Density Residential

0.4-0.5 peak hour vehicle trips/dwelling (up to 2 bedrooms)

The RMS *Guidelines* also make the following observation in respect of medium density residential flat buildings:

Definition

A medium density residential flat building refers to a building containing at least 2 but less than 20 dwellings. This includes villas, town houses, flats, semi-detached houses, terrace or row houses and other medium density developments. This does not include aged or disabled persons' housing.

Application of the above traffic generation rates to the development potential of 6 x 1 bedroom and 24 x 2 bedroom townhouses on the site, which could be achieved under the current R3 Medium Density Residential *WLEP 2012* planning controls yields a peak hour traffic generation potential of approximately 14 vehicle trips per hour during commuter peak periods.

Accordingly, the planning proposal could result in a *nett increase* in the traffic generation potential of the site during both the AM and PM commuter peak periods when compared with a development that would be potentially approved if the site was to be rezoned to B4 Mixed Use zone, as set out below:

**Projected Nett Increase in the Traffic Generation Potential of the Site
as a Consequence of the Planning Proposal**

	AM	PM
Projected Future Traffic Generation Potential (Planning Proposal):	50.1 vph	38.4 vph
Less Permissible Traffic Generation Potential (Current WLEP Controls):	-14.4 vph	-14.4 vph
NETT INCREASE IN TRAFFIC GENERATION POTENTIAL:	35.7 vph	32.4 vph

Notwithstanding, for the purposes of this assessment it has been assumed that *all* of the projected future traffic flows of 50 vph and 38 vph during the AM and PM commuter peak periods respectively, will be new or *additional* to the existing traffic flows currently using the adjacent road network.

That projected “increase” in the traffic generation potential of the site as a consequence of the updated planning proposal is *minimal*, and will not have any unacceptable traffic implications in terms of road network capacity, as is demonstrated by the following section of this report.

In particular, it is noted that when compared to the previously endorsed planning proposal, the traffic generation potential of updated planning proposal will likely be *substantially less*, with a reduction of approximately 11 vph and 8 vph during the AM and PM commuter peak periods respectively.

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 SIDRA program which is widely used by the RMS and many LGA’s for this purpose. Criteria for evaluating the results of SIDRA analysis are reproduced in the following pages.

The results of the SIDRA analysis of the in the Pacific Highway and Wilson Street intersection are summarised on Table 3.1 below, revealing that:

- the Pacific Highway and Wilson Street intersection currently operates at *Level of Service “A”* under the existing traffic demands with total average vehicle delays in the order of *less than* 1 second/vehicle

- under the projected future traffic demands which could be generated by a residential townhouse development permitted under the *existing planning controls*, the intersection would continue to operate at *Level of Service “A”* during the AM and PM commuter peak periods, with increases in total average vehicle delays of ***less than*** 1 second/vehicle.
- under the projected future traffic demands expected to be generated by the *planning proposal*, the intersection would also continue to operate at *Level of Service “A”* during the AM and PM commuter peak periods, with increases in total average vehicle delays of ***less than*** 1 second/vehicle.

The results of the SIDRA analysis of the Anderson Street and Wilson Street/Zinnia Lane intersection are summarised on Table 3.2 below, revealing that:

- the Anderson Street and Wilson Street/Zinnia Lane intersection currently operates at *Level of Service “A”* under the existing traffic demands with total average vehicle delays in the order of ***less than*** 1 second/vehicle
- under the projected future traffic demands which could be generated by a residential townhouse development permitted under the *existing planning controls*, the intersection would continue to operate at *Level of Service “A”* during the AM and PM commuter peak periods, with increases in average vehicle delays of ***less than*** 1 second/vehicle.
- under the projected future traffic demands expected to be generated by the *planning proposal*, the intersection would also continue to operate at *Level of Service “A”* during the AM and PM commuter peak periods, 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.

TABLE 3.1 - RESULTS OF SIDRA ANALYSIS OF PACIFIC HIGHWAY & WILSON STREET						
Key Indicators	Existing Traffic Demand		Existing Planning Controls Traffic Demand		Planning Proposal Traffic Demands	
	AM	PM	AM	PM	AM	PM
Level of Service	A	A	A	A	A	A
Degree of Saturation	0.821	0.438	0.821	0.438	0.821	0.438
Average Vehicle Delay (secs/veh)						
Wilson Street (east) L	35.8	8.0	37.4	8.0	40.5	8.0
Pacific Highway (north) L	5.5	5.5	5.5	5.5	5.5	5.5
T	0.1	0.0	0.1	0.0	0.1	0.0
TOTAL AVERAGE VEHICLE DELAY	0.5	0.3	0.6	0.4	0.8	0.4
<div>PAC_WILX</div> <div>PAC_WILPermissible</div> <div>PAC_WILP</div>						

TABLE 3.2 - RESULTS OF SIDRA ANALYSIS OF ANDERSON STREET & WILSON STREET / ZINNIA LANE						
Key Indicators	Existing Traffic Demand		Existing Planning Controls Traffic Demand		Planning Proposal Traffic Demands	
	AM	AM	AM	PM	AM	PM
Level of Service	A	A	A	A	A	A
Degree of Saturation	0.172	0.144	0.173	0.148	0.205	0.130
Average Vehicle Delay (secs/veh)						
Anderson Street (south)	L	3.7	3.4	3.6	3.4	3.4
	T	0.0	0.0	0.0	0.0	0.0
	R	4.6	4.4	4.6	4.4	4.3
Zinnia Lane (east)	L	7.9	7.5	7.9	7.6	8.0
	T	9.0	9.1	9.1	9.2	9.5
	R	9.3	9.3	9.3	9.4	9.8
Anderson Street (north)	L	3.9	4.3	4.0	4.3	4.0
	T	0.0	0.2	0.1	0.2	0.1
	R	4.1	4.4	4.1	4.4	4.1
Wilson Street (west)	L	7.1	7.5	7.2	7.5	7.1
	T	9.0	9.2	9.1	9.3	9.6
	R	9.4	9.5	9.5	9.6	10.0
TOTAL AVERAGE VEHICLE DELAY	0.5	0.9	0.6	1.0	1.0	1.2

AND_WILX

AND_WILPermissible

AND_WILP

Criteria for Interpreting Results of Sidra 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 signals¹ 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 7. Key features of those parking restrictions are:

- NO STOPPING / NO PARKING restrictions in the vicinity of the Anderson Street, Wilson Street and O'Brien Street intersections, including along the Railway Overpass along Wilson Street
- generally UNRESTRICTED kerbside parking along the both sides of Anderson Street, in the vicinity of the site
- CAR SHARE restrictions along a small portion on the eastern side of Anderson Street, in between Tulip Street and Iris Lane
- generally 2 HOUR PARKING restrictions along both sides of O'Brien Street, including along the eastern portion of the site frontage (Permit Holders Excepted)
- NO PARKING restrictions along a small portion on the northern side of the O'Brien Street site frontage
- 2 HOUR PARKING restrictions along the southern side of Violet Street (Permit Holders Excepted)
- generally NO PARKING / NO STOPPING restrictions along the southern side of Zinnia Lane, Tulip Street and also the northern side of Daisy Street
- NO PARKING restrictions along the northern side of Violet Street, Zinnia Lane, Tulip Street and also Iris Lane between 8:30am – 6:00pm MON-FRI and also 8:30am – 12:00pm SAT



- generally UNRESTRICTED kerbside parking along the northern side of Violet Street, Zinnia Lane, Tulip Street and also Iris Lane at all other times
- BUS ZONES at regular intervals along both sides of Anderson Street, including along the site frontage.

Off-Street Car Parking Provisions

Following discussions between Council and TfNSW, it is understood that an agreement has been reached that the following *constrained* parking rates should be applied to new developments in the Chatswood CBD:

Land use		Parking rate
Residential	Studio	0.5 spaces per dwelling
	1-bed	0.5 spaces per dwelling
	2+bed	1 space per dwelling
	Visitor	1 space per 10 dwellings
Office		1 space per 400 sqm GFA
Retail (<1000 sqm)		1 space per 300 sqm GFA
Retail (>1000 sqm)		1 space per 300 sqm GFA

Application of the above parking rates to the various components of the planning proposal yields an off-street car parking requirement of 118 spaces as set out below:

Residents (114 apartments):	102.0 spaces
Visitors:	11.4 spaces
Retail (435m ²):	1.5 spaces
Commercial/business (1,340m ²):	3.4 spaces
TOTAL:	118.3 spaces

Notwithstanding, the subject site is located within 800 metres of a railway station in the Sydney metropolitan area, and therefore the residential component of the Planning Proposal is also subject to the parking requirements specified in the *State Environmental Planning Policy No 65 – Design Quality of Residential Flat Development (Amendment No 3), 2015* in the following terms:

30 Standards that cannot be used to refuse development consent or modification of development consent

- (1) If an application for the modification of a development consent or a development application for the carrying out of development to which this Policy applies satisfies the following design criteria, the consent authority must not refuse the application because of those matters:
- a) if the car parking for the building will be equal to, or greater than, the recommended minimum amount of car parking specified in Part 3J of the Apartment Design Guide.

