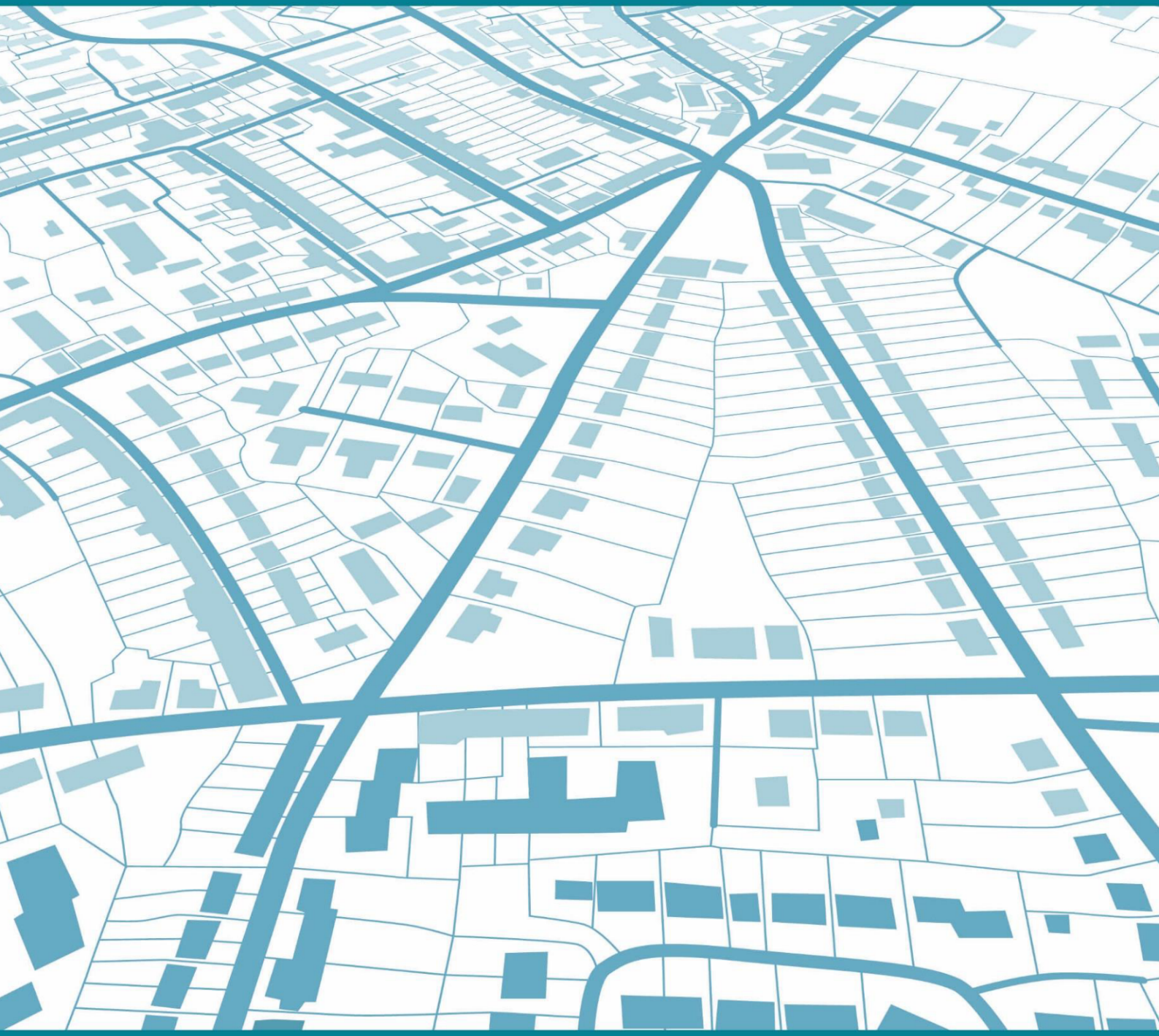
ttpa TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

Established 1994

[redacted]



Bunnings North Penrith

Proposed Alterations and Additions

Traffic and Parking Assessment

Ref: 20240

Date: November 2020

Issue: B

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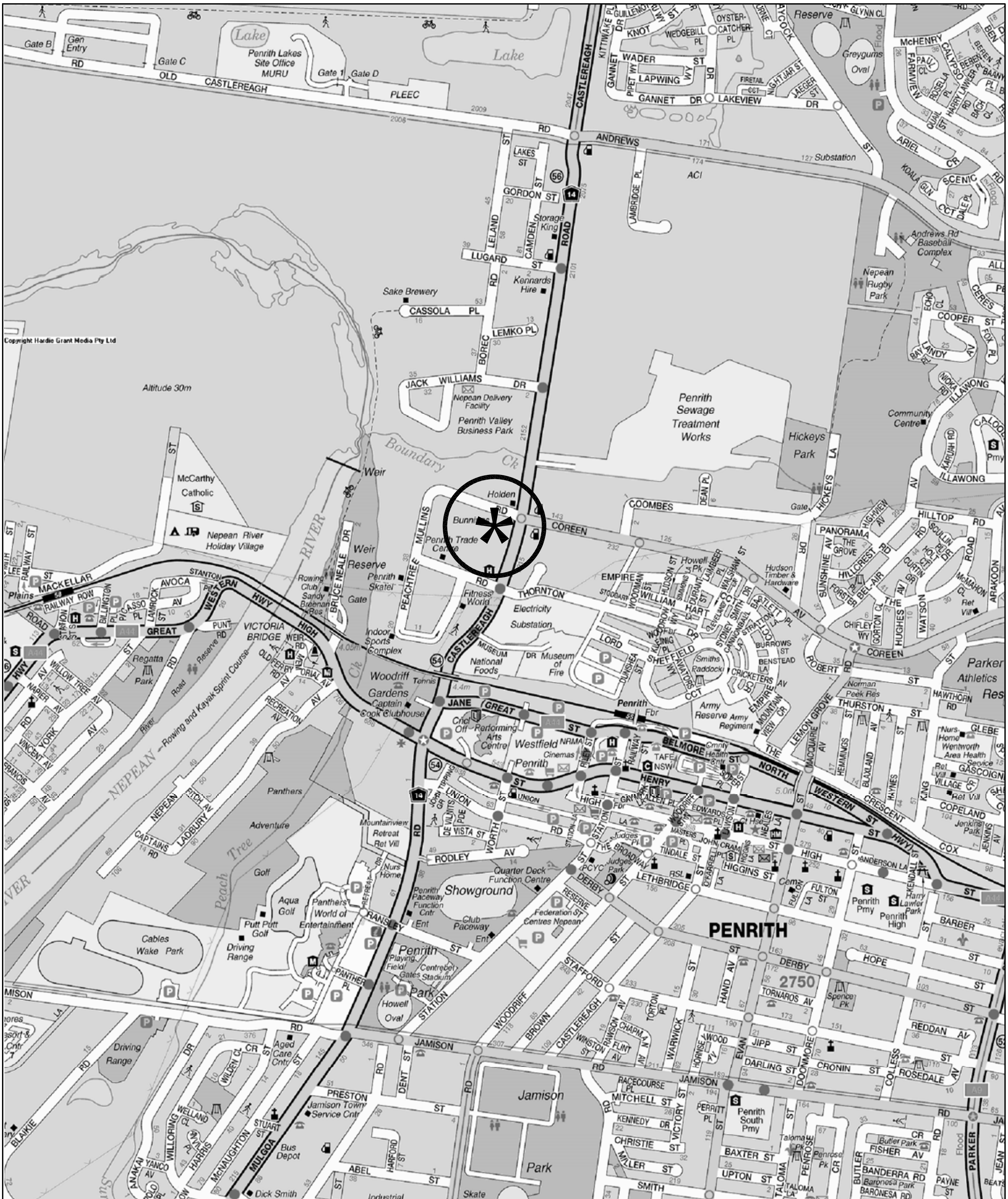
1.0 Introduction

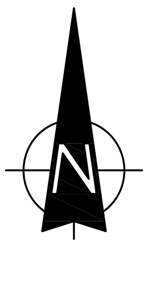
This report has been prepared to accompany a Development Application to Penrith City Council for proposed alterations and additions to the existing Bunnings on the corner of Castlereagh Road and Mullins Road at North Penrith (Figure 1).

The existing Bunnings trades quite successfully however the need is recognised for Bunnings to upgrade some of its older medium size existing outlets to conform with the contemporary store provisions. The proposed alterations to the North Penrith site will provide some additional floorspace for the Warehouse and Timber Trade Sales areas and the provision of a Building Materials and Landscape Yard element and these changes have been enabled by use of the previously designated “pad” site in the north western corner which is vacant land.

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 traffic conditions on that network
- assess the potential traffic implications
- assess the adequacy of the proposed parking provision
- assess the 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), which now incorporates the adjoining 'pad' site, comprises a generally rectangular shaped area of some 40,546m^2 with extensive frontages to Castlereagh Road and Mullins Street.

The nearby uses comprise:

- the Peachtree Hotel (pub) and industrial uses which adjoin to the south
- the vacant land which adjoins to the west
- the service stations on the opposite side of Castlereagh Road
- the mixed industrial and commercial uses extending along Castlereagh Road
- the car dealership on the opposite side of Mullins Road

The existing Bunnings comprises:

Warehouse	8,761m^2
Nursery & BG's	2,509m^2
Timber Trade	1,863m^2
Total Retail area	**13,133m^2**

There is a total of 375 parking spaces provided with vehicle access involving:

- an ingress driveway (carpark and trucks) and adjacent egress driveway (car park) on Mullins Road midway along the site frontage
- driveway on the Mullins Road frontage at the western site boundary for truck egress and car park ingress/egress

Details of the existing Bunnings are provided on the plan reproduced in Appendix A.

LEGEND

N

SITE

FIG 2

2.2 Proposed Development

It is proposed to demolish some existing Timber Trade Sales and Goods Receiving elements and extend the TTS to the north and provide a BM & LS Yard to the north of that.

The development scheme involves a slightly enlarged Warehouse and TTS elements as well as providing a BM & LS extending into part of the existing parking however the loss of these spaces will be offset by extension of the parking into the vacant 'pad' site area.

The proposed development comprises:

Warehouse	8,875 m^2	(+114 m^2)
Timber Trade sales	2,886 m^2	(+1,023 m^2)
Nursery/Bagged Goods	2,509 m^2	(Nil m^2)
Building Materials & L/S Yard	1,493 m^2	(+1,493m^2)
Total:	**15,763 m^2**	**(+2630 m^2)**

( ) change

A total of 389 parking spaces will be provided retaining the existing vehicle accesses on Mullins Road with a slight adjustment of the western driveway.

Details of the proposed development scheme are provided on the plans prepared by John R Brogan which accompany the Development Application and are reproduced in part in Appendix B.

3.0 Road Network and Traffic Conditions

3.1 Road Network

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

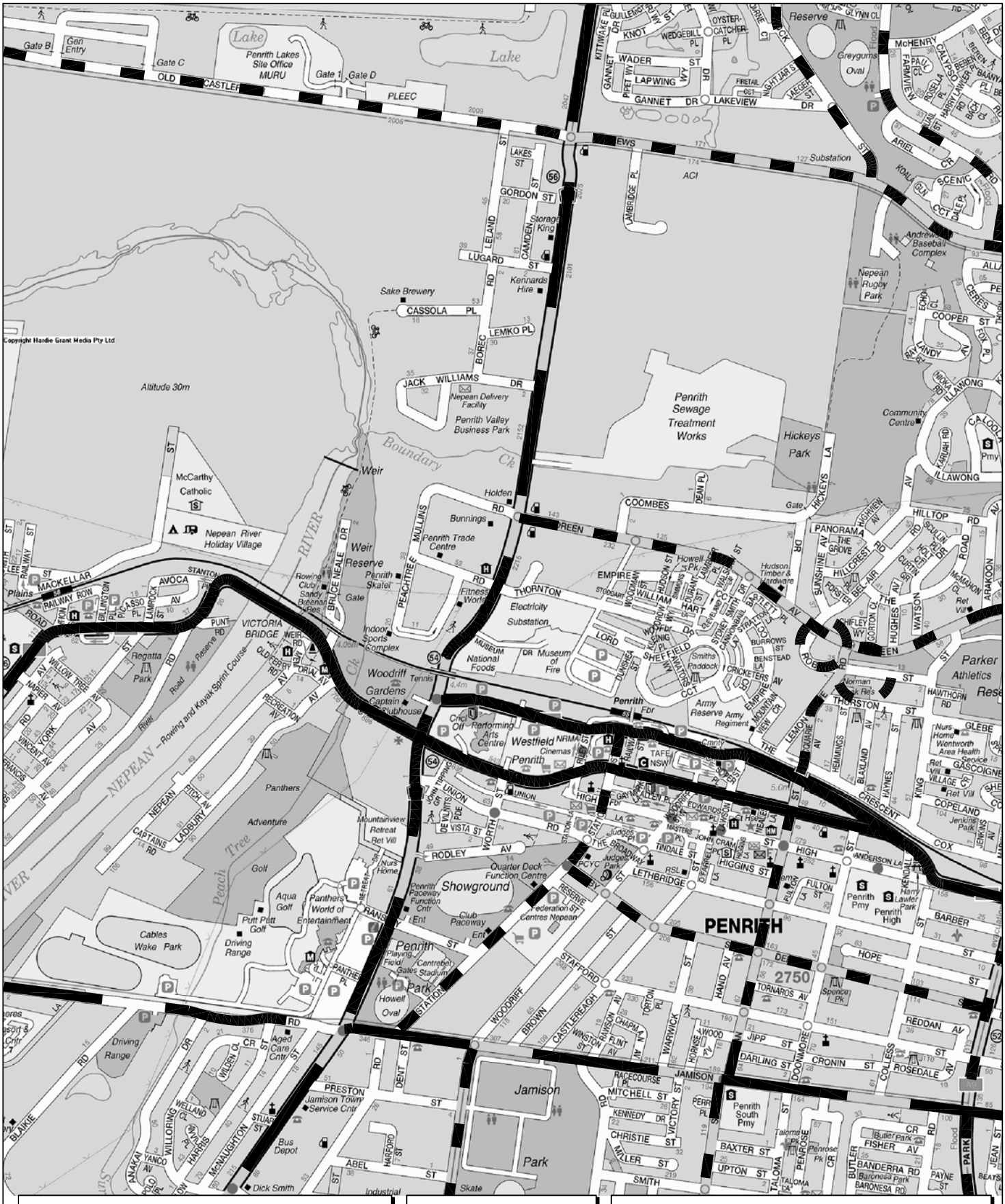
- *Great Western Highway (High Street / Harry Street)* – a State Highway and east-west arterial route between the City and the Blue Mountains crossing
- *Castlereagh Road* – a State Road and sub-arterial route linking between Wallacia and Richmond running along the western side of Penrith CBD
- *Parker Street* – a State Road and sub-arterial route linking along the western side of Penrith CBD
- *Coreen Avenue* – a collector route connecting between Castlereagh Road and Parker Street
- *Mullins Road* – a local access road

Castlereagh Road has 2 traffic lanes in each direction with a wide central median island while Mullins Road has a straight and level alignment with one traffic lane in each direction with Kerbside parking and supplementary lanes at the Castlereagh Road intersection.

