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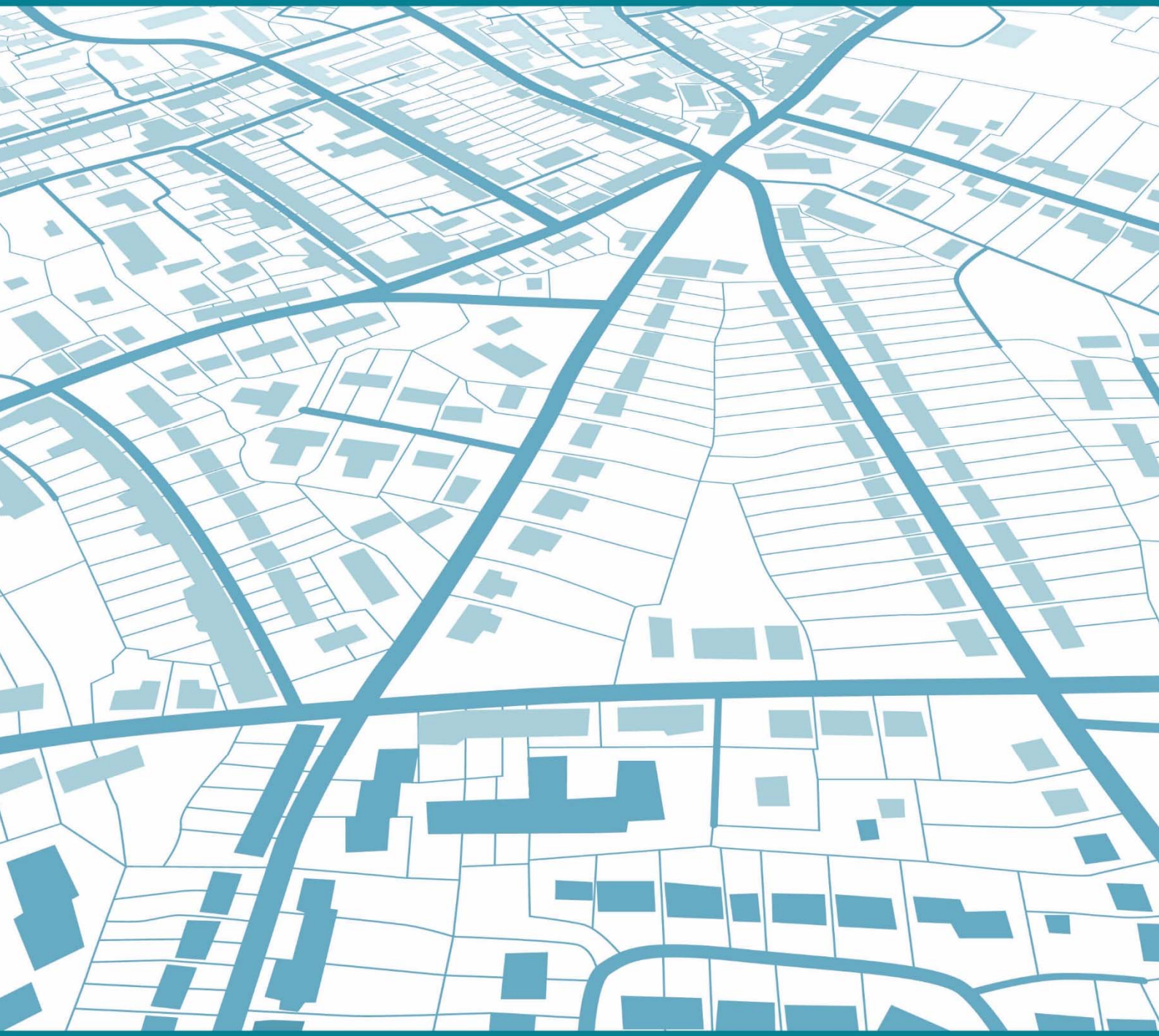

Proposed Bunnings Development

Cnr Warringah Road & Allambie Road, Frenchs Forest

Traffic and Parking Assessment

Ref: 19217
Date: May 2020
Issue: C

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1.0 Introduction

This report has been prepared to accompany a Development Application to Northern Beaches Council for a proposed Bunnings Warehouse on the corner of Warringah Road and Allambie Road at Frenchs Forest (Figure 1).

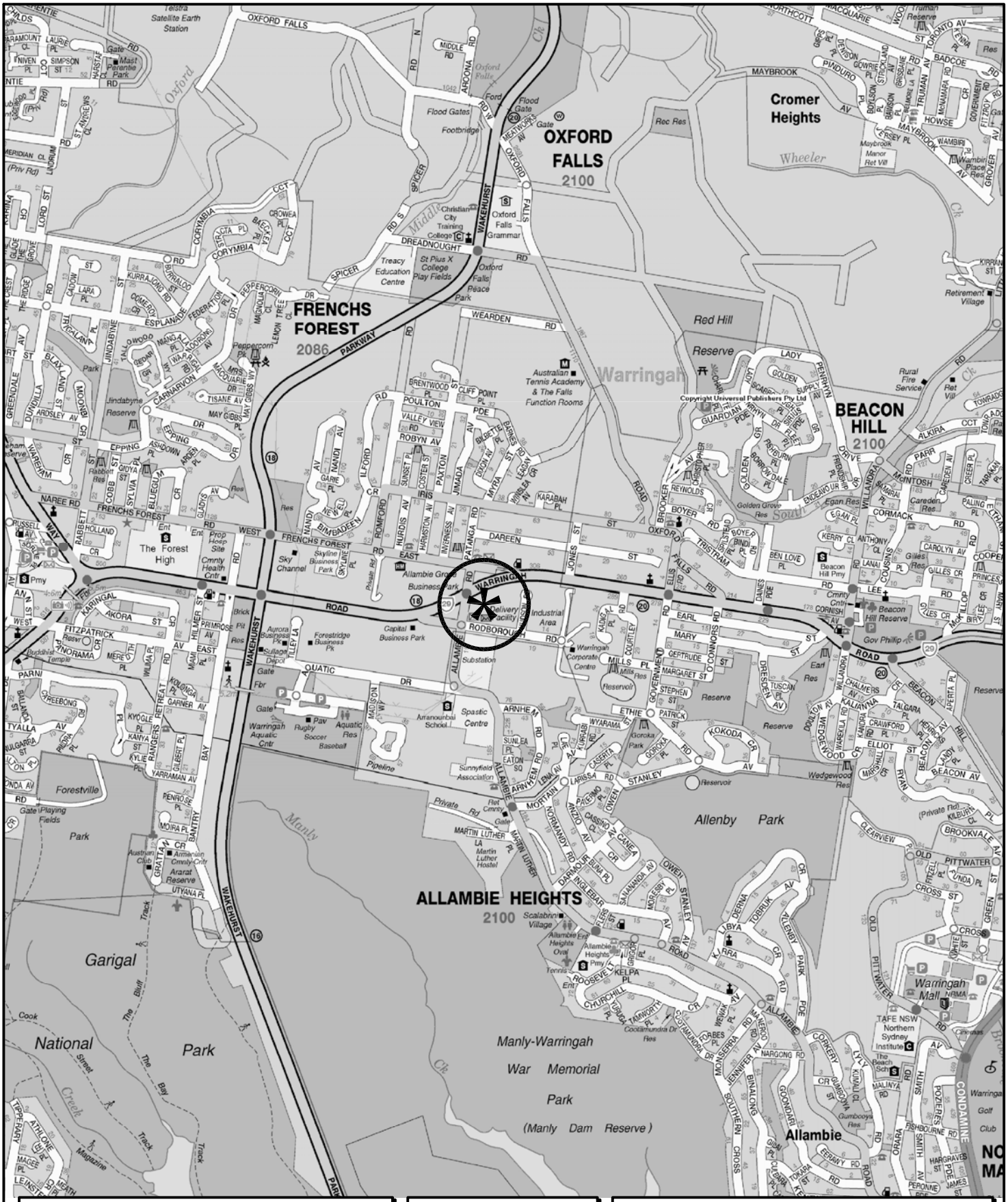
Bunnings have existing warehouses at Belrose, Balgowlah and Chatswood as well as small outlets in Warringah Mall and Narrabeen which have a very limited range of goods. Bunnings has for some time been searching for another site to serve the western part of the Northern Beaches area and the opportunity has now arisen to develop a site in the Frenchs Forest Business Park precinct which was previously acquired for a Masters outlet.

The proposed Bunnings comprises:

- Main warehouse
- Nursery / Bagged Goods
- Timber Trade / BMLY
- Total 19,654m^2

The purpose of this report is to:

- describe the site, its context and the proposed development scheme
- describe the road network serving the site and the prevailing traffic conditions
- assess the potential traffic implications of the proposed development
- assess the adequacy of the proposed parking provision
- assess the proposed vehicle access, internal circulation and servicing arrangements



LEGEND

LOCATION

FIG 1

2.0 Proposed Development Scheme

2.1 Site, Context and Existing Circumstances

The site (Figure 2) occupies an irregular shaped area of 21,750m^2 (as adjusted) with frontages to Warringah Road, Allambie Road and Rodborough Road in the eastern part of the Frenchs Forest Industrial Area.

The surrounding uses comprise:

- The large electrical substation and warehouse uses extending along Rodborough Road
- The vacant warehouse/office building which adjoins to the east
- The business park uses extending to the south and west

The existing uses on the site comprises:

- An Australia Post Distribution Facility in the southern part which has a number of access driveways on the Rodborough Road frontage and a combined ingress/egress driveway on the Allambie Road frontage
- The former Infomedia Warehouse and Office buildings in the northern part

Infomedia have vacated the site, and the parked cars shown on the Figure 2 image belong to workers from the Australia Post facility.

LEGEND

N

SITE

FIG 2

2.2 Proposed Development

It is proposed to demolish the existing buildings and excavate the site to provide for a basement level and level platforms for the building and hardstand areas. The new building will extend through the north – south centre of the site over 3 levels with basement and at-grade parking. The proposed Bunnings will comprise:

Main Warehouse	12,178m^2
Nursery / Bagged Goods	3,119m^2
Timber Trade	2,743m^2
BMLY	1,614m^2
Total:	**19,654m^2**

The loading area will extend along the eastern side of the building while a total of 397 parking spaces will be provided and the proposed vehicle access arrangements comprise:

- a new combined ingress/ egress driveway for the carpark on Rodborough Road
- relocation of the combined ingress/egress driveway on Allambie Road for carpark access (with left turn deceleration lane and left turn IN/OUT only)
- a combined ingress and egress driveway for trucks on Rodborough Road

Details of the proposed development are provided on the plans which accompany the Development Application and are reproduced in part in Appendix A.

3.0 Road Network and Traffic Conditions

3.1 Road Network

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

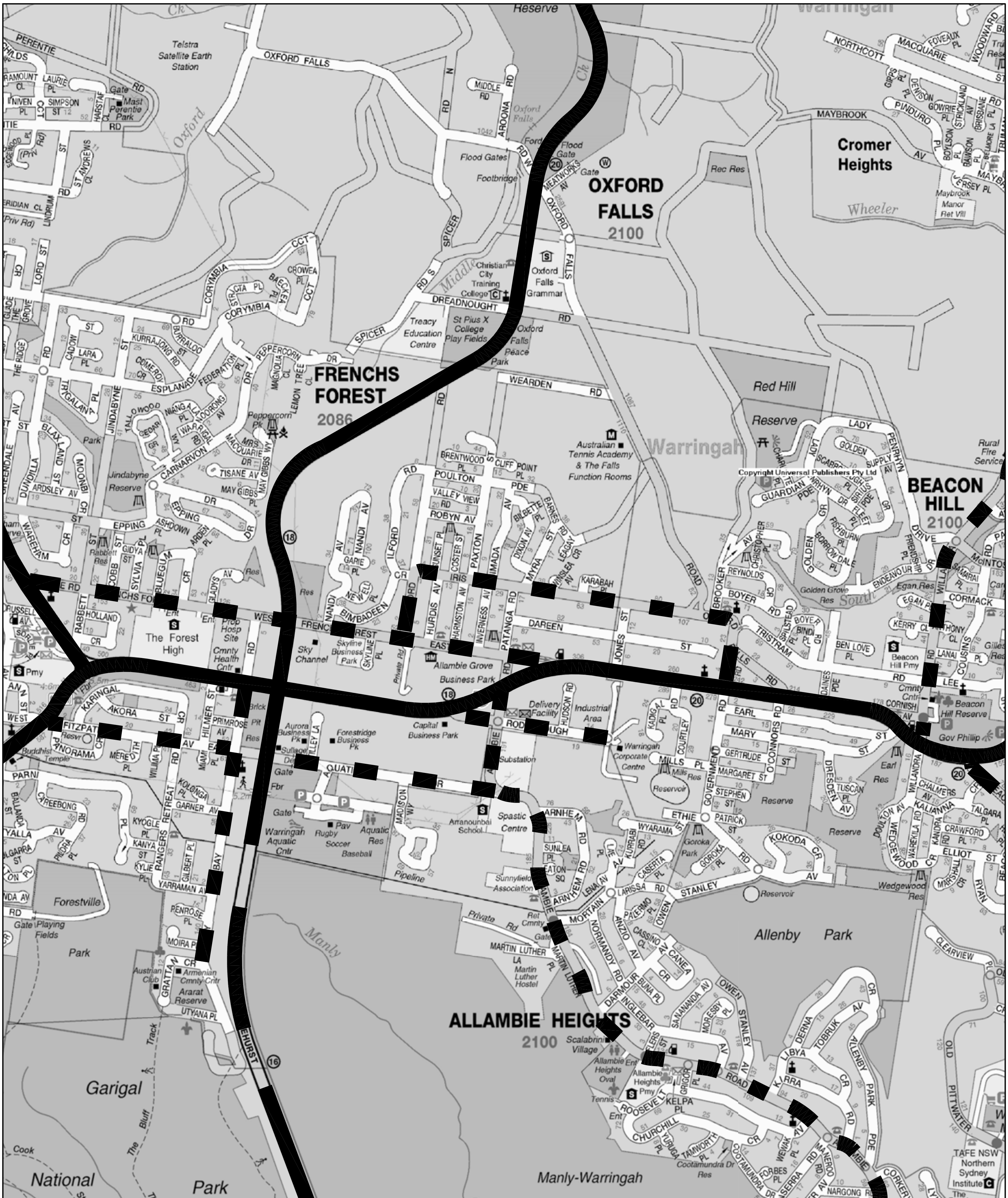
- *Warringah Road* – a State Road and arterial route connecting between Pittwater Road at Brookvale and across Roseville Bridge to Eastern Valley Way and Pacific Highway via Boundary Road
- *Wakehurst Parkway* – a State Road and arterial/sub-arterial route connecting between Pittwater Road at Narrabeen and Sydney Road at Balgowlah
- *Allambie Road* – a Regional Road and major collector road route connecting between Warringah Road and Condamine Street at North Manly
- *Frenchs Forest Road* – a collector road route running between Forestway and Warringah Road
- *Rodborough Road and Aquatic Drive* – minor "dead end" collector roads

Previously accessibility for the area was constrained by the non-connection of Aquatic Drive to Wakehurst Parkway. However this connection has recently been provided along with road widening along Warringah Road (with an underpass at the Wakehurst Parkway intersection) and widening of Allambie Road between Warringah Road and Rodborough Road.

3.2 Traffic Controls

The existing traffic controls, which have been applied to the road system serving the site (Figure 4) comprise:

- the traffic signals at the Warringah Road/Allambie Road intersection (see details overleaf) which include:



LEGEND

ARTERIAL

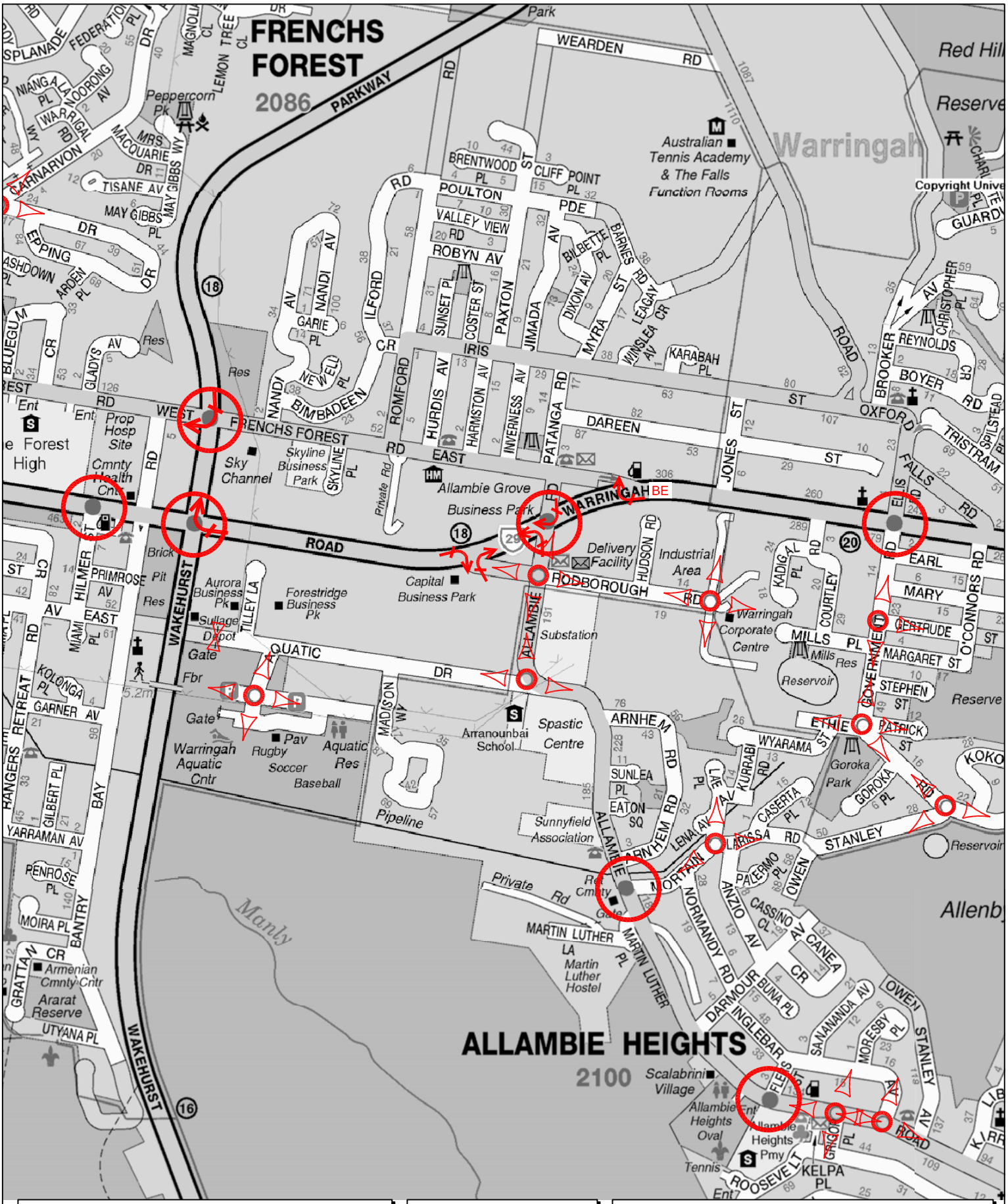
SUB-ARTERIAL

COLLECTOR

N

ROAD NETWORK

FIG 3



LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT

N

TRAFFIC CONTROLS

FIG 4

TCS 0713

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 16/12/71
DATE RECONSTRUCTED : 00/00/00

Transport Roads & Maritime Services
NSW GOVERNMENT

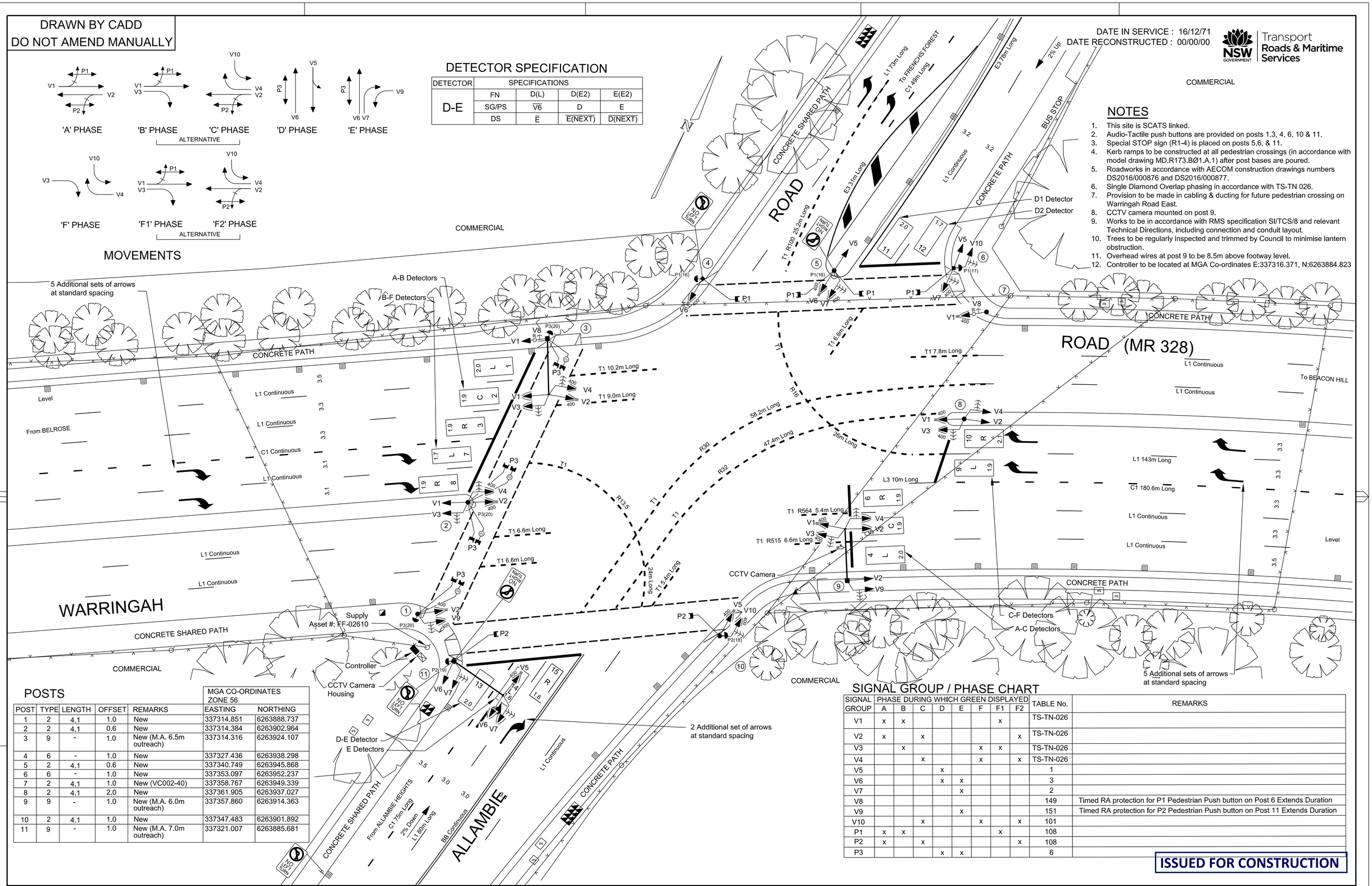
MOVEMENTS

DETECTOR SPECIFICATION

DETECTOR	SPECIFICATIONS			
D-E	FN	D(L)	D(E2)	E(E2)
	SG/PS	V6	D	E
	DS	E	E(NEXT)	D(NEXT)

