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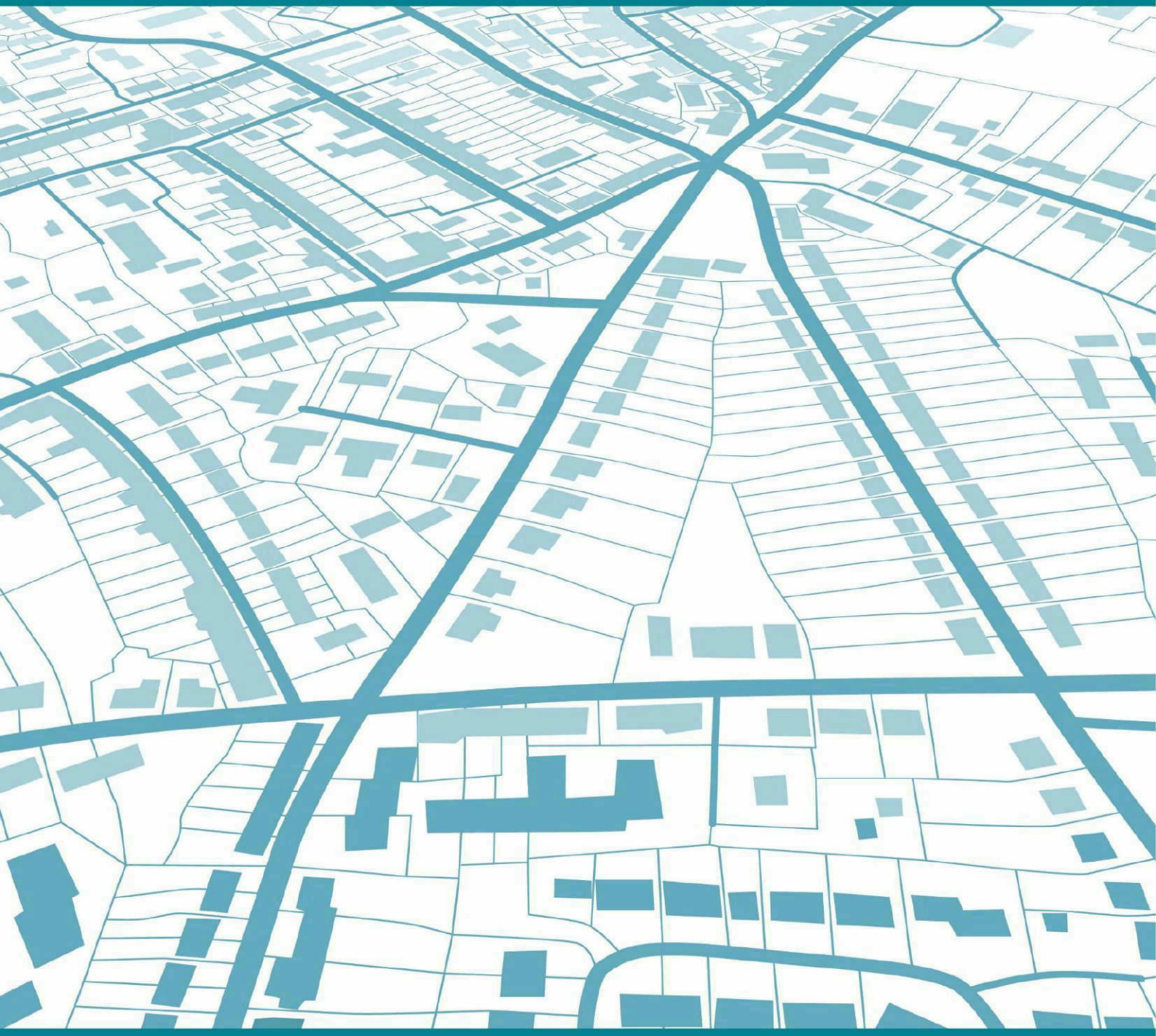

38-40 Orth Street Kingswood & 26 Somerset Street, Kingswood
Proposed Mixed Use Development
Assessment of Traffic, Parking and Access