3.2 Traffic Controls

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

- the 2 lane roundabout at the Castlereagh Road / Coreen Avenue / Mullins Road intersection



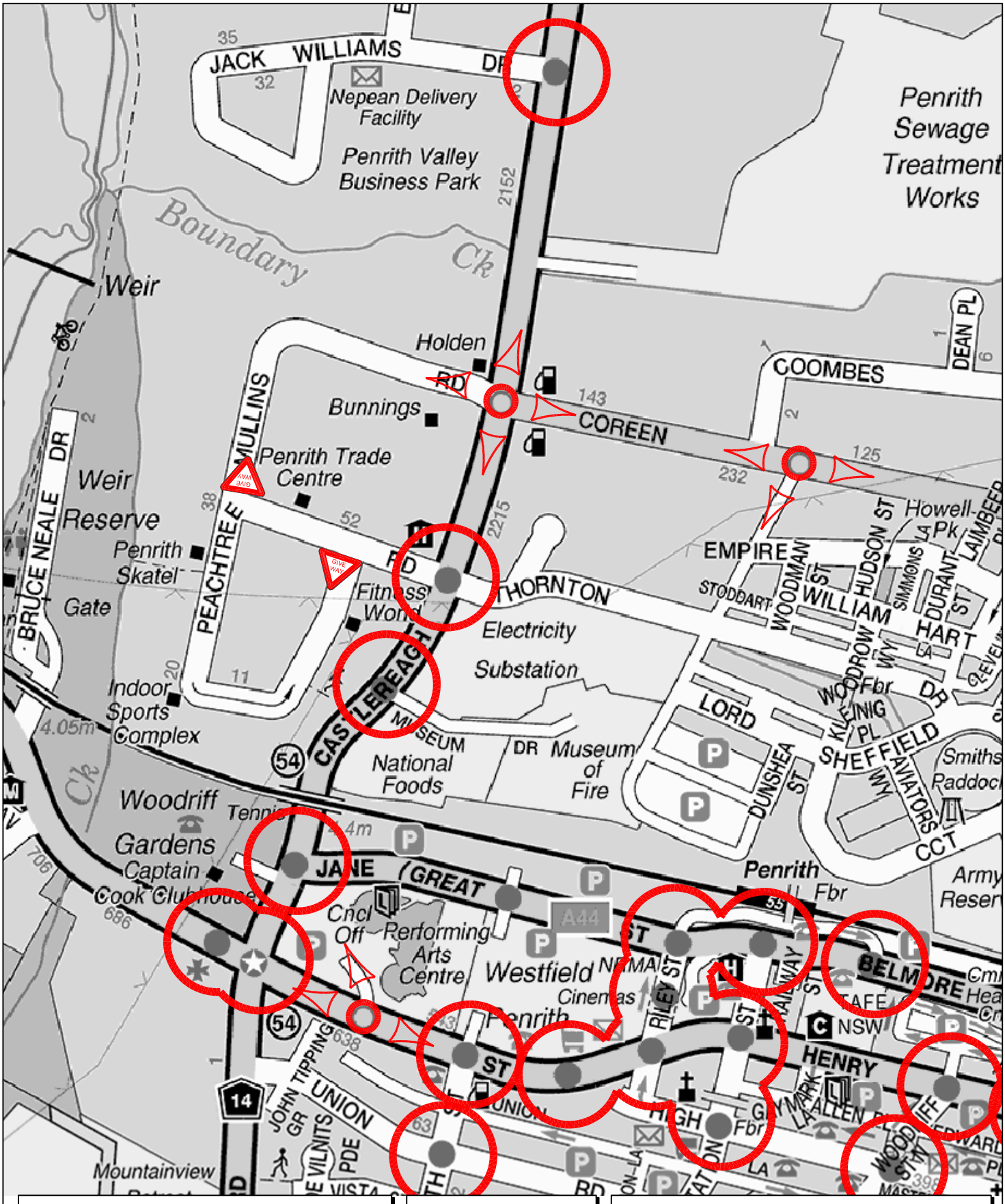
LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

N

ROAD NETWORK

FIG 3



LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT

TRAFFIC CONTROLS

FIG 4

- the traffic signals along Castlereagh Road at the intersections of:

  Lugard Street
  Jack Williams Drive
  Peachtree Road
  Museum Drive

- the central median island along Castlereagh Road
- the 60 kmph speed limit along Castlereagh Road and 50 kmph on the local and collector road system
- the NHVR approved B Double routes along a number of roads in the area including Castlereagh Road and Mullins Road

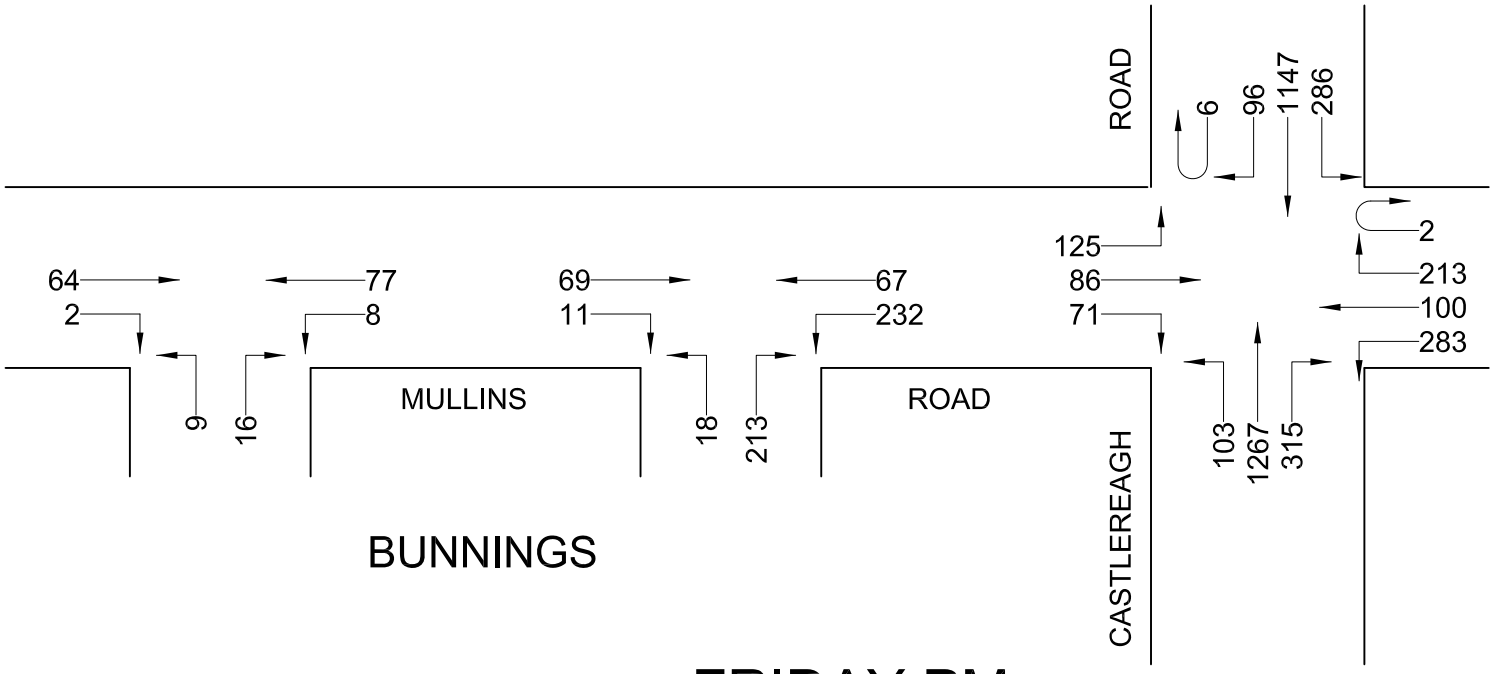
3.3 Traffic Conditions

An indication of the prevailing traffic conditions on the road system serving the site is provided in study[1] undertaken for the proposed upgrade of Castlereagh Road and surveys undertaken for this assessment. The study data is expressed in terms of 7 Day Average, Weekday Average and Weekend Day Average and are provided in the following:

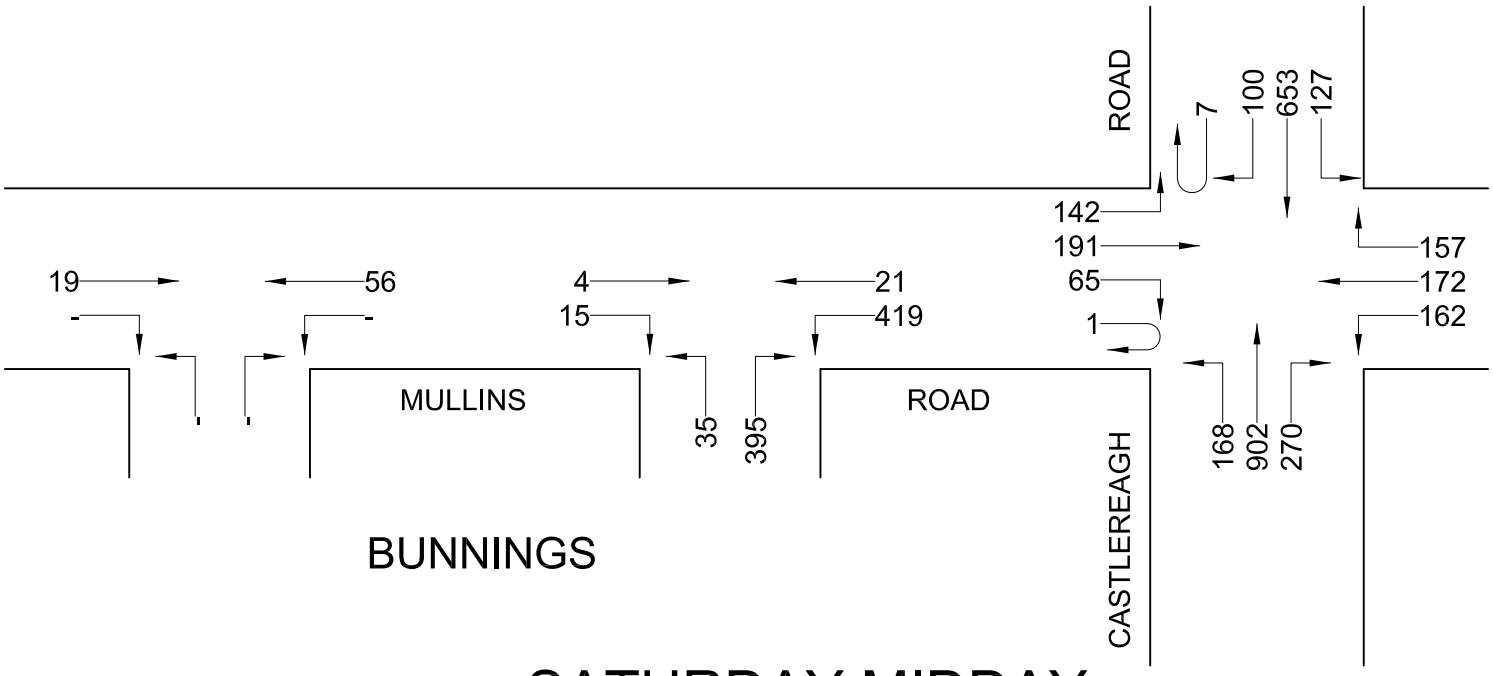
Location	7 Day Av.	WD Av.	WED Av.
Castlereagh Road - north of Jane Street	33,935	36,025	28,710

The results of the traffic surveys undertaken at the Castlereagh Road/Coreen Avenue/Mullins Road intersection and the Bunnings access during the weekday afternoon peak and Saturday Midday traffic periods are provided in Appendix C and summarised on Figure 5.

1 *Mulgoa Road/Castlereagh Road Upgrade*
Traffic and Transport Assessment
Arcadis Jan 2017

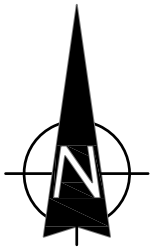


FRIDAY PM



SATURDAY MIDDAY

LEGEND



EXISTING PEAK TRAFFIC VOLUMES

FIG 5

The operational performance of the intersection has been assessed with SIDRA and the results are provided in Appendix D and summarised in the following while the criteria for interpreting SIDRA results is reproduced overleaf.

	WD PM	SAT MD
LOS	B	A
AVD	19.7	9.5

The results indicate that this intersection operates quite satisfactorily at the present time with significant spare capacity.

3.4 Transport Services

The site is located less than 1.0 km from Penrith Railway Station on the Great Western Line and the existing bus network servicing the area are identified on the diagrams overleaf with 673, 783 and 784 services along Castlereagh Road connecting to Penrith CBD and Railway Station.

3.5 Future Circumstances

TfNSW, with Federal and State funding, propose to upgrade the 6.5km long Mulgoa Road/Castlereagh Road route between Glenmore Park and Andrews Road at Penrith to support the future traffic demands resultant to expected urban development in the area. The Mulgoa Road/Castlereagh Road Corridor Upgrade is part of a plan to progressively upgrade a number of major arterial roads in Western Sydney to deliver a more efficient, reliable network that meets the future needs of the community and the economy.

There are a number of key developments served by Mulgoa Road/Castlereagh Road that will contribute to increased population/employment and traffic movements in its immediate vicinity. These include:

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*

- Penrith Panthers Entertainment precinct
- Penrith Station precinct
- Riverlink and Nepean River precincts
- Penrith Stadium
- Penrith Lakes Scheme
- Penrith Homemaker Centre
- New urban land releases at Glenmore Park and Thornton.

Related to the proposal is “the Jane Street and Mulgoa Road Infrastructure Upgrade” and while it is a separate proposal, planning and staging of these two projects is being coordinated.

The diagram overleaf shows the location of both the proposal and the Jane Street and Mulgoa Road Infrastructure Upgrade.