NOTES

1. This site is SCATS linked.
2. Audio-Tactile push buttons are provided on posts 1,3, 4, 6, 10 & 11.
3. Special STOP sign (R1-4) is placed on posts 5,6, & 11.
4. Kerb ramps to be constructed at all pedestrian crossings (in accordance with model drawing MD.R173.BØ1.A.1) after post bases are poured.
5. Roadworks in accordance with AECOM construction drawings numbers DS2016/000876 and DS2016/000877.
6. Single Diamond Overlap phasing in accordance with TS-TN 026.
7. Provision to be made in cabling & ducting for future pedestrian crossing on Warringah Road East.
8. CCTV camera mounted on post 9.
9. Works to be in accordance with RMS specification SI/TCS/8 and relevant Technical Directions, including connection and conduit layout.
10. Trees to be regularly inspected and trimmed by Council to minimise lantern obstruction.
11. Overhead wires at post 9 to be 8.5m above footway level.
12. Controller to be located at MGA Co-ordinates E:337316.371, N:6263884.823



POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS	MGA CO-ORDINATES ZONE 56 EASTING	NORTHING
1	2	4.1	1.0	New	337314.851	6263888.737
2	2	4.1	0.6	New	337314.384	6263902.964
3	9	-	1.0	New (M.A. 6.5m outreach)	337314.316	6263924.107
4	6	-	1.0	New	337327.436	6263938.298
5	2	4.1	0.6	New	337340.749	6263945.868
6	6	-	1.0	New	337353.097	6263952.237
7	2	4.1	1.0	New (VC002-40)	337358.767	6263949.339
8	2	4.1	2.0	New	337361.905	6263937.027
9	9	-	1.0	New (M.A. 6.0m outreach)	337357.860	6263914.363
10	2	4.1	1.0	New	337347.483	6263901.892
11	9	-	1.0	New (M.A. 7.0m outreach)	337321.007	6263885.681

SIGNAL GROUP / PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED A	B	C	D	E	F	F1	F2	TABLE No.	REMARKS
V1	x	x					x		TS-TN-026	
V2	x		x					x	TS-TN-026	
V3		x				x	x		TS-TN-026	
V4			x			x		x	TS-TN-026	
V5				x					1	
V6				x	x				3	
V7					x				2	
V8									149	Timed RA protection for P1 Pedestrian Push button on Post 6 Extends Duration
V9					x				151	Timed RA protection for P2 Pedestrian Push button on Post 11 Extends Duration
V10			x			x		x	101	
P1	x	x					x		108	
P2	x		x					x	108	
P3				x	x				6	

ISSUED FOR CONSTRUCTION

A ORIGINAL ISSUE

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	▲	STD POSIT	VD001-5
GAS VALVE	#	PRES. DETECT	VC005-17
SEWER MANHOLE	⊕	VEH, GROUP OP	TS-TN-019
TELECOM PIT	◪	DET, LOGIC OP	TS-TN-020
ELECT LIGHT POLE	○	PED, MOVEMNT OP	TS-TN-021
POWER POLE	○		
STAY POLE	⊘		
TELEPHONE BOX	T	SURVEYOR :	BILLY CHO
TELECOM PILLAR	◪	DATE :	MARCH 2013

U.B.D. Ref, Map 177 A6
I.S.G. CO-ORDS E: 322 479 N: 1 263 820

DESIGNED B. KRYGSMAN
CHECKED B. ATKINSON
B. ATKINSON
SITE CHECKED
C. WARD
RECOMMENDED

DESIGN APPROVAL
APPROVED
TRACY EDWARDS
POSITION DESIGN MANAGER
DATE 18/10/2016
DESIGN PREPARED BY AECOM

RMS ACCEPTANCE
RECOMMENDED
ENNIO MORSON
TEAM LEADER NETWORK OPERATIONS
POSITION
DATE 28/09/2016
ACCEPTED
PETER CARRUTHERS
MANAGER NETWORK AND SAFETY SERVICES
POSITION
DATE 12/10/2016

ROADS AND MARITIME SERVICES

NORTHERN BEACHES COUNCIL AREA
TRAFFIC SIGNALS AT
WARRINGAH (MR328) ROAD
AND ALLAMBIE ROAD
FRENCHS FOREST

DESIGN LAYOUT TCS No 0713

EXISTING □ PROPOSED ☒
CADD FILE: VV0713_16A.dgn
SCALE 5 0 (1:200) 5 10
ISSUE A
FILE SF2014/009706
SUPERSEDES SHEET/ISSUE 1/I
REG No. DS2014/001105
TCS No. 0713
SHEET 16

19/12/2016 3:33:45 PM K:\Signals\TCS\vv0700-vv0799\vv0713\Drawings\VV0713_16A.dgn

Revision 1 - August 2014

  - the prohibition of the right-turn movement out of Allambie Road north
  - the prohibition of the left-turn movement out of Allambie Road south

- the roundabouts at the Allambie Road/Aquatic Drive and Allambie Road/ Rodborough Road intersections
- the prohibition of the right turn movement out of Aquatic Drive at the Wakehurst Parkway intersection
- the traffic signals at the Warringah Road/Wakehurst Parkway intersection
- the central median island along Warringah Road which prevents right-turn movements at the Rodborough Road intersection
- the NO STOPPING restrictions along Warringah Road and Allambie Road and afternoon peak NO STANDING along the southern side of Rodborough Road (4.30pm to 6.30pm).

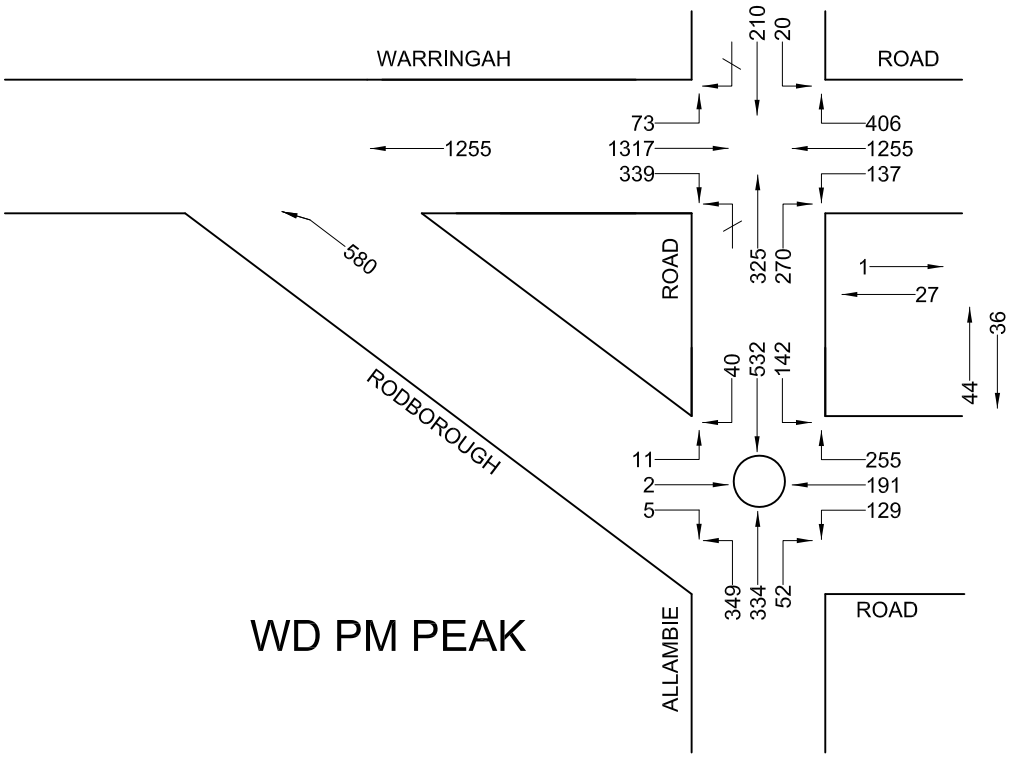
3.3 Traffic Conditions

An indication of traffic conditions on the road system serving the area is provided by data[1] published by TfNSW and surveys undertaken as part of this study. The data published by TfNSW is expressed in terms of Annual Average Daily Traffic (AADT) is provided in the following:

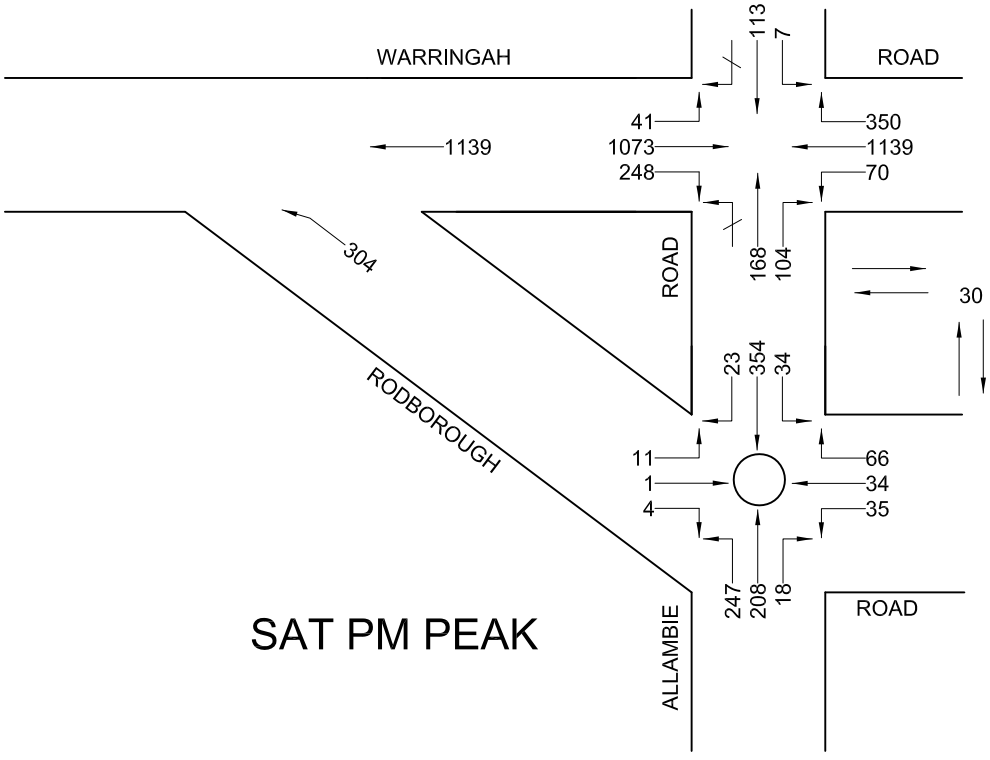
	AADT
Warringah Road west of Wakehurst Parkway	75,000
Allambie Road north of Condamine Street	17,000

Traffic surveys have been undertaken at the access intersections during the weekday afternoon and Saturday midday peak periods in December 2019 and the results of these surveys are provided in Appendix B and summarised in Figure 5.

[1] *Traffic Volume Data for Sydney Region*
Roads and Maritime Services



WD PM PEAK



SAT PM PEAK

LEGEND

EXISTING PEAK TRAFFIC FLOWS

FIG 5

The operational performance of the intersections in the vicinity of the site has been modelled with SIDRA and the results are provided in Appendix C and summarised in the following while the criteria for assessing SIDRA output is reproduced overleaf.

	WDPM		SAT MD	
	LOS	**AVD**	**LOS**	**AVD**
Warringah Road/Allambie Road	C	39.9s	C	36.2s
Allambie Road/Rodborough Road	A	4.5s	A	3.2s
Warringah Road/Rodborough Road	A	1.2s	A	0.6s

The traffic conditions at times during the height of the commuter peaks, particularly during the afternoon were previously not entirely satisfactory and there was some consistent queuing both in Rodborough Road and Allambie Road. However, the recent connection of Aquatic Drive to Wakehurst Parkway and completion of the grade separation works at the Wakehurst Parkway/Warringah Road intersection together with the widening of Allambie Road has resulted in significantly improved conditions.

3.4 Transport Services

Public transport services for the site area are provided by the bus routes operated by Sydney Buses and Forest Coach Lines as shown on Figure 6 with the principal routes being:

Sydney Buses

L60	-	Mona Vale to Chatswood
173	-	Cromer to Wynyard
E72/73	-	Narraweena/Cromer to Wynyard
142	-	Manly Wharf to Skyline

Forest Coachlines

280	-	Chatswood to Warringah Mall
276	-	Warringah Mall to Belrose

As a consequence of the proximity to these significant/frequent services it is considered that the site is well served by public transport.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'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, Roundabouts	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*

4.0 Traffic

The former RMS undertook a study of Hardware/DIY landuses as part of its program to upgrade the Guide To Traffic Generating Development document. However, it is widely recognised that the results of this study do not reflect that of large contemporary Bunnings Warehouses as the study largely only surveyed small Mitre 10 sites. TTPA have assessed a large volume of data relating to the traffic generation characteristics of contemporary Bunnings Warehouses and this data is provided in the "Bunnings Traffic Characteristics" document reproduced in Appendix D.

Reference to the graphed "trend line" in this document reveal that the expected peak traffic generation of a Bunnings with a total retail floor area of some 19,654m^2 is as followings:

Vtph per 100m^2	
WDPM	**SAT MD**
1.5	4.5

However, the Bunnings sites which dictate the large formed section of the 'trendline' being Castle Hill, Huntingwood, Oxenford, Woodville and Thomastown do not have competing Bunnings within their principal catchment areas and it is a normal circumstance that where there are competing sites (i.e. overlapping catchments) the peak traffic generation of those sites is "tempered".

As an indication, the assessment by Bunnings is that the development of the site at Frenchs Forest will reduce trade at the other competing sites as follows, Belrose – 27%, Chatswood – 6%, Balgowlah – 4% and Narrabeen – 5%. At the same time, Bunnings are also in the process of constructing a new warehouse at Pymble and the proposed significant TTS and BMLY elements will principally "tradie areas" which will not generate any significant traffic movements during the weekday afternoon and Saturday peak periods.

It is apparent that this "tempering" will reduce the peak generation rate at the 19,654m^2 Frenchs Forest site (below the trend line 'norm') as follows:

WDPM	SAT MD
1.45 vtph / 100m^2	4.0 vtph / 100m^2
285 vtph	786 vtph

The projected distribution of the generated movements is as follows:

Forestway	20%
Warringah Road West	10%
Warringah Road East	25%
Allambie Road South	20%
Wakehurst Parkway North	10%
Wakehurst Parkway South	15%
Total:	**100%**

A significant element of the Forestway and Wakehurst Parkway North vehicles will choose to travel via Frenchs Forest Road. The Appendix D document also indicates that there will be a significant element of "passing trade" traffic with the Appendix D ARRB document recommending 25-30% of generated traffic.

The traffic surveys of the existing Australia Post Facility (Appendix B) indicate peak traffic generations (including a significant percentage of trucks) of:

AM	100 vtph
PM	
3.30 – 4.30	250 vtph
4.30 – 5.30	100 vtph

Surveys were not undertaken during the weekend, however it is assessed that the generation would only be some 30 vtph during the Saturday Midday period.

In order to establish the projected future traffic circumstances on the road system relevant to the proposed Bunnings development the following process has been undertaken.

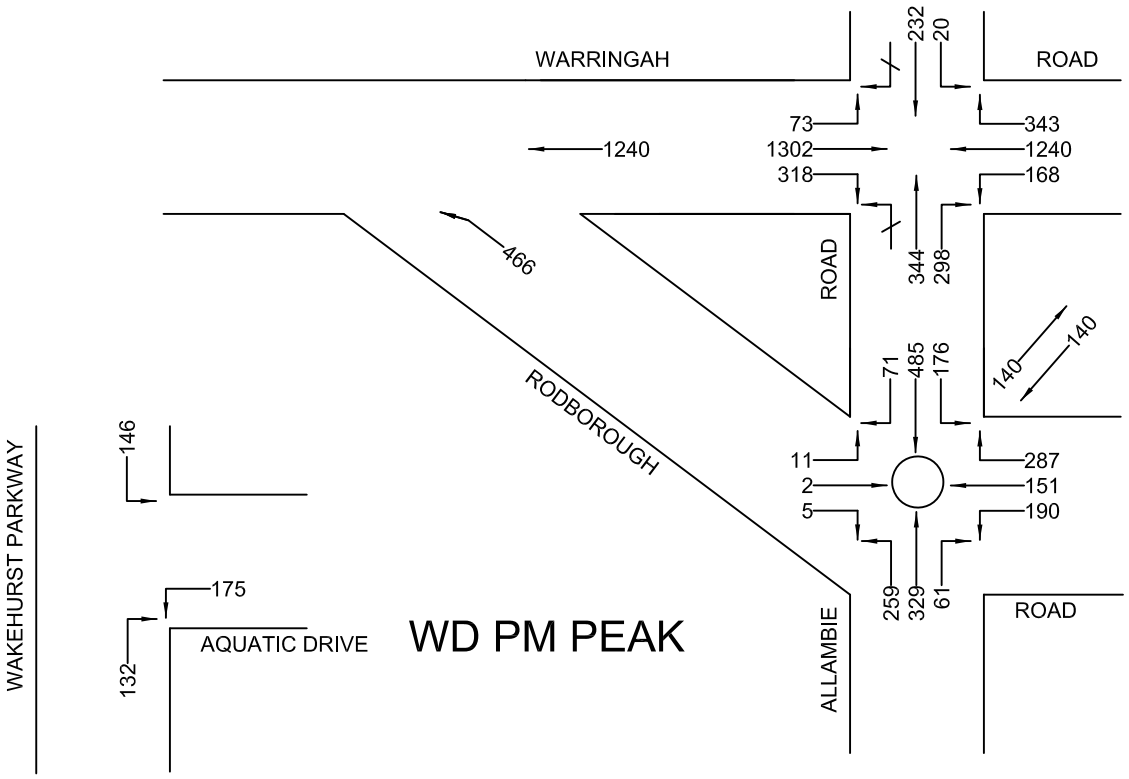
- subtract the traffic movements generated by the existing Australia Post Facility
- allocate the projected “passing trade” movements
- distribute the projected “additional” Bunnings generated movements

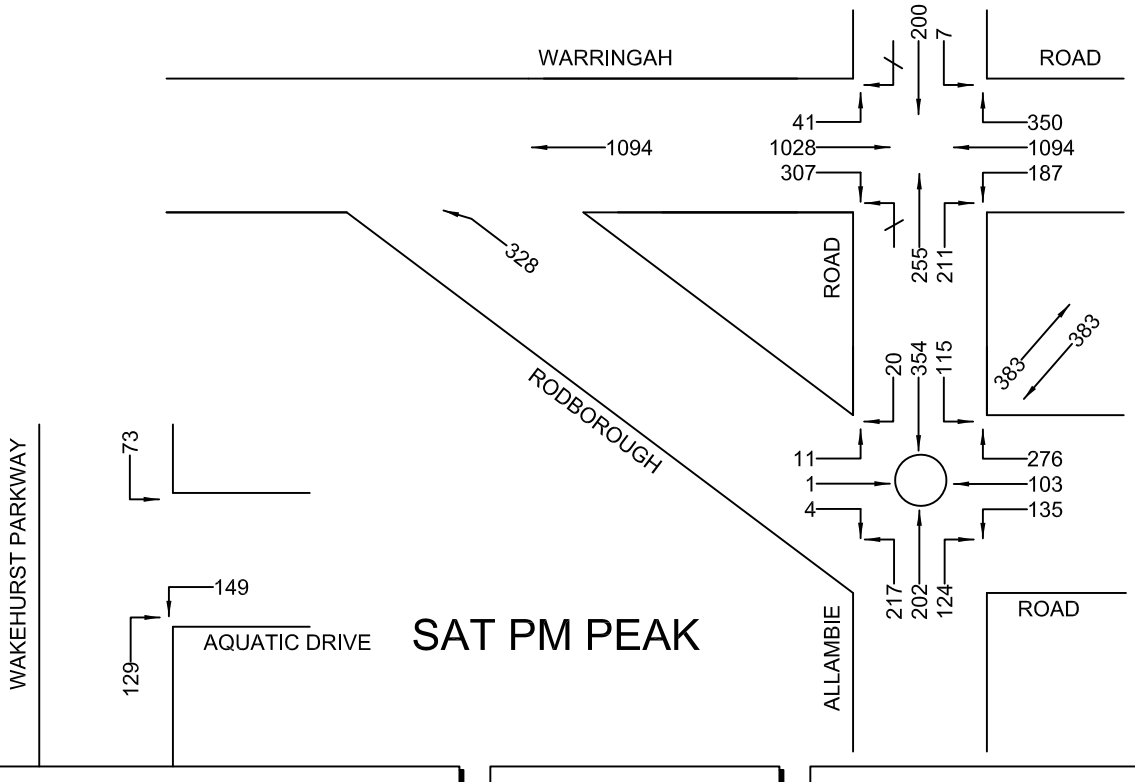
The resultant projected future traffic movements for WDPM & SAT MD peak periods as a result of this assessment process are shown on Figure 6. The operational performance of the access intersections under these projected future traffic circumstances has been assessed with SIDRA and the results are provided in Appendix C and summarised in the following:

	WD PM		SAT MD	
	LOS	**AVD**	**LOS**	**AVD**
Warringah / Allambie	C	40.4s	C	39.3s
Allambie / Rodborough	A	4.9s	A	4.8s
Warringah / Rodborough	A	1.3s	A	0.9s

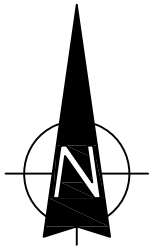
These results indicate that the access intersections will operate satisfactorily and the principal reasons for this outcome are:

- the existing level of traffic generation of the current site use (a discount to the projected Bunnings generation)
- the fact that the peak Bunnings traffic generation occurs on weekends whereas the existing generation of the current site use would be greater than Bunnings in the AM peak and similar in the PM peak
- the redistribution of traffic away from the Warringah Road/Allambie Road intersection as a result of the provision of the connection of Aquatic Drive to Wakehurst Parkway and the provision of Warringah Road underpass at Wakhurst Parkway





LEGEND



FUTURE PEAK TRAFFIC FLOWS

FIG 6

5.0 Parking

Council's DCP in relation to Bulky Goods and Timber & Building Supplies specifies that "*comparison should be made with similar developments*". The experience with Bunnings parking demands (Appendix D) is a normal peak demand of 1 space per 48 to 50m^2 while consideration also needs to be given to seasonal peak demands.