Reference is therefore made to the *Apartment Design Guide 2015, Section 3J – Bicycle and Car Parking* document which nominates the following car parking requirements:

Objective 3J-1

Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas

For development in the following locations:

- on sites that are within 800 metres of a railway station or light rail stop in the Sydney Metropolitan Area; or
- on land zoned, and sites within 400 metres of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre

the minimum car parking requirements for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less.

The car parking needs for a development must be provided off street.

Comparison therefore needs to be drawn between the off-street car parking requirements for residential flat buildings outlined in the Council's *WDCP* and also the *RMS Guidelines* to determine the *lesser* requirement. The relevant car parking rates outlined in the *RMS Guidelines* are reproduced below:

RMS Guidelines – High Density Residential Flat Buildings in Metro Regional Centres

0.4 spaces per 1 bedroom unit

0.7 spaces per 2 bedroom unit

1.2 spaces per 3 bedroom unit

1 space per 7 units for visitor parking

The minimum off-street car parking requirement applicable to the residential component of the planning proposal is 99 spaces, comprising 83 residential spaces and 16 visitor spaces as set out below:

	WDCP / TfNSW	SEPP 65/RMS Guidelines
Residents:	102.0 spaces	82.6 spaces
Visitors:	11.4 spaces	16.3 spaces
Total:	113.4 spaces	98.9 spaces
Lesser Car Parking Requirement: 99 spaces		

Accordingly, the minimum off-street car parking requirement applicable to the planning proposal is therefore 104 spaces as set out below:

Residential (114 apartments):	82.6 spaces (SEPP 65/RMS)
Visitors:	16.3 spaces (SEPP 65/RMS)
Retail (435m ²):	1.5 spaces (DCP/TfNSW)
Commercial/business (1,340m ²):	3.4 spaces (DCP/TfNSW)
TOTAL:	103.8 spaces

Whilst the number of parking spaces to be provided as part of the planning proposal is not yet known, it is clear that the above parking requirements can be satisfied within the provision of basement parking area on the subject site.

The geometric design layout of the future car parking facilities will ultimately be designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 1 - Off-Street Car Parking AS2890.1:2004* and *Parking Facilities Part 6 - Off-Street Parking for People with Disabilities AS2890.6*.

Off-Street Motorcycle and Bicycle Parking Provisions

The motorcycle and bicycle parking requirements applicable to the development proposal are also specified in *Willoughby Development Control Plan Part C.4 – Transport Requirements for Development* document in the following terms:

Motorcycle

1 motorcycle space per 25 car spaces

Bicycle

Residential (lockers):	1 space per 10 units	<i>plus</i>
Residential (rail/racks):	1 space per 12 units	
Commercial (lockers):	1 space per 600m ²	<i>plus</i>
Commercial (rail/racks):	1 space per 2,500m ²	

Application of the above motorcycle and bicycle parking requirements to the various components of the planning proposal yields an off-street parking requirement of between 5 to 7 motorcycle spaces, 14 bicycle lockers and 10 bicycle rails/racks.

Whilst the number of parking spaces to be provided as part of the planning proposal is not yet known, it is clear that the above parking requirements can be satisfied within the proposed of basement parking area on the subject site.

Loading/Service Provisions

The proposed new mixed use building is expected to be serviced by a variety of commercial vehicles up to and including 8.8m long medium rigid trucks.

The service area is to be located at the bottom of the basement access ramp, with vehicular access to the loading dock provided via the abovementioned two-way basement access driveway located off the O'Brien Street site frontage.

The manoeuvring area has been designed to accommodate the swept turning path requirements of these 8.8m long rigid trucks, allowing them to enter and exit the site whilst travelling in a forward direction at all times, as per the attached *swept turning path* diagram.

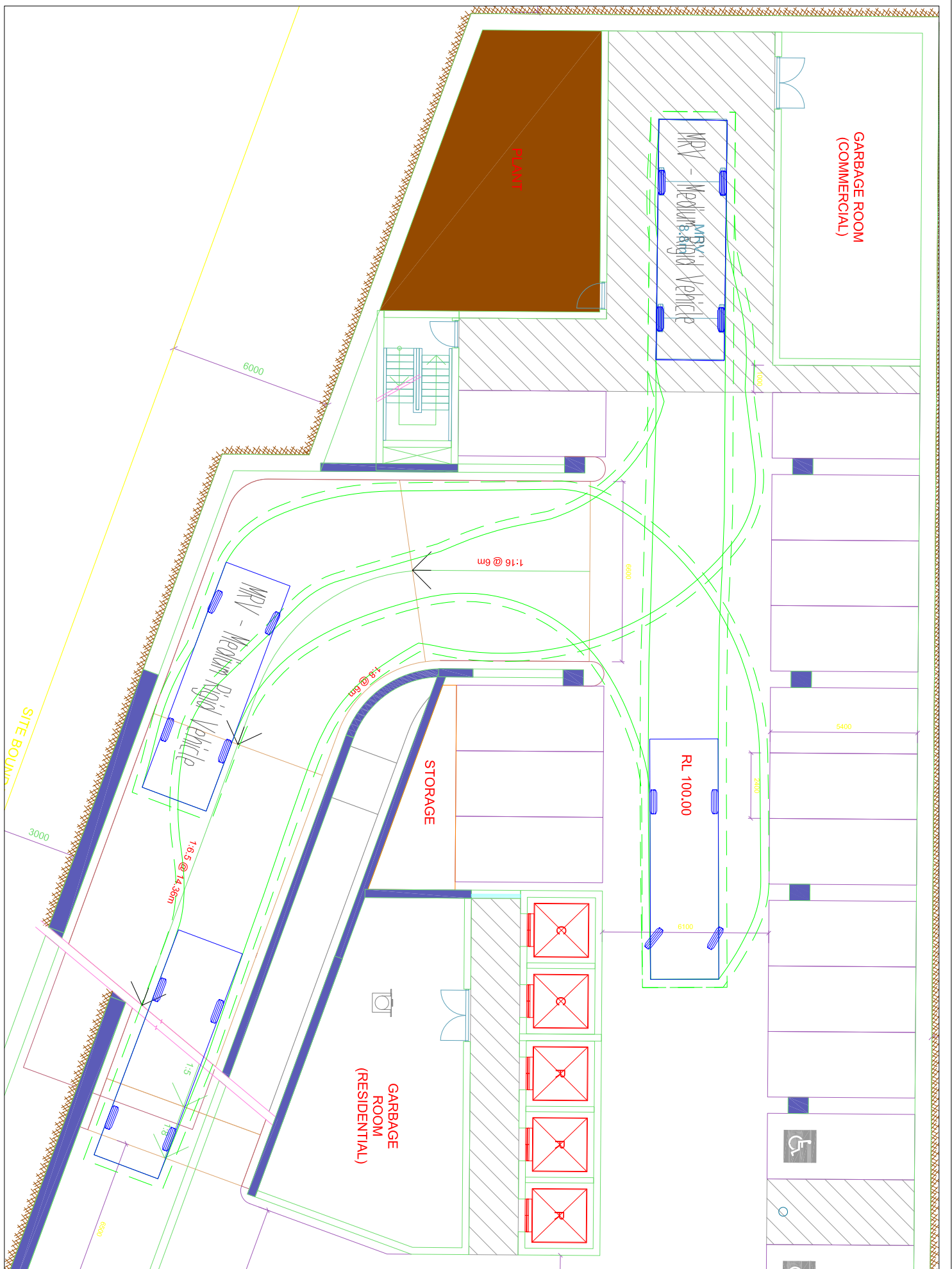
The geometric design layout of the proposed loading facilities will also ultimately be designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 2 - Off-Street Commercial Vehicle Facilities AS2890.2* in respect of loading dock dimensions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

Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

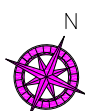
- the planning proposal seeks approval to increase the allowable FSR and height controls for the site, resulting in the potential for approximately 114 apartments and approximately 1,775m² of retail/commercial floor space
- the SIDRA capacity analysis of the Pacific Highway & Wilson Street and Anderson Street & Wilson Street/Zinnia Lane intersections indicate that:
 - the projected additional traffic flows as a consequence of the planning proposal will not have any unacceptable effects on the operational performance of the intersection, and
 - no road improvements or intersection upgrades would be required as a consequence of the planning proposal
- the future car, motorcycle, bicycle and loading facilities will ultimately be provided and designed in accordance with Council's requirements, *SEPP 65* and the relevant Australian Standards
- the future vehicular access arrangements will be designed in accordance with Council and RMS requirements.

It is therefore reasonable to conclude that the planning proposal will not have any unacceptable implications in terms of road network capacity or off-street parking/loading requirements.