Ref: 18107
Date: September 2019
Issue: C

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1.0 Introduction

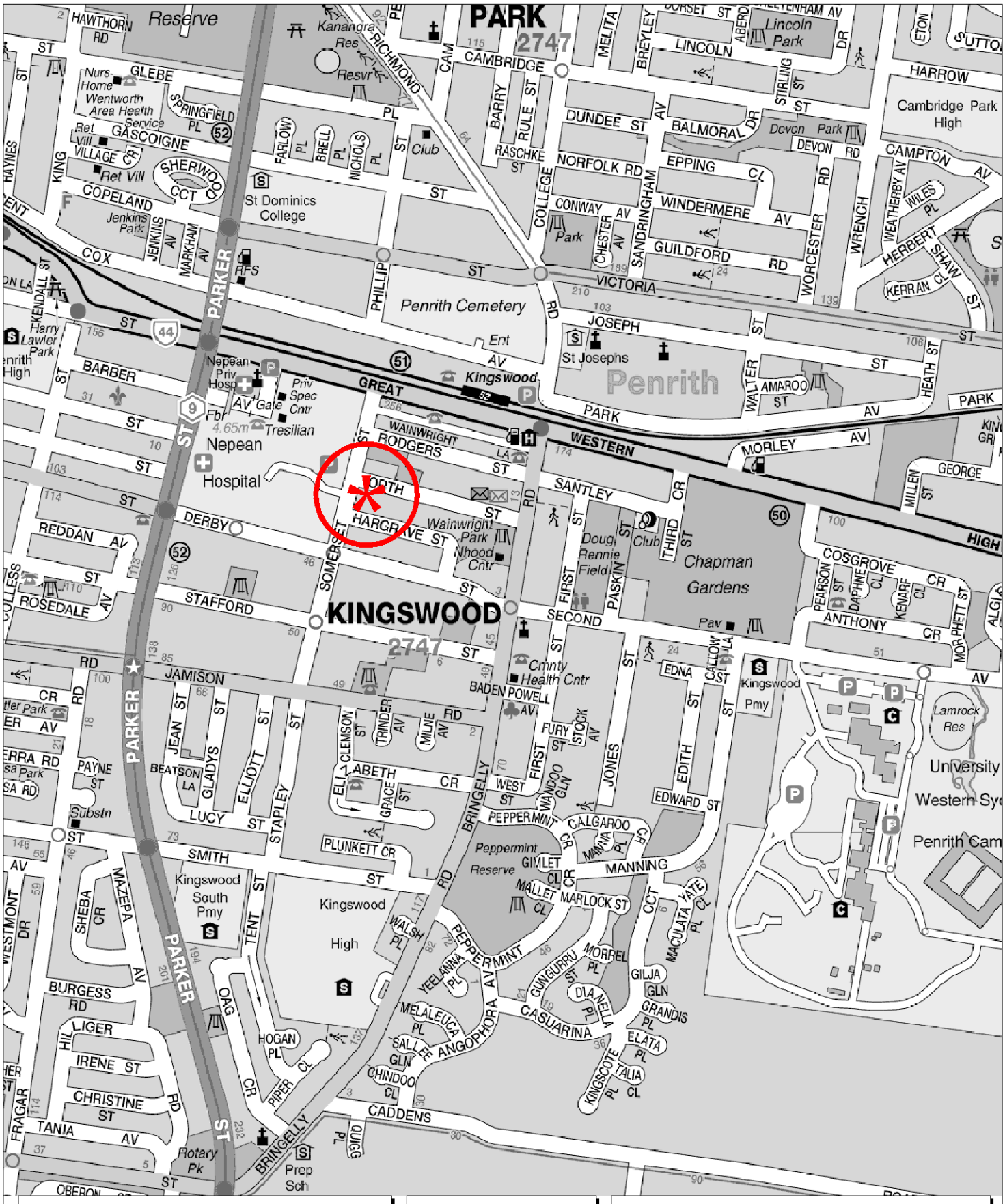
This report has been prepared to accompany Development Application to Penrith City Council for a proposed mixed-use development for the consolidated site of 38-40 Orth Street Kingswood & 26 Somerset Street, Kingswood (Figure 1).

Numerous suburban centres in the Sydney Metropolitan Area are undergoing significant change with residential lots being consolidated and redevelopment for new residential apartment and mixed-use complexes. The subject development site is just to the south of the Great Western Highway with easy access to the nearby railway station and represents an ideal opportunity for a new land use consistent with the urban consolidation process.

The proposed development scheme will provide 41 residential apartments with some 1,148m^2 of commercial floorspace and basement car parking.

The purpose of this report is to:

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



LEGEND

LOCATION

FIG 1

2.0 Proposed Development

2.1 Site, Context, and Existing Circumstances

The site (Figure 2) is a consolidation of Lots 60, 61 and 62 in DP36728 which occupies an irregular shaped area of 1,786m^2 with frontages to the southern side of Orth Street and eastern side of Somerset Street.

The existing development on the site comprises 3 residential dwellings while the surrounding development consists of:

- the single dwellings to the south
- the medium density residences to the north and east
- the Nepean Hospital campus on the western side of Somerset Street
- the Kingswood railway station and commuter carpark
- the numerous park and open space areas

2.2 Proposed Development

It is proposed to demolish the existing structures on the site and excavate to provide for basement car parking. The new 7-level building with basement parking will be constructed comprising:

6 x	One Bedroom apartments
31 x	Two Bedroom apartments
4 x	Three Bedroom apartments
Total	**41 apartments**
	Commercial 1,148m^2 (2 tenancies)

It is proposed to provide a total of 82 parking spaces in 3 basement levels with vehicle access located on the north-eastern site boundary.