It is proposed to provide 397 parking spaces in the carpark which for the proposed 19,654m^2 which equates to 1 space per 49m^2 and this will include 10 accessible spaces and 7 trailer bays.

It is the Bunnings experience that this provision will be quite appropriate to satisfy peak seasonal demands and reflects the fact that customers tend to stay longer in large format Bunnings due to the greater range of goods on display.

6.0 Access, Internal Circulation and Servicing

6.1 Access

The vehicle access provision will comprise:

- combined ingress and egress driveway on Rodborough Road towards the centre of the site frontage
- combined ingress/egress driveway on the Allambie Road frontage involving the proposed relocation of the existing driveway on the Allambie Road frontage will incorporate a left turn deceleration lane and a central median island in Allambie Road to restrict access to left turn IN/OUT. The provision of this access was the subject of a meeting with officers of the former RMS and the RMS response is reproduced overleaf.
- combined ingress/egress driveway for delivery and service vehicles on Rodborough Road located at the eastern site boundary

The proposed access driveways will comply with the design requirements of AS2890.1 & 2 and they will accommodate all vehicles requiring to access the site.

6.2 Internal Circulation

Flexible 2-way provision is made for circulation within the carpark areas and the design of these areas will comply with the requirements of AS2890.1 & 6. Details of the turning path assessment for the carpark areas are provided in Appendix E.

6.3 Servicing

Service and delivery trucks will have a separate access driveway with the normal Bunnings unloading arrangements. Should a number of trucks be on-site at the same time there will be extensive queuing provision. Provision is also made for trucks (including articulated vehicles) to turn and egress the site. Details of the turning path assessment for trucks is shown in Appendix E.

Ross Nettle

From: PILLY MOOTANAH Hans R <Hans.PILLY.MOOTANAH@rms.nsw.gov.au>
Sent: Friday, 21 July 2017 11:00 AM
To: Philip Drew; gturner@bunnings.com.au; Ross Nettle
Cc: RATHAN Pahee; COATES Alexander R; LEUNG David; TAN Boon T
Subject: 20170721 - Roads and Maritime Pre DA meeting Notes: Bunnings Frenchs Forest - SYD17/00857
Attachments: 20170727 - SYD17_00857 Bunnings Frenchs Forest Attendance sheet.pdf

Gents,

Thank you for attending the meeting today regarding the Pre-DA for a potential Bunnings at 357-373 Warringah Road, Frenchs Forest , Roads and Maritime provides the following meeting notes:

1. Roads and Maritime will provide an updated intersection layout plan and information regarding the left turn slip at Allambie Road/Warringah Road for Bunnings to provide an updated access arrangement plan. As discussed at the meeting Roads and Maritime will consider access into the site via a left turn slip from Allambie Road, not from Warringah Road.

2. The left in/left out access on Allambie Road shall be located as far away from Warringah Road intersection.

3. Roads and Maritime require additional information from Bunnings;

    a. Potential traffic generation and peak times/car parking/heavy vehicle movements

    b. SIDRA Modelling for the following intersections:
        i. Warringah Road/Allambie Road
        ii. Rodborough Road/Allambie Road
        iii. Rodborough Road/Warringah Road

Should you have any further queries, Please do not hesitate to contact me.

Kind regards,

Hans Pilly Mootanah
Land Use Planner
Network Sydney | South Precinct
T 02 8849 2076
www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 11 27 Argyle Street Parramatta NSW 2150

Before printing, please consider the environment

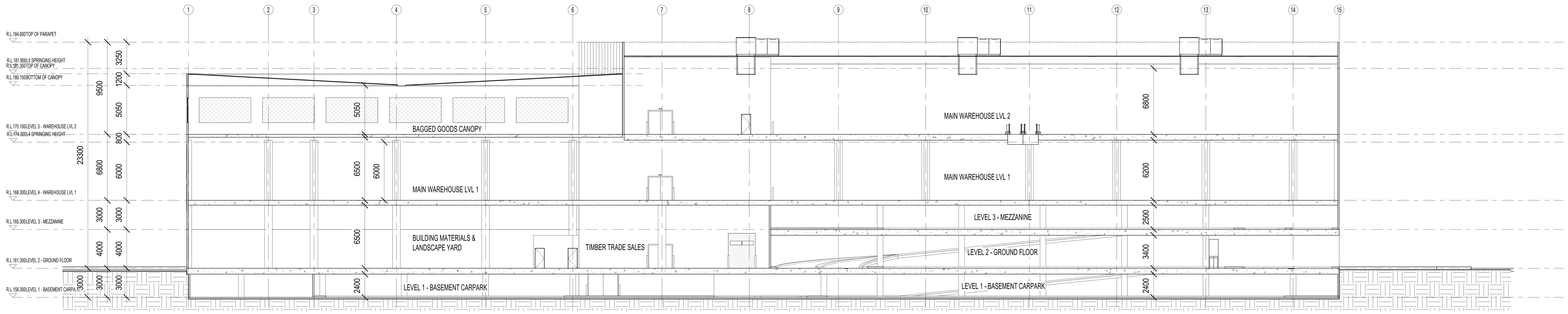
7.0 Conclusion

This Traffic and Parking Assessment for the proposed Bunnings development at Frenchs Forest has concluded that:

- there will not be any adverse traffic implications
- the proposed parking provision will be quite adequate
- the design of the vehicle access, internal circulation and servicing arrangements will be suitable and appropriate

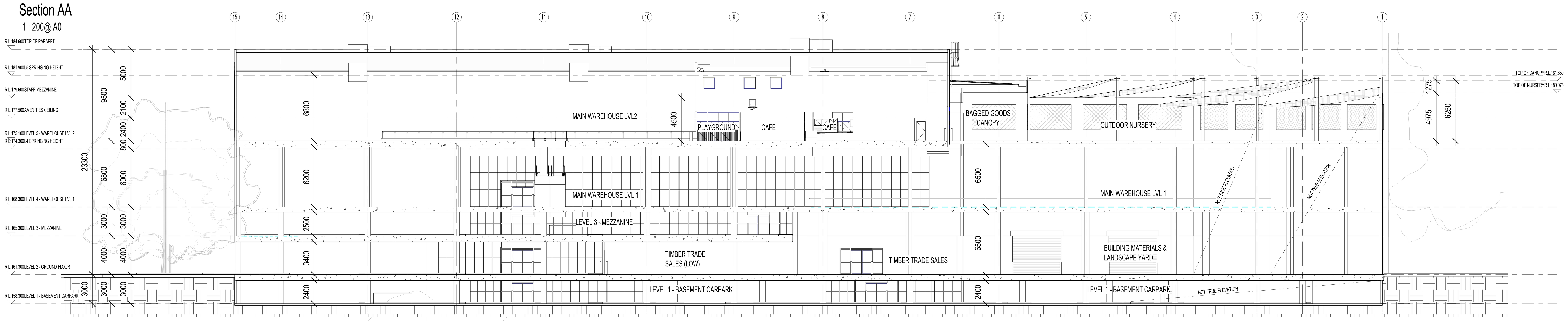
Appendix A

Development Plans



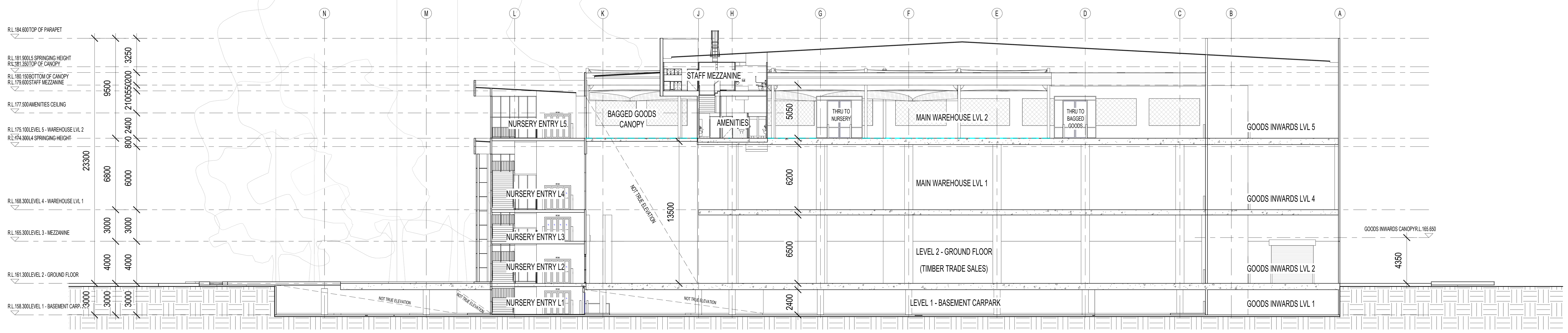
Section AA

1 : 200@ A0



Section BB

1 : 200@ A0



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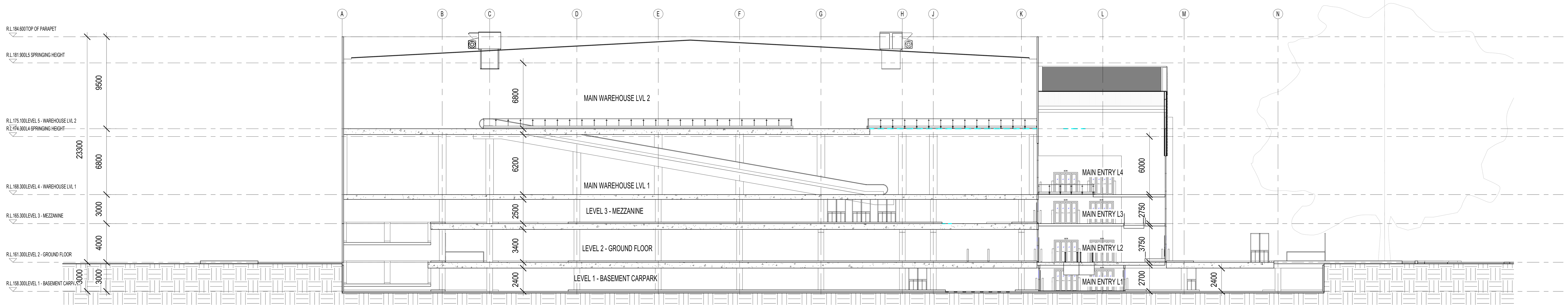
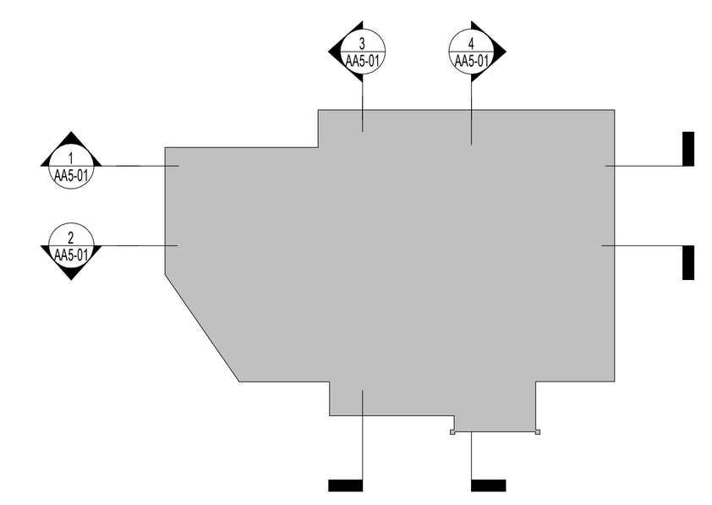


Section DD

1 : 200@ A0



DRAFT 12 - 07/05/2020

DATE	REV	AMENDMENT	BY

CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE BEFORE COMMENDING ANY WORK OR PREPARING ANY SHOP DRAWINGS

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CLIENT:

ARCHITECTURAL

PROJECT:

BUNNINGS WAREHOUSE
357-373 WARRINGAH RD
FRENCHS FOREST, NSW 2086

DRAWING TITLE:

SECTIONS

SCALE: As indicated@ A0

DATE: 05/04/20

FILE:

DESIGNED: -

DRAWN: OH

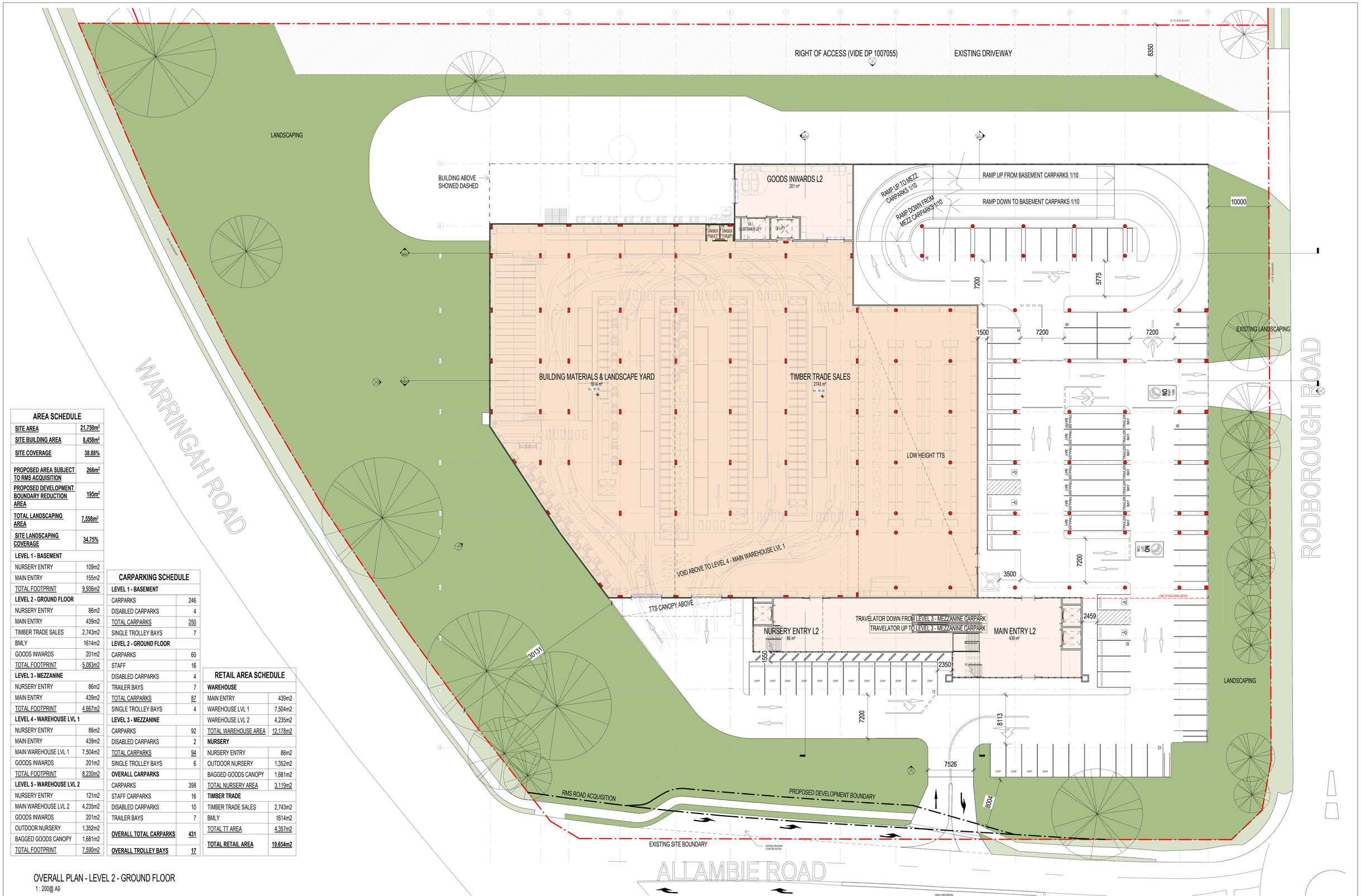
CHECKED: AZ

PROJECT No. 18122

VERIFICATION: THIS DRAWING HAS BEEN REVIEWED & VERIFIED BY:

DRAWING No. AA5-01

REVISION:



AREA SCHEDULE	
SITE AREA	21,750m²
SITE BUILDING AREA	8,458m²
SITE COVERAGE	38.88%
PROPOSED AREA SUBJECT TO RMS ACQUISITION	266m²
PROPOSED DEVELOPMENT BOUNDARY REDUCTION AREA	195m²
TOTAL LANDSCAPING AREA	7,558m²
SITE LANDSCAPING COVERAGE	34.75%
LEVEL 1 - BASEMENT	
NURSERY ENTRY	109m2
MAIN ENTRY	155m2
TOTAL FOOTPRINT	9,936m2
LEVEL 2 - GROUND FLOOR	
NURSERY ENTRY	86m2
MAIN ENTRY	439m2
TIMBER TRADE SALES	2,743m2
BMLY	1614m2
GOODS INWARDS	201m2
TOTAL FOOTPRINT	5,083m2
LEVEL 3 - MEZZANINE	
NURSERY ENTRY	86m2
MAIN ENTRY	439m2
TOTAL FOOTPRINT	4,667m2
LEVEL 4 - WAREHOUSE LVL 1	
NURSERY ENTRY	86m2
MAIN ENTRY	439m2
MAIN WAREHOUSE LVL 1	7,504m2
GOODS INWARDS	201m2
TOTAL FOOTPRINT	8,230m2
LEVEL 5 - WAREHOUSE LVL 2	
NURSERY ENTRY	121m2
MAIN WAREHOUSE LVL 2	4,235m2
GOODS INWARDS	201m2
OUTDOOR NURSERY	1,352m2
BAGGED GOODS CANOPY	1,681m2
TOTAL FOOTPRINT	7,590m2

CARPARKING SCHEDULE	
LEVEL 1 - BASEMENT	
CARPARKS	246
DISABLED CARPARKS	4
TOTAL CARPARKS	250
SINGLE TROLLEY BAYS	7
LEVEL 2 - GROUND FLOOR	
CARPARKS	60
STAFF	16
DISABLED CARPARKS	4
TRAILER BAYS	7
TOTAL CARPARKS	87
SINGLE TROLLEY BAYS	4
LEVEL 3 - MEZZANINE	
CARPARKS	92
DISABLED CARPARKS	2
TOTAL CARPARKS	94
SINGLE TROLLEY BAYS	6
OVERALL CARPARKS	
CARPARKS	398
STAFF CARPARKS	16
DISABLED CARPARKS	10
TRAILER BAYS	7
OVERALL TOTAL CARPARKS	**431**
OVERALL TROLLEY BAYS	**17**

RETAIL AREA SCHEDULE	
WAREHOUSE	
MAIN ENTRY	439m2
WAREHOUSE LVL 1	7,504m2
WAREHOUSE LVL 2	4,235m2
TOTAL WAREHOUSE AREA	12,178m2
NURSERY	
NURSERY ENTRY	86m2
OUTDOOR NURSERY	1,352m2
BAGGED GOODS CANOPY	1,681m2
TOTAL NURSERY AREA	3,119m2
TIMBER TRADE	
TIMBER TRADE SALES	2,743m2
BMLY	1614m2
TOTAL TT AREA	4,357m2
TOTAL RETAIL AREA	**19,654m2**

OVERALL PLAN - LEVEL 2 - GROUND FLOOR
1 : 200@ A0

DRAFT 12 - 07/05/2020

DATE	REV	AMENDMENT	BY

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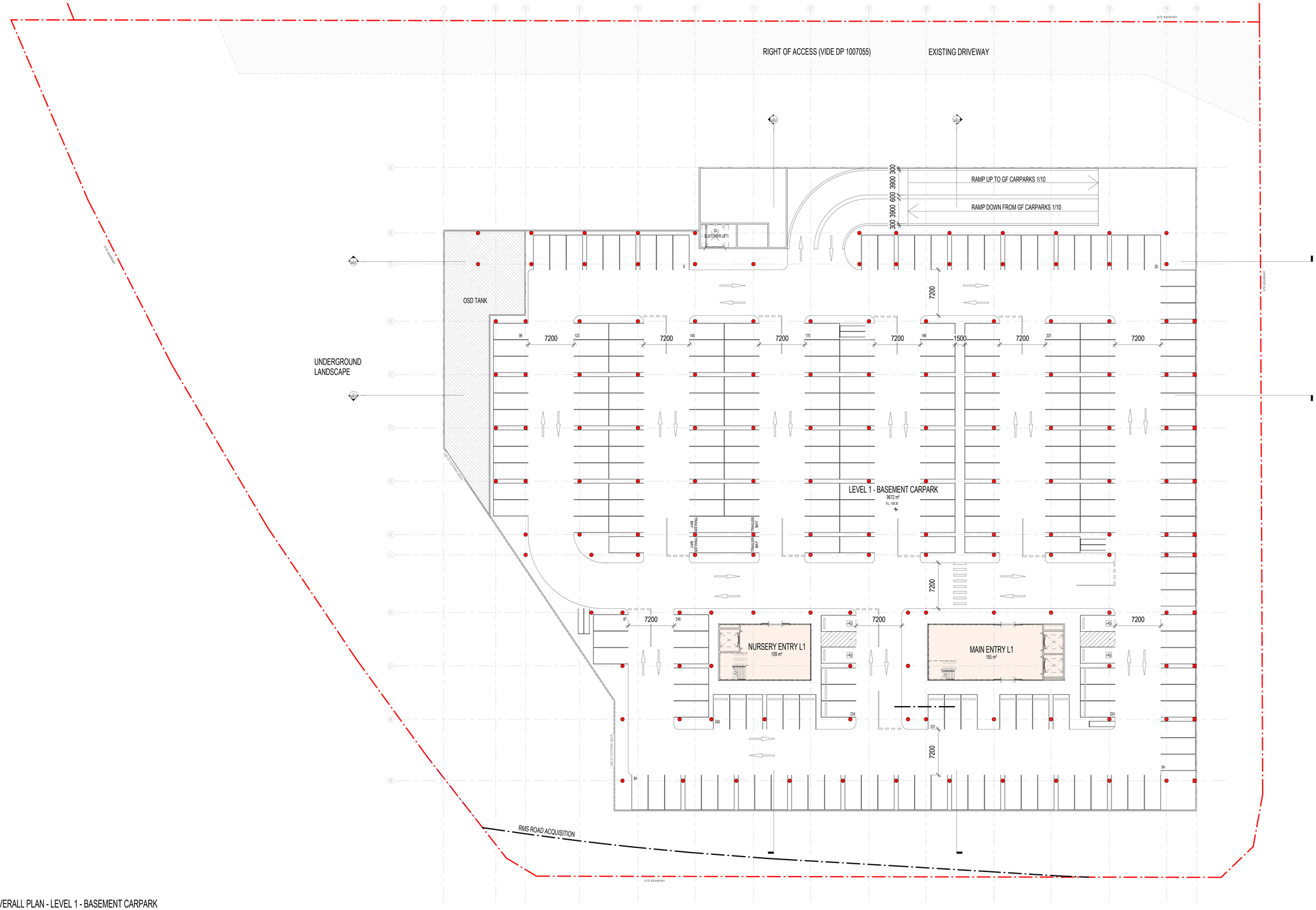
BUNNINGS WAREHOUSE
357-373 WARRINGAH RD
FRENCHS FOREST, NSW 2086