Details of the assessments undertaken for the upgrade and the identified Preferred Option are provided in a Preferred Option Report[2] which includes a Traffic and Transport Assessment Study[3]. The preferred upgrade option is to widen the roadway to provide 3 lanes in each direction plus turning lanes at intersections. Details of the proposal for the Coreen Avenue and Mullins Road intersection are as follows:

- Replacement of the roundabout with traffic signal control
- Widening of sections of Coreen Avenue and Mullins Road

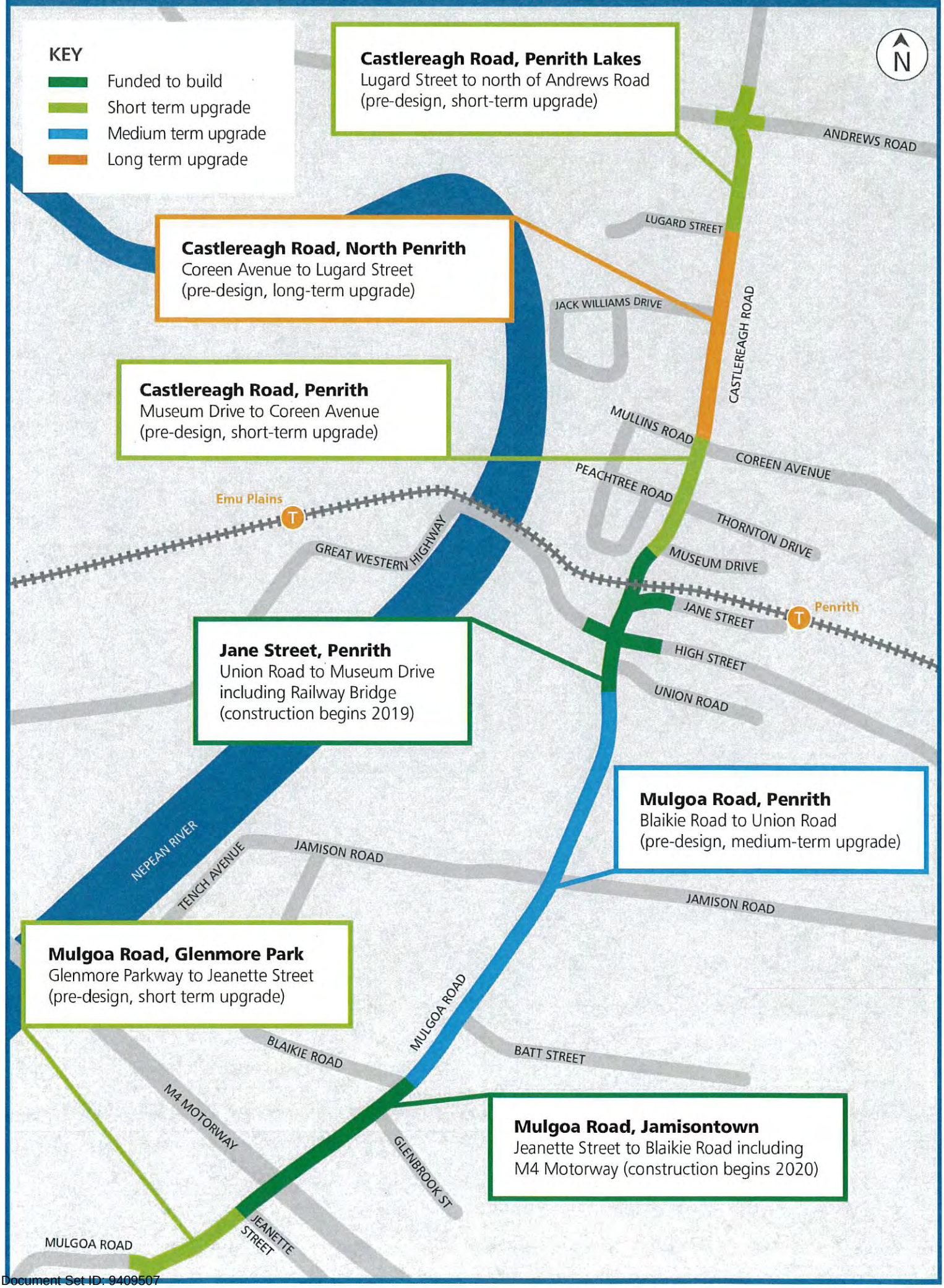
The traffic modelling undertaken took into account the projected future traffic growth, including development in the Penrith Lakes Scheme, both for a normal growth scenario (i.e. 1.3% p.a.) and an accelerated growth scenario (i.e. 2.0% p.a.) as follows:

---

2 *Mulgoa Road/Castlereagh Road Corridor Upgrade Preferred Option Report Hills Environmental April 2017*

3 *Mulgoa Road/Castlereagh Road Corridor Upgrade Transport & Traffic Assessment Study Arcadis January 2017*

Mulgoa Road / Castlereagh Road corridor upgrade



Daily Volumes Andrews Road – Museum Drive Section

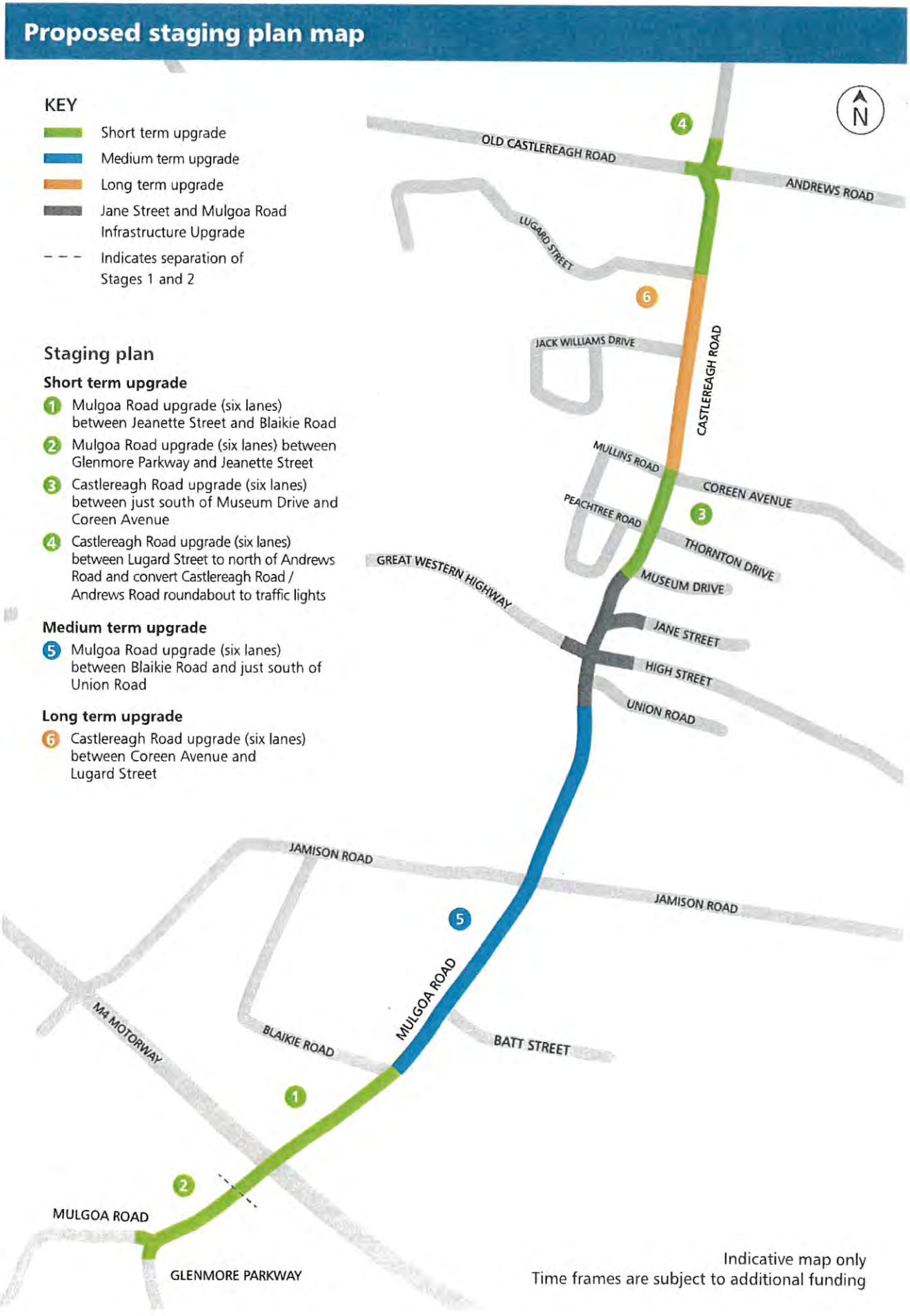
	2015	2026	2036
Normal Growth	36,700	53,000	60,000
Accelerated Growth	36,700	55,000	65,000

The assessed operational performance outcome with the upgrade works completed were as follows:

	2020				2026				2036			
	AM		PM		AM		PM		AM		PM	
	LOS	AVD	LOS	AVD	LOS	AVD	LOS	AVD	LOS	AVD	LOS	AVD
Cureen Ave/ Mullins Road	C	37	C	33	D	43	C	36	D	52	C	35

The proposed staging plan reproduced overleaf indicates that the widening south of Coreen Avenue/Mullins Road intersection will be undertaken in the short term while the widening between Coreen Avenue and Lugard Street will be undertaken “long term”.

Proposed staging plan map



Indicative map only
Time frames are subject to additional funding

4.0 Traffic

The results of the Appendix C surveys of the existing Bunnings access movements during the peak Friday afternoon and Saturday midday trading circumstances are summarised in the following:

	Fri PM	Sat MD
IN	253 vtph	434
OUT	256 vtph	430
Total	509 vtph	864

For the existing retail floor area of 16,133m^2, this represents traffic generation rates of:

Thurs PM	Sat MD
3.15 vtph/100m^2	5.35 vtph/100m^2

These are quite high generation rates when compared to the Bunnings "trend lines" for other existing outlets with similar floor areas (Appendix E). However, these results most likely reflect:

- the peak "Spring" trading circumstances
- the COVID circumstances which has seen Bunnings sales suddenly increase by some 20%, however this phenomena will inevitably subside as the circumstances return to normal in 2021

The evidence of the Appendix E Bunnings traffic generation characteristics also is that the provision of a BM & LSY element does not increase the traffic generation characteristic as very few vehicles are generated by this element. Also, the TTS element is largely for tradespersons with the heaviest activity during weekday mornings and only limited activity in the afternoon and on weekends.

It is assessed that, in terms of normal week to week peak traffic generation, the additional 114m^2 of warehouse floor area, the 1,023m^2 additional TTS area and the provision of a BM&LS element will not result in any perceptible increase in traffic generation than that recorded in the recent September surveys.

Accordingly, it is apparent that there will not be any adverse traffic implications as a result of the proposed alterations and additions scheme.

5.0 Parking

As indicated in Appendix E the normal peak Bunnings parking demand is 1 space per 48 to 55m^2 and Councils DCP specifies a parking requirement for Bulky Goods use of 1 space per 50m^2. It is proposed to provide 389 parking spaces (an increase of 14 spaces) and this equates to 1 space per 40.3m^2 including 8 accessible spaces and 8 trailer spaces.

It is apparent that the proposed parking provision will be quite adequate and appropriate.

6.0 Access, Internal Circulation and Servicing

Access

The existing vehicle accesses will be retained with the western driveway being slightly altered due to the location of the proposed BM & LS element. However, the driveways will continue to satisfactorily provide for carpark access as will the existing truck ingress and egress arrangement as indicated on the Appendix F turning path diagrams.

Internal Circulation

The existing car park arrangement will be modified however the design will accord to the requirements of AS2890.1 & 6 with appropriate bay and aisle provisions and simple 2-way circulation arrangement.

Servicing

The existing constrained Goods Receiving arrangements will be upgraded it is apparent that the servicing provisions will continue to be quite satisfactory with the proposed development scheme (see Appendix F turning path diagrams).

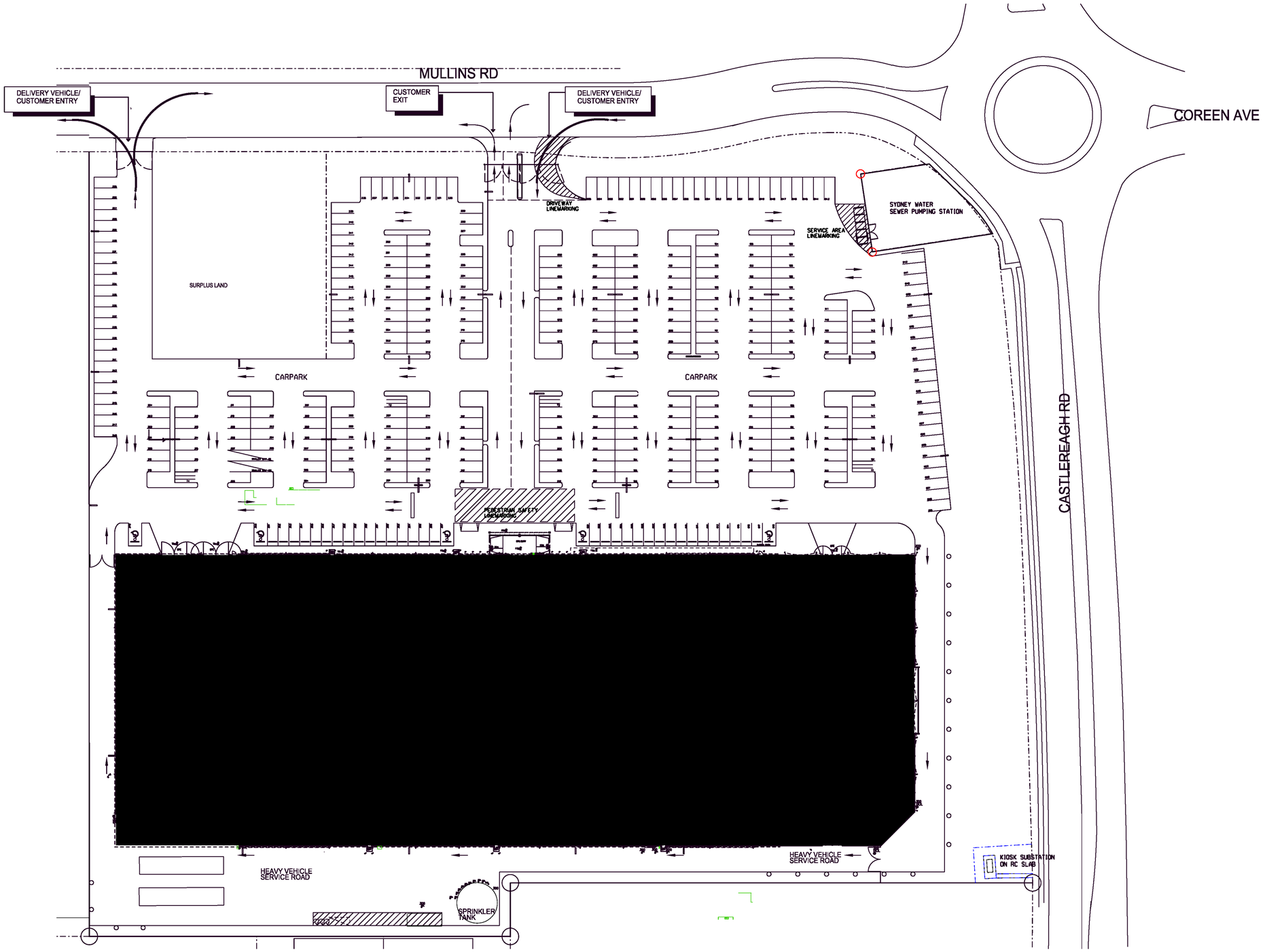
7.0 Conclusion

The proposed alterations and additions to the Bunnings warehouse at North Penrith will upgrade this site which has convenient access to the arterial road system. This assessment has concluded that:

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

Appendix A

Plan of Existing



REFER TO DWG 030 FOR EXISTING SITE AREAS & CARPARKING

DA ISSUE

NOT FOR CONSTRUCTION

NO.	AMENDMENT	DATE	NO.	AMENDMENT	DATE
A	DEVELOPMENT APPLICATION	12.11.20			

CLIENT

BUNNINGS warehouse

JOHN R. BROGAN & ASSOCIATES
PTY. LIMITED
ARCHITECTS, PLANNERS & COMMERCIAL INTERIOR DESIGNERS
EST · 1927
A.B.N. 93 003 284 759

PROPOSED ALTERATIONS & ADDITIONS
BUNNINGS WAREHOUSE PENRITH
2166-2190 CASTLEREAGH RD NSW 2750
CNR MULLINS RD, LOT 1 DP 1067795

EXISTING SITE PLAN

SCALE : 1:500
DATE : JUL 20

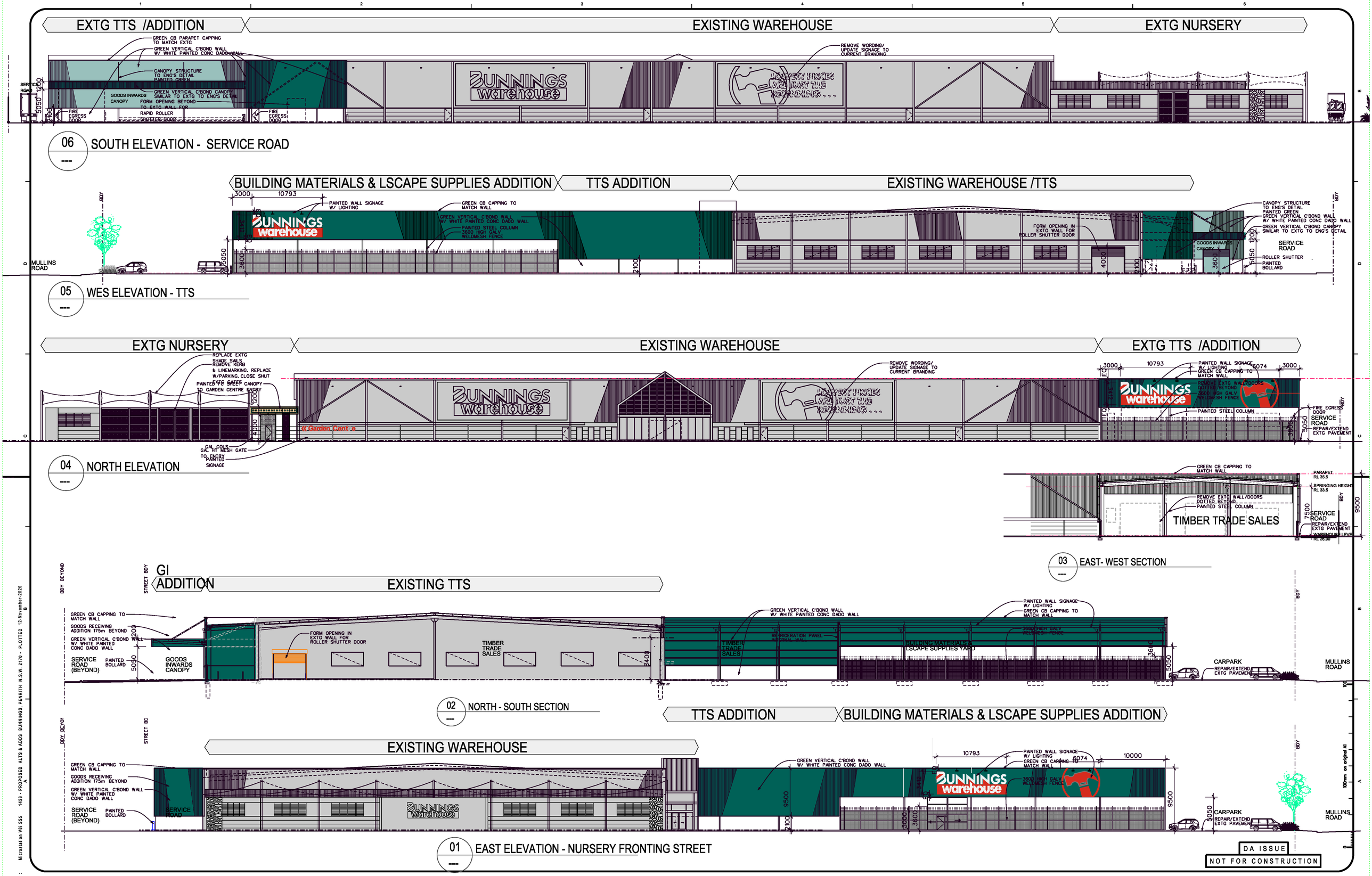
PROJ. NO. 1428
DRG. NO. 010
AMD NO. A

CAD REF : 1428 - PROPOSED ALTS & ADDS BUNNINGS, PENRITH N.S.W. 2170 - PLOTTED 12-November-2020
Microstation V8i SS5

100mm on original A1

Appendix B

Development Plans



NO.	AMENDMENT	DATE
A	DEVELOPMENT APPLICATION	12.11.20

CLIENT

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ARCHITECTS, PLANNERS & COMMERCIAL INTERIOR DESIGNERS
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A.B.N. 93 003 284 759

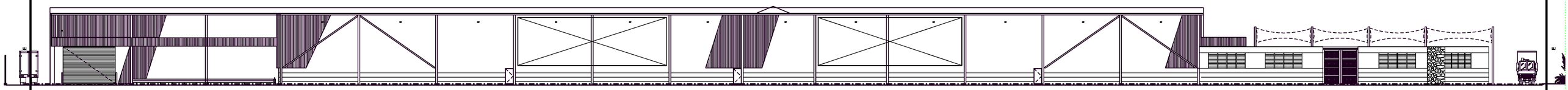
PROPOSED ALTERATIONS & ADDITIONS
BUNNINGS WAREHOUSE PENRITH
2166-2190 CASTLEREAGH RD NSW 2750
CNR MULLINS RD, LOT 1 DP 1067795

SECTIONS & ELEVATIONS

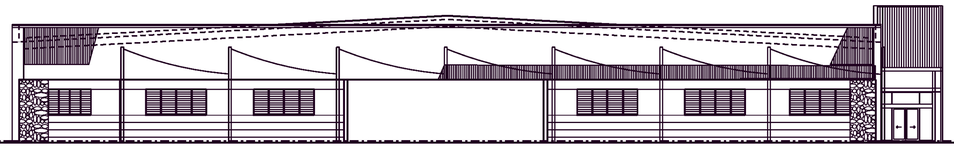
SCALE : 1:500
DATE : JUL 20
PROJ. NO. 1428
DRG. NO. 120
AMD NO. A

CAD REF : Microstation V8i SS5 1428 - PROPOSED ALTS & ADDS BUNNINGS, PENRITH N.S.W. 2170 - PLOTTED 12-November-2020

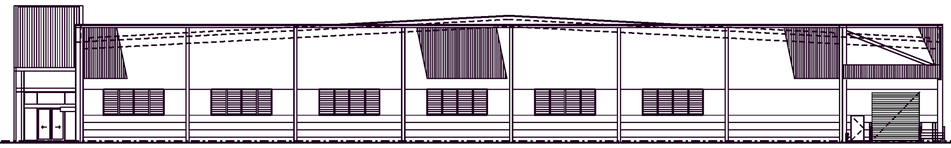
100mm on original A1



06 SOUTH ELEVATION - SERVICE ROAD

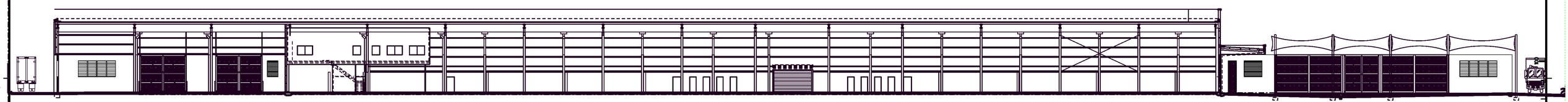


04 EAST ELEVATION - NURSERY FRONTING STREET

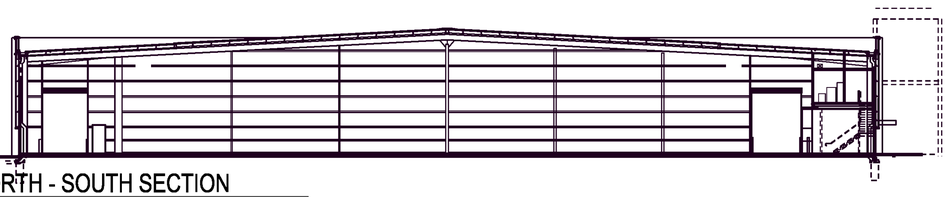


05 WES ELEVATION - TTS

03 NORTH ELEVATION



02 EAST- WEST SECTION



01 NORTH - SOUTH SECTION

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NO.	AMENDMENT	DATE	NO.	AMENDMENT	DATE
A	DEVELOPMENT APPLICATION	12.11.20			

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BUNNINGS warehouse

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PROPOSED ALTERATIONS & ADDITIONS
BUNNINGS WAREHOUSE PENRITH
2166-2190 CASTLEREAGH RD NSW 2750
CNR MULLINS RD, LOT 1 DP 1067795

EXISTING SECTIONS & ELEVATIONS

SCALE : 1:500
DATE : JUL 20
PROJ. NO. 1428
DRG. NO. 022
AMD NO. A

CAD REF : Microstation V8i SS5 1428 - PROPOSED ALTS & ADDS BUNNINGS, PENRITH N.S.W. 2170 - PLOTTED 12-November-2020

100mm on original A1

REWORK EXTG VEHICLE CROSSING TO SUIT SERVICE ROAD ALIGNMENT

CARPARK DRAINAGE & PAVEMENT TO ENGINEER'S DETAIL - REFER CIVIL DRAWINGS

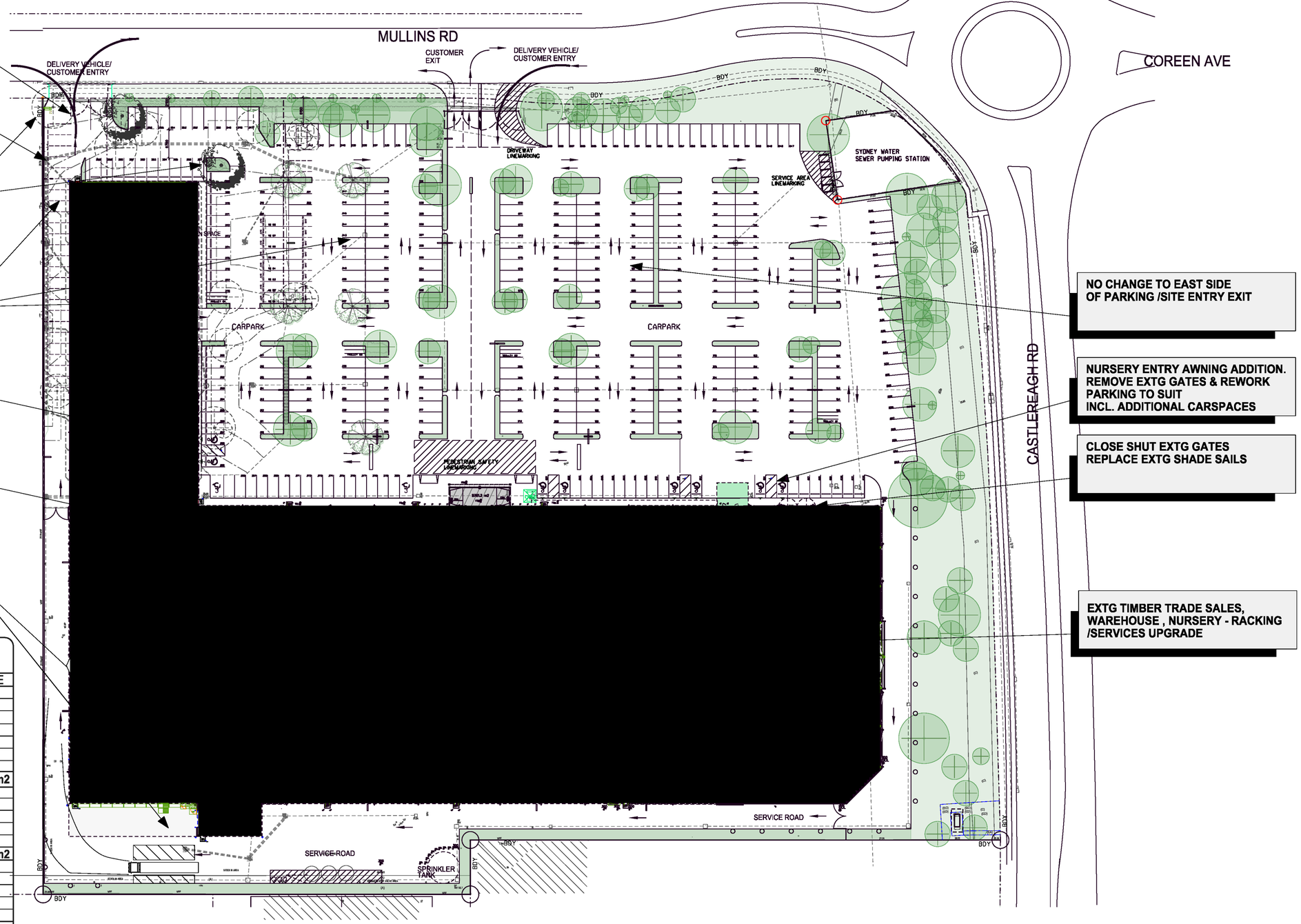
CARPARK TREE PLANTING TO LANDSCAPE ARCHITECT'S DETAIL - REFER TO DETAIL DRAWINGS