VARGA TRAFFIC PLANNING Pty Ltd
 ABN 88 071 762 537 Phone +61 2 9904 3224
 Suite 6, Level 1 PO Box 1868
 20 Young Street Neutral Bay, NSW 2089
 Neutral Bay, NSW 2089
 www.vargatraffic.com.au
 Sydney, Australia

PROJECT
 MIXED USE DEVELOPMENT

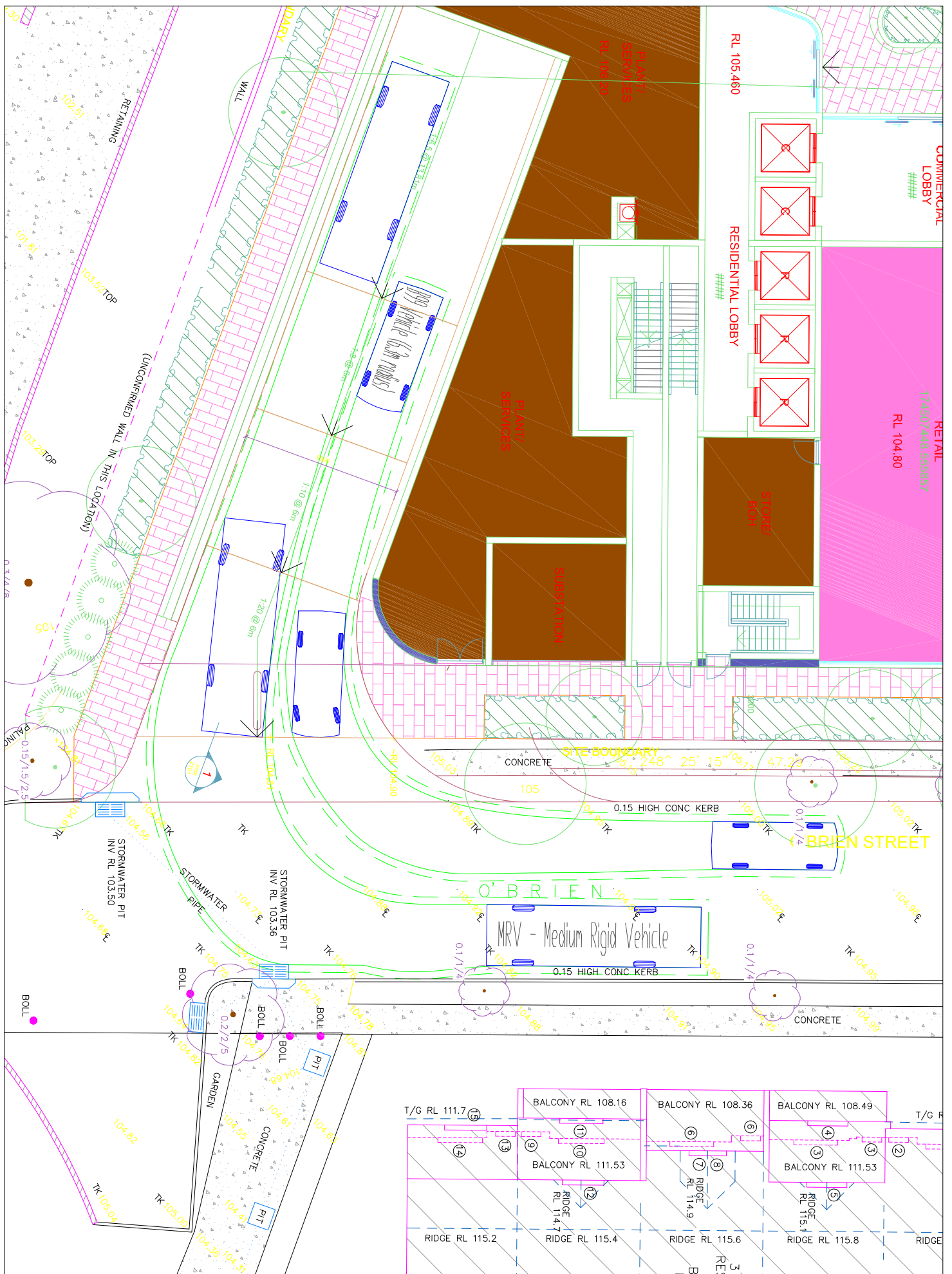


DRAWING TITLE
 8.8M MRV TRUCK TURNING PATH
 Entering / Exiting Loading Bay Area
 ADDRESS
 54-56 Anderson Street,
 Chatswood

PROJECT NO.
 17499
 REVIEWED
 CHRIS PALMER

1:200 @ A4
 DATE DRAWN
 2021-2-3
 PREPARED
 DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
 Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
 Suite 6, Level 1
 20 Young Street
 Neutral Bay, NSW 2089

Phone +61 2 9904 3224
 PO Box 1868
 Neutral Bay, NSW 2089
 www.vargatrafic.com.au
 Sydney, Australia

PROJECT
 MIXED USE DEVELOPMENT



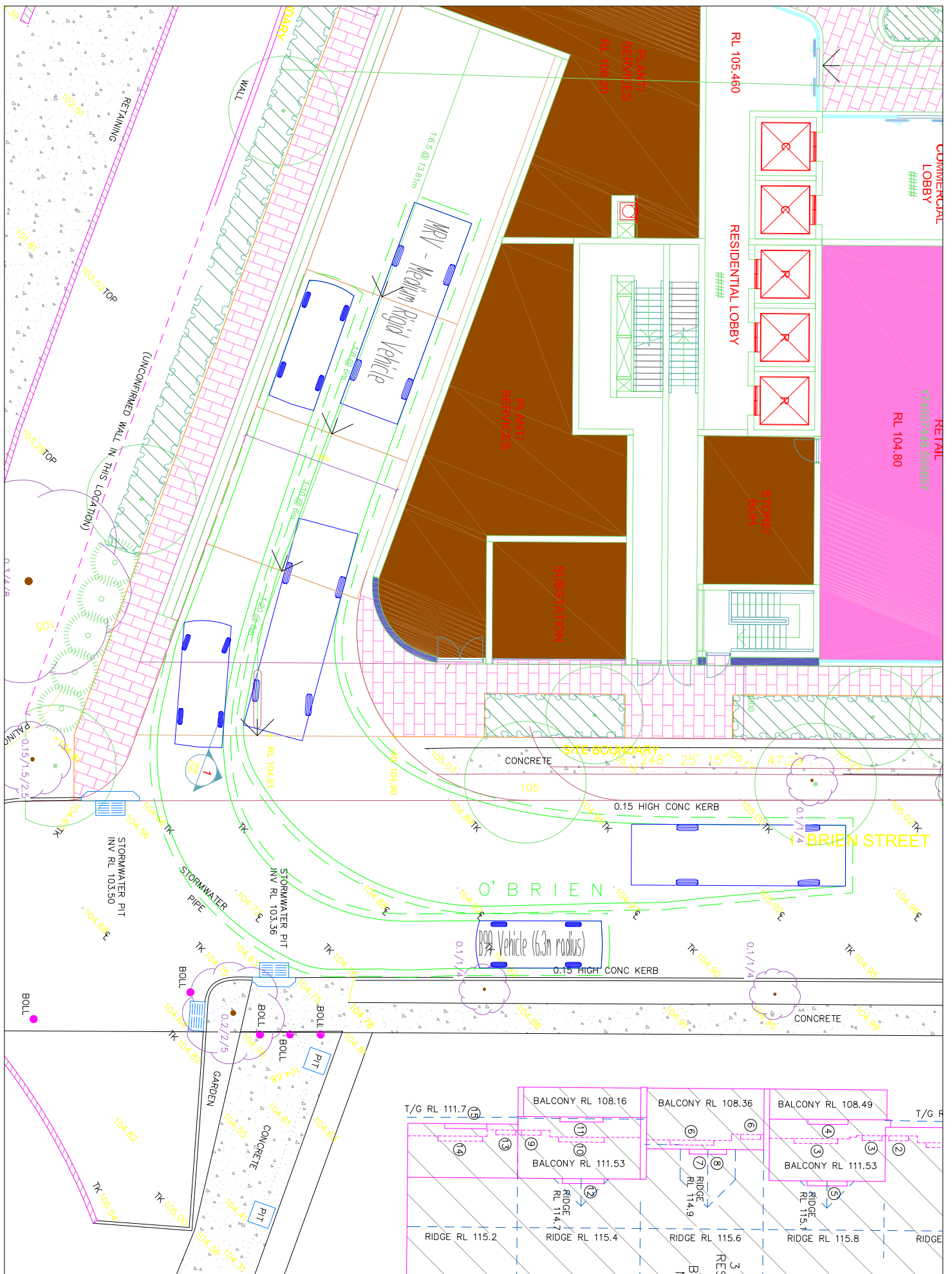
DRAWING TITLE
 8.8M MRV TRUCK TURNING PATH - GROUND
 Service vehicle entering site

ADDRESS
 54-56 Anderson Street,
 Chatswood

PROJECT NO.
 17499
 REVIEWED
 CHRIS PALMER

1:200 @ A4
 DATE DRAWN
 2021-2-3
 PREPARED
 DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
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VARGA TRAFFIC PLANNING Pty Ltd
ABN 68 071 702 537
Suite 6, Level 1
20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT



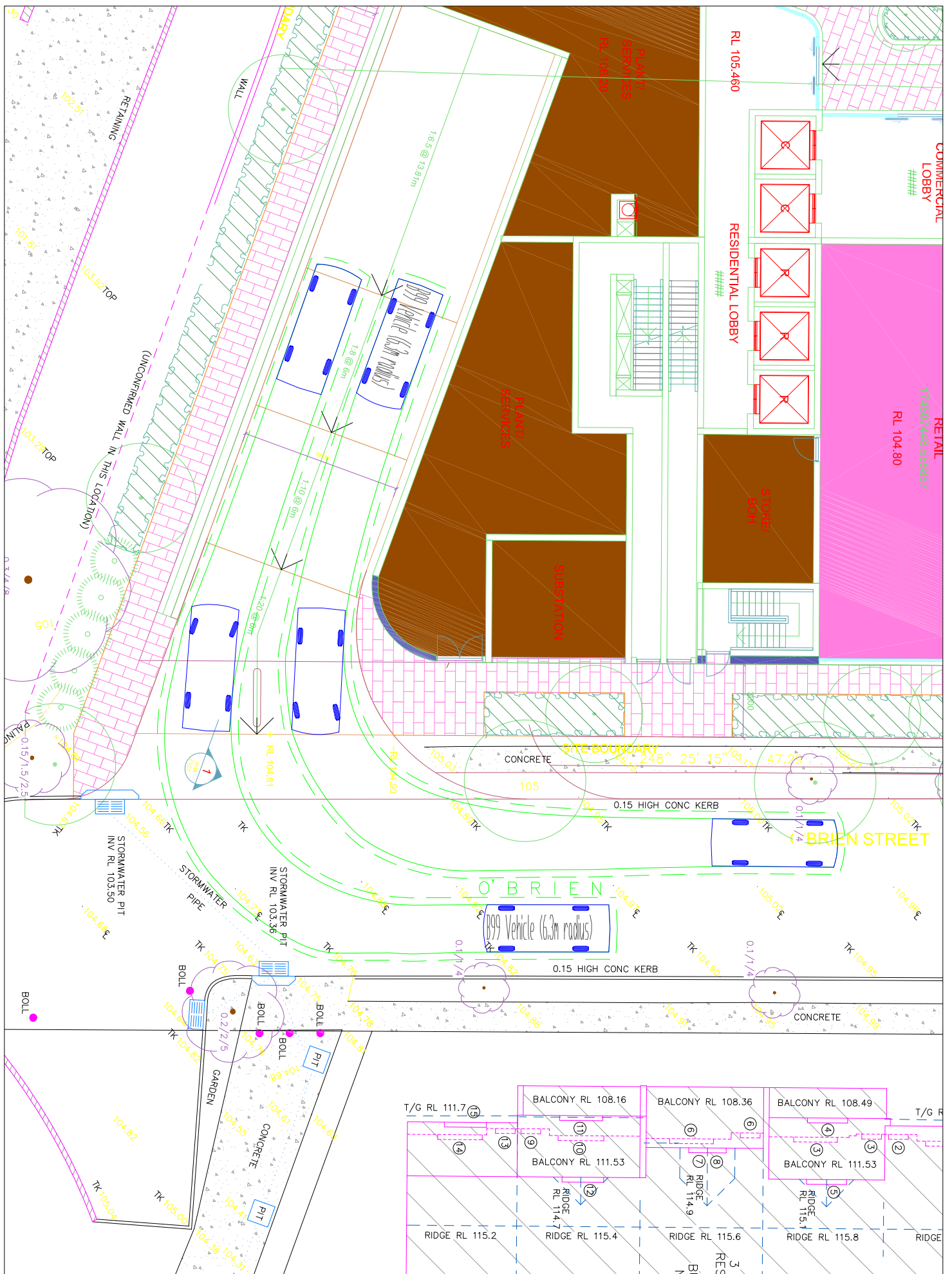
DRAWING TITLE
8.8M MRV TRUCK TURNING PATH - GROUND
Service vehicle exiting site

ADDRESS
54-56 Anderson Street,
Chatswood

PROJECT NO.
17499
REVIEWED
CHRIS PALMER

1:200 @ A4
DATE DRAWN
2021-2-3
PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
ABN 48 071 702 537
Suite 6, Level 1
20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT



DRAWING TITLE
B99 VEHICLE TURNING PATHS
Entering / Exiting Site

ADDRESS
54-56 Anderson Street,
Chatswood

PROJECT NO.
17499
REVIEWED
CHRIS PALMER

1:200 @ A4
DATE DRAWN
2021-2-3
PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

APPENDIX A

TRAFFIC SURVEY DATA



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Lights	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0645	0	17	1	1	0	1	3	12	0	0	0	0	35
0645 - 0700	0	40	3	3	0	0	2	15	0	0	0	0	63
0700 - 0715	0	54	1	1	0	1	2	24	1	0	1	0	85
0715 - 0730	0	70	7	0	0	1	1	20	0	0	0	0	99
0730 - 0745	0	67	5	1	0	1	6	28	2	1	0	0	111
0745 - 0800	0	85	7	1	0	1	1	31	0	0	0	0	126
0800 - 0815	0	81	11	1	0	5	0	33	0	0	1	0	132
0815 - 0830	0	114	16	1	0	3	4	25	0	0	0	0	163
0830 - 0845	0	84	15	4	0	4	5	25	0	0	1	0	138
0845 - 0900	0	80	16	4	0	3	2	28	0	0	0	0	133
0900 - 0915	0	72	15	1	0	4	4	14	0	2	1	1	114
0915 - 0930	0	78	7	4	0	1	1	15	1	0	0	0	107
Period End	0	842	104	22	0	25	31	270	4	3	4	1	1306

Heavies	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0645	0	0	0	0	0	0	1	2	0	0	0	0	3
0645 - 0700	0	2	0	0	0	0	0	0	0	0	0	0	2
0700 - 0715	0	2	0	0	0	0	1	2	0	0	0	0	5
0715 - 0730	0	6	0	0	0	0	0	5	0	0	0	0	11
0730 - 0745	0	7	0	0	0	0	0	7	0	0	0	0	14
0745 - 0800	0	5	0	0	0	0	0	6	0	0	0	0	11
0800 - 0815	0	3	0	0	0	0	0	4	0	0	0	0	7
0815 - 0830	0	6	0	0	0	0	0	4	0	0	0	0	10
0830 - 0845	0	2	0	0	0	0	0	1	0	0	0	0	3
0845 - 0900	0	3	0	0	0	0	0	2	0	0	0	0	5
0900 - 0915	0	2	0	0	0	0	0	8	0	0	0	0	10
0915 - 0930	0	2	0	0	0	0	0	2	0	0	0	0	4
Period End	0	40	0	0	0	0	2	43	0	0	0	0	85

Combined	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0645	0	17	1	1	0	1	4	14	0	0	0	0	38
0645 - 0700	0	42	3	3	0	0	2	15	0	0	0	0	65
0700 - 0715	0	56	1	1	0	1	3	26	1	0	1	0	90
0715 - 0730	0	76	7	0	0	1	1	25	0	0	0	0	110
0730 - 0745	0	74	5	1	0	1	6	35	2	1	0	0	125
0745 - 0800	0	90	7	1	0	1	1	37	0	0	0	0	137
0800 - 0815	0	84	11	1	0	5	0	37	0	0	1	0	139
0815 - 0830	0	120	16	1	0	3	4	29	0	0	0	0	173
0830 - 0845	0	86	15	4	0	4	5	26	0	0	1	0	141
0845 - 0900	0	83	16	4	0	3	2	30	0	0	0	0	138
0900 - 0915	0	74	15	1	0	4	4	22	0	2	1	1	124
0915 - 0930	0	80	7	4	0	1	1	17	1	0	0	0	111
Period End	0	882	104	22	0	25	33	313	4	3	4	1	1391

Client : Varga Traffic Planning
 Job No/Name : 6527 CHATSWOOD Wilson St
 Day/Date : Thursday 10th August 2017

Lights	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0730	0	181	12	5	0	3	8	71	1	0	1	0	282
0645 - 0745	0	231	16	5	0	3	11	87	3	1	1	0	358
0700 - 0800	0	276	20	3	0	4	10	103	3	1	1	0	421
0715 - 0815	0	303	30	3	0	8	8	112	2	1	1	0	468
0730 - 0830	0	347	39	4	0	10	11	117	2	1	1	0	532
0745 - 0845	0	364	49	7	0	13	10	114	0	0	2	0	559
0800 - 0900	0	359	58	10	0	15	11	111	0	0	2	0	566
0815 - 0915	0	350	62	10	0	14	15	92	0	2	2	1	548
0830 - 0930	0	314	53	13	0	12	12	82	1	2	2	1	492

PEAK HOUR	0	359	58	10	0	15	11	111	0	0	2	0	566
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Heavies	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0730	0	10	0	0	0	0	2	9	0	0	0	0	21
0645 - 0745	0	17	0	0	0	0	1	14	0	0	0	0	32
0700 - 0800	0	20	0	0	0	0	1	20	0	0	0	0	41
0715 - 0815	0	21	0	0	0	0	0	22	0	0	0	0	43
0730 - 0830	0	21	0	0	0	0	0	21	0	0	0	0	42
0745 - 0845	0	16	0	0	0	0	0	15	0	0	0	0	31
0800 - 0900	0	14	0	0	0	0	0	11	0	0	0	0	25
0815 - 0915	0	13	0	0	0	0	0	15	0	0	0	0	28
0830 - 0930	0	9	0	0	0	0	0	13	0	0	0	0	22