DRAWING TITLE:
LEVEL 2 - GROUND FLOOR PLAN - CARPARK

SCALE:	As indicated@ A0
DATE:	06/05/18
FILE:	
DESIGNED:	-
DRAWN:	CY
CHECKED:	AZ
PROJECT No.	18122
VERIFICATION:	THIS DRAWING HAS BEEN REVIEWED & VERIFIED BY:
DRAWING No.	AA2-02
REVISION:	



OVERALL PLAN - LEVEL 1 - BASEMENT CARPARK
1 : 200@ A0

DRAFT 12 - 07/05/2020

DATE	REV	AMENDMENT	BY

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BUNNINGS warehouse

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ARCHITECTURAL

PROJECT:
BUNNINGS WAREHOUSE
357-373 WARRINGAH RD
FRENCHS FOREST, NSW 2086

DRAWING TITLE:
LEVEL 1 - BASEMENT FLOOR PLAN - CARPARK

SCALE:	1 : 200@ A0
DATE:	06/05/18
FILE:	
DESIGNED:	-
DRAWN:	CY
CHECKED:	AZ
PROJECT No.	18122
VERIFICATION: THIS DRAWING HAS BEEN REVIEWED & VERIFIED BY:	
DRAWING No.	AA2-01
REVISION:	

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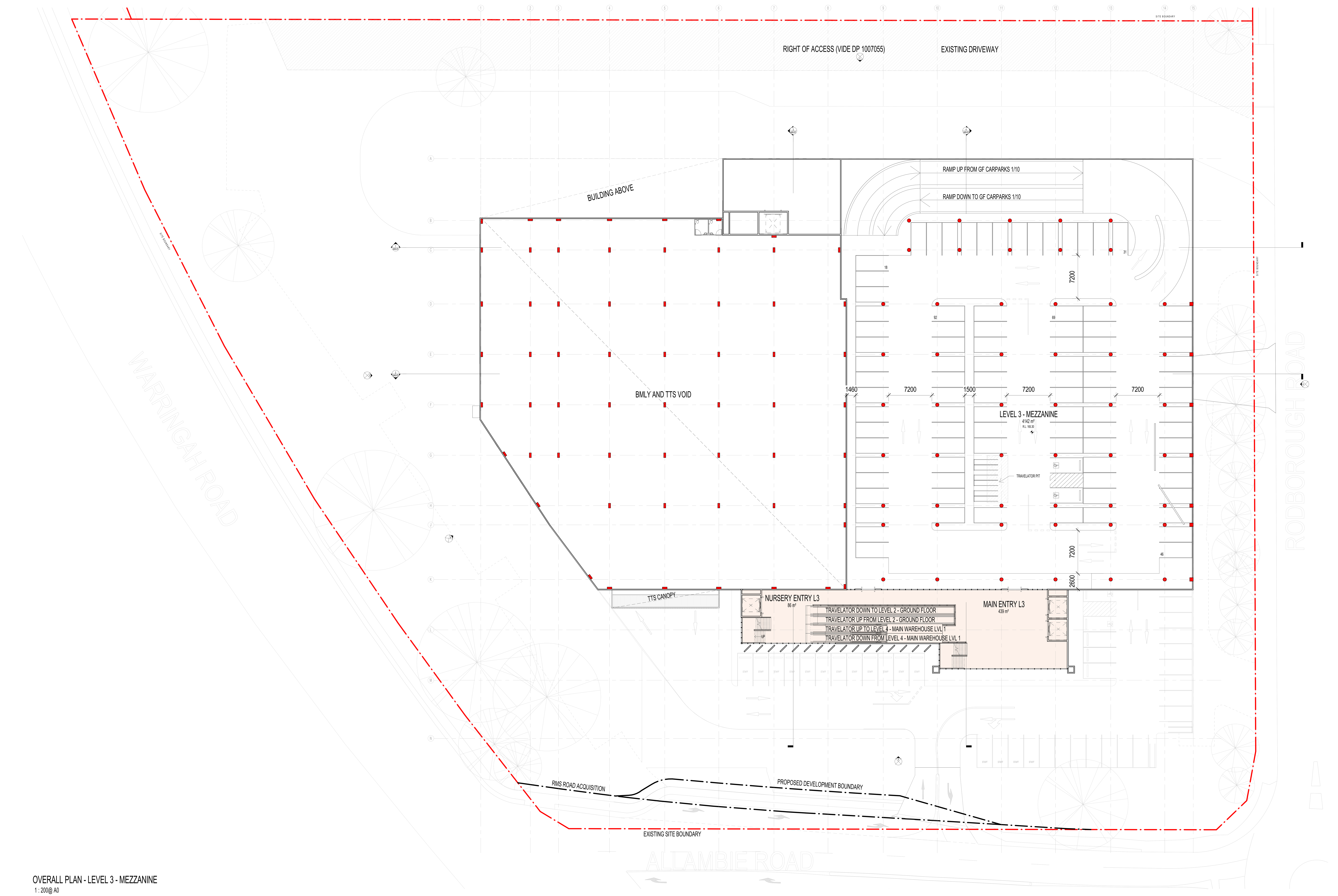

OVERALL PLAN - LEVEL 3 - MEZZANINE

1 : 200@ A0

DRAFT 12 - 07/05/2020

DATE	REV	AMENDMENT	BY

CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE BEFORE COMMENDING ANY WORK OR PREPARING ANY SHOP DRAWINGS

BUNNINGS warehouse

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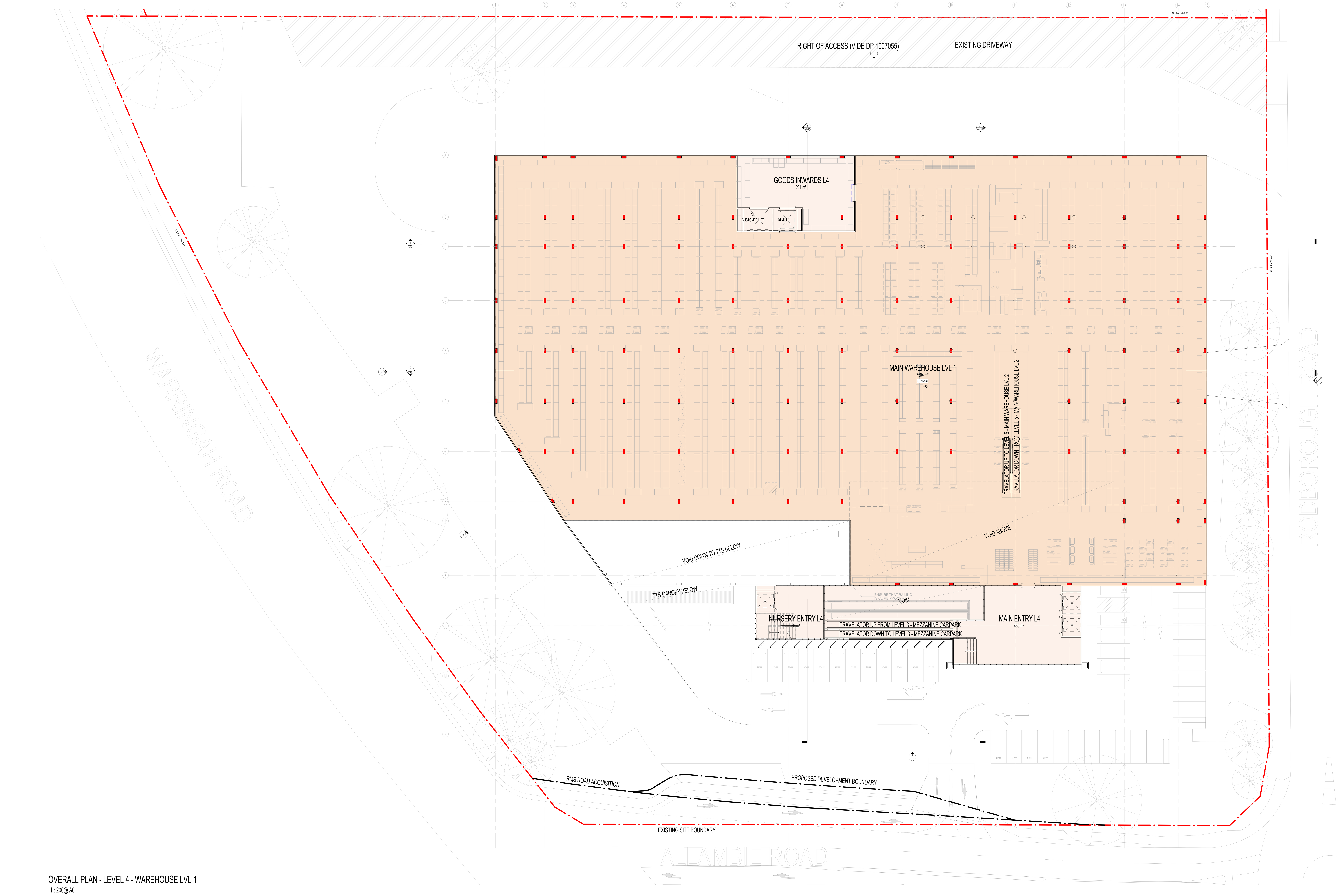
PROJECT:
BUNNINGS WAREHOUSE
357-373 WARRINGAH RD
FRENCHS FOREST, NSW 2086

DRAWING TITLE:
LEVEL 3 - MEZZANINE PLAN - CARPARK

SCALE:	1 : 200@ A0
DATE:	06/05/18
FILE:	
DESIGNED:	-
DRAWN:	CY
CHECKED:	AZ
PROJECT No.	18122
VERIFICATION: THIS DRAWING HAS BEEN REVIEWED & VERIFIED BY:	
DRAWING No.	AA2-03
REVISION:	



OVERALL PLAN - LEVEL 4 - WAREHOUSE LVL 1

1 : 200@ A0

DATE	REV	AMENDMENT	BY

DRAFT 12 - 07/05/2020

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BUNNINGS warehouse

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ARCHITECTURAL

PROJECT: BUNNINGS WAREHOUSE
357-373 WARRINGAH RD
FRENCHS FOREST, NSW 2086

DRAWING TITLE: LEVEL 4 - WAREHOUSE LVL 1 PLAN

SCALE: 1 : 200@ A0
DATE: 04/03/19
FILE:
DESIGNED: -
DRAWN: CY
CHECKED: AZ

PROJECT No. 18122

VERIFICATION: THIS DRAWING HAS BEEN REVIEWED & VERIFIED BY:

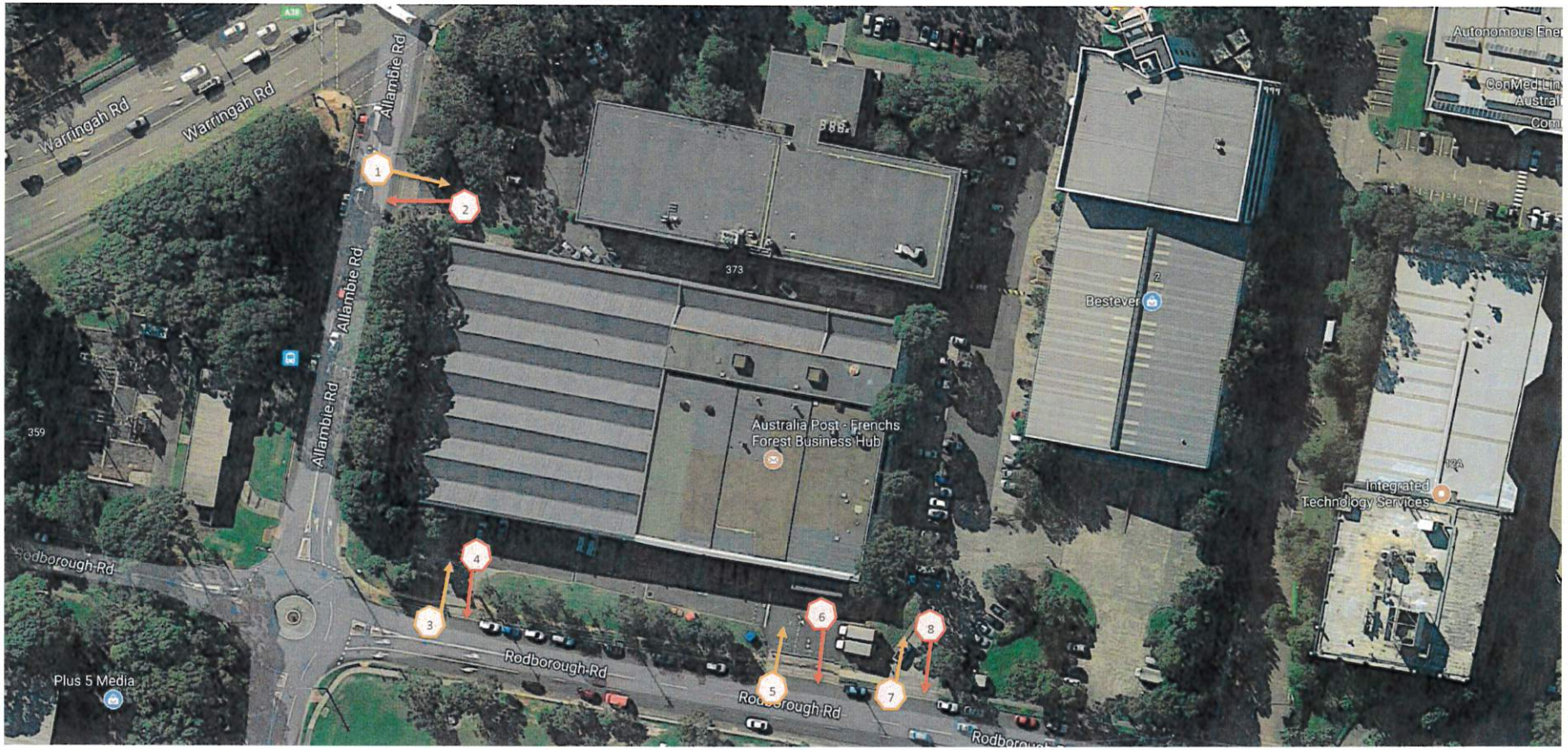
DRAWING No. AA2-04

REVISION:

Appendix B

Traffic Survey Results

LOCATION	NORTH	Allambie Road	TIME PERIOD	0630 - 0930
	EAST	Rodborough Road		1530 - 1830
	SOUTH	Allambie Road		0
	WEST	Rodborough Road	DATE	Friday, 11 August 2017
SUBURB		FRENCHS FOREST	WEATHER	FINE



Traffic Information Specialist

Traffic Information Specialist

LOCATION	NORTH	Allambie Road	TIME PERIOD	0630 - 0930
	EAST	Rodborough Road		1530 - 1830
	SOUTH	Allambie Road		
	WEST	Rodborough Road	DATE	Friday, 11 August 2017
SUBURB		FRENCHS FOREST	WEATHER	FINE

Vehicle EXITING Premise

Vehicle ENTERING Premise

MOVEMENTS Time Per 15 Mins			1	2	3	4	5	6	7	8	
6:30	-	6:45	0	1	2	0	1	4	1	6	15
6:45	-	7:00	1	1	3	0	0	5	3	11	24
7:00	-	7:15	4	0	3	1	1	1	1	4	15
7:15	-	7:30	1	0	4	0	0	3	0	4	12
7:30	-	7:45	0	0	8	1	0	5	1	0	15
7:45	-	8:00	0	6	4	0	0	5	1	2	18
8:00	-	8:15	1	0	4	0	0	9	0	3	17
8:15	-	8:30	0	0	7	0	0	7	2	0	16
8:30	-	8:45	2	0	4	0	0	3	3	3	15
8:45	-	9:00	4	0	8	0	0	14	0	3	29
9:00	-	9:15	2	1	12	0	1	15	4	3	38
9:15	-	9:30	2	3	5	0	0	11	0	2	23
Period End			17	12	64	2	3	82	16	41	237
15:30	-	15:45	0	3	6	0	0	4	2	1	16
15:45	-	16:00	1	1	7	0	6	6	6	5	32
16:00	-	16:15	0	3	8	0	2	10	5	5	33
16:15	-	16:30	1	4	10	0	6	13	8	7	49
16:30	-	16:45	0	3	9	0	6	15	5	8	46
16:45	-	17:00	1	2	3	0	4	3	3	1	17
17:00	-	17:15	0	10	2	0	2	2	2	3	21
17:15	-	17:30	0	11	2	0	0	3	6	1	23
17:30	-	17:45	2	4	5	0	0	5	8	1	25
17:45	-	18:00	0	3	5	0	1	5	1	3	18
18:00	-	18:15	0	3	1	0	3	5	4	3	19
18:15	-	18:30	0	0	2	0	0	0	0	3	5
Period End			5	47	60	0	30	71	50	41	304

MOVEMENTS Time Per HOUR			1	2	3	4	5	6	7	8	
6:30	-	7:30	6	2	12	1	2	13	5	25	66
6:45	-	7:45	6	1	18	2	1	14	5	19	66
7:00	-	8:00	5	6	19	2	1	14	3	10	60
7:15	-	8:15	2	6	20	1	0	22	2	9	62
7:30	-	8:30	1	6	23	1	0	26	4	5	66
7:45	-	8:45	3	6	19	0	0	24	6	8	66
8:00	-	9:00	7	0	23	0	0	33	5	9	77
8:15	-	9:15	8	1	31	0	1	39	9	9	98
8:30	-	9:30	10	4	29	0	1	43	7	11	105
Period End			48	32	194	7	6	228	46	105	666
15:30	-	16:30	17	15	70	2	3	86	18	42	253
15:45	-	16:45	1	4	13	0	6	10	8	6	48
16:00	-	17:00	1	4	15	0	8	16	11	10	65
16:15	-	17:15	1	7	18	0	8	23	13	12	82
16:30	-	17:30	1	7	19	0	12	28	13	15	95
16:45	-	17:45	1	5	12	0	10	18	8	9	63
17:00	-	18:00	1	12	5	0	6	5	5	4	38
17:15	-	18:15	0	21	4	0	2	5	8	4	44
17:30	-	18:30	2	15	7	0	0	8	14	2	48
Period End			25	90	163	2	55	199	98	104	736

Traffic Information Specialist

Location	Allambie Road	Duration	15:00 - 18:00
	Warringah Road		-
	Allambie Road		-
	Warringah Road	Day/Date	Thursday, 5 December 2019
Suburb	FRENCH FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH *Allambie Road*										EAST *Warringah Road*												
	L			T			R				L			T			R				TOTAL		TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
15:00 - 15:15	2	0	2	39	1	40	0	0	0	42	36	3	39	321	24	345	105	3	108	492	503	31	534
15:15 - 15:30	1	0	1	40	4	44	0	0	0	45	34	3	37	273	15	288	84	0	84	409	432	57	454
15:30 - 15:45	6	0	6	39	1	40	0	0	0	46	31	1	32	290	20	310	118	3	121	463	484	51	509
15:45 - 16:00	3	0	3	31	3	34	0	0	0	37	29	0	29	218	14	232	103	1	104	365	384	36	402
16:00 - 16:15	1	0	1	35	1	36	0	0	0	37	26	0	26	302	12	314	71	1	72	412	435	27	449
16:15 - 16:30	1	0	1	39	0	39	0	0	0	40	30	2	32	283	19	302	79	0	79	413	432	40	453
16:30 - 16:45	6	0	6	53	0	53	0	0	0	59	32	0	32	304	17	321	77	1	78	431	472	33	490
16:45 - 17:00	5	0	5	58	1	59	0	0	0	64	35	0	35	262	13	275	99	0	99	409	459	33	473
17:00 - 17:15	4	0	4	41	1	42	0	0	0	46	37	0	37	354	14	368	82	0	82	487	518	24	533
17:15 - 17:30	5	0	5	56	0	56	0	0	0	61	33	0	33	283	8	291	80	3	83	407	457	21	468
17:30 - 17:45	8	0	8	53	1	54	0	0	0	62	19	0	19	265	10	275	75	0	75	369	420	25	431
17:45 - 18:00	1	0	1	56	1	57	0	0	0	58	18	0	18	204	8	212	81	0	81	311	360	17	369
Period End	43	0	43	540	14	554	0	0	0	597	360	9	369	3359	174	3533	1054	12	1066	4968	5356	395	5565

All Vehicles Time Per 15 Mins	SOUTH *Allambie Road*										WEST *Warringah Road*												
	L			T			R				L			T			R				TOTAL		TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
15:00 - 15:15	0	0	0	104	0	104	66	1	67	171	8	1	9	260	15	275	53	4	57	341	491	21	512
15:15 - 15:30	1	0	1	86	5	91	53	1	54	146	8	1	9	298	23	321	52	5	57	387	498	35	533
15:30 - 15:45	4	0	4	89	2	91	64	1	65	160	19	3	22	353	17	370	82	3	85	477	611	26	637
15:45 - 16:00	3	0	3	102	2	104	61	0	61	168	15	2	17	310	12	322	82	2	84	423	573	18	591
16:00 - 16:15	1	0	1	99	3	102	75	0	75	178	13	1	14	330	7	337	47	2	49	400	565	13	578
16:15 - 16:30	0	0	0	68	2	70	64	2	66	136	11	1	12	321	12	333	75	2	77	422	539	19	558
16:30 - 16:45	2	0	2	82	1	83	70	1	71	156	12	4	16	328	3	331	59	6	65	412	553	15	568
16:45 - 17:00	5	0	5	79	3	82	65	1	66	153	23	2	25	261	11	272	77	2	79	376	510	19	529
17:00 - 17:15	0	0	0	108	1	109	75	0	75	184	13	2	15	330	6	336	78	0	78	429	604	9	613
17:15 - 17:30	0	0	0	90	1	91	78	0	78	169	16	1	17	371	7	378	80	1	81	476	635	10	645
17:30 - 17:45	0	0	0	94	2	96	72	0	72	168	14	3	17	327	6	333	80	3	83	433	587	14	601
17:45 - 18:00	0	0	0	83	1	84	47	2	49	133	7	0	7	277	5	282	69	0	69	358	483	8	491
Period End	16	0	16	1084	23	1107	790	9	799	1922	159	21	180	3766	124	3890	834	30	864	4934	6649	207	6856