ADDITIONAL BUILDING MATERIALS & LANDSCAPE SUPPLIES YARD (WITH ROOF) TO EXTG VACANT LAND . REWORK CARPARKING TO SUIT

REFER DRAWING 100 FOR DETAIL PLAN

EXTEND EXISTING TIMBER TRADE SALES TO NORTH

EXTEND TTS TO SOUTH UNDER EXTG CANOPY. REWORK UNLOADING AREA TO SOUTH W/CANOPY



NO CHANGE TO EAST SIDE OF PARKING /SITE ENTRY EXIT

NURSERY ENTRY AWNING ADDITION. REMOVE EXTG GATES & REWORK PARKING TO SUIT INCL. ADDITIONAL CARSPACES

CLOSE SHUT EXTG GATES REPLACE EXTG SHADE SAILS

EXTG TIMBER TRADE SALES, WAREHOUSE , NURSERY - RACKING /SERVICES UPGRADE

AREA ANALYSIS BUNNINGS PENRITH ALTERATIONS & ADDTIONS

	EXTG	PROPOSED	CHANGE
Main Entry	73.8 m2	N/C	**+ 0**
Warehouse	8687.4 m2	8801.4 m2	**+114**
TOTAL WAREHOUSE AREA	**8 761.2 m2**	**8 875.2 m2**	
Mezzanine (Office)	190 m2	190 m2	**+ 0**
Timber Trade Sales	1863.6 m2	2886.4 m2	**+1022.8**
Building Materials & LS Yard (BMLS)	0 m2	1493.5 m2	**+1493.5**
TOTAL GROUND FLOOR AREA (GFA)	**10 624.8 m2**	**13 255.1 m2**	**+2630.3 m2**
Outdoor Nursery Area	1600 m2	N/C	**+ 0**
Bagged Goods Canopy	909 m2	N/C	**+ 0**
TOTAL NURSERY AREA	**2 509 m2**	**2 509 m2**	**+ 0**
TOTAL BUNNINGS AREA	**13 133.8 m2**	**15 764.1 m2**	**+2630.3 m2**
Standard Carparks - Warehouse Level	360	353	-7
Disabled Carparks	5	8	+3
Trailer Bays	2	8	+6
Timber Trade Sales / BMLS Yard	8	20	+12
TOTAL PARKING	**375 cars**	**389 cars**	**+14 cars**
PARKING RATIO (total area/parking)	**1/35 m2**	**1/40.5 m2**	
Land Size -			
MAIN SITE	38 464.8 m2		
RESIDUAL PAD SITE		2 081 m2	**+2 081 m2**
TOTAL LAND AREA	**38 464.8 m2**	**40 545.8 m2**	**+2 081 m2**

CONCEPT/RACKING PLAN
RP 02 01A RECD 12 OCT 20
- INDICATIVE ONLY - MERCHANDISE RACKING SUBJECT TO CHANGE

DA ISSUE
NOT FOR CONSTRUCTION

NO.	AMENDMENT	DATE	NO.	AMENDMENT	DATE
A	DA ISSUE	12.11.20			

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PROPOSED ALTERATIONS & ADDITIONS
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2166-2190 CASTLEREAGH RD NSW 2750
CNR MULLINS RD, LOT 1 DP 1067795

SITE PLAN

SCALE : 1:500
DATE : JUL 20
PROJ. NO. 1428
DRG. NO. 030
AMD NO. A

CAD REF : 1428 - PROPOSED ALTS & ADDS BUNNINGS, PENRITH N.S.W. 2170 - PLOTTED 12-November-2020 Microstation V8i SS5

100mm on original A1

Appendix C

Traffic Survey Results

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY trafficsurvey.com.au

Intersection of Coreen Ave and Castlereagh Rd, North Penrith

GPS -33.743189, 150.691985

Date:	Fri 04/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	Castlereagh Rd
East:	Coreen Ave
South:	Castlereagh Rd
West:	Mullins Rd

Survey Period	AM:	3:00 PM-3:00 PM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	#REF!
	PM:	3:30 PM-4:30 PM

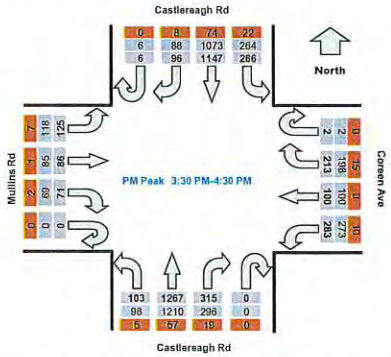
All Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
15:00	15:15	0	27	282	71	0	65	15	52	0	81	306	25	1	17	19	25	3992	
15:15	15:30	0	30	306	52	0	67	23	54	1	78	274	18	1	17	25	29	4071	
15:30	15:45	1	26	298	62	0	40	26	68	0	81	307	28	0	18	20	31	4100	Peak
15:45	16:00	1	21	302	81	0	71	23	64	0	83	291	20	0	12	21	35	4064	
16:00	16:15	3	29	302	74	1	48	31	77	0	81	337	22	0	18	21	21	4018	
16:15	16:30	1	20	245	69	1	54	20	74	0	70	332	33	0	23	24	38	3902	
16:30	16:45	1	18	249	68	0	58	25	53	0	66	341	24	1	19	18	29	3813	
16:45	17:00	5	21	278	60	0	68	12	59	0	62	333	24	0	16	18	23	3668	
17:00	17:15	4	11	261	65	0	61	12	54	0	65	331	17	0	21	20	27	3550	
17:15	17:30	4	11	219	52	0	73	10	49	0	54	373	14	0	23	16	17		
17:30	17:45	4	10	227	60	0	47	10	50	0	48	313	22	0	11	14	9		
17:45	18:00	10	16	243	45	0	78	15	41	0	69	281	16	0	17	16	14		

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
15:30	16:30	6	96	1147	286	2	213	100	283	0	315	1267	103	0	71	86	125	4100

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic
Total
Light
Heavy



Light Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
15:00	15:15		26	281	68		60	15	48		76	291	23	1	14	19	22
15:15	15:30		30	296	49		63	22	52	1	76	255	18	1	15	24	27
15:30	15:45	1	23	272	54		37	26	65		75	291	28		17	19	30
15:45	16:00	1	20	285	76		66	23	62		79	268	19		11	21	33
16:00	16:15	3	27	289	68	1	47	31	73		77	326	19		18	21	19
16:15	16:30	1	18	227	66	1	48	20	73		65	325	32		23	24	36
16:30	16:45	1	17	234	64		54	22	49		64	326	18	1	19	18	27
16:45	17:00	5	17	272	57		65	11	57		60	317	17		15	17	23
17:00	17:15	4	11	254	65		59	12	52		63	322	13		21	19	26
17:15	17:30	4	10	213	50		73	10	48		49	359	9		20	16	17
17:30	17:45	4	10	220	60		47	10	47		48	309	18		11	14	8
17:45	18:00	10	16	240	43		78	15	41		65	275	11		17	16	14

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
15:30	16:30	6	88	1073	264	2	198	100	273	0	296	1210	98	0	69	85	118	3880

Heavy Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
15:00	15:15		1	1	3		5		4		5	15	2		3		3
15:15	15:30			10	3		4	1	2		2	19			2	1	2
15:30	15:45		3	26	8		3		3		6	16			1	1	1
15:45	16:00		1	17	5		5		2		4	23	1		1		2
16:00	16:15		2	13	6		1		4		4	11	3				2
16:15	16:30		2	18	3		6		1		5	7	1				2
16:30	16:45		1	15	4		4	3	4		2	15	6				2
16:45	17:00		4	6	3		3	1	2		2	16	7		1	1	
17:00	17:15			7			2		2		2	9	4			1	1
17:15	17:30		1	6	2				1		5	14	5		3		
17:30	17:45			7					3			4	4				1
17:45	18:00			3	2						4	6	5				

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
15:30	16:30	0	8	74	22	0	15	0	10	0	19	57	5	0	2	1	7	220

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Mullins Rd and Access 1, North Penrith

GPS -33.742804, 150.690737

Date:	Fri 04/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	N/A
East:	Mullins Rd
South:	Access 1
West:	Mullins Rd

Survey Period	AM:	3:00 PM-3:00 PM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	#REF!
	PM:	3:00 PM-4:00 PM

All Vehicles

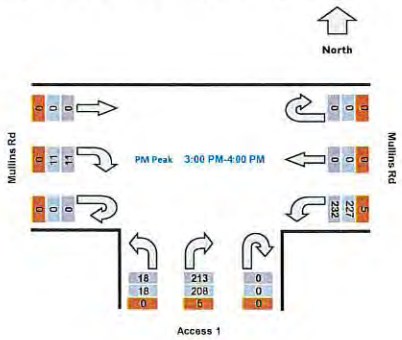
Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
15:00	15:15	0	N/A	63	0	50	4	0	0	N/A	474	Peak
15:15	15:30	0	N/A	60	0	60	3	0	5	N/A	463	
15:30	15:45	0	N/A	64	0	51	5	0	3	N/A	465	
15:45	16:00	0	N/A	45	0	52	6	0	3	N/A	449	
16:00	16:15	0	N/A	56	0	48	2	0	0	N/A	427	
16:15	16:30	0	N/A	58	0	61	6	0	5	N/A	407	
16:30	16:45	0	N/A	49	0	53	4	0	1	N/A	340	
16:45	17:00	0	N/A	35	0	43	3	0	3	N/A	301	
17:00	17:15	0	N/A	32	0	47	3	0	4	N/A	289	
17:15	17:30	0	N/A	20	0	39	2	0	2	N/A		
17:30	17:45	0	N/A	39	0	25	4	0	0	N/A		
17:45	18:00	0	N/A	36	0	35	0	0	1	N/A		

Peak Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:00	16:00	0	0	232	0	213	18	0	11	0	474

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Light Vehicles

Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
15:00	15:15	0	N/A	63	0	48	4	0	0	N/A
15:15	15:30	0	N/A	57	0	60	3	0	5	N/A
15:30	15:45	0	N/A	62	0	49	5	0	3	N/A
15:45	16:00	0	N/A	45	0	51	6	0	3	N/A
16:00	16:15	0	N/A	55	0	48	2	0	0	N/A
16:15	16:30	0	N/A	57	0	60	6	0	5	N/A
16:30	16:45	0	N/A	46	0	53	4	0	1	N/A
16:45	17:00	0	N/A	34	0	42	3	0	3	N/A
17:00	17:15	0	N/A	32	0	44	3	0	3	N/A
17:15	17:30	0	N/A	20	0	38	2	0	2	N/A
17:30	17:45	0	N/A	38	0	24	4	0	0	N/A
17:45	18:00	0	N/A	36	0	35	0	0	1	N/A

Peak Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:00	16:00	0	0	227	0	208	18	0	11	0	464

Heavy Vehicles

Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
15:00	15:15	0	N/A	0	0	2	0	0	0	N/A
15:15	15:30	0	N/A	3	0	0	0	0	0	N/A
15:30	15:45	0	N/A	2	0	2	0	0	0	N/A
15:45	16:00	0	N/A	0	0	1	0	0	0	N/A
16:00	16:15	0	N/A	1	0	0	0	0	0	N/A
16:15	16:30	0	N/A	1	0	1	0	0	0	N/A
16:30	16:45	0	N/A	3	0	0	0	0	0	N/A
16:45	17:00	0	N/A	1	0	1	0	0	0	N/A
17:00	17:15	0	N/A	0	0	3	0	0	1	N/A
17:15	17:30	0	N/A	0	0	1	0	0	0	N/A
17:30	17:45	0	N/A	1	0	1	0	0	0	N/A
17:45	18:00	0	N/A	0	0	0	0	0	0	N/A

Peak Time		East Approach Mullins Rd			South Approach Access 1			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:00	16:00	0	0	5	0	5	0	0	0	0	10

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY trafficsurvey.com.au

Intersection of Mullins Rd and Access 2, North Penrith

GPS -33.742519, 150.689772

Date:	Fri 04/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	N/A
East:	Mullins Rd
South:	Access 2
West:	Mullins Rd

Survey Period	AM:	3:00 PM-3:00 PM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	#REF!
	PM:	3:30 PM-4:30 PM

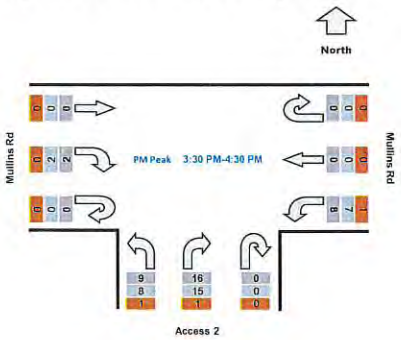
All Vehicles

Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
15:00	15:15	0	N/A	0	0	1	3	0	1	N/A	28	
15:15	15:30	0	N/A	2	0	2	1	0	0	N/A	31	
15:30	15:45	0	N/A	0	0	6	4	0	1	N/A	35	Peak
15:45	16:00	0	N/A	2	0	2	3	0	0	N/A	29	
16:00	16:15	0	N/A	4	0	3	0	0	1	N/A	26	
16:15	16:30	0	N/A	2	0	5	2	0	0	N/A	19	
16:30	16:45	0	N/A	0	0	3	1	0	1	N/A	10	
16:45	17:00	0	N/A	1	0	2	0	0	1	N/A	6	
17:00	17:15	0	N/A	0	0	1	0	0	0	N/A	4	
17:15	17:30	0	N/A	0	0	0	0	0	0	N/A		
17:30	17:45	0	N/A	0	0	1	0	0	0	N/A		
17:45	18:00	0	N/A	0	0	1	1	0	0	N/A		

Peak Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:30	16:30	0	0	8	0	16	9	0	2	0	35

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic
Total
Light
Heavy



Light Vehicles

Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
15:00	15:15	0	N/A	0	0	1	3	0	1	N/A
15:15	15:30	0	N/A	2	0	2	1	0	0	N/A
15:30	15:45	0	N/A	0	0	5	4	0	1	N/A
15:45	16:00	0	N/A	1	0	2	2	0	0	N/A
16:00	16:15	0	N/A	4	0	3	0	0	1	N/A
16:15	16:30	0	N/A	2	0	5	2	0	0	N/A
16:30	16:45	0	N/A	0	0	1	1	0	1	N/A
16:45	17:00	0	N/A	1	0	2	0	0	1	N/A
17:00	17:15	0	N/A	0	0	1	0	0	0	N/A
17:15	17:30	0	N/A	0	0	0	0	0	0	N/A
17:30	17:45	0	N/A	0	0	0	0	0	0	N/A
17:45	18:00	0	N/A	0	0	1	1	0	0	N/A

Peak Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:30	16:30	0	0	7	0	15	8	0	2	0	32

Heavy Vehicles

Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
15:00	15:15	0	N/A	0	0	0	0	0	0	N/A
15:15	15:30	0	N/A	0	0	0	0	0	0	N/A
15:30	15:45	0	N/A	0	0	1	0	0	0	N/A
15:45	16:00	0	N/A	1	0	0	1	0	0	N/A
16:00	16:15	0	N/A	0	0	0	0	0	0	N/A
16:15	16:30	0	N/A	0	0	0	0	0	0	N/A
16:30	16:45	0	N/A	0	0	2	0	0	0	N/A
16:45	17:00	0	N/A	0	0	0	0	0	0	N/A
17:00	17:15	0	N/A	0	0	0	0	0	0	N/A
17:15	17:30	0	N/A	0	0	0	0	0	0	N/A
17:30	17:45	0	N/A	0	0	1	0	0	0	N/A
17:45	18:00	0	N/A	0	0	0	0	0	0	N/A

Peak Time		East Approach Mullins Rd			South Approach Access 2			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
15:30	16:30	0	0	1	0	1	1	0	0	0	3

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY trafficsurvey.com.au

Intersection of Coreen Ave and Castlereagh Rd, North Penrith

GPS	-33.743189, 150.691985
Date:	Sat 05/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	Castlereagh Rd
East:	Coreen Ave
South:	Castlereagh Rd
West:	Mullins Rd

Survey Period	AM:	12:00 PM-12:00 PM
	PM:	12:00 PM-3:00 PM
Traffic Peak	AM:	N/A
	PM:	1:45 PM-2:45 PM