PEAK HOUR	0	14	0	0	0	0	0	11	0	0	0	0	25
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Combined	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0630 - 0730	0	191	12	5	0	3	10	80	1	0	1	0	303
0645 - 0745	0	248	16	5	0	3	12	101	3	1	1	0	390
0700 - 0800	0	296	20	3	0	4	11	123	3	1	1	0	462
0715 - 0815	0	324	30	3	0	8	8	134	2	1	1	0	511
0730 - 0830	0	368	39	4	0	10	11	138	2	1	1	0	574
0745 - 0845	0	380	49	7	0	13	10	129	0	0	2	0	590
0800 - 0900	0	373	58	10	0	15	11	122	0	0	2	0	591
0815 - 0915	0	363	62	10	0	14	15	107	0	2	2	1	576
0830 - 0930	0	323	53	13	0	12	12	95	1	2	2	1	514

PEAK HOUR	0	373	58	10	0	15	11	122	0	0	2	0	591
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Ph.88196847, Mob.0418-239019

Client	: Varga Traffic Planning
Job No/Name	: 6527 CHATSWOOD Wilson St
Day/Date	: Thursday 10th August 2017

Peds	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Per	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			TOT
0630 - 0730		1			10			4			11		26
0645 - 0745		4			18			9			14		45
0700 - 0800		5			16			10			16		47
0715 - 0815		10			21			15			25		71
0730 - 0830		11			27			16			26		80
0745 - 0845		10			21			14			31		76
0800 - 0900		11			18			16			32		77
0815 - 0915		7			16			12			27		62
0830 - 0930		8			10			12			25		55
PEAK HR		11			18			16			32		77





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Lights	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1530 - 1545	0	43	6	2	0	0	8	25	0	0	0	0	84
1545 - 1600	0	40	8	1	0	4	7	19	0	2	1	0	82
1600 - 1615	0	50	7	1	0	1	9	30	1	1	0	0	100
1615 - 1630	0	49	10	0	0	0	4	28	0	0	0	1	92
1630 - 1645	0	61	11	0	0	3	4	34	0	0	0	1	114
1645 - 1700	1	51	8	1	0	2	2	37	0	0	0	0	102
1700 - 1715	0	35	5	2	0	3	7	62	0	0	0	0	114
1715 - 1730	0	63	11	2	0	5	9	61	0	0	0	0	151
1730 - 1745	0	44	8	2	0	1	4	33	0	0	0	0	92
1745 - 1800	0	43	10	2	0	3	4	52	0	0	0	0	114
1800 - 1815	0	62	11	4	0	1	7	29	0	0	1	0	115
1815 - 1830	0	64	11	1	0	3	8	45	0	0	1	0	133
Period End	1	605	106	18	0	26	73	455	1	3	3	2	1293

Heavies	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	TOT
1530 - 1545	0	7	0	0	0	0	0	5	0	0	0	0	12
1545 - 1600	0	5	0	0	0	0	0	4	0	0	0	0	9
1600 - 1615	0	0	0	0	0	0	0	3	0	0	0	0	3
1615 - 1630	0	9	0	0	0	0	0	6	0	0	0	0	15
1630 - 1645	0	4	0	0	0	0	0	1	0	0	0	0	5
1645 - 1700	0	4	0	0	0	0	0	4	0	0	0	0	8
1700 - 1715	0	3	0	0	0	0	0	3	0	0	0	0	6
1715 - 1730	0	3	0	0	0	0	0	4	0	0	0	0	7
1730 - 1745	0	4	0	0	0	0	0	1	0	0	0	0	5
1745 - 1800	0	4	0	0	0	0	0	5	0	0	0	0	9
1800 - 1815	0	6	0	0	0	0	0	1	0	0	0	0	7
1815 - 1830	0	3	0	0	0	0	0	3	0	0	0	0	6
Period End	0	52	0	0	0	0	0	40	0	0	0	0	92

Combined	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Time Per	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	TOT
1530 - 1545	0	50	6	2	0	0	8	30	0	0	0	0	96
1545 - 1600	0	45	8	1	0	4	7	23	0	2	1	0	91
1600 - 1615	0	50	7	1	0	1	9	33	1	1	0	0	103
1615 - 1630	0	58	10	0	0	0	4	34	0	0	0	1	107
1630 - 1645	0	65	11	0	0	3	4	35	0	0	0	1	119
1645 - 1700	1	55	8	1	0	2	2	41	0	0	0	0	110
1700 - 1715	0	38	5	2	0	3	7	65	0	0	0	0	120
1715 - 1730	0	66	11	2	0	5	9	65	0	0	0	0	158
1730 - 1745	0	48	8	2	0	1	4	34	0	0	0	0	97
1745 - 1800	0	47	10	2	0	3	4	57	0	0	0	0	123
1800 - 1815	0	68	11	4	0	1	7	30	0	0	1	0	122
1815 - 1830	0	67	11	1	0	3	8	48	0	0	1	0	139
Period End	1	657	106	18	0	26	73	495	1	3	3	2	1385

Client : Varga Traffic Planning
Job No/Name : 6527 CHATSWOOD Wilson St
Day/Date : Thursday 10th August 2017

Lights	NORTH			WEST			SOUTH			EAST			TOT
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1530 - 1630	0	182	31	4	0	5	28	102	1	3	1	1	358
1545 - 1645	0	200	36	2	0	8	24	111	1	3	1	2	388
1600 - 1700	1	211	36	2	0	6	19	129	1	1	0	2	408
1615 - 1715	1	196	34	3	0	8	17	161	0	0	0	2	422
1630 - 1730	1	210	35	5	0	13	22	194	0	0	0	1	481
1645 - 1745	1	193	32	7	0	11	22	193	0	0	0	0	459
1700 - 1800	0	185	34	8	0	12	24	208	0	0	0	0	471
1715 - 1815	0	212	40	10	0	10	24	175	0	0	1	0	472
1730 - 1830	0	213	40	9	0	8	23	159	0	0	2	0	454

PEAK HOUR	1	210	35	5	0	13	22	194	0	0	0	1	481
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Heavies	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Per	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	TOT
1530 - 1630	0	21	0	0	0	0	0	18	0	0	0	0	39
1545 - 1645	0	18	0	0	0	0	0	14	0	0	0	0	32
1600 - 1700	0	17	0	0	0	0	0	14	0	0	0	0	31
1615 - 1715	0	20	0	0	0	0	0	14	0	0	0	0	34
1630 - 1730	0	14	0	0	0	0	0	12	0	0	0	0	26
1645 - 1745	0	14	0	0	0	0	0	12	0	0	0	0	26
1700 - 1800	0	14	0	0	0	0	0	13	0	0	0	0	27
1715 - 1815	0	17	0	0	0	0	0	11	0	0	0	0	28
1730 - 1830	0	17	0	0	0	0	0	10	0	0	0	0	27

PEAK HOUR	0	14	0	0	0	0	0	12	0	0	0	0	26
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Combined	NORTH			WEST			SOUTH			EAST			
	Anderson St			Wilson St			Anderson St			Zinnia Lane			
Peak Per	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	<u>L</u>	<u>I</u>	<u>R</u>	TOT
1530 - 1630	0	203	31	4	0	5	28	120	1	3	1	1	397
1545 - 1645	0	218	36	2	0	8	24	125	1	3	1	2	420
1600 - 1700	1	228	36	2	0	6	19	143	1	1	0	2	439
1615 - 1715	1	216	34	3	0	8	17	175	0	0	0	2	456
1630 - 1730	1	224	35	5	0	13	22	206	0	0	0	1	507
1645 - 1745	1	207	32	7	0	11	22	205	0	0	0	0	485
1700 - 1800	0	199	34	8	0	12	24	221	0	0	0	0	498
1715 - 1815	0	229	40	10	0	10	24	186	0	0	1	0	500
1730 - 1830	0	230	40	9	0	8	23	169	0	0	2	0	481

PEAK HOUR	1	224	35	5	0	13	22	206	0	0	0	1	507
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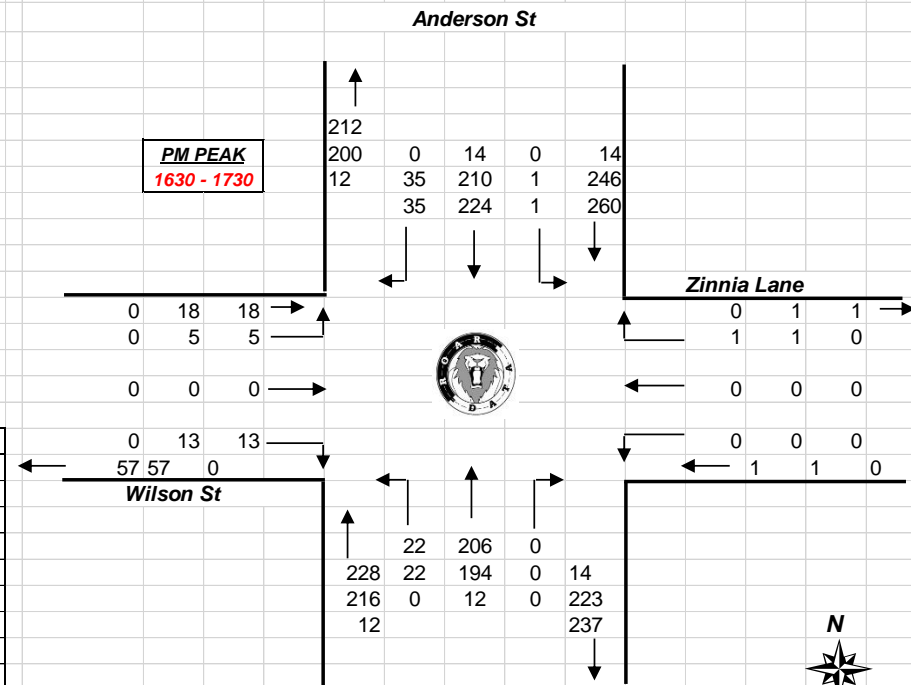