Traffic Information Specialist

Location	Allambie Road	Duration	12:00 - 15:00
	Warringah Road		-
	Allambie Road		-
	Warringah Road	Day/Date	Saturday, 7 December 2019
Suburb	FRENCH FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH *Allambie Road*										EAST *Warringah Road*										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
12:00 - 12:15	3	0	3	22	1	23	0	0	0	26	15	0	15	232	9	241	46	0	46	302	318	10	328
12:15 - 12:30	3	0	3	33	1	34	0	0	0	37	13	0	13	275	4	279	64	2	66	358	388	7	395
12:30 - 12:45	0	0	0	29	2	31	0	0	0	31	16	0	16	253	5	258	58	3	61	335	356	10	366
12:45 - 13:00	4	0	4	18	0	18	0	0	0	22	14	2	16	282	2	284	53	4	57	357	371	8	379
13:00 - 13:15	1	0	1	37	1	38	0	0	0	39	12	0	12	290	3	293	51	0	51	356	391	4	395
13:15 - 13:30	2	0	2	26	0	26	0	0	0	28	24	2	26	301	3	304	79	2	81	411	432	7	439
13:30 - 13:45	2	0	2	19	1	20	0	0	0	22	18	0	18	251	8	259	70	3	73	350	360	12	372
13:45 - 14:00	6	0	6	32	0	32	0	0	0	38	21	0	21	176	3	179	79	3	82	282	314	6	320
14:00 - 14:15	2	0	2	21	1	22	0	0	0	24	26	0	26	191	2	193	69	0	69	288	309	3	312
14:15 - 14:30	3	0	3	23	1	24	0	0	0	27	16	0	16	201	3	204	73	1	74	294	316	5	321
14:30 - 14:45	0	0	0	20	1	21	0	0	0	21	15	0	15	194	3	197	62	1	63	275	291	5	296
14:45 - 15:00	1	0	1	33	0	33	0	0	0	34	15	0	15	213	2	215	47	1	48	278	309	3	312
Period End	27	0	27	313	9	322	0	0	0	349	205	4	209	2859	47	2906	751	20	771	3886	4155	80	4235

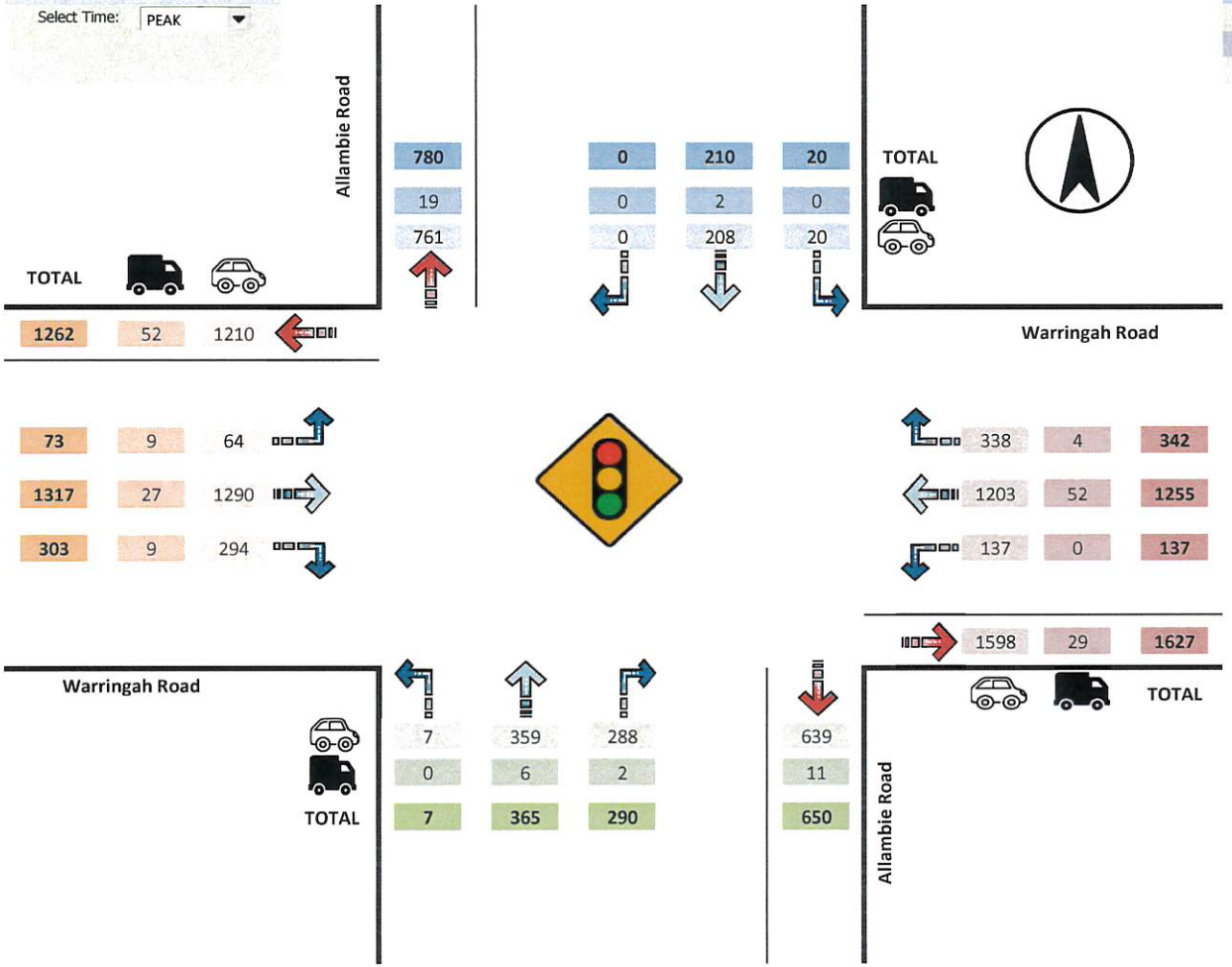
All Vehicles Time Per 15 Mins	SOUTH *Allambie Road*										WEST *Warringah Road*										TOTAL		TOTAL
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	
12:00 - 12:15	0	0	0	40	2	42	27	0	27	69	7	1	8	301	2	303	63	1	64	375	438	6	444
12:15 - 12:30	2	0	2	37	1	38	35	0	35	75	2	0	2	276	4	280	55	2	57	339	407	7	414
12:30 - 12:45	1	0	1	31	1	32	31	0	31	64	6	0	6	274	5	279	67	3	70	355	410	9	419
12:45 - 13:00	2	0	2	48	1	49	22	0	22	73	11	0	11	247	5	252	57	1	58	321	387	7	394
13:00 - 13:15	0	0	0	45	1	46	27	0	27	73	14	0	14	277	6	283	56	1	57	354	419	8	427
13:15 - 13:30	3	0	3	40	1	41	24	0	24	68	10	0	10	258	1	259	62	1	63	332	397	3	400
13:30 - 13:45	1	0	1	59	0	59	24	0	24	84	4	0	4	249	7	256	50	3	53	313	387	10	397
13:45 - 14:00	1	0	1	65	2	67	19	1	20	88	3	0	3	240	2	242	60	1	61	306	388	6	394
14:00 - 14:15	1	0	1	45	2	47	18	0	18	66	10	0	10	224	3	227	57	1	58	295	355	6	361
14:15 - 14:30	2	0	2	52	1	53	21	0	21	76	11	0	11	261	5	266	69	1	70	347	416	7	423
14:30 - 14:45	0	0	0	33	1	34	14	0	14	48	9	0	9	223	4	227	66	2	68	304	345	7	352
14:45 - 15:00	1	0	1	37	1	38	11	0	11	50	4	0	4	211	4	215	58	0	58	277	322	5	327
Period End	14	0	14	532	14	546	272	1	274	834	91	1	92	3041	48	3089	720	17	737	3918	4671	81	4752

Location	Allambie Road	Duration	15:00 - 18:00
	Warringah Road		-
	Allambie Road		-
	Warringah Road	Day/Date	Thursday, 5 December 2019
Suburb	FRENCH FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:30	-	17:30



Traffic Information Specialist

ABN: 42 613 389 923

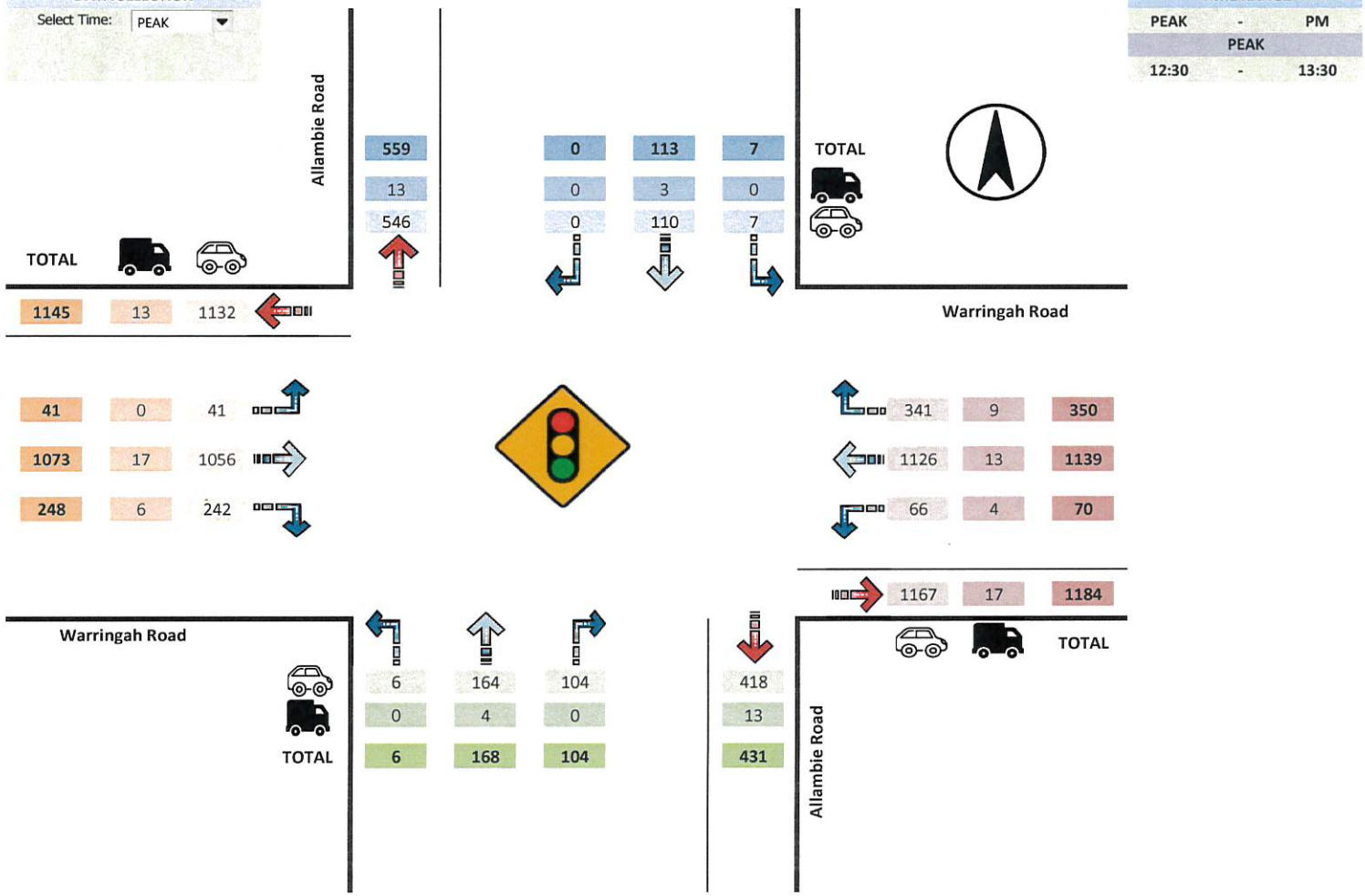
Email info@tistraffic.com.au

Location	Allambie Road	Duration	12:00 - 15:00
	Warringah Road		0:00 - 0:00
	Allambie Road		-
	Warringah Road	Day/Date	Saturday, 7 December 2019
Suburb	FRENCH FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
12:30	-	13:30



Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

Traffic Information Specialist

Location	Allambie Road	Duration	15:00 - 18:00
	Rodborought Road		-
	Allambie Road		-
	Rodborought Road	Day/Date	Thursday, 5 December 2019
Suburb	FRENCH FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH Allambie Road													EAST Rodborought Road												TOTAL		
	L			T			R			U			TOTAL	L			T			R			U			TOTAL			TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	
15:00 - 15:15	37	2	39	118	5	123	9	1	10	0	0	0	172	0	1	1	12	1	13	45	1	46	0	0	0	60	221	11	232
15:15 - 15:30	30	5	35	115	4	119	3	2	5	2	0	2	161	0	0	0	15	0	15	25	1	26	0	0	0	41	190	12	202
15:30 - 15:45	37	2	39	112	2	114	8	1	9	5	0	5	167	2	2	4	0	0	0	37	2	39	0	0	0	43	201	9	210
15:45 - 16:00	34	0	34	134	2	136	4	4	8	2	0	2	180	5	0	5	4	1	5	37	1	38	0	0	0	48	220	8	228
16:00 - 16:15	37	0	37	103	1	104	3	2	5	2	0	2	148	10	3	13	31	3	34	65	0	65	1	0	1	113	252	9	261
16:15 - 16:30	28	1	29	123	2	125	3	1	4	1	0	1	159	6	0	6	14	1	15	50	0	50	0	0	0	71	225	5	230
16:30 - 16:45	40	0	40	125	4	129	6	3	9	1	0	1	179	6	2	8	26	2	28	61	1	62	0	0	0	98	265	12	277
16:45 - 17:00	31	0	31	132	2	134	8	1	9	0	0	0	174	20	0	20	33	0	33	62	0	62	1	0	1	116	287	3	290
17:00 - 17:15	28	0	28	143	1	144	13	0	13	2	0	2	187	33	0	33	49	0	49	86	0	86	0	0	0	168	354	1	355
17:15 - 17:30	43	0	43	125	0	125	8	1	9	0	0	0	177	20	0	20	33	0	33	65	0	65	1	0	1	119	295	1	296
17:30 - 17:45	24	2	26	138	1	139	6	0	6	0	0	0	171	12	0	12	26	0	26	66	0	66	0	0	0	104	272	3	275
17:45 - 18:00	28	0	28	115	1	116	3	0	3	1	0	1	148	4	0	4	19	0	19	50	1	51	0	0	0	74	220	2	222
Period End	397	12	409	1483	25	1508	74	16	90	16	0	16	2023	118	8	126	262	8	270	649	7	656	3	0	3	1055	3002	76	3078

All Vehicles Time Per 15 Mins	SOUTH Allambie Road													WEST Rodborought Road												TOTAL		
	L			T			R			U			TOTAL	L			T			R			U			TOTAL			TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	
15:00 - 15:15	79	4	83	111	0	111	8	0	8	0	0	0	202	13	0	13	2	0	2	5	0	5	0	0	0	20	218	4	222
15:15 - 15:30	48	4	52	99	3	102	13	1	14	0	0	0	168	6	1	7	0	0	0	1	0	1	0	0	0	8	167	9	176
15:30 - 15:45	30	5	35	118	3	121	13	1	14	0	0	0	170	8	0	8	0	0	0	0	0	0	0	0	0	8	169	9	178
15:45 - 16:00	50	3	53	118	1	119	12	0	12	1	0	1	185	9	0	9	0	0	0	0	0	0	0	0	0	9	190	4	194
16:00 - 16:15	80	2	82	111	3	114	8	1	9	0	0	0	205	4	0	4	1	0	1	0	0	0	0	0	0	5	204	6	210
16:15 - 16:30	44	2	46	81	3	84	11	1	12	0	0	0	142	7	1	8	1	0	1	2	0	2	0	0	0	11	146	7	153
16:30 - 16:45	57	4	61	96	1	97	12	0	12	0	0	0	170	2	0	2	0	0	0	1	0	1	0	0	0	3	168	5	173
16:45 - 17:00	58	0	58	79	5	84	11	0	11	0	0	0	153	1	1	2	0	0	0	1	0	1	0	0	0	3	150	6	156
17:00 - 17:15	77	1	78	84	1	85	7	0	7	0	0	0	170	4	0	4	2	0	2	1	0	1	0	0	0	7	175	2	177
17:15 - 17:30	64	0	64	107	1	108	22	0	22	0	0	0	194	3	0	3	0	0	0	2	0	2	0	0	0	5	198	1	199
17:30 - 17:45	49	1	50	91	3	94	11	0	11	0	1	1	156	4	0	4	1	0	1	1	0	1	0	0	0	6	157	5	162
17:45 - 18:00	39	2	41	69	2	71	7	0	7	0	1	1	120	2	0	2	0	0	0	0	0	0	0	0	0	2	117	5	122
Period End	675	28	703	1164	26	1190	135	4	139	1	2	3	2035	63	3	66	7	0	7	14	0	14	0	0	0	87	2059	63	2122

Traffic Information Specialist

Location	Allambie Road	Duration	12:00 - 15:00
	Rodborought Road		-
	Allambie Road		-
	Rodborought Road	Day/Date	Saturday, 7 December 2019
Suburb	FRENCH FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH *Allambie Road*													EAST *Rodborought Road*														
	L			T			R			U				L			T			R			U				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
12:00 - 12:15	8	0	8	95	2	97	9	0	9	0	0	0	114	10	0	10	7	0	7	12	0	12	0	0	0	29	141	2	143
12:15 - 12:30	10	0	10	83	3	86	6	0	6	1	0	1	103	7	0	7	6	1	7	14	0	14	0	0	0	28	127	4	131
12:30 - 12:45	9	1	10	97	4	101	6	0	6	0	0	0	117	12	0	12	11	0	11	22	0	22	0	0	0	45	157	5	162
12:45 - 13:00	5	1	6	70	0	70	2	0	2	0	0	0	78	6	0	6	9	0	9	18	0	18	0	0	0	33	110	1	111
13:00 - 13:15	11	0	11	90	3	93	8	0	8	3	0	3	115	7	0	7	4	0	4	24	0	24	0	0	0	35	147	3	150
13:15 - 13:30	13	1	14	97	3	100	5	0	5	1	0	1	120	7	0	7	2	0	2	15	0	15	0	0	0	24	140	4	144
13:30 - 13:45	8	1	9	75	2	77	3	0	3	3	0	3	92	5	0	5	2	0	2	11	0	11	0	0	0	18	107	3	110
13:45 - 14:00	15	0	15	80	1	81	10	0	10	6	0	6	112	7	0	7	5	0	5	13	1	14	0	0	0	26	136	2	138
14:00 - 14:15	8	0	8	91	2	93	3	0	3	0	0	0	104	4	0	4	4	0	4	7	0	7	1	0	1	16	118	2	120
14:15 - 14:30	7	0	7	96	1	97	6	1	7	2	0	2	113	6	0	6	7	0	7	2	0	2	0	0	0	15	126	2	128
14:30 - 14:45	8	1	9	86	2	88	3	0	3	1	0	1	101	1	0	1	5	0	5	6	0	6	0	0	0	12	110	3	113
14:45 - 15:00	17	0	17	86	1	87	8	0	8	1	0	1	113	4	0	4	6	0	6	4	1	5	0	0	0	15	126	2	128
Period End	119	5	124	1046	24	1070	69	1	70	18	0	18	1282	76	0	76	68	1	69	148	2	150	1	0	1	296	1545	33	1578