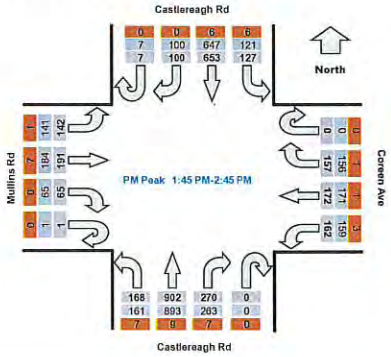
All Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
12:00	12:15	0	33	99	44	0	65	24	42	0	87	238	41	0	11	39	43	3097	
12:15	12:30	0	14	104	37	0	55	33	43	0	80	262	62	1	19	37	36	3101	
12:30	12:45	2	11	136	50	0	41	25	40	0	90	255	49	0	25	44	44	3069	
12:45	13:00	0	4	152	36	0	32	36	42	0	65	234	37	0	18	38	42	3028	
13:00	13:15	1	6	167	52	0	35	30	33	0	72	236	45	0	17	43	33	3085	
13:15	13:30	4	45	102	22	0	53	44	33	0	70	221	46	0	24	48	39	3068	
13:30	13:45	2	29	168	33	0	28	34	33	0	53	250	31	0	17	54	39	3071	
13:45	14:00	3	35	195	27	0	37	48	28	0	73	208	41	0	11	52	35	3117	Peak
14:00	14:15	2	20	162	25	0	37	38	45	0	61	218	43	1	18	51	32	3101	
14:15	14:30	1	11	123	41	0	42	44	47	0	70	235	43	0	18	44	35		
14:30	14:45	1	34	173	34	0	41	42	42	0	66	241	41	0	18	44	40		
14:45	15:00	4	38	153	38	0	28	35	24	0	72	257	39	0	18	34	37		

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
13:45	14:45	7	100	653	127	0	157	172	162	0	270	902	168	1	65	191	142	3117

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic
Total
Light
Heavy



Light Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
12:00	12:15	0	32	95	43	0	60	24	42	0	81	235	40	0	11	39	41
12:15	12:30	0	14	103	35	0	55	33	42	0	78	256	61	1	19	36	36
12:30	12:45	2	10	136	47	0	39	25	37	0	88	251	49	0	24	43	43
12:45	13:00	0	4	145	35	0	31	36	42	0	65	227	36	0	18	37	42
13:00	13:15	1	6	166	50	0	33	30	33	0	71	231	45	0	17	42	32
13:15	13:30	4	45	101	22	0	53	44	33	0	67	218	44	0	24	48	37
13:30	13:45	2	27	163	32	0	28	34	33	0	50	247	28	0	17	52	39
13:45	14:00	3	35	194	25	0	37	48	27	0	71	205	39	0	11	50	35
14:00	14:15	2	20	158	24	0	37	38	44	0	60	215	43	1	18	48	32
14:15	14:30	1	11	123	40	0	41	44	46	0	68	234	38	0	18	44	34
14:30	14:45	1	34	172	32	0	41	41	42	0	64	239	41	0	18	42	40
14:45	15:00	4	38	151	36	0	27	34	24	0	71	253	36	0	17	33	37

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
13:45	14:45	7	100	647	121	0	156	171	159	0	263	893	161	1	65	184	141	3069

Heavy Vehicles

Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
12:00	12:15	0	1	4	1	0	5	0	0	0	6	3	1	0	0	0	2
12:15	12:30	0	0	1	2	0	0	0	1	0	2	6	1	0	0	1	0
12:30	12:45	0	1	0	3	0	2	0	3	0	2	4	0	0	1	1	1
12:45	13:00	0	0	7	1	0	1	0	0	0	0	7	1	0	0	1	0
13:00	13:15	0	0	1	2	0	2	0	0	0	1	5	0	0	0	1	1
13:15	13:30	0	0	1	0	0	0	0	0	0	3	3	2	0	0	0	2
13:30	13:45	0	2	5	1	0	0	0	0	0	3	3	3	0	0	2	0
13:45	14:00	0	0	1	2	0	0	0	1	0	2	3	2	0	0	2	0
14:00	14:15	0	0	4	1	0	0	0	1	0	1	3	0	0	0	3	0
14:15	14:30	0	0	0	1	0	1	0	1	0	2	1	5	0	0	0	1
14:30	14:45	0	0	1	2	0	0	1	0	0	2	2	0	0	0	2	0
14:45	15:00	0	0	2	2	0	1	1	0	0	1	4	3	0	1	1	0

Peak Time		North Approach Castlereagh Rd				East Approach Coreen Ave				South Approach Castlereagh Rd				West Approach Mullins Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
13:45	14:45	0	0	6	6	0	1	1	3	0	7	9	7	0	0	7	1	48

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Mullins Rd and Eastern Access, North Pe

GPS -33.742804, 150.690737

Date:	Sat 05/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	N/A
East:	Mullins Rd
South:	Eastern Access
West:	Mullins Rd

Survey Period	AM:	12:00 PM-12:00 PM
	PM:	12:00 PM-3:00 PM
Traffic Peak	AM:	N/A
	PM:	1:15 PM-2:15 PM

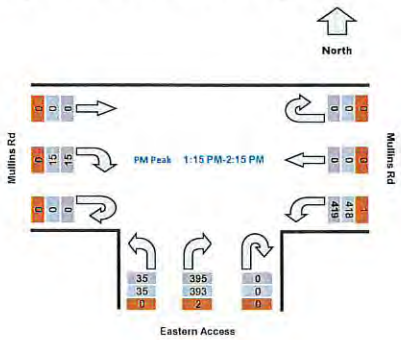
All Vehicles

Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
12:00	12:15	0	N/A	98	0	96	5	0	4	N/A	805	
12:15	12:30	0	N/A	101	0	90	5	0	3	N/A	781	
12:30	12:45	0	N/A	89	0	103	8	0	5	N/A	813	
12:45	13:00	0	N/A	85	0	101	9	0	3	N/A	816	
13:00	13:15	0	N/A	92	0	77	5	0	5	N/A	834	
13:15	13:30	0	N/A	118	0	102	7	0	4	N/A	864	Peak
13:30	13:45	0	N/A	84	0	112	7	0	5	N/A	833	
13:45	14:00	0	N/A	118	0	84	9	0	5	N/A	845	
14:00	14:15	0	N/A	99	0	97	12	0	1	N/A	815	
14:15	14:30	0	N/A	91	0	95	10	0	4	N/A		
14:30	14:45	0	N/A	115	0	94	6	0	5	N/A		
14:45	15:00	0	N/A	83	0	94	4	0	5	N/A		

Peak Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
13:15	14:15	0	0	419	0	395	35	0	15	0	864

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration

Graphic
Total
Light
Heavy



Light Vehicles

Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
12:00	12:15	0	N/A	98	0	95	5	0	4	N/A
12:15	12:30	0	N/A	100	0	90	5	0	3	N/A
12:30	12:45	0	N/A	89	0	102	8	0	5	N/A
12:45	13:00	0	N/A	82	0	100	9	0	3	N/A
13:00	13:15	0	N/A	91	0	75	5	0	5	N/A
13:15	13:30	0	N/A	117	0	101	7	0	4	N/A
13:30	13:45	0	N/A	84	0	111	7	0	5	N/A
13:45	14:00	0	N/A	118	0	84	9	0	5	N/A
14:00	14:15	0	N/A	99	0	97	12	0	1	N/A
14:15	14:30	0	N/A	90	0	95	10	0	4	N/A
14:30	14:45	0	N/A	114	0	94	6	0	4	N/A
14:45	15:00	0	N/A	82	0	93	4	0	5	N/A

Peak Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
13:15	14:15	0	0	418	0	393	35	0	15	0	861

Heavy Vehicles

Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
12:00	12:15	0	N/A	0	0	1	0	0	0	N/A
12:15	12:30	0	N/A	1	0	0	0	0	0	N/A
12:30	12:45	0	N/A	0	0	1	0	0	0	N/A
12:45	13:00	0	N/A	3	0	1	0	0	0	N/A
13:00	13:15	0	N/A	1	0	2	0	0	0	N/A
13:15	13:30	0	N/A	1	0	1	0	0	0	N/A
13:30	13:45	0	N/A	0	0	1	0	0	0	N/A
13:45	14:00	0	N/A	0	0	0	0	0	0	N/A
14:00	14:15	0	N/A	0	0	0	0	0	0	N/A
14:15	14:30	0	N/A	1	0	0	0	0	0	N/A
14:30	14:45	0	N/A	1	0	0	0	0	1	N/A
14:45	15:00	0	N/A	1	0	1	0	0	0	N/A

Peak Time		East Approach Mullins Rd			uth Approach Eastern Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
13:15	14:15	0	0	1	0	2	0	0	0	0	3

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Mullins Rd and Western Access, North Pe

GPS -33.742519, 150.689772

Date:	Sat 05/09/20
Weather:	Overcast
Suburban:	North Penrith
Customer:	TTPA

North:	N/A
East:	Mullins Rd
South:	Western Access
West:	Mullins Rd

Survey Period	AM:	12:00 PM-12:00 PM
	PM:	12:00 PM-3:00 PM
Traffic Peak	AM:	N/A
	PM:	12:00 PM-1:00 PM

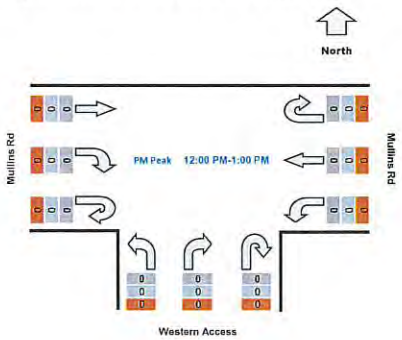
All Vehicles

Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
12:00	12:15	0	N/A	0	0	0	0	0	0	N/A	0	Peak
12:15	12:30	0	N/A	0	0	0	0	0	0	N/A	0	Peak
12:30	12:45	0	N/A	0	0	0	0	0	0	N/A	0	Peak
12:45	13:00	0	N/A	0	0	0	0	0	0	N/A	0	Peak
13:00	13:15	0	N/A	0	0	0	0	0	0	N/A	0	Peak
13:15	13:30	0	N/A	0	0	0	0	0	0	N/A	0	Peak
13:30	13:45	0	N/A	0	0	0	0	0	0	N/A	0	Peak
13:45	14:00	0	N/A	0	0	0	0	0	0	N/A	0	Peak
14:00	14:15	0	N/A	0	0	0	0	0	0	N/A	0	Peak
14:15	14:30	0	N/A	0	0	0	0	0	0	N/A		
14:30	14:45	0	N/A	0	0	0	0	0	0	N/A		
14:45	15:00	0	N/A	0	0	0	0	0	0	N/A		

Peak Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
12:00	13:00	0	0	0	0	0	0	0	0	0	0

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic
Total
Light
Heavy



Light Vehicles

Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
12:00	12:15	0	N/A	0	0	0	0	0	0	N/A
12:15	12:30	0	N/A	0	0	0	0	0	0	N/A
12:30	12:45	0	N/A	0	0	0	0	0	0	N/A
12:45	13:00	0	N/A	0	0	0	0	0	0	N/A
13:00	13:15	0	N/A	0	0	0	0	0	0	N/A
13:15	13:30	0	N/A	0	0	0	0	0	0	N/A
13:30	13:45	0	N/A	0	0	0	0	0	0	N/A
13:45	14:00	0	N/A	0	0	0	0	0	0	N/A
14:00	14:15	0	N/A	0	0	0	0	0	0	N/A
14:15	14:30	0	N/A	0	0	0	0	0	0	N/A
14:30	14:45	0	N/A	0	0	0	0	0	0	N/A
14:45	15:00	0	N/A	0	0	0	0	0	0	N/A

Peak Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
12:00	13:00	0	0	0	0	0	0	0	0	0	0

Heavy Vehicles

Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
12:00	12:15	0	0	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0	0	0
13:30	13:45	0	0	0	0	0	0	0	0	0
13:45	14:00	0	0	0	0	0	0	0	0	0
14:00	14:15	0	0	0	0	0	0	0	0	0
14:15	14:30	0	0	0	0	0	0	0	0	0
14:30	14:45	0	0	0	0	0	0	0	0	0
14:45	15:00	0	0	0	0	0	0	0	0	0

Peak Time		East Approach Mullins Rd			uth Approach Western Acce			West Approach Mullins Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
12:00	13:00	0	0	0	0	0	0	0	0	0	0

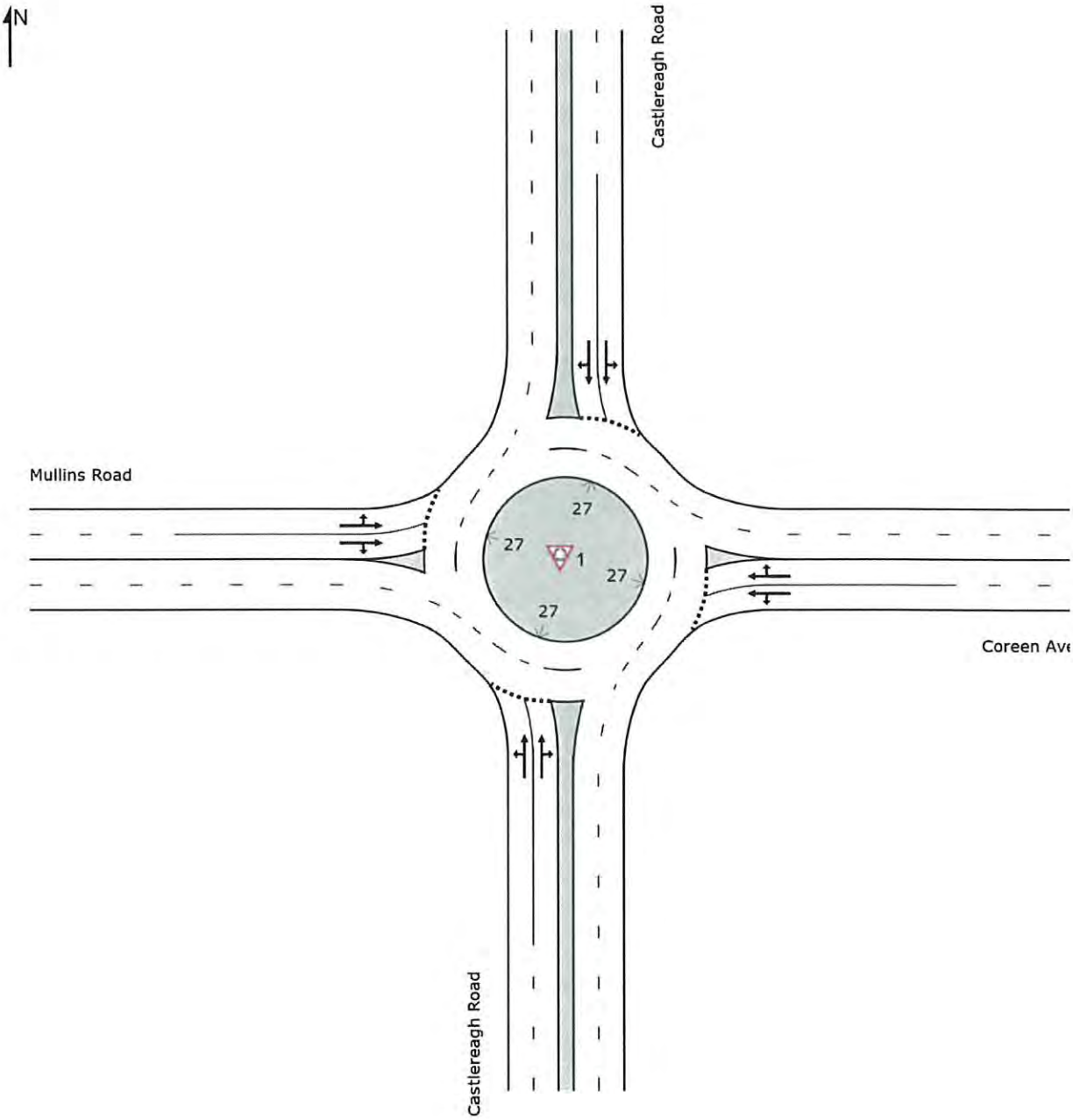
Appendix D

SIDRA Results

SITE LAYOUT

Site: 1 [Castlereagh Rd & Mullins Rd]