Ph.88196847, Mob.0418-239019

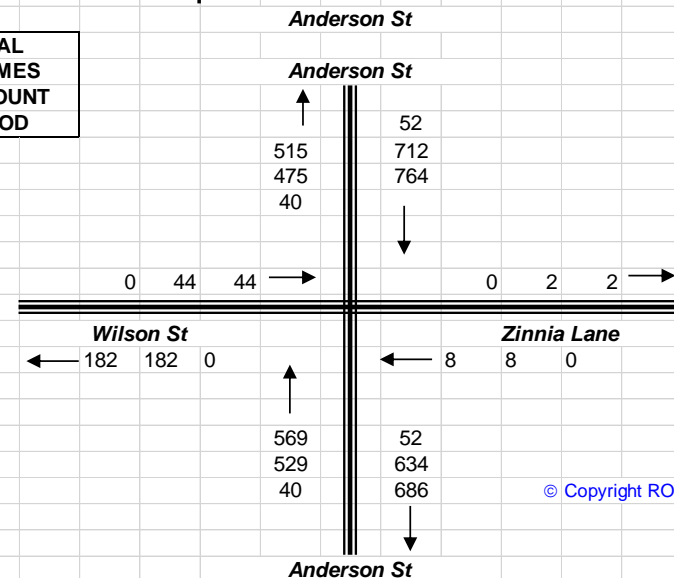
Day/Date	: Thursday 10th August 2017
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Peds	NORTH	WEST	SOUTH	EAST	
	<i>Anderson St</i>	<i>Wilson St</i>	<i>Anderson St</i>	<i>Zinnia Lane</i>	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1530 - 1545	2	7	1	6	16
1545 - 1600	1	7	2	5	15
1600 - 1615	2	1	0	3	6
1615 - 1630	1	2	1	2	6
1630 - 1645	0	3	1	1	5
1645 - 1700	2	5	2	10	19
1700 - 1715	3	5	6	9	23
1715 - 1730	0	5	3	11	19
1730 - 1745	4	9	0	5	18
1745 - 1800	0	8	0	3	11
1800 - 1815	1	3	1	7	12
1815 - 1830	0	9	2	12	23
Period End	16	64	19	74	173

Peds	NORTH	WEST	SOUTH	EAST	
	<i>Anderson St</i>	<i>Wilson St</i>	<i>Anderson St</i>	<i>Zinnia Lane</i>	
Peak Per	<u>UNCLASSIFIED</u>	<u>UNCLASSIFIED</u>	<u>UNCLASSIFIED</u>	<u>UNCLASSIFIED</u>	TOT
1530 - 1630	6	17	4	16	43
1545 - 1645	4	13	4	11	32
1600 - 1700	5	11	4	16	36
1615 - 1715	6	15	10	22	53
1630 - 1730	5	18	12	31	66
1645 - 1745	9	24	11	35	79
1700 - 1800	7	27	9	28	71
1715 - 1815	5	25	4	26	60
1730 - 1830	5	29	3	27	64
PEAK HR	5	18	12	31	66



TOTAL VOLUMES FOR COUNT PERIOD	
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 6527 CHATSWOOD Wilson St
Day/Date : Thursday 10th August 2017

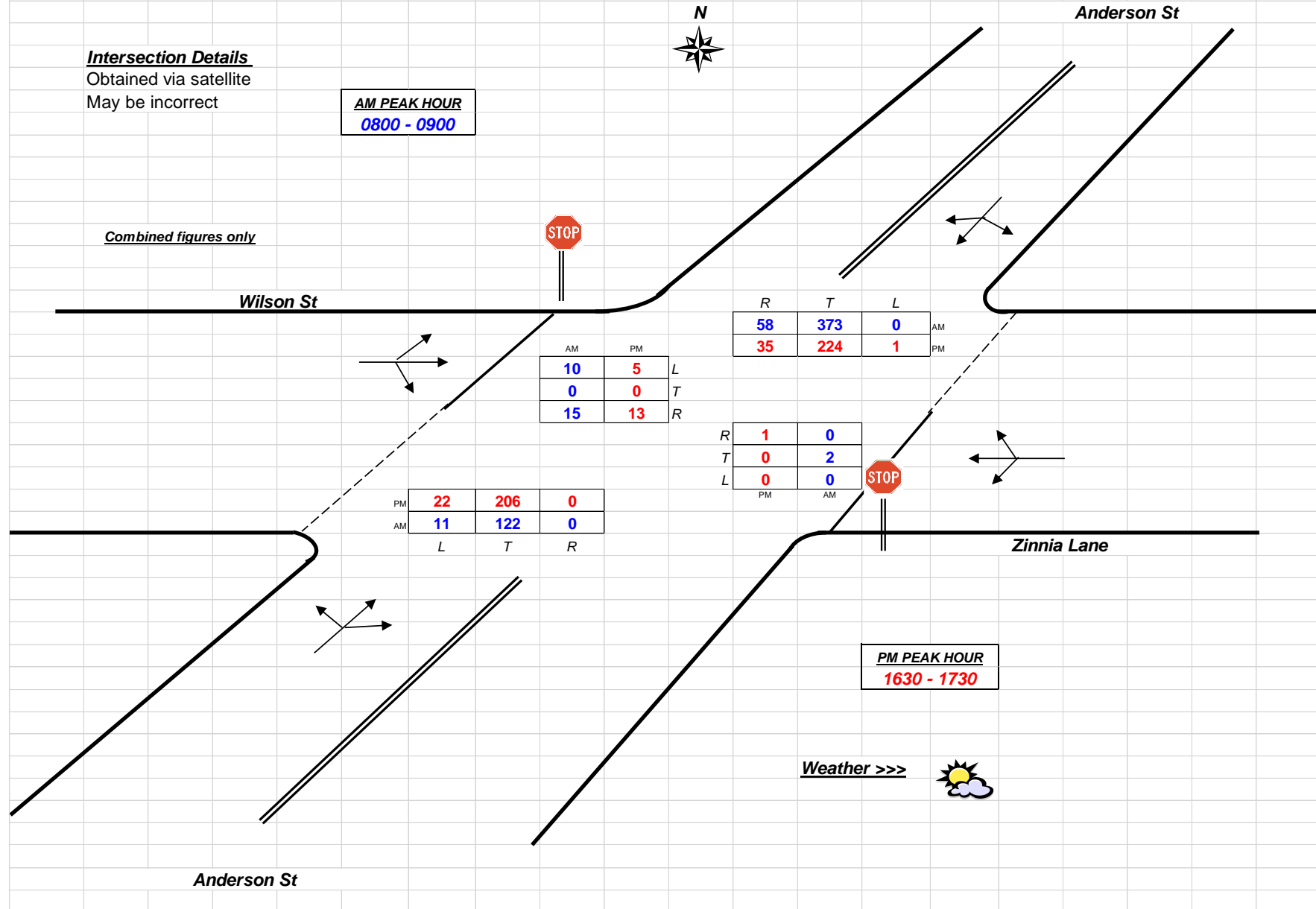
Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0800 - 0900

Combined figures only





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning

Job No/Name : 6527 CHATSWOOD Wilson St

Day/Date : Thursday 10th August 2017

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
<u>Time Per</u>	<u>Pacific Hwy</u>	<u>Wilson St</u>	<u>Pacific Hwy</u>	<u>TOT</u>
0630 - 0645	5	2	1	8
0645 - 0700	6	9	1	16
0700 - 0715	4	7	2	13
0715 - 0730	4	14	2	20
0730 - 0745	7	6	2	15
0745 - 0800	9	8	3	20
0800 - 0815	4	15	5	24
0815 - 0830	3	18	3	24
0830 - 0845	10	11	1	22
0845 - 0900	5	14	2	21
0900 - 0915	6	10	1	17
0915 - 0930	5	17	1	23
Per End	68	131	24	223

<u>PEDS</u>	<u>NORTH</u>	<u>EAST</u>	<u>SOUTH</u>	
<u>Peak Per</u>	<u>Pacific Hwy</u>	<u>Wilson St</u>	<u>Pacific Hwy</u>	<u>TOT</u>
0630 - 0730	19	32	6	57
0645 - 0745	21	36	7	64
0700 - 0800	24	35	9	68
0715 - 0815	24	43	12	79
0730 - 0830	23	47	13	83
0745 - 0845	26	52	12	90
0800 - 0900	22	58	11	91
0815 - 0915	24	53	7	84
0830 - 0930	26	52	5	83
PEAK HR	24	35	9	68