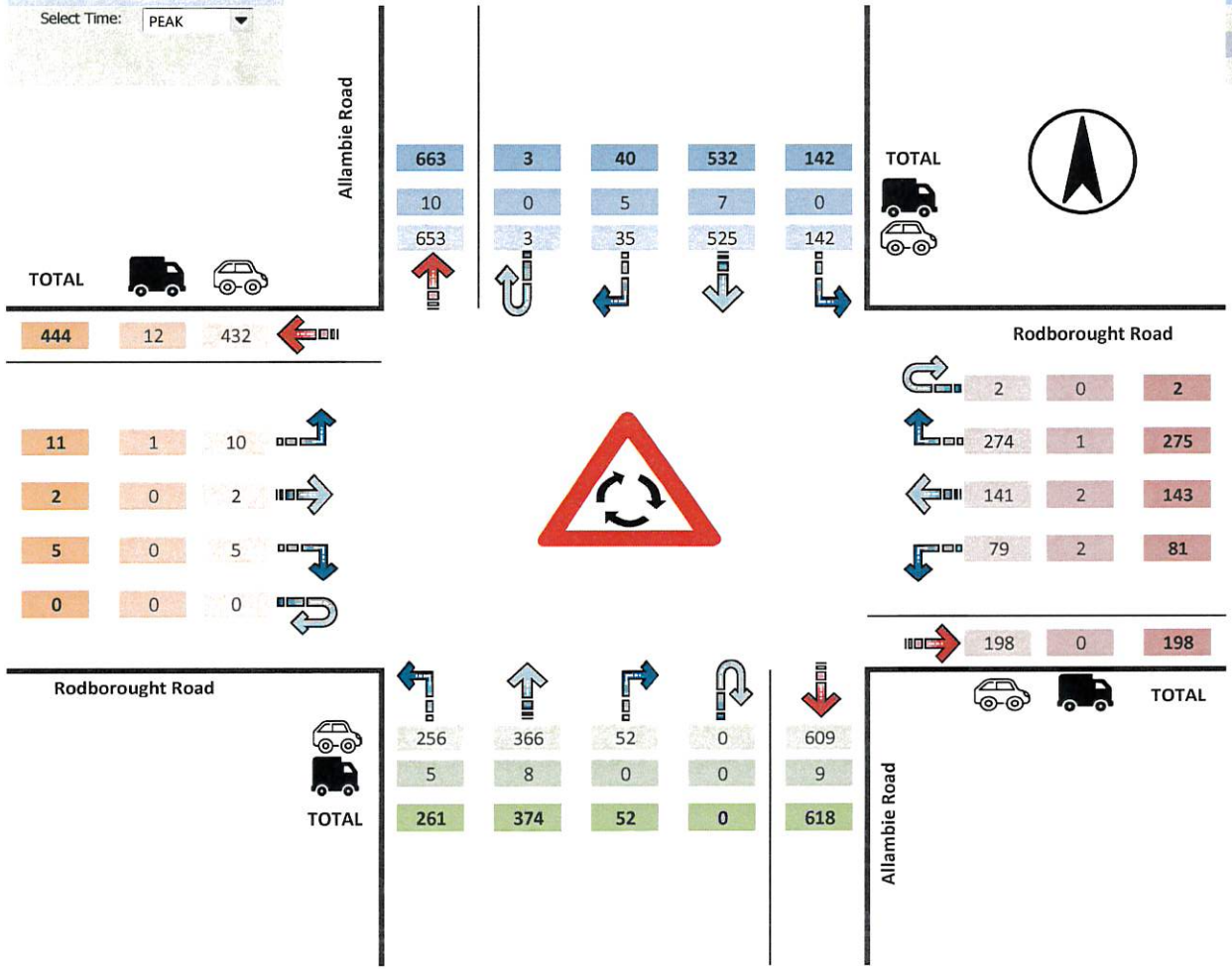
All Vehicles Time Per 15 Mins	SOUTH *Allambie Road*													WEST *Rodborought Road*														
	L			T			R			U				L			T			R			U				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
12:00 - 12:15	49	0	49	44	2	46	1	0	1	0	0	0	96	2	0	2	0	0	0	1	0	1	0	0	0	3	97	2	99
12:15 - 12:30	48	0	48	56	1	57	6	0	6	1	0	1	112	4	0	4	0	0	0	2	0	2	0	0	0	6	117	1	118
12:30 - 12:45	39	0	39	44	2	46	6	0	6	0	0	0	91	3	0	3	0	0	0	0	0	0	0	0	0	3	92	2	94
12:45 - 13:00	29	2	31	58	1	59	5	0	5	0	0	0	95	2	0	2	1	0	1	1	0	1	0	0	0	4	96	3	99
13:00 - 13:15	27	0	27	43	1	44	8	0	8	0	0	0	79	0	0	0	0	0	0	0	0	0	0	0	0	0	78	1	79
13:15 - 13:30	34	1	35	51	1	52	3	0	3	0	0	0	90	0	0	0	0	0	0	1	0	1	0	0	0	1	89	2	91
13:30 - 13:45	8	0	8	60	0	60	4	0	4	0	0	0	72	6	0	6	0	0	0	0	0	0	0	0	0	6	78	0	78
13:45 - 14:00	22	1	23	51	2	53	5	0	5	1	0	1	82	19	1	20	0	0	0	3	0	3	0	0	0	23	101	4	105
14:00 - 14:15	23	0	23	44	2	46	1	0	1	0	0	0	70	12	0	12	0	0	0	1	0	1	0	0	0	13	81	2	83
14:15 - 14:30	26	1	27	58	1	59	2	0	2	0	0	0	88	10	0	10	0	0	0	0	0	0	0	0	0	10	96	2	98
14:30 - 14:45	24	1	25	35	1	36	1	0	1	0	0	0	62	7	0	7	0	0	0	0	0	0	0	0	0	7	67	2	69
14:45 - 15:00	19	0	19	42	0	42	4	0	4	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	65
Period End	348	6	354	586	14	600	46	0	46	2	0	2	1002	65	1	66	1	0	1	9	0	9	0	0	0	76	1057	21	1078

Location	Allambie Road	Duration	15:00 - 18:00
	Rodborought Road		-
	Allambie Road		-
	Rodborought Road	Day/Date	Thursday, 5 December 2019
Suburb	FRENCH FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:30	-	17:30



Traffic Information Specialist

ABN: 42 613 389 923

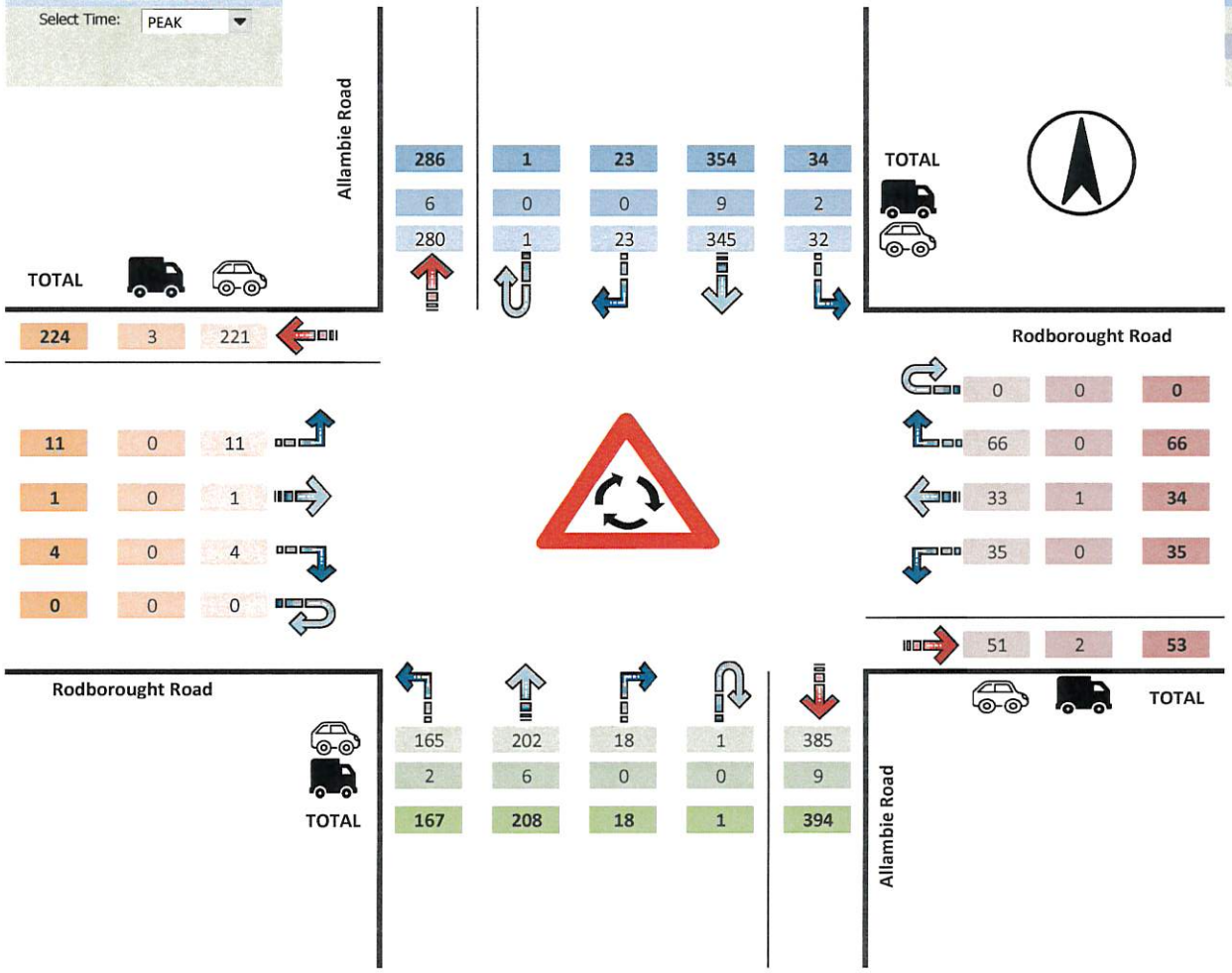
Email info@tistraffic.com.au

Location	Allambie Road	Duration	12:00 - 15:00
	Rodborought Road		-
	Allambie Road		-
	Rodborought Road	Day/Date	Saturday, 7 December 2019
Suburb	FRENCH FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
12:00	-	13:00



Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

Location	Wakehurst Parkway	Duration	15:00 - 18:00
	Aquatic Drive		-
	Wakehurst Parkway		-
	-	Day/Date	Thursday, 5 December 2019
Suburb	FRENCHS FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH *Wakehurst Parkway*				EAST *Aquatic Drive*				SOUTH *Wakehurst Parkway*				WEST -				
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	TOTAL
15:00 - 15:15	30			30	36			36			28	14					80
15:15 - 15:30	36			36	21			21			24	12					69
15:30 - 15:45	30			30	57			57			28	14					101
15:45 - 16:00	36			36	30			30			42	21					87
16:00 - 16:15	38			38	30			30			18	9					77
16:15 - 16:30	42			42	42			42			28	14					98
16:30 - 16:45	36			36	54			54			24	12					102
16:45 - 17:00	30			30	48			48			22	11					89
17:00 - 17:15	32			32	33			33			30	15					80
17:15 - 17:30	24			24	57			57			26	13					94
17:30 - 17:45	14			14	33			33			12	6					53
17:45 - 18:00	24			24	24			24			8	4					52
Period End	372			372	465			465			290	145					982

Traffic Information Specialist

Location	Wakehurst Parkway	Duration	12:00 - 15:00
	Aquatic Drive		-
	Wakehurst Parkway		-
	-	Day/Date	Saturday, 7 December 2019
Suburb	FRENCHS FOREST	Weather	-

All Vehicles Time Per 15 Mins	NORTH *Wakehurst Parkway*				EAST *Aquatic Drive*				SOUTH *Wakehurst Parkway*				WEST -				
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	TOTAL
12:00 - 12:15	15			15	24			24			21	21					60
12:15 - 12:30	18			18	14			14			18	18					50
12:30 - 12:45	15			15	38			38			21	21					74
12:45 - 13:00	18			18	20			20			31	31					69
13:00 - 13:15	19			19	20			20			13	13					52
13:15 - 13:30	21			21	28			28			21	21					70
13:30 - 13:45	18			18	36			36			18	18					72
13:45 - 14:00	15			15	32			32			17	17					64
14:00 - 14:15	16			16	22			22			22	22					60
14:15 - 14:30	12			12	38			38			20	20					70
14:30 - 14:45	7			7	22			22			9	9					38
14:45 - 15:00	12			12	16			16			6	6					34
Period End	186	0		186	310		0	310	0	0	217	217	0	0	0	0	713

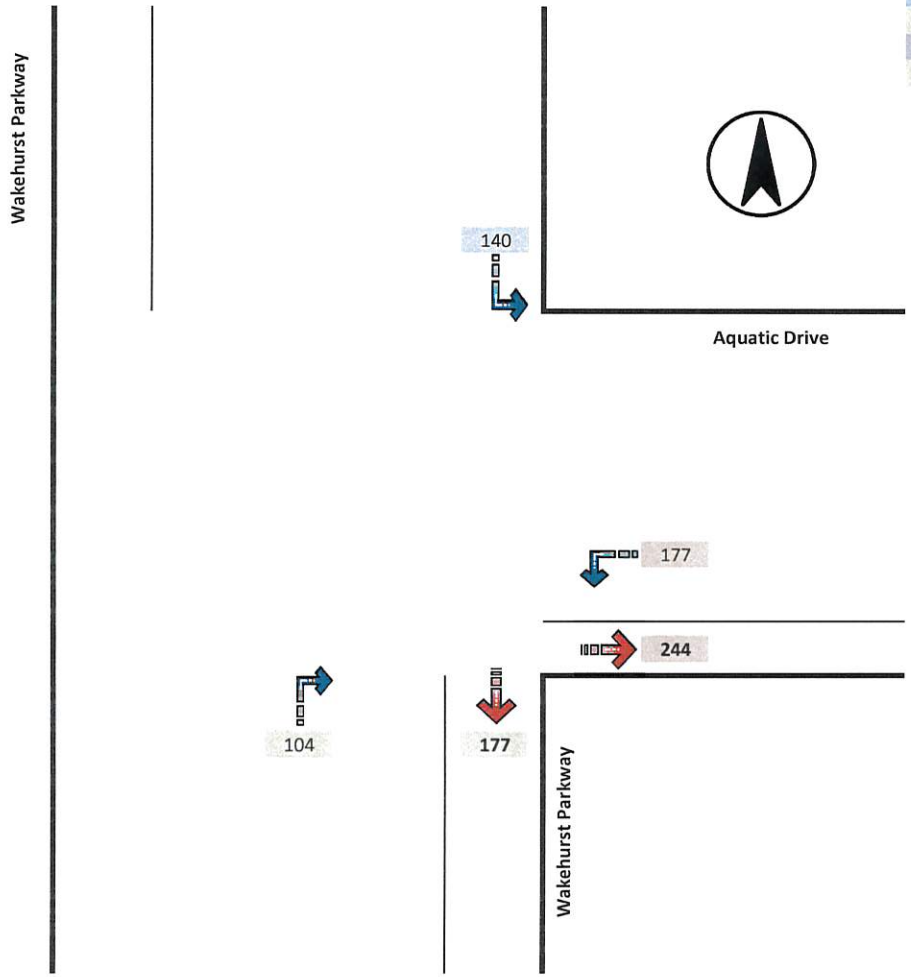
Traffic Information Specialist
ABN: 42 613 389 923
Email info@tistraffic.com.au

Location	Wakehurst Parkway	Duration	15:00 - 18:00
	Aquatic Drive		-
	Wakehurst Parkway		-
	-	Day/Date	Thursday, 5 December 2019
Suburb	FRENCHS FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:15	-	17:15



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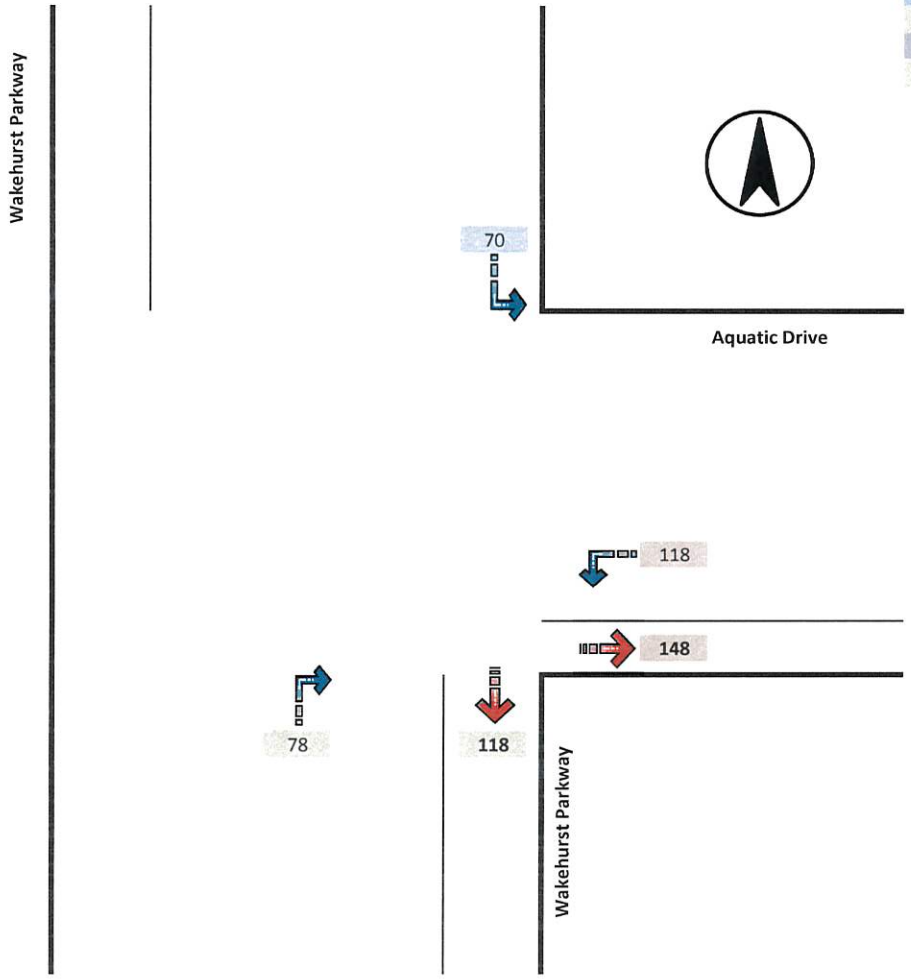
Location	Wakehurst Parkway	Duration	15:00 - 18:00
	Aquatic Drive		-
	Wakehurst Parkway		-
	-	Day/Date	Saturday, 7 December 2019
Suburb	FRENCHS FOREST	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
13:15	-	14:15



-

Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

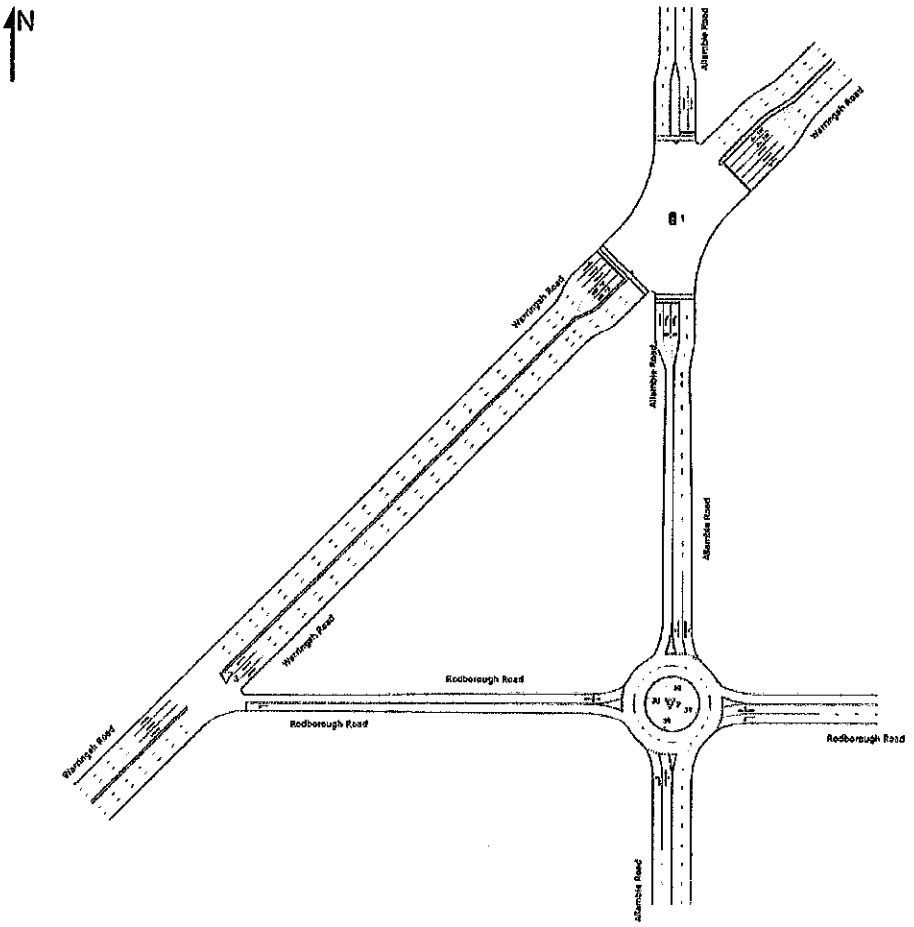
Appendix C

SIDRA Results

NETWORK LAYOUT

Network: N101 [LAYOUT]

New Network
Network Category: (None)



SITES IN NETWORK		
Site ID	CCG ID	Site Name
1	NA	Warringah Road and Allambie Road LAYOUT
2	NA	Allambie Road and Rodborough Road LAYOUT
3	NA	Warringah Road and Rodborough Road LAYOUT

MOVEMENT SUMMARY

Site: 1 [Warringah Road and Allambie Road THUR PM PEAK]

Network: N101 [EX THUR PM PEAK]

Warringah Road and Allambie Road
Site Category: BUNNINGS
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
2	T1	325	1.8	325	1.8	0.494	33.5	LOS C	9.2	65.4	0.84	0.73	0.84	16.6
3a	R1	270	0.7	270	0.7	0.655	60.9	LOS E	4.9	34.3	1.00	0.83	1.05	23.6
Approach		595	1.3	595	1.3	0.655	45.9	LOS D	9.2	65.4	0.92	0.77	0.94	20.9
NorthEast: Warringah Road														
24a	L1	137	0.0	137	0.0	0.698	39.4	LOS C	13.2	94.4	0.85	0.77	0.85	29.8
25	T1	1255	4.1	1255	4.1	0.698	34.0	LOS C	13.2	94.4	0.85	0.75	0.85	30.4
26b	R3	343	1.2	343	1.2	0.672	60.6	LOS E	5.9	41.6	0.97	0.83	1.00	23.3
Approach		1735	3.2	1735	3.2	0.698	39.7	LOS C	13.2	95.1	0.87	0.77	0.88	28.4
North: Allambie Road														
7b	L3	20	0.0	20	0.0	0.326	40.1	LOS C	2.9	20.6	0.74	0.62	0.74	30.7
8	T1	210	1.0	210	1.0	0.326	35.4	LOS C	3.0	21.3	0.75	0.61	0.75	9.1
Approach		230	0.9	230	0.9	0.326	35.8	LOS C	3.0	21.3	0.75	0.61	0.75	12.0
SouthWest: Warringah Road														
30a	L1	73	12.3	73	12.3	0.691	39.5	LOS C	12.9	93.4	0.84	0.76	0.84	20.4
31	T1	1317	2.1	1317	2.1	0.691	33.9	LOS C	13.1	93.4	0.84	0.75	0.84	36.3
32b	R3	302	3.0	302	3.0	0.598	59.5	LOS E	5.0	36.2	0.95	0.81	0.95	11.4
Approach		1692	2.7	1692	2.7	0.691	38.7	LOS C	13.1	93.4	0.86	0.76	0.86	31.3
All Vehicles		4252	2.6	4252	2.6	0.698	39.9	LOS C	13.2	95.1	0.87	0.76	0.87	27.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Warringah Road and Allambie Road SAT MD PEAK] Network: N101 [EX SAT MD PEAK]