Castlereagh Road / Mullins Road / Coreen Avenue, North Penrith
Site Category: Bunnings North Penrith
Roundabout



Organisation: TRANSPORT AND TRAFFIC PLANNING ASSOCIATES | Created: Tuesday, 22 September 2020 2:24:11 PM
Project: Not Saved

MOVEMENT SUMMARY

Site: 1 [Castlereagh Rd & Mullins Rd FRIDAY PM]

Castlereagh Road / Mullins Road / Coreen Avenue, North Penrith
Site Category: Bunnings North Penrith
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Road												
1	L2	108	5.0	0.941	18.6	LOS B	21.6	174.7	1.00	1.37	1.94	34.5
2	T1	1334	20.0	0.941	20.0	LOS B	21.6	174.7	1.00	1.39	1.98	43.2
3	R2	332	15.0	0.941	26.6	LOS B	20.7	166.9	1.00	1.43	2.03	40.8
Approach		1774	18.1	0.941	21.1	LOS B	21.6	174.7	1.00	1.40	1.99	42.3
East: Coreen Avenue												
4	L2	298	15.0	0.744	16.5	LOS B	6.1	47.3	0.97	1.14	1.42	43.5
5	T1	105	5.0	0.744	17.0	LOS B	6.1	47.3	0.96	1.14	1.41	40.5
6	R2	224	15.0	0.744	24.7	LOS B	5.2	41.0	0.94	1.13	1.40	43.9
6u	U	2	0.0	0.744	26.1	LOS B	5.2	41.0	0.94	1.13	1.40	44.6
Approach		629	13.3	0.744	19.5	LOS B	6.1	47.3	0.96	1.14	1.41	43.3
North: Castlereagh Road												
7	L2	301	15.0	0.913	17.5	LOS B	17.7	143.4	1.00	1.34	1.83	45.8
8	T1	1207	20.0	0.913	18.7	LOS B	17.7	143.4	1.00	1.36	1.87	44.1
9	R2	101	5.0	0.913	24.4	LOS B	16.8	135.8	1.00	1.39	1.91	29.5
9u	U	6	0.0	0.913	26.5	LOS B	16.8	135.8	1.00	1.39	1.91	47.4
Approach		1616	18.1	0.913	18.9	LOS B	17.7	143.4	1.00	1.36	1.87	43.4
West: Mullins Road												
10	L2	132	5.0	0.454	14.0	LOS A	3.0	21.6	0.96	1.03	1.12	43.6
11	T1	91	5.0	0.454	15.6	LOS B	3.0	21.6	0.93	1.02	1.10	42.1
12	R2	75	5.0	0.454	22.6	LOS B	2.5	18.2	0.91	1.02	1.08	35.3
Approach		297	5.0	0.454	16.7	LOS B	3.0	21.6	0.94	1.02	1.10	41.2
All Vehicles		4316	16.5	0.941	19.7	LOS B	21.6	174.7	0.99	1.32	1.80	42.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Castlereagh Rd & Mullins Rd SATURDAY MD]

Castlereagh Road / Mullins Road / Coreen Avenue, North Penrith
Site Category: Bunnings North Penrith
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Road												
1	L2	177	5.0	0.739	8.4	LOS A	7.5	60.3	0.81	0.92	1.03	44.1
2	T1	949	20.0	0.739	9.2	LOS A	7.5	60.3	0.81	0.95	1.05	50.9
3	R2	284	15.0	0.739	15.0	LOS B	7.3	59.1	0.82	1.00	1.08	48.9
Approach		1411	17.1	0.739	10.3	LOS A	7.5	60.3	0.81	0.96	1.05	49.9
East: Coreen Avenue												
4	L2	171	15.0	0.348	6.7	LOS A	1.8	13.8	0.71	0.72	0.71	50.6
5	T1	181	5.0	0.348	6.7	LOS A	1.8	13.8	0.71	0.77	0.72	49.8
6	R2	165	15.0	0.348	13.0	LOS A	1.7	13.2	0.71	0.86	0.74	51.4
Approach		517	11.5	0.348	8.7	LOS A	1.8	13.8	0.71	0.78	0.72	50.7
North: Castlereagh Road												
7	L2	134	15.0	0.524	7.2	LOS A	3.5	28.7	0.69	0.76	0.78	52.2
8	T1	687	20.0	0.524	7.6	LOS A	3.5	28.7	0.70	0.79	0.79	52.1
9	R2	105	5.0	0.524	12.8	LOS A	3.4	27.4	0.70	0.83	0.81	33.9
9u	U	7	0.0	0.524	15.0	LOS B	3.4	27.4	0.70	0.83	0.81	54.8
Approach		934	17.4	0.524	8.2	LOS A	3.5	28.7	0.70	0.79	0.79	49.7
West: Mullins Road												
10	L2	149	5.0	0.406	9.0	LOS A	2.5	18.0	0.86	0.94	0.96	48.1
11	T1	201	5.0	0.406	9.9	LOS A	2.5	18.0	0.85	0.95	0.96	47.7
12	R2	68	5.0	0.406	16.1	LOS B	2.2	16.0	0.84	0.96	0.96	42.1
12u	U	1	0.0	0.406	18.1	LOS B	2.2	16.0	0.84	0.96	0.96	24.8
Approach		420	5.0	0.406	10.6	LOS A	2.5	18.0	0.85	0.95	0.96	47.0
All Vehicles		3281	14.8	0.739	9.5	LOS A	7.5	60.3	0.77	0.88	0.91	49.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

Appendix E

Bunnings Traffic Characteristics

[redacted]

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 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*

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:

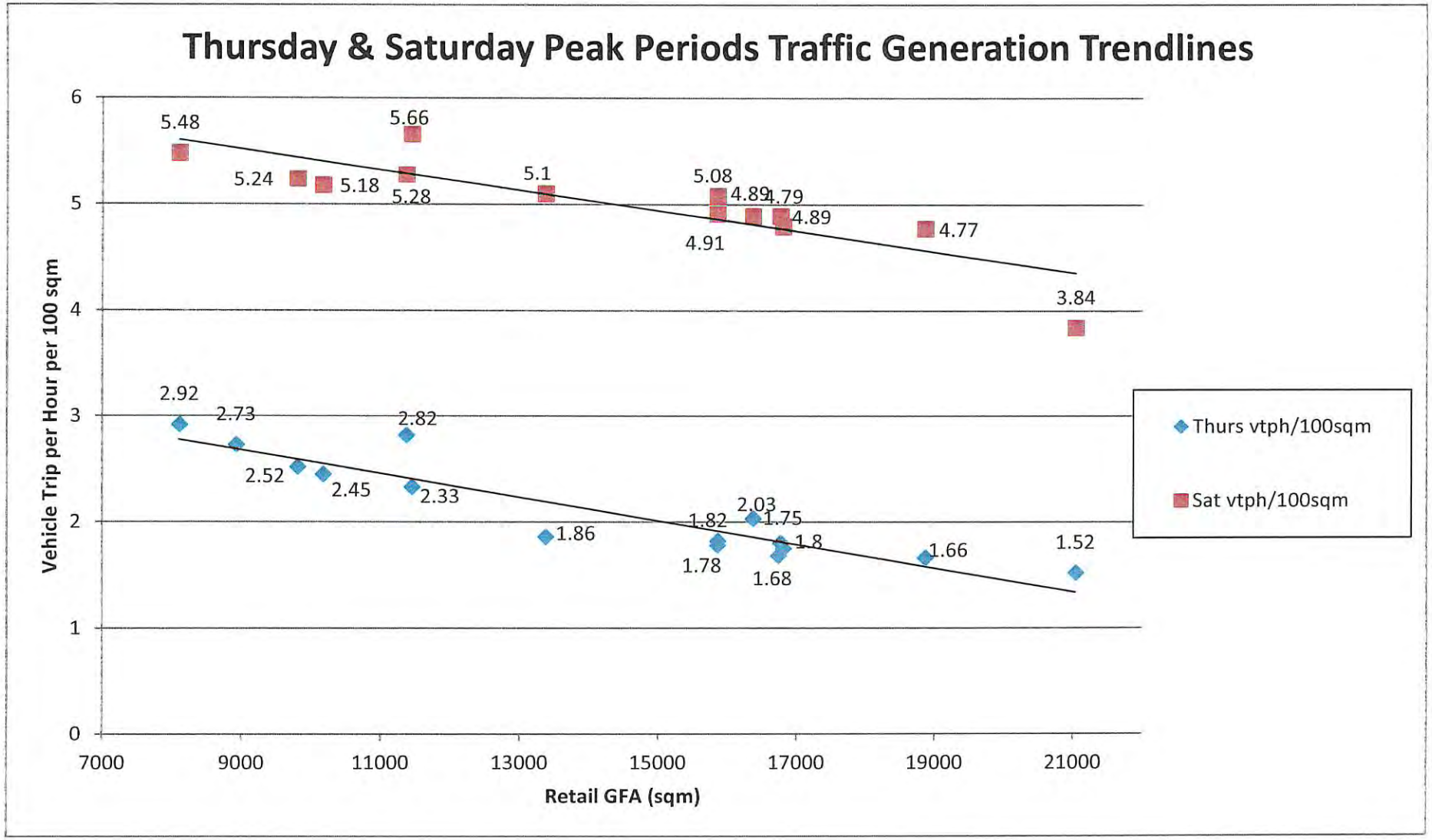
		Peak Parking	**Cars per m^2**
Balgowlah	8,106m^2	163 cars	1 space per 50m^2
Parramatta	9,800m^2	196 cars	1 space per 50m^2
Chatswood	11,443m^2	234 cars	1 space per 49m^2
Bankstown	15,853m^2	285 cars	1 space per 55.6m^2
Castle Hill	18,860m^2	397 cars	1 space per 48m^2

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

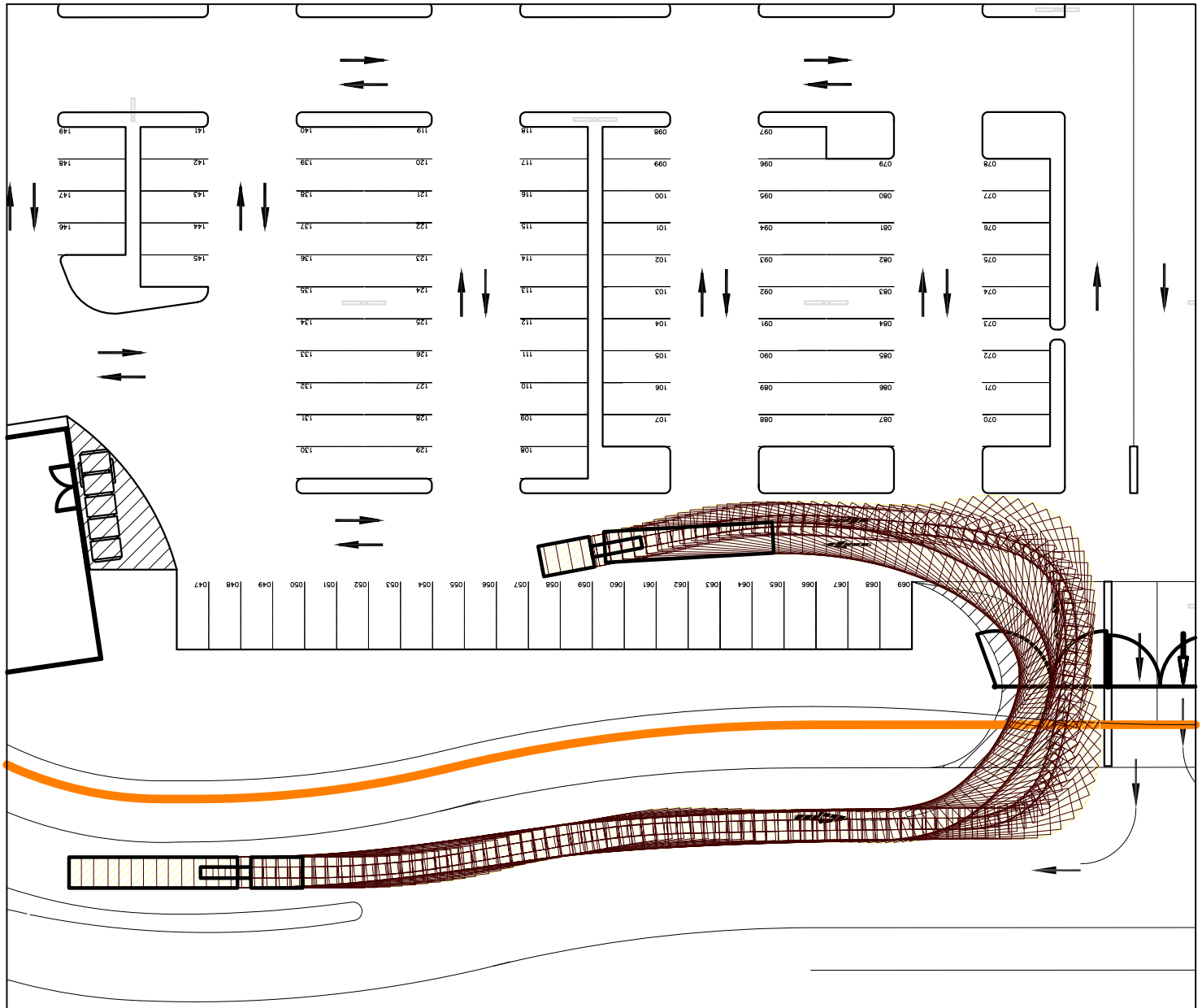
[redacted]