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0645	476	0		5			481
0645 - 0700	587	1		2			590
0700 - 0715	802	2		6			810
0715 - 0730	768	1		8			777
0730 - 0745	780	2		12			794
0745 - 0800	793	2		8			803
0800 - 0815	744	5		7			756
0815 - 0830	713	2		22			737
0830 - 0845	698	3		16			717
0845 - 0900	654	3		17			674
0900 - 0915	598	4		21			623
0915 - 0930	527	3		9			539
Per End	8140	28	0	133	0	0	8301

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0645	5	0		1			6
0645 - 0700	4	0		0			4
0700 - 0715	10	0		1			11
0715 - 0730	12	0		0			12
0730 - 0745	6	0		0			6
0745 - 0800	7	0		0			7
0800 - 0815	7	0		0			7
0815 - 0830	10	0		0			10
0830 - 0845	5	0		0			5
0845 - 0900	11	0		0			11
0900 - 0915	8	0		0			8
0915 - 0930	19	0		0			19
Per End	104	0	0	2	0	0	106

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Time Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0645	481	0	0	6	0	0	487
0645 - 0700	591	1	0	2	0	0	594
0700 - 0715	812	2	0	7	0	0	821
0715 - 0730	780	1	0	8	0	0	789
0730 - 0745	786	2	0	12	0	0	800
0745 - 0800	800	2	0	8	0	0	810
0800 - 0815	751	5	0	7	0	0	763
0815 - 0830	723	2	0	22	0	0	747
0830 - 0845	703	3	0	16	0	0	722
0845 - 0900	665	3	0	17	0	0	685
0900 - 0915	606	4	0	21	0	0	631
0915 - 0930	546	3	0	9	0	0	558
Per End	8244	28	0	135	0	0	8407

<u>Lights</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0730	2633	4	0	21	0	0	2658
0645 - 0745	2937	6	0	28	0	0	2971
0700 - 0800	3143	7	0	34	0	0	3184
0715 - 0815	3085	10	0	35	0	0	3130
0730 - 0830	3030	11	0	49	0	0	3090
0745 - 0845	2948	12	0	53	0	0	3013
0800 - 0900	2809	13	0	62	0	0	2884
0815 - 0915	2663	12	0	76	0	0	2751
0830 - 0930	2477	13	0	63	0	0	2553
PEAK HR	3143	7	0	34	0	0	3184

<u>Heavies</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0730	31	0	0	2	0	0	33
0645 - 0745	32	0	0	1	0	0	33
0700 - 0800	35	0	0	1	0	0	36
0715 - 0815	32	0	0	0	0	0	32
0730 - 0830	30	0	0	0	0	0	30
0745 - 0845	29	0	0	0	0	0	29
0800 - 0900	33	0	0	0	0	0	33
0815 - 0915	34	0	0	0	0	0	34
0830 - 0930	43	0	0	0	0	0	43
PEAK HR	35	0	0	1	0	0	36

<u>Combined</u>	<u>NORTH</u>		<u>EAST</u>		<u>SOUTH</u>		
	<u>Pacific Hwy</u>		<u>Wilson St</u>		<u>Pacific Hwy</u>		
<u>Peak Per</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>R</u>	<u>I</u>	<u>TOT</u>
0630 - 0730	2664	4	0	23	0	0	2691
0645 - 0745	2969	6	0	29	0	0	3004
0700 - 0800	3178	7	0	35	0	0	3220
0715 - 0815	3117	10	0	35	0	0	3162
0730 - 0830	3060	11	0	49	0	0	3120
0745 - 0845	2977	12	0	53	0	0	3042
0800 - 0900	2842	13	0	62	0	0	2917
0815 - 0915	2697	12	0	76	0	0	2785
0830 - 0930	2520	13	0	63	0	0	2596
PEAK HR	3178	7	0	35	0	0	3220



R.O.A.R. DATA

Reliable, Original & Authentic Results

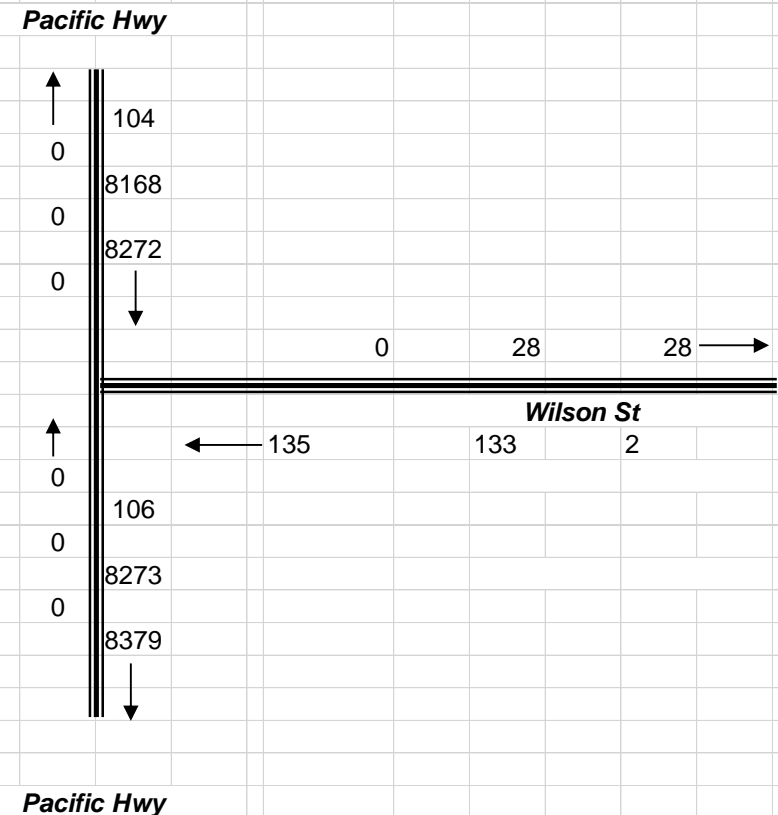
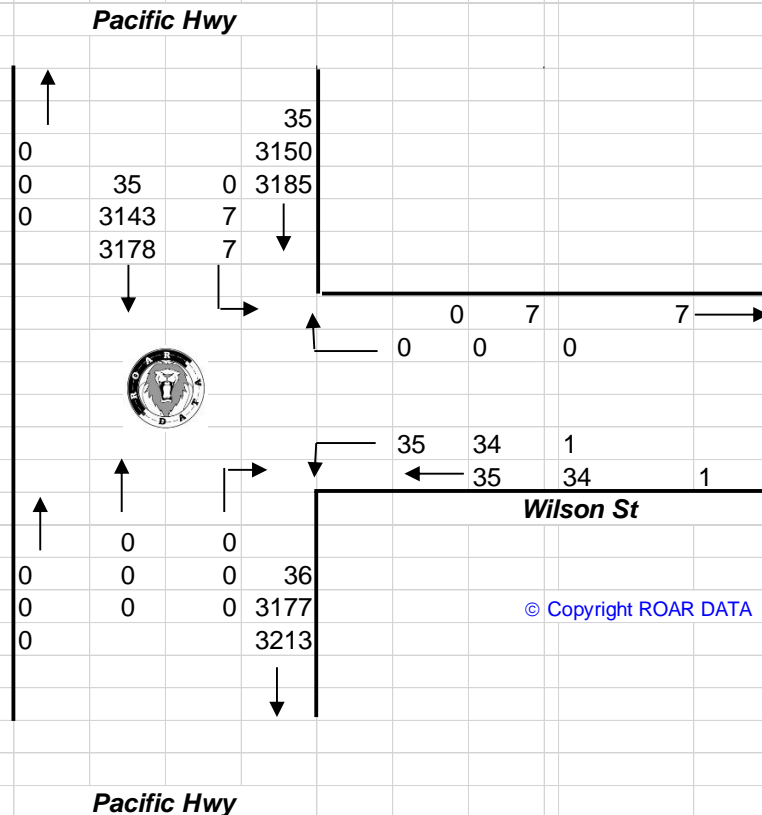
Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 6527 CHATSWOOD Wilson St
Day/Date : Thursday 10th August 2017

AM PEAK
0700 - 0800

1	2	3
4	5	6
7	8	9

TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results
Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 6527 CHATSWOOD Wilson St
Day/Date : Thursday 10th August 2017

PEDS	NORTH	EAST	SOUTH	
Time Per	Pacific Hwy	Wilson St	Pacific Hwy	TOT
1530 - 1545	1	7	2	10
1545 - 1600	2	8	1	11
1600 - 1615	0	7	3	10
1615 - 1630	1	4	2	7
1630 - 1645	3	5	4	12
1645 - 1700	0	12	1	13
1700 - 1715	2	12	2	16
1715 - 1730	0	14	4	18
1730 - 1745	0	19	3	22
1745 - 1800	3	15	5	23
1800 - 1815	0	12	2	14
1815 - 1830	2	11	3	16
Per End	14	126	32	172