Warringah Road and Allambie Road
Site Category: BUNNINGS
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
2	T1	168	2.4	168	2.4	0.309	36.3	LOS C	4.7	33.7	0.83	0.68	0.83	15.7
3a	R1	104	0.0	104	0.0	0.544	67.5	LOS E	2.0	13.7	1.00	0.75	1.03	22.2
Approach		272	1.5	272	1.5	0.544	48.2	LOS D	4.7	33.7	0.90	0.71	0.91	19.3
NorthEast: Warringah Road														
24a	L1	70	5.7	70	5.7	0.570	35.7	LOS C	10.1	72.1	0.76	0.69	0.76	32.1
25	T1	1139	1.1	1139	1.1	0.570	30.2	LOS C	10.2	72.2	0.76	0.67	0.76	32.5
26b	R3	350	2.6	350	2.6	0.547	54.6	LOS D	5.5	39.4	0.91	0.81	0.91	24.9
Approach		1559	1.7	1559	1.7	0.570	35.9	LOS C	10.2	72.2	0.79	0.70	0.79	30.1
North: Allambie Road														
7b	L3	7	0.0	7	0.0	0.172	43.7	LOS D	1.3	9.4	0.69	0.60	1.10	29.4
8	T1	113	2.7	113	2.7	0.172	36.4	LOS C	1.5	10.5	0.70	0.57	0.89	9.0
Approach		120	2.5	120	2.5	0.172	36.8	LOS C	1.5	10.5	0.70	0.57	0.90	10.9
SouthWest: Warringah Road														
30a	L1	41	0.0	41	0.0	0.525	35.0	LOS C	9.1	64.5	0.74	0.66	0.74	22.5
31	T1	1073	1.6	1073	1.6	0.525	29.6	LOS C	9.1	64.6	0.74	0.64	0.74	38.6
32b	R3	248	2.4	248	2.4	0.388	53.0	LOS D	3.7	26.4	0.86	0.79	0.86	12.5
Approach		1362	1.7	1362	1.7	0.525	34.0	LOS C	9.1	64.6	0.76	0.67	0.76	33.6
All Vehicles		3313	1.7	3313	1.7	0.570	36.2	LOS C	10.2	72.2	0.78	0.68	0.79	30.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [Allambie Road and Rodborough Road THUR PM PEAK]

Network: N101 [EX THUR PM PEAK]

Allambie Road and Rodborough Road
Site Category: BUNNINGS
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
1	L2	259	1.9	259	1.9	0.275	4.7	LOS A	0.6	4.5	0.58	0.61	0.58	39.4
2	T1	334	2.4	334	2.4	0.346	4.0	LOS A	0.9	6.3	0.60	0.51	0.60	38.5
3	R2	52	0.0	52	0.0	0.346	9.4	LOS A	0.9	6.3	0.60	0.51	0.60	47.8
3u	U	1	0.0	1	0.0	0.346	13.5	LOS A	0.9	6.3	0.60	0.51	0.60	51.0
Approach		646	2.0	646	2.0	0.346	4.8	LOS A	0.9	6.3	0.59	0.55	0.59	40.3
East: Rodborough Road														
4	L2	179	1.1	179	1.1	0.190	4.5	LOS A	0.4	2.6	0.49	0.56	0.49	46.2
5	T1	141	1.4	141	1.4	0.326	3.7	LOS A	0.8	5.4	0.52	0.61	0.52	40.7
6	R2	255	0.4	255	0.4	0.326	9.1	LOS A	0.8	5.4	0.52	0.61	0.52	40.7
6u	U	2	0.0	2	0.0	0.326	13.3	LOS A	0.8	5.4	0.52	0.61	0.52	51.0
Approach		577	0.9	577	0.9	0.326	6.4	LOS A	0.8	5.4	0.51	0.60	0.51	42.7
North: Allambie Road														
7	L2	142	0.0	142	0.0	0.236	2.7	LOS A	0.4	3.2	0.14	0.29	0.14	47.3
8	T1	502	1.4	502	1.4	0.236	2.2	LOS A	0.4	3.2	0.15	0.31	0.15	49.6
9	R2	40	12.5	40	12.5	0.236	7.8	LOS A	0.4	3.1	0.15	0.32	0.15	38.7
9u	U	3	0.0	3	0.0	0.236	11.8	LOS A	0.4	3.1	0.15	0.32	0.15	38.7
Approach		687	1.7	687	1.7	0.236	2.7	LOS A	0.4	3.2	0.15	0.30	0.15	48.6
West: Rodborough Road														
10	L2	11	9.1	11	9.1	0.024	5.4	LOS A	0.0	0.4	0.59	0.60	0.59	33.6
11	T1	2	0.0	2	0.0	0.024	4.9	LOS A	0.0	0.4	0.59	0.60	0.59	45.9
12	R2	5	0.0	5	0.0	0.024	10.3	LOS A	0.0	0.4	0.59	0.60	0.59	45.8
12u	U	1	0.0	1	0.0	0.024	14.5	LOS A	0.0	0.4	0.59	0.60	0.59	33.6
Approach		19	5.3	19	5.3	0.024	7.1	LOS A	0.0	0.4	0.59	0.60	0.59	39.9
All Vehicles		1929	1.6	1929	1.6	0.346	4.5	LOS A	0.9	6.3	0.41	0.48	0.41	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Allambie Road and Rodborough Road SAT MD PEAK]

Network: N101 [EX SAT MD PEAK]

Allambie Road and Rodborough Road
Site Category: BUNNINGS
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
1	L2	167	1.2	167	1.2	0.134	3.0	LOS A	0.3	1.8	0.26	0.39	0.26	42.0
2	T1	208	2.9	208	2.9	0.161	2.4	LOS A	0.3	2.3	0.25	0.32	0.25	42.1
3	R2	18	0.0	18	0.0	0.161	7.8	LOS A	0.3	2.3	0.25	0.32	0.25	50.0
3u	U	1	0.0	1	0.0	0.161	12.0	LOS A	0.3	2.3	0.25	0.32	0.25	54.4
Approach		394	2.0	394	2.0	0.161	2.9	LOS A	0.3	2.3	0.26	0.35	0.26	42.8
East: Rodborough Road														
4	L2	35	0.0	35	0.0	0.037	3.8	LOS A	0.1	0.4	0.37	0.45	0.37	46.7
5	T1	34	2.9	34	2.9	0.077	2.9	LOS A	0.1	1.0	0.35	0.54	0.35	41.4
6	R2	66	0.0	66	0.0	0.077	8.3	LOS A	0.1	1.0	0.35	0.54	0.35	41.4
6u	U	1	0.0	1	0.0	0.077	12.4	LOS A	0.1	1.0	0.35	0.54	0.35	51.6
Approach		136	0.7	136	0.7	0.077	5.8	LOS A	0.1	1.0	0.36	0.52	0.36	43.1
North: Allambie Road														
7	L2	34	5.9	34	5.9	0.136	2.6	LOS A	0.2	1.4	0.07	0.25	0.07	47.9
8	T1	354	2.5	354	2.5	0.136	2.1	LOS A	0.2	1.4	0.07	0.27	0.07	50.5
9	R2	23	0.0	23	0.0	0.136	7.5	LOS A	0.2	1.4	0.07	0.30	0.07	39.8
9u	U	1	0.0	1	0.0	0.136	11.7	LOS A	0.2	1.4	0.07	0.30	0.07	39.8
Approach		412	2.7	412	2.7	0.136	2.5	LOS A	0.2	1.4	0.07	0.27	0.07	49.8
West: Rodborough Road														
10	L2	11	0.0	11	0.0	0.016	3.3	LOS A	0.0	0.2	0.36	0.48	0.36	36.3
11	T1	1	0.0	1	0.0	0.016	3.1	LOS A	0.0	0.2	0.36	0.48	0.36	47.5
12	R2	4	0.0	4	0.0	0.016	8.5	LOS A	0.0	0.2	0.36	0.48	0.36	48.0
12u	U	1	0.0	1	0.0	0.016	12.6	LOS A	0.0	0.2	0.36	0.48	0.36	36.3
Approach		17	0.0	17	0.0	0.016	5.1	LOS A	0.0	0.2	0.36	0.48	0.36	41.3
All Vehicles		959	2.1	959	2.1	0.161	3.2	LOS A	0.3	2.3	0.19	0.34	0.19	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 3 [Warringah Road and Rodborough Road THUR PM PEAK]

Network: N101 [EX THUR PM PEAK]

Warringah Road and Rodborough Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Rodborough Road														
4a	L1	463	2.7	463	2.7	0.535	9.4	LOS A	1.8	13.2	0.64	0.89	0.93	47.4
Approach		463	2.7	463	2.7	0.535	9.4	LOS A	1.8	13.2	0.64	0.89	0.93	47.4
NorthEast: Warringah Road														
25	T1	1321	4.1	1321	4.1	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1321	4.1	1321	4.1	0.232	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
SouthWest: Warringah Road														
31	T1	1781	2.7	1781	2.7	0.310	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1781	2.7	1781	2.7	0.310	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
All Vehicles		3565	3.2	3565	3.2	0.535	1.2	NA	1.8	13.2	0.08	0.12	0.12	65.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 3 [Warringah Road and Rodborough Road SAT MD PEAK]

⧓ Network: N101 [EX SAT MD PEAK]

Warringah Road and Rodborough Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Rodborough Road														
4a	L1	236	1.3	236	1.3	0.258	6.7	LOS A	0.5	3.4	0.49	0.66	0.49	50.0
Approach		236	1.3	236	1.3	0.258	6.7	LOS A	0.5	3.4	0.49	0.66	0.49	50.0
NorthEast: Warringah Road														
25	T1	1199	1.1	1199	1.1	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1199	1.1	1199	1.1	0.206	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
SouthWest: Warringah Road														
31	T1	1434	1.7	1434	1.7	0.248	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1434	1.7	1434	1.7	0.248	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
All Vehicles		2868	1.4	2868	1.4	0.258	0.6	NA	0.5	3.4	0.04	0.05	0.04	67.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Warringah Road and Allambie Road THUR PM PEAK DEV]

Network: N101 [DEV THUR PM PEAK]

Warringah Road and Allambie Road
Site Category: BUNNINGS
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
2	T1	344	1.7	344	1.7	0.510	33.0	LOS C	9.7	69.0	0.84	0.73	0.84	16.7
3a	R1	298	0.7	298	0.7	0.671	60.3	LOS E	5.4	37.7	1.00	0.84	1.05	23.8
Approach		642	1.2	642	1.2	0.671	45.7	LOS D	9.7	69.0	0.92	0.78	0.94	21.2
NorthEast: Warringah Road														
24a	L1	168	0.0	168	0.0	0.706	39.5	LOS C	13.4	95.9	0.85	0.78	0.85	29.6
25	T1	1240	4.2	1240	4.2	0.706	34.1	LOS C	13.4	95.9	0.85	0.76	0.85	30.3
26b	R3	343	1.2	343	1.2	0.709	62.3	LOS E	6.0	42.6	0.98	0.84	1.04	22.9
Approach		1751	3.2	1751	3.2	0.709	40.2	LOS C	13.4	96.8	0.88	0.78	0.89	28.2
North: Allambie Road														
7b	L3	20	0.0	20	0.0	0.357	40.4	LOS C	3.2	22.9	0.75	0.63	0.75	30.7
8	T1	232	0.9	232	0.9	0.357	35.6	LOS C	3.4	23.7	0.76	0.62	0.76	9.1
Approach		252	0.8	252	0.8	0.357	36.0	LOS C	3.4	23.7	0.76	0.62	0.76	11.8
SouthWest: Warringah Road														
30a	L1	73	12.3	73	12.3	0.684	39.4	LOS C	12.7	91.9	0.84	0.75	0.84	20.4
31	T1	1302	2.1	1302	2.1	0.684	33.8	LOS C	12.9	92.0	0.84	0.74	0.84	36.3
32b	R3	318	2.8	318	2.8	0.664	61.5	LOS E	5.5	39.3	0.97	0.82	1.00	11.0
Approach		1693	2.7	1693	2.7	0.684	39.2	LOS C	12.9	92.0	0.86	0.76	0.87	30.9
All Vehicles		4338	2.6	4338	2.6	0.709	40.4	LOS C	13.4	96.8	0.87	0.76	0.88	27.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Warringah Road and Allambie Road SAT MD PEAK DEV]

Network: N101 [DEV SAT MD PEAK]

Warringah Road and Allambie Road
Site Category: BUNNINGS
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
2	T1	255	1.6	255	1.6	0.406	33.7	LOS C	7.1	50.2	0.83	0.70	0.83	16.5
3a	R1	211	0.0	211	0.0	0.602	62.1	LOS E	3.8	26.7	1.00	0.80	1.02	23.4
Approach		466	0.9	466	0.9	0.602	46.6	LOS D	7.1	50.2	0.91	0.74	0.92	20.8
NorthEast: Warringah Road														
24a	L1	187	2.1	187	2.1	0.633	38.4	LOS C	11.5	81.4	0.81	0.76	0.81	29.9
25	T1	1094	1.2	1094	1.2	0.633	33.0	LOS C	11.6	82.0	0.81	0.72	0.81	30.9
26b	R3	350	2.6	350	2.6	0.626	57.9	LOS E	5.8	41.4	0.95	0.81	0.95	24.0
Approach		1631	1.6	1631	1.6	0.633	38.9	LOS C	11.6	82.0	0.84	0.74	0.84	28.7
North: Allambie Road														
7b	L3	7	0.0	7	0.0	0.293	46.6	LOS D	2.6	18.1	0.73	0.63	1.17	28.4
8	T1	200	1.5	200	1.5	0.293	38.3	LOS C	2.7	18.9	0.74	0.61	0.95	8.6
Approach		207	1.4	207	1.4	0.293	38.6	LOS C	2.7	18.9	0.74	0.61	0.96	9.7
SouthWest: Warringah Road														
30a	L1	41	0.0	41	0.0	0.528	36.9	LOS C	9.0	63.8	0.76	0.67	0.76	21.6
31	T1	1028	1.7	1028	1.7	0.528	31.4	LOS C	9.0	64.0	0.76	0.66	0.76	37.6
32b	R3	307	2.0	307	2.0	0.547	57.2	LOS E	5.0	35.3	0.93	0.80	0.93	11.7
Approach		1376	1.7	1376	1.7	0.547	37.4	LOS C	9.0	64.0	0.79	0.69	0.79	31.4
All Vehicles		3680	1.5	3680	1.5	0.633	39.3	LOS C	11.6	82.0	0.83	0.72	0.84	27.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P8	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [Allambie Road and Rodborough Road THUR PM PEAK DEV] **Network: N101 [DEV THUR PM PEAK]**

Allambie Road and Rodborough Road
Site Category: BUNNINGS
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
1	L2	259	1.9	259	1.9	0.292	5.3	LOS A	0.7	5.0	0.63	0.66	0.63	39.0
2	T1	329	2.4	329	2.4	0.368	4.5	LOS A	1.0	7.1	0.66	0.56	0.66	37.9
3	R2	61	0.0	61	0.0	0.368	9.9	LOS A	1.0	7.1	0.66	0.56	0.66	47.4
3u	U	1	0.0	1	0.0	0.368	14.0	LOS A	1.0	7.1	0.66	0.56	0.66	50.4
Approach		650	2.0	650	2.0	0.368	5.3	LOS A	1.0	7.1	0.65	0.60	0.65	39.9
East: Rodborough Road														
4	L2	190	1.1	190	1.1	0.205	4.6	LOS A	0.4	2.9	0.51	0.57	0.51	46.1
5	T1	151	1.3	151	1.3	0.362	3.9	LOS A	0.9	6.4	0.55	0.63	0.55	40.5
6	R2	287	0.3	287	0.3	0.362	9.3	LOS A	0.9	6.4	0.55	0.63	0.55	40.5
6u	U	2	0.0	2	0.0	0.362	13.4	LOS A	0.9	6.4	0.55	0.63	0.55	50.8
Approach		630	0.8	630	0.8	0.362	6.6	LOS A	0.9	6.4	0.54	0.61	0.54	42.5
North: Allambie Road														
7	L2	176	0.0	176	0.0	0.255	2.7	LOS A	0.5	3.6	0.16	0.30	0.16	47.2
8	T1	485	1.4	485	1.4	0.255	2.3	LOS A	0.5	3.6	0.16	0.33	0.16	49.1
9	R2	71	7.0	71	7.0	0.255	7.8	LOS A	0.5	3.5	0.16	0.35	0.16	37.6
9u	U	3	0.0	3	0.0	0.255	11.9	LOS A	0.5	3.5	0.16	0.35	0.16	37.6
Approach		735	1.6	735	1.6	0.255	3.0	LOS A	0.5	3.6	0.16	0.33	0.16	47.9
West: Rodborough Road														
10	L2	11	9.1	11	9.1	0.025	5.6	LOS A	0.1	0.4	0.62	0.61	0.62	33.2
11	T1	2	0.0	2	0.0	0.025	5.1	LOS A	0.1	0.4	0.62	0.61	0.62	45.7
12	R2	5	0.0	5	0.0	0.025	10.6	LOS A	0.1	0.4	0.62	0.61	0.62	45.5
12u	U	1	0.0	1	0.0	0.025	14.7	LOS B	0.1	0.4	0.62	0.61	0.62	33.2
Approach		19	5.3	19	5.3	0.025	7.4	LOS A	0.1	0.4	0.62	0.61	0.62	39.5
All Vehicles		2034	1.5	2034	1.5	0.368	4.9	LOS A	1.0	7.1	0.44	0.51	0.44	43.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Allambie Road and Rodborough Road SAT MD PEAK DEV]

Network: N101 [DEV SAT MD PEAK]

Allambie Road and Rodborough Road
Site Category: BUNNINGS
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Allambie Road														
1	L2	217	0.9	217	0.9	0.220	4.4	LOS A	0.5	3.3	0.52	0.57	0.52	39.9
2	T1	202	3.0	202	3.0	0.282	3.7	LOS A	0.7	4.7	0.53	0.54	0.53	38.1
3	R2	124	0.0	124	0.0	0.282	9.1	LOS A	0.7	4.7	0.53	0.54	0.53	47.5
3u	U	1	0.0	1	0.0	0.282	13.2	LOS A	0.7	4.7	0.53	0.54	0.53	50.4
Approach		544	1.5	544	1.5	0.282	5.2	LOS A	0.7	4.7	0.53	0.55	0.53	42.2
East: Rodborough Road														
4	L2	135	0.0	135	0.0	0.144	4.0	LOS A	0.3	1.9	0.43	0.50	0.43	46.5
5	T1	103	1.0	103	1.0	0.296	3.2	LOS A	0.7	4.7	0.45	0.59	0.45	40.6
6	R2	276	0.0	276	0.0	0.296	8.6	LOS A	0.7	4.7	0.45	0.59	0.45	40.6
6u	U	1	0.0	1	0.0	0.296	12.8	LOS A	0.7	4.7	0.45	0.59	0.45	50.9
Approach		515	0.2	515	0.2	0.296	6.3	LOS A	0.7	4.7	0.44	0.57	0.44	42.4
North: Allambie Road														
7	L2	115	1.7	115	1.7	0.183	2.9	LOS A	0.3	2.3	0.20	0.33	0.20	46.9
8	T1	354	2.5	354	2.5	0.183	2.5	LOS A	0.3	2.3	0.21	0.33	0.21	49.1
9	R2	20	0.0	20	0.0	0.183	7.9	LOS A	0.3	2.3	0.21	0.33	0.21	38.1
9u	U	1	0.0	1	0.0	0.183	12.1	LOS A	0.3	2.3	0.21	0.33	0.21	38.1
Approach		490	2.2	490	2.2	0.183	2.8	LOS A	0.3	2.3	0.21	0.33	0.21	48.2
West: Rodborough Road														
10	L2	11	0.0	11	0.0	0.020	4.8	LOS A	0.0	0.3	0.56	0.57	0.56	34.4
11	T1	1	0.0	1	0.0	0.020	4.6	LOS A	0.0	0.3	0.56	0.57	0.56	46.5
12	R2	4	0.0	4	0.0	0.020	10.0	LOS A	0.0	0.3	0.56	0.57	0.56	46.6
12u	U	1	0.0	1	0.0	0.020	14.2	LOS A	0.0	0.3	0.56	0.57	0.56	34.4
Approach		17	0.0	17	0.0	0.020	6.6	LOS A	0.0	0.3	0.56	0.57	0.56	39.6
All Vehicles		1566	1.3	1566	1.3	0.296	4.8	LOS A	0.7	4.7	0.40	0.49	0.40	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 3 [Warringah Road and Rodborough Road THUR PM PEAK DEV]

⧺ Network: N101 [DEV THUR PM PEAK]

Warringah Road and Rodborough Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Rodborough Road														
4a	L1	491	2.6	491	2.6	0.563	9.7	LOS A	2.1	14.8	0.65	0.91	0.98	47.1
Approach		491	2.6	491	2.6	0.563	9.7	LOS A	2.1	14.8	0.65	0.91	0.98	47.1
NorthEast: Warringah Road														
25	T1	1305	4.2	1305	4.2	0.229	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1305	4.2	1305	4.2	0.229	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
SouthWest: Warringah Road														
31	T1	1782	2.7	1782	2.7	0.310	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1782	2.7	1782	2.7	0.310	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
All Vehicles		3578	3.2	3578	3.2	0.563	1.3	NA	2.1	14.8	0.09	0.12	0.13	65.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 3 [Warringah Road and Rodborough Road SAT MD PEAK DEV]

⧓ Network: N101 [DEV SAT MD PEAK]

Warringah Road and Rodborough Road
Site Category: BUNNINGS
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Rodborough Road														
4a	L1	345	0.9	345	0.9	0.369	7.1	LOS A	0.9	6.0	0.52	0.70	0.57	49.6
Approach		345	0.9	345	0.9	0.369	7.1	LOS A	0.9	6.0	0.52	0.70	0.57	49.6
NorthEast: Warringah Road														
25	T1	1152	1.2	1152	1.2	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1152	1.2	1152	1.2	0.198	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
SouthWest: Warringah Road														
31	T1	1448	1.7	1448	1.7	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1448	1.7	1448	1.7	0.250	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
All Vehicles		2945	1.4	2945	1.4	0.369	0.9	NA	0.9	6.0	0.06	0.08	0.07	66.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix D

Bunnings Traffic Characteristics

Established 1994 ttpa
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August 2019 (Issue K)
Ref: 120/2013

BUNNINGS TRAFFIC GENERATION

ROAR Data was engaged to undertake traffic generation surveys at a number of recently constructed large format Bunnings sites in the Sydney Metropolitan Area. These surveys were completed in August 2013 in unusually sunny and warm weather essentially representing an "early spring" seasonal circumstance. ROAR Data has also undertook similar surveys at Parramatta, Wollongong and Rydalmere in NSW as well as Oxenford in Queensland.

Other survey data for existing Bunnings is provided by the results of the RMS Hardware Study, RMS SCATS data, a study by the Traffix Group (Mornington and Thomastown in Victoria) and surveys by Austraffic in S.A. These examples provide an escalating scale of floor areas as indicated in the following together with the "peak traffic generation" and "generation rate per 100m^2" for each of the locations.