Ross Nettle
Director
Transport and Traffic Planning Associates



Appendix F

Turning Path Assessment



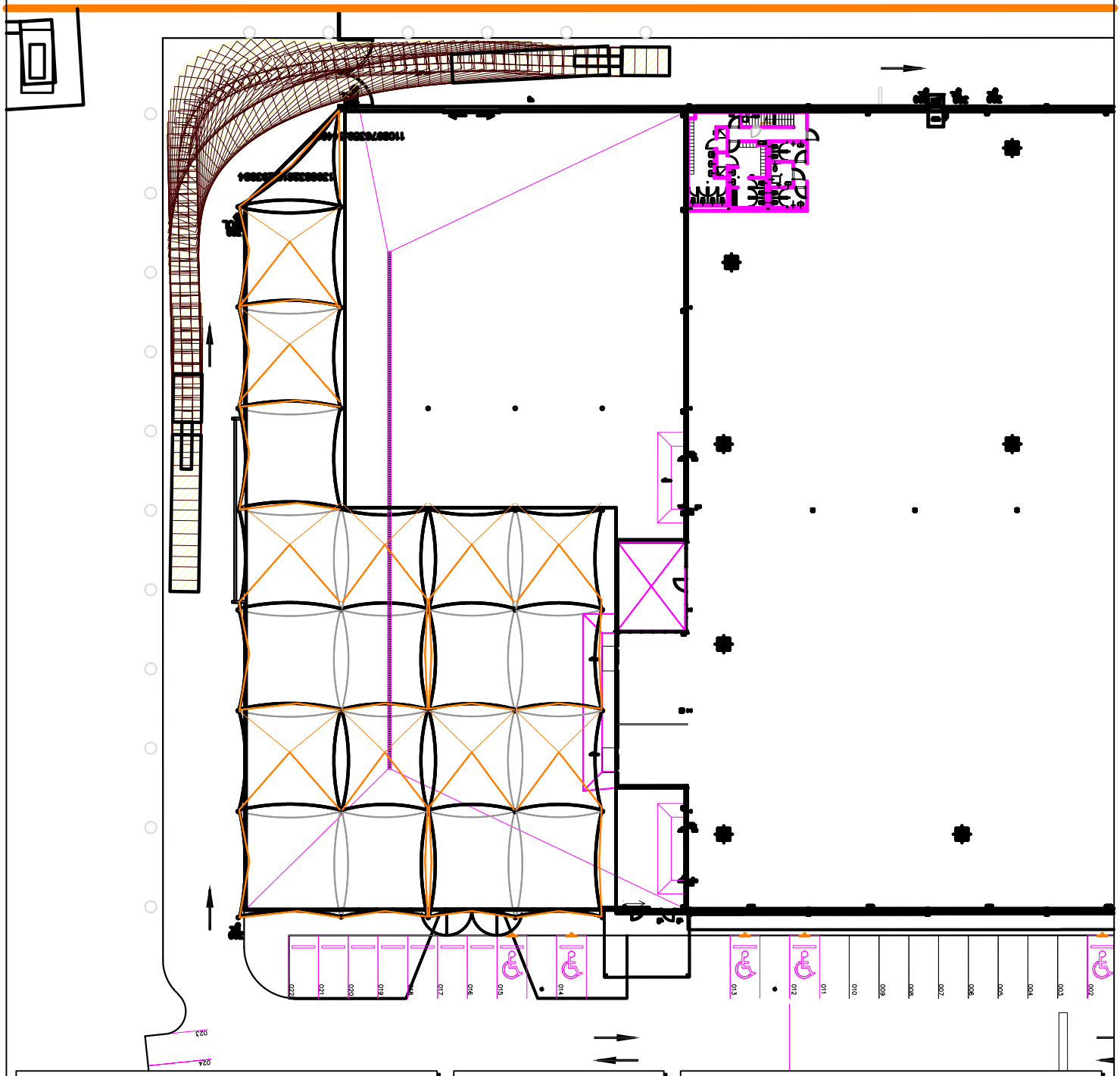
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

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

SP 1

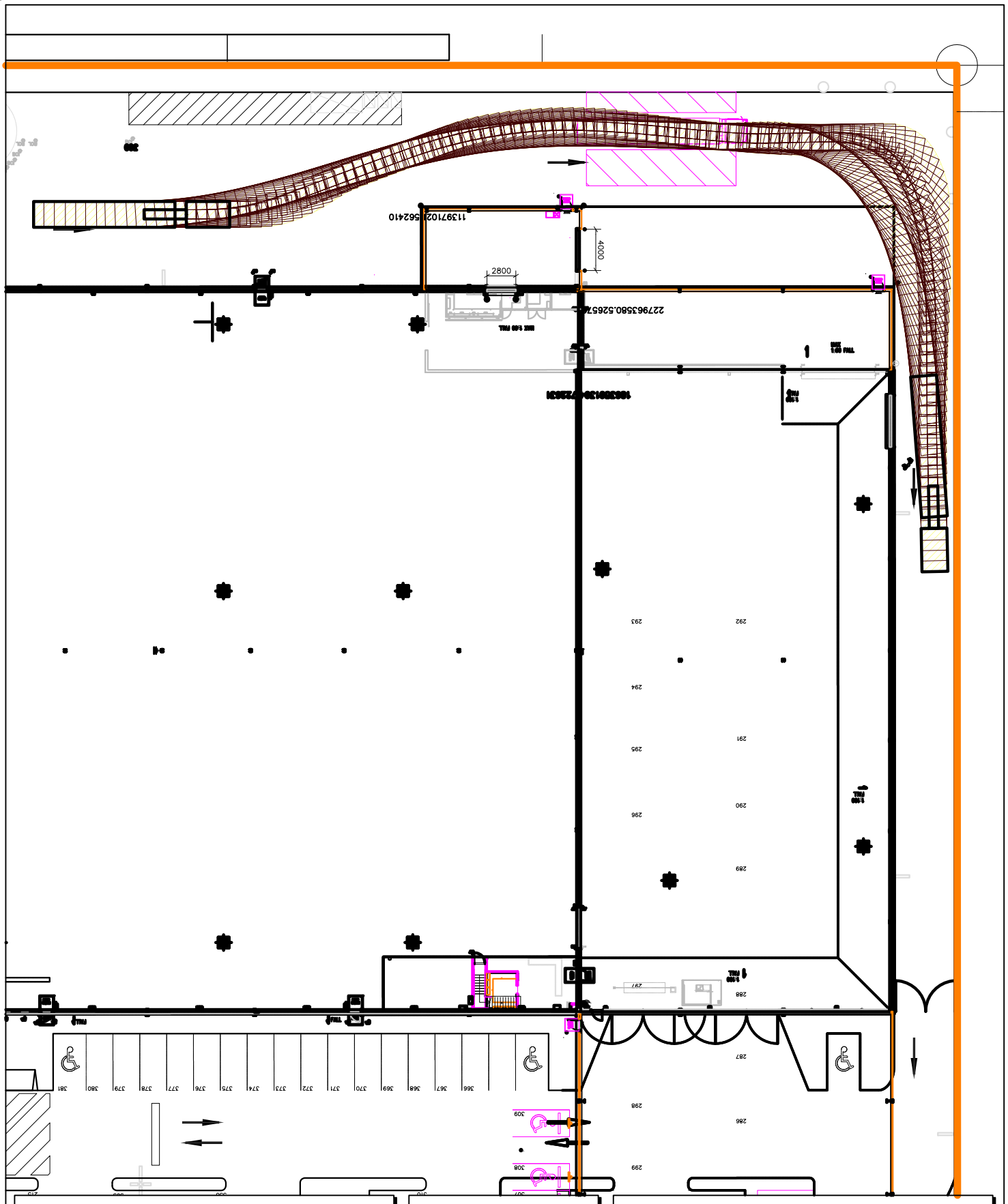


LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE

SP 2



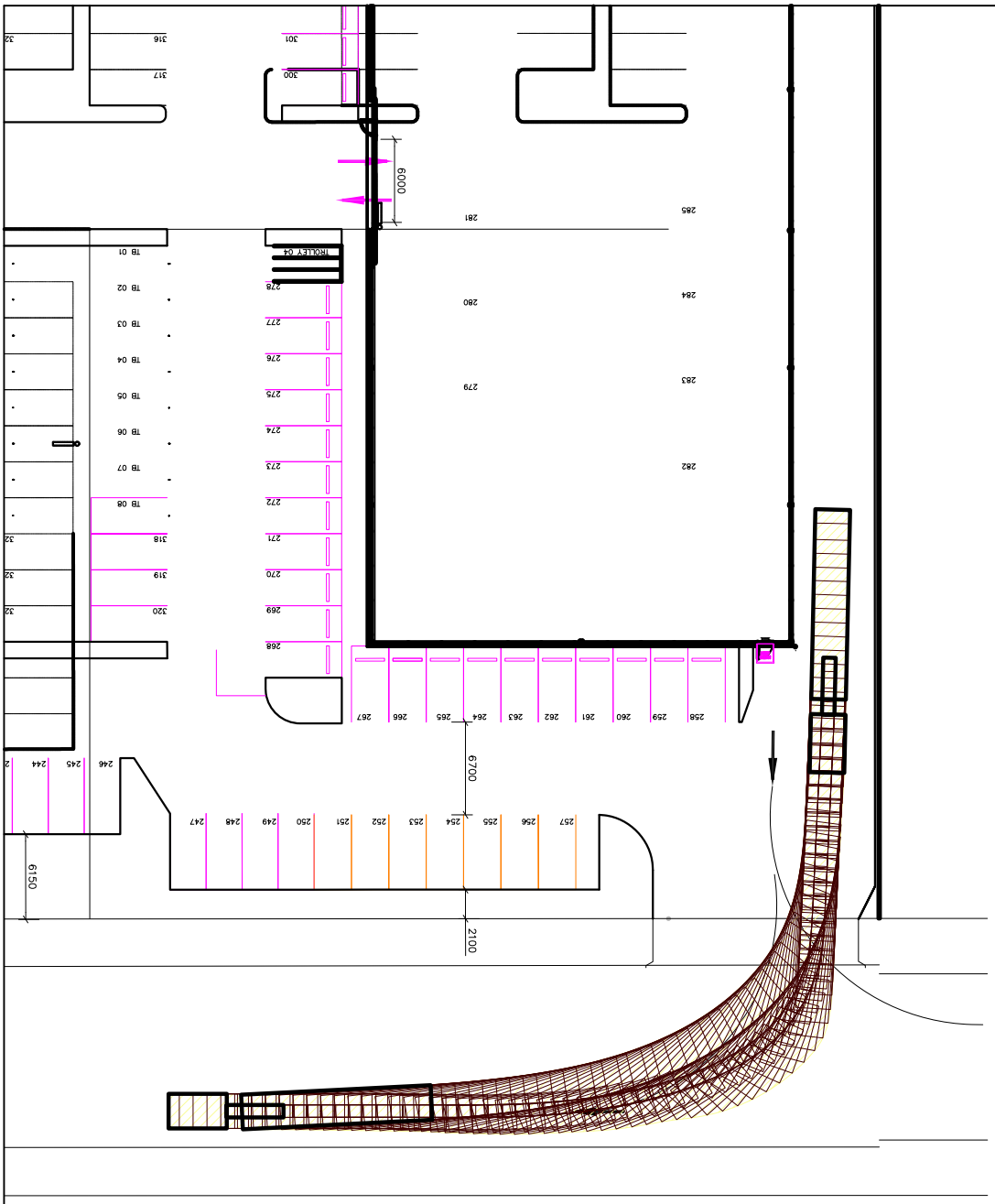
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE

SP 3

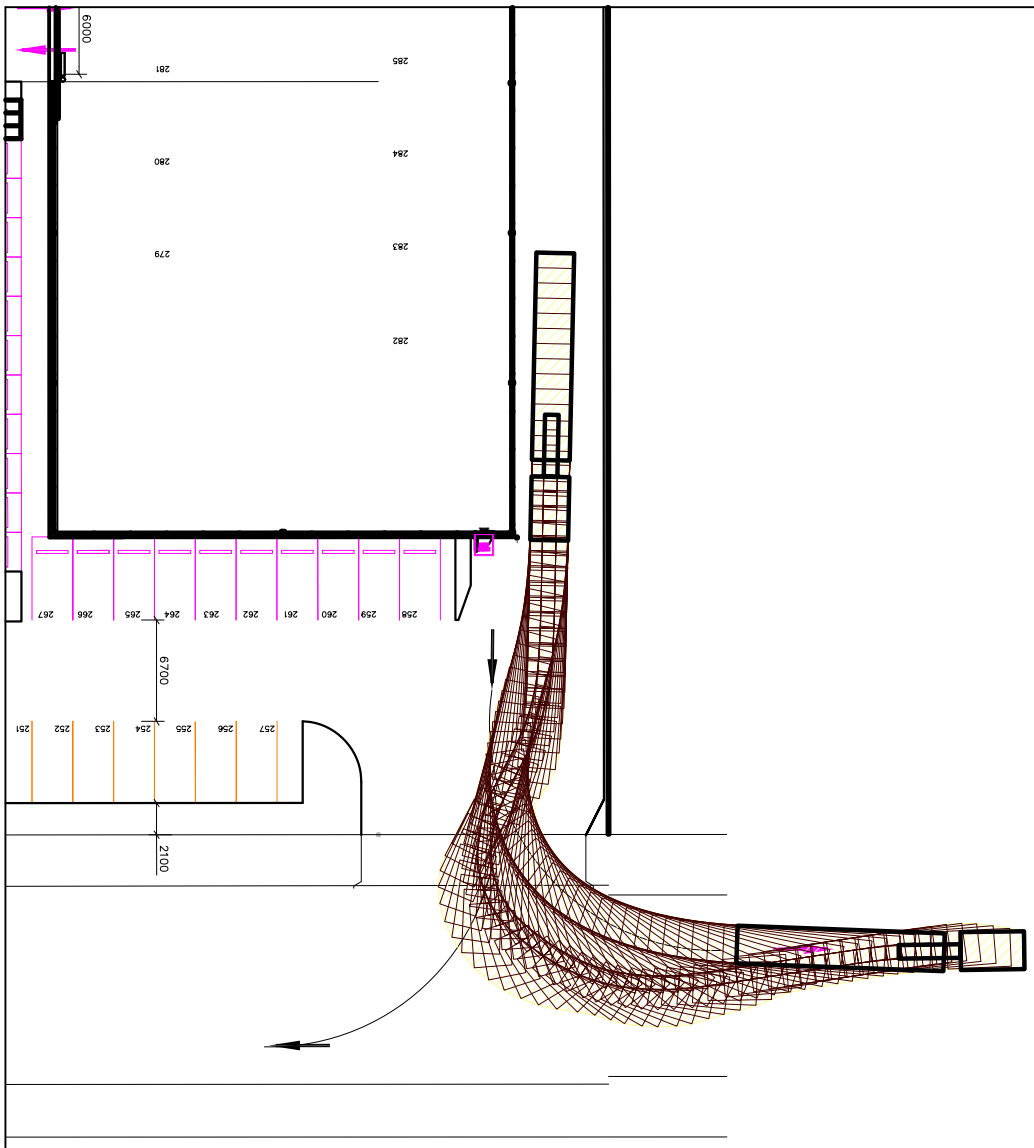


LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE (RIGHT)

SP 4



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE (LEFT)

SP 5