PEDS	NORTH	EAST	SOUTH	
Peak Per	Pacific Hwy	Wilson St	Pacific Hwy	TOT
1530 - 1630	4	26	8	38
1545 - 1645	6	24	10	40
1600 - 1700	4	28	10	42
1615 - 1715	6	33	9	48
1630 - 1730	5	43	11	59
1645 - 1745	2	57	10	69
1700 - 1800	5	60	14	79
1715 - 1815	3	60	14	77
1730 - 1830	5	57	13	75
PEAK HR	5	43	11	59

Lights	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Time Per	I	L	R	L	R	I	TOT
1530 - 1545	391	2		14			407
1545 - 1600	395	5		18			418
1600 - 1615	399	2		17			418
1615 - 1630	391	1		15			407
1630 - 1645	406	5		15			426
1645 - 1700	409	4		9			422
1700 - 1715	386	5		15			406
1715 - 1730	476	5		20			501
1730 - 1745	397	3		1			401
1745 - 1800	373	5		13			391
1800 - 1815	347	2		20			369
1815 - 1830	363	6		18			387
Per End	4733	45	0	175	0	0	4953

Heavies	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Time Per	I	L	R	L	R	I	TOT
1530 - 1545	5	0		0			5
1545 - 1600	6	0		0			6
1600 - 1615	11	0		0			11
1615 - 1630	5	0		0			5
1630 - 1645	6	0		0			6
1645 - 1700	6	0		0			6
1700 - 1715	4	0		0			4
1715 - 1730	2	0		0			2
1730 - 1745	1	0		0			1
1745 - 1800	1	0		0			1
1800 - 1815	2	0		0			2
1815 - 1830	10	0		0			10
Per End	59	0	0	0	0	0	59

Combined	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Time Per	I	L	R	L	R	I	TOT
1530 - 1545	396	2	0	14	0	0	412
1545 - 1600	401	5	0	18	0	0	424
1600 - 1615	410	2	0	17	0	0	429
1615 - 1630	396	1	0	15	0	0	412
1630 - 1645	412	5	0	15	0	0	432
1645 - 1700	415	4	0	9	0	0	428
1700 - 1715	390	5	0	15	0	0	410
1715 - 1730	478	5	0	20	0	0	503
1730 - 1745	398	3	0	1	0	0	402
1745 - 1800	374	5	0	13	0	0	392
1800 - 1815	349	2	0	20	0	0	371
1815 - 1830	373	6	0	18	0	0	397
Per End	4792	45	0	175	0	0	5012

Lights	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Peak Per	I	L	R	L	R	I	TOT
1530 - 1630	1576	10	0	64	0	0	1650
1545 - 1645	1591	13	0	65	0	0	1669
1600 - 1700	1605	12	0	56	0	0	1673
1615 - 1715	1592	15	0	54	0	0	1661
1630 - 1730	1677	19	0	59	0	0	1755
1645 - 1745	1668	17	0	45	0	0	1730
1700 - 1800	1632	18	0	49	0	0	1699
1715 - 1815	1593	15	0	54	0	0	1662
1730 - 1830	1480	16	0	52	0	0	1548

Heavies	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Peak Per	I	L	R	L	R	I	TOT
1530 - 1630	27	0	0	0	0	0	27
1545 - 1645	28	0	0	0	0	0	28
1600 - 1700	28	0	0	0	0	0	28
1615 - 1715	21	0	0	0	0	0	21
1630 - 1730	18	0	0	0	0	0	18
1645 - 1745	13	0	0	0	0	0	13
1700 - 1800	8	0	0	0	0	0	8
1715 - 1815	6	0	0	0	0	0	6
1730 - 1830	14	0	0	0	0	0	14

Combined	NORTH		EAST		SOUTH		
	Pacific Hwy		Wilson St		Pacific Hwy		
Peak Per	I	L	R	L	R	I	TOT
1530 - 1630	1603	10	0	64	0	0	1677
1545 - 1645	1619	13	0	65	0	0	1697
1600 - 1700	1633	12	0	56	0	0	1701
1615 - 1715	1613	15	0	54	0	0	1682
1630 - 1730	1695	19	0	59	0	0	1773
1645 - 1745	1681	17	0	45	0	0	1743
1700 - 1800	1640	18	0	49	0	0	1707
1715 - 1815	1599	15	0	54	0	0	1668
1730 - 1830	1494	16	0	52	0	0	1562

PEAK HR	1677	19	0	59	0	0	1755
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PEAK HR	18	0	0	0	0	0	18
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PEAK HR	1695	19	0	59	0	0	1773
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning

Job No/Name : 6527 CHATSWOOD Wilson St

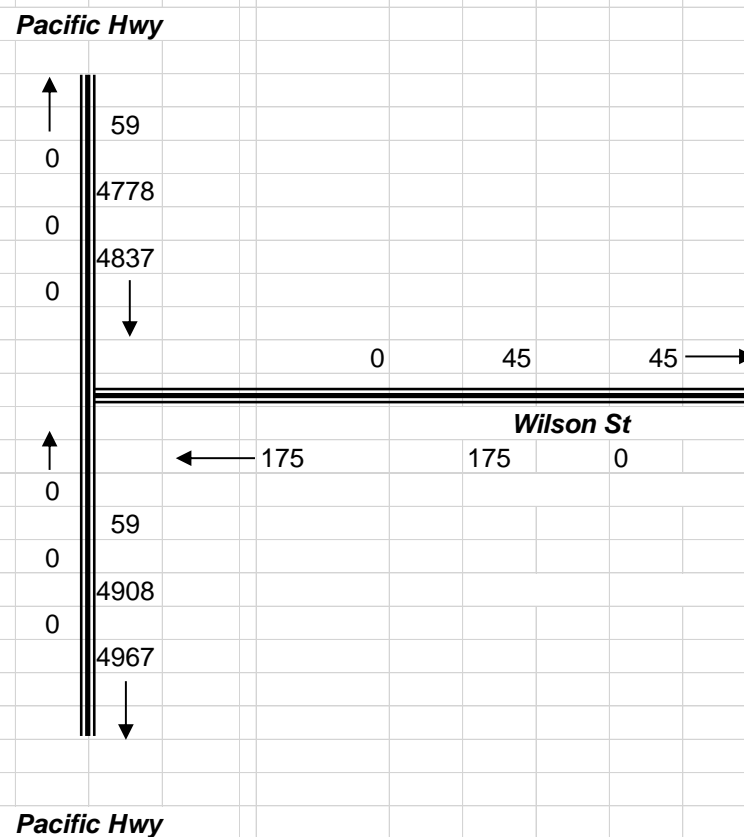
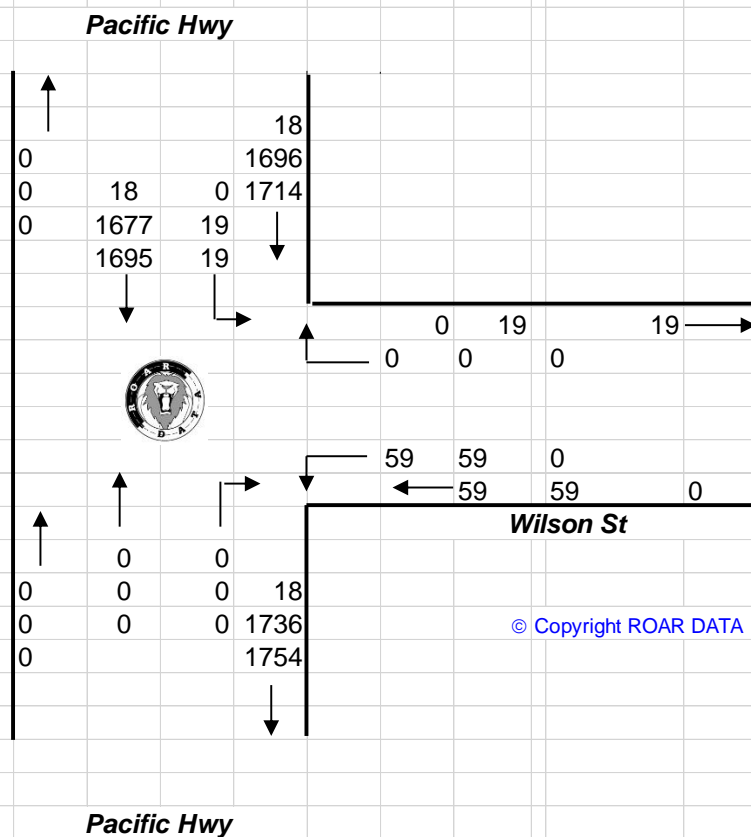
Day/Date : Thursday 10th August 2017

PM PEAK

1630 - 1730

1	2	3
4	5	6
7	8	9

**TOTAL VOLUMES
FOR COUNT
PERIOD**





R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 6527 CHATSWOOD Wilson St
Day/Date : Thursday 10th August 2017

Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0700 - 0800

Combined figures only



Pacific Hwy

T	L	
3178	7	AM
1695	19	PM

	PM	AM
L	59	35



Wilson St

PM PEAK HOUR
1630 - 1730

Weather >>>



Pacific Hwy