		Thursday		Saturday		BMLSY[#]
		vtph	vtph/100m^2	vtph	vtph/100m^2	
Balgowlah	8,106m^2	237	2.92	444	5.48	No
Ashfield	8,920m^2	244	2.73	628	7.00	1,453m^2
Parramatta (RMS)	9,800m^2	247	2.52	514	5.24	738m^2
Nowra (RMS)	9,948m^2	198	1.99	447	4.49	766m^2
Wollongong	10,619m^2	260	2.45	550	5.18	No
Noarlunga (SA)	11,365m^2	321	2.82	643	5.66	No
Chatswood	11,443m^2	267	2.33	605	5.28	No
Minchinbury (RMS)	11,915m^2	338	2.84	754	6.33	No
Mornington (VIC)	13,369m^2	248	1.86	682	5.10	695m^2
Bankstown (RMS)	*15,734m^2	289	1.82	805	5.08	No
Thomastown (VIC)	15,851m^2	282	1.78	778	4.91	No
Woodville (SA)	16,364m^2	333	2.03	800	4.89	No
Rydalmere	16,732m^2	281	1.68	569	3.40	751m^2
Oxenford (QLD)	16,763m^2	302	1.80	819	4.89	1,426m^2
Huntingwood	16,804m^2	294	1.75	805	4.79	1,636m^2
Castle Hill	18,860m^2	314	1.66	900	4.77	No
Alexandra	21,037m^2	320	1.52	808	3.84	582m^2

☐ *Variation to 'trend' (outlying)* * *RMS incorrectly adopts 14,111m^2*

A Division of Monvale Pty Ltd ACN 060 653 125 ABN: 44 060 653 125

These results (see attached graph deleting the 'outlying' results) evidences the very clear characteristic that the traffic generation rate per 100m^2 reduces as the floor area increases and the 'consistency' of the results, particularly being from a number of sources, gives a high level of confidence to this traffic generation characteristic. The RMS Minchinbury site was surveyed in 2009 and it is stated in the RMS study that it overtraded significantly due to absence of any competition in its catchment. The RMS Bankstown site stated an incorrect floorspace (14,111m^2) which has been revised in this document. The evidence is that the BM&LSY elements do not perceptibly generate traffic and are ancillary to the warehouse, TT and Nursery elements.

ARRB has published the results of a study which established "drop in trips" (passing trade) for large format hardware outlet indicating 27% on a weekday afternoon and 28% for Saturday. An extract from this paper is appended.

Bunnings Parking Demand

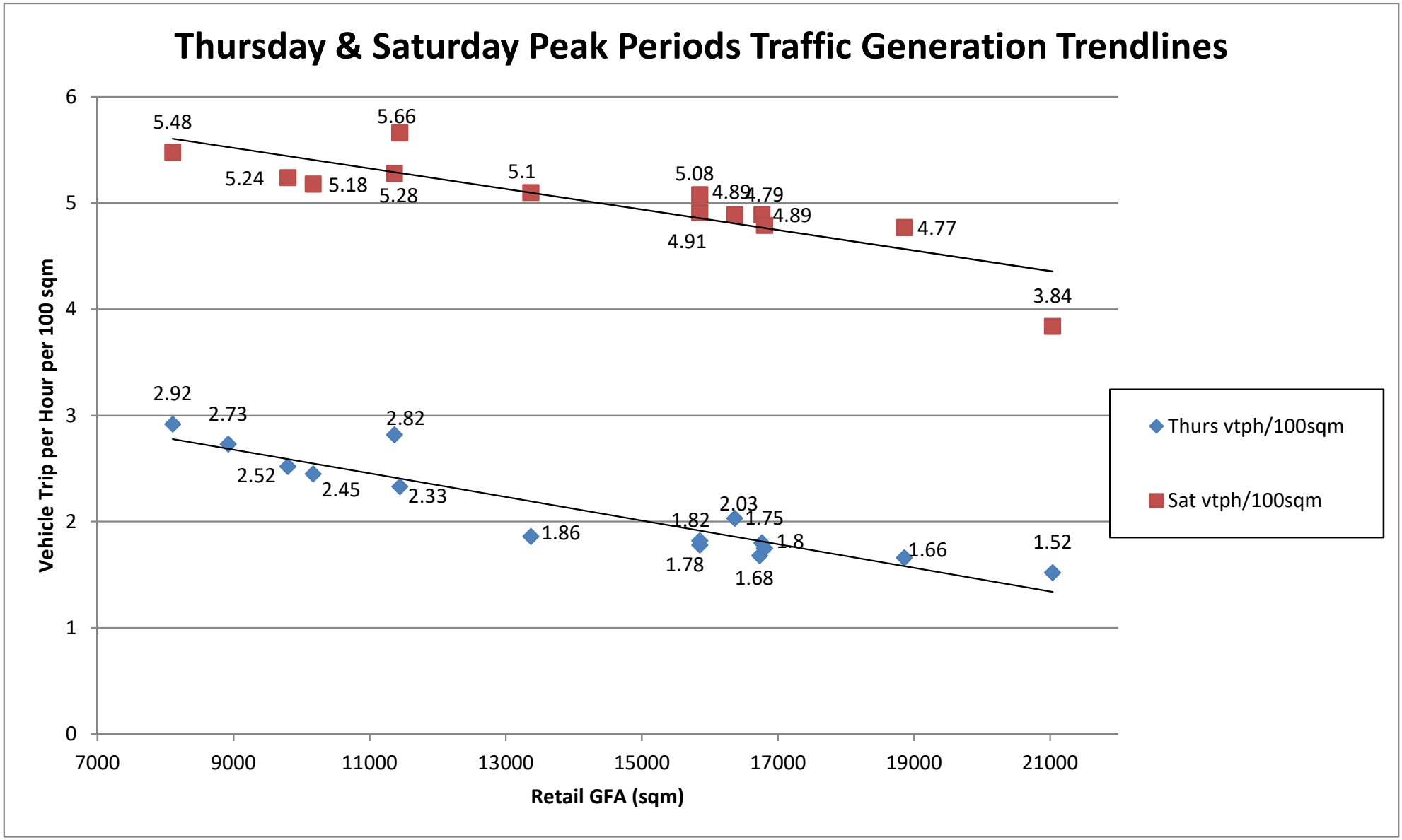
The onsite parking demands were only recorded in the Saturday surveys (ROAR and RMS) as this represents the peak parking demand circumstance. The results of those surveys are as follows:

		Peak Parking	**Cars per m^2**
Balgowlah	8,106m^2	163 cars	1 space per 50m^2
Parramatta	9,800m^2	196 cars	1 space per 50m^2
Chatswood	11,443m^2	234 cars	1 space per 49m^2
Bankstown	15,853m^2	285 cars	1 space per 55.6m^2
Castle Hill	18,860m^2	397 cars	1 space per 48m^2

It is apparent that the peak parking demand for Bunnings is some 1 space per 50m^2 or less and the characteristic that Castle Hill retains a consistent parking demand (but lower traffic generation) reflects the longer stay pattern at the larger floorspace Bunnings.

Yours faithfully

Ross Nettle
Director
Transport and Traffic Planning Associates


Thursday & Saturday Peak Periods Traffic Generation Trendlines
Vehicle Trip per Hour per 100 sqm
Retail GFA (sqm)
0
1
2
3
4
5
6
7000
9000
11000
13000
15000
17000
19000
21000
5.48
5.66
5.24
5.18
5.28
5.1
5.08
4.89
4.79
4.89
4.91
4.77
3.84
2.92
2.73
2.82
2.52
2.45
2.33
1.86
2.03
1.82
1.75
1.8
1.78
1.68
1.66
1.52
Thurs vtph/100sqm
Sat vtph/100sqm

ARRB EXTRACT

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SUPERMARKET AND HOME IMPROVEMENT RESULTS COMPARED

The lack of data pertaining to the trip type proportion estimates for non-supermarket large-format retail developments has meant that it is common practice to apply supermarket trip type proportions to other forms of large-format retail.

The surveys undertaken at the supermarket and home improvement warehouse reveal similar proportions for primary, pass-by and link diverted trips as can be seen in Figure 10. However, despite this similarity, there is not enough evidence to confidently say that these activities should be treated as one general large-format retail activity.

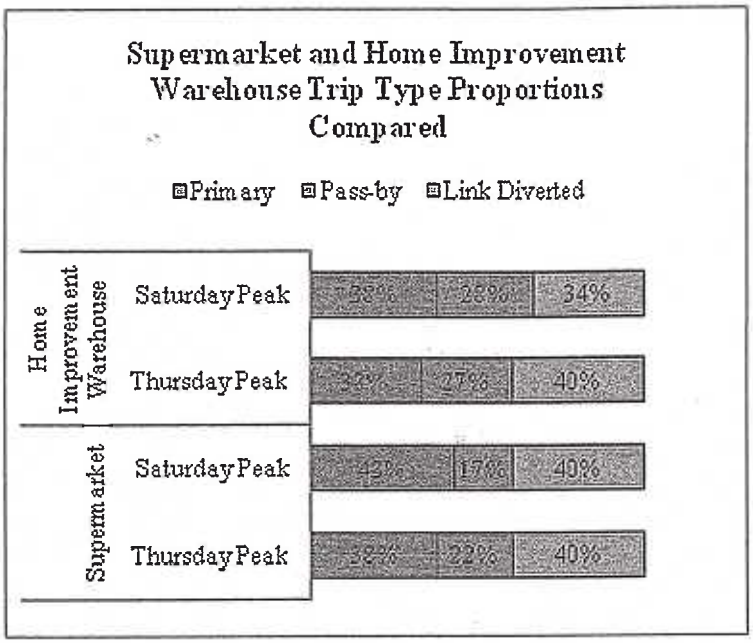

Figure 10: Surveyed trip type proportions for the supermarket and home improvement warehouse compared

CONCLUSIONS AND RECOMMENDATIONS

Given the results of the surveys, it is concluded that a higher proportion of pass-by and link diverted trips are generated by supermarket and home improvement warehouse developments than previously assumed in industry. This means that the effect of the developments surveyed on the surrounding road network is likely to be less than was estimated in the individual traffic impact assessments.

It is also concluded that through the comparison of the measured data to the international trip type proportion data, it is inappropriate to apply the supermarket proportion estimates of ITE (1991, 2008) and TRICS (1995) to a New Zealand based supermarket development. This would likely lead to an overestimate of primary trips.

The recommended trip type proportions for future supermarket developments in urban New Zealand for the Thursday evening and Saturday midday peak hour periods are outlined in Table 8 below.

Table 8: Recommended trip type proportions for supermarket developments

	Primary	Pass-by	Link diverted
Thursday PM Peak	35-45%	20-25%	40%
Saturday Midday Peak	40-50%	10-20%	40%

The recommended trip type proportion estimates to apply to future home improvement warehouse developments are outlined in Table 9 below.

Table 9: Recommended trip type proportions for home improvement warehouse developments

	Primary	Pass-by	Link diverted
Thursday PM Peak	30-35%	25-30%	40%
Saturday Midday Peak	35-40%	25-30%	30-35%

More research needs to be carried out in this area in order to make these estimates with higher confidence.

Despite the similarities in the trip results obtained at the two different developments surveyed here, it is not recommended that supermarket trip type proportions are applied to non-supermarket large-format retail. At this stage, there is not enough data to support this claim.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the significant support of 'Traffic Design Group Ltd' staff which ensured this project was successful. This research was undertaken as part of the first two authors for their BE(Civil) Hons degrees.

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TTM EXTRACT

5. Car Parking Supply

5.1 Council Parking Supply Requirement

The carparking requirements for the 'Mixed Industry and Business Area North Sector One', as outlined in the Sector Plan no 026-1000indicates that parking for both a 'hardware shop/centre', and a 'showroom' is 1 space per 30m^2 gfa (or 3.33 spaces / 100m^2). Application of this rate to the proposed development results in a total parking requirement of 647 spaces.

The above parking supply is to include PWD parking, which is required at a minimum rate of 1 PWD space per 50 standard spaces.

5.2 Surveyed Practical Parking Demand

TTM has conducted numerous parking demand surveys at existing Bunnings stores throughout Queensland over the past two years (note that the Rocklea store has been surveyed a number of times). The results indicate that the Saturday demand is significantly higher than the weekday demand.

The Saturday results (summarised in Figure5.1) indicate that (excluding the Stafford store) the 85th percentile parking demand rate was 1.78 spaces per 100m^2 gfa (or 1 space per 56.2m^2 gfa). The Stafford store was excluded as it is not considered representative of a normal Bunnings site in that there is a complete lack of alternative large format hardware stores in the vicinity. This is clearly not the case at the subject site, with other Bunnings stores located at Rothwell (6km), Morayfield (13km), Lawnton (13km); and a Masters to be located within the North Lakes town centre less than 3km away. Application of this rate to the proposed development results in a maximum parking demand of 345 spaces.

	GFA	Rate
Bundaberg	10532	1.10
Capalaba	12550	1.43
Capalaba	12550	1.43
Hervey Bay	11736	1.33
Mackay	11902	1.66
Mt Gravatt	9668	1.71
Nerang	13853	1.65
Oxley	13453	1.92
Rockhamptor	11574	1.93
Rocklea	12540	1.59
Rocklea	12540	1.69
Rocklea	12540	1.71
Rocklea	12540	1.83
Rothwell	13679	1.08
Stafford	12564	2.86

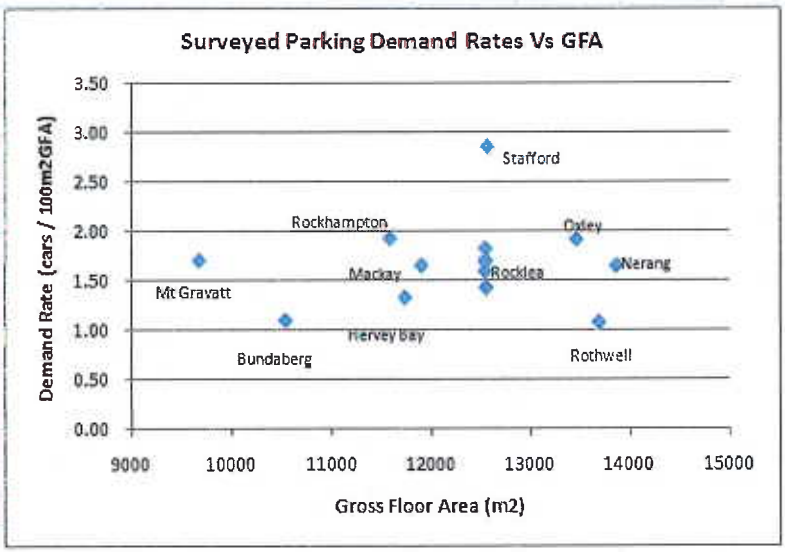
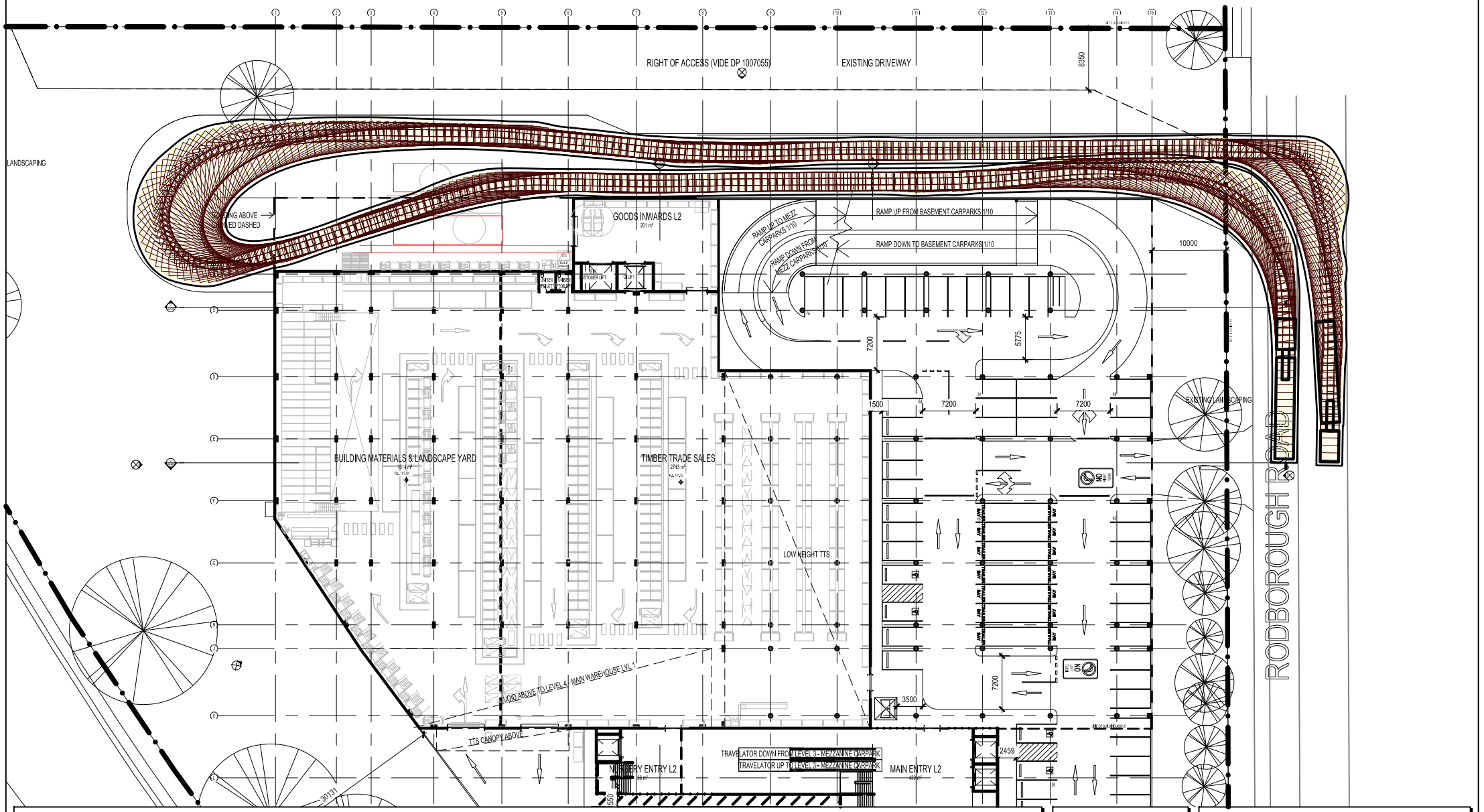


Figure 5.1: Surveyed Parking Demand Rates at Existing Bunnings Stores

Appendix E

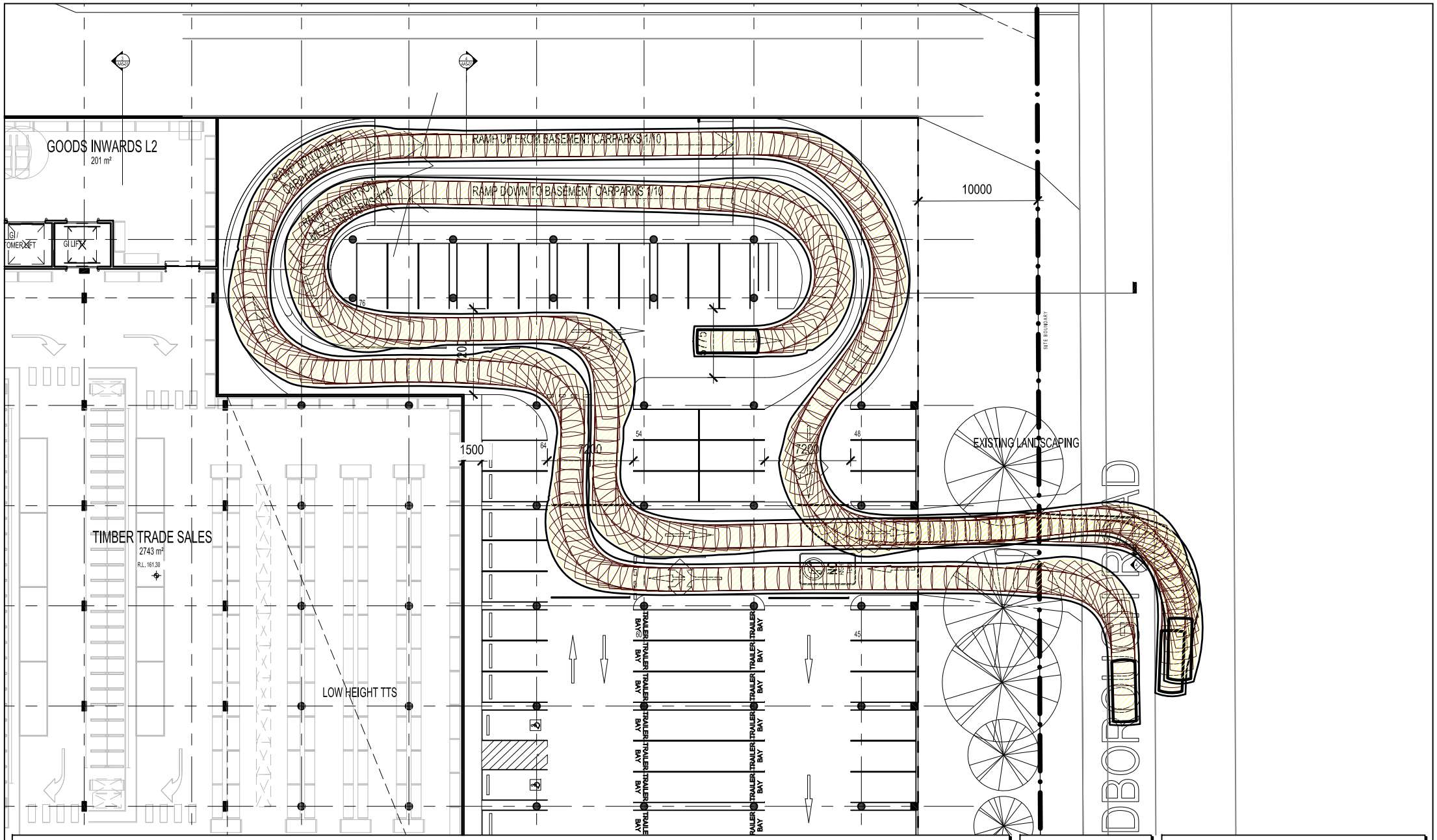
Turning Path Assessment



LEGEND

SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING AND EXITING THE SITE

SP 1



LEGEND

SWEPT PATH ANALYSIS OF 99th PERCENTILE VEHICLES CIRCULATING

SP 2