Details of the development scheme are provided on the architectural plans which are prepared by AC Project Group and are reproduced in part in Appendix A.

LEGEND

N

SITE

FIG 2

3.0 Existing Road Network and Traffic Conditions

3.1 Road Network

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

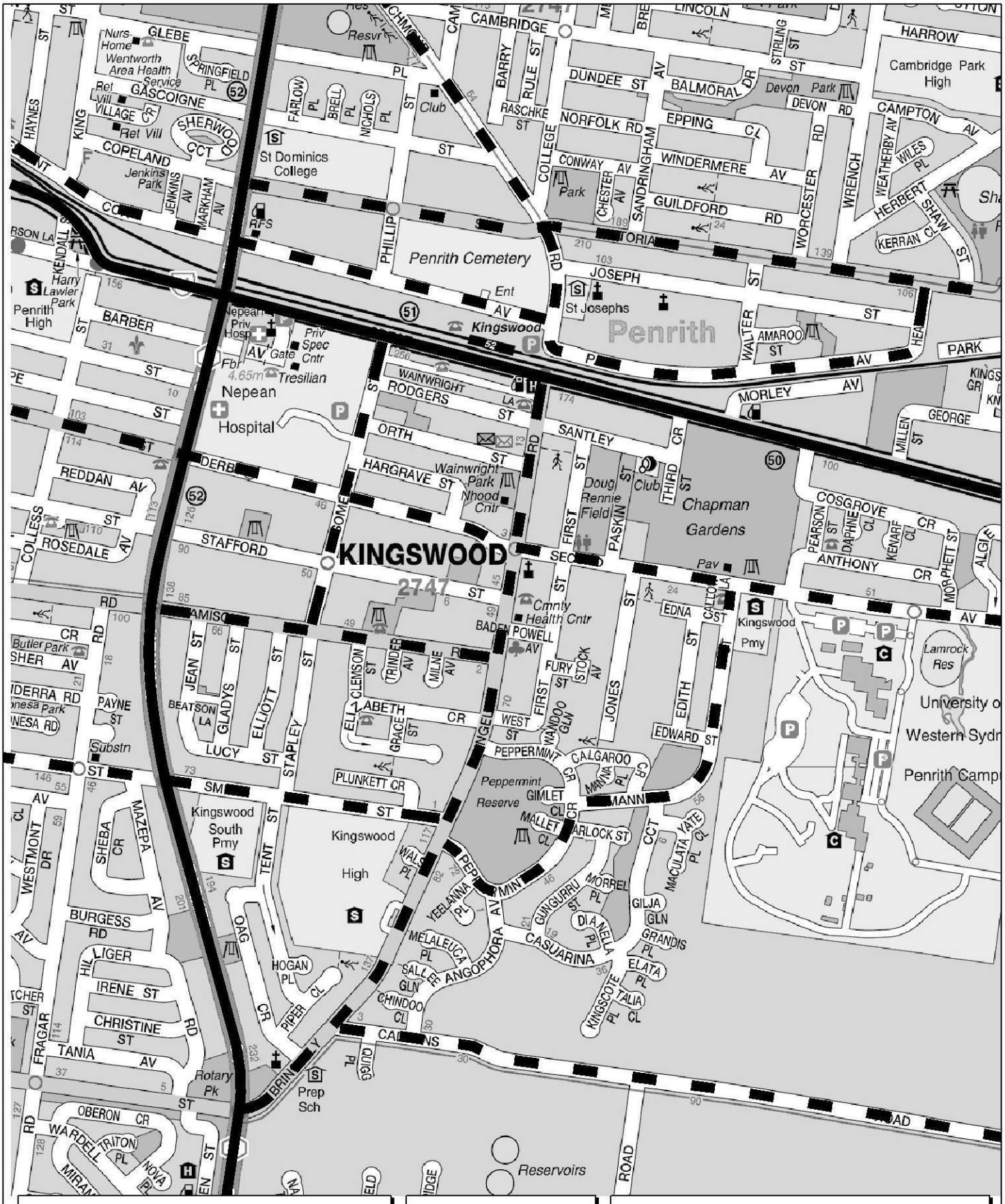
- *M4 Motorway* – a principal arterial route linking between the City and the Blue Mountains crossing
- *Great Western Highway* – a State Road and arterial route which provides the secondary connection between the City and Penrith
- *Northern Road / Parker Street* – a State Road and sub-arterial route which provides a connection between Campbelltown and Windsor
- *Bringelly Road* – a collector route which provides a connection between the Great Western Highway and Parker Street
- *Derby Street / Second Avenue* – a collector route connecting between the UWS Campus and Penrith
- *Orth Street* – a local access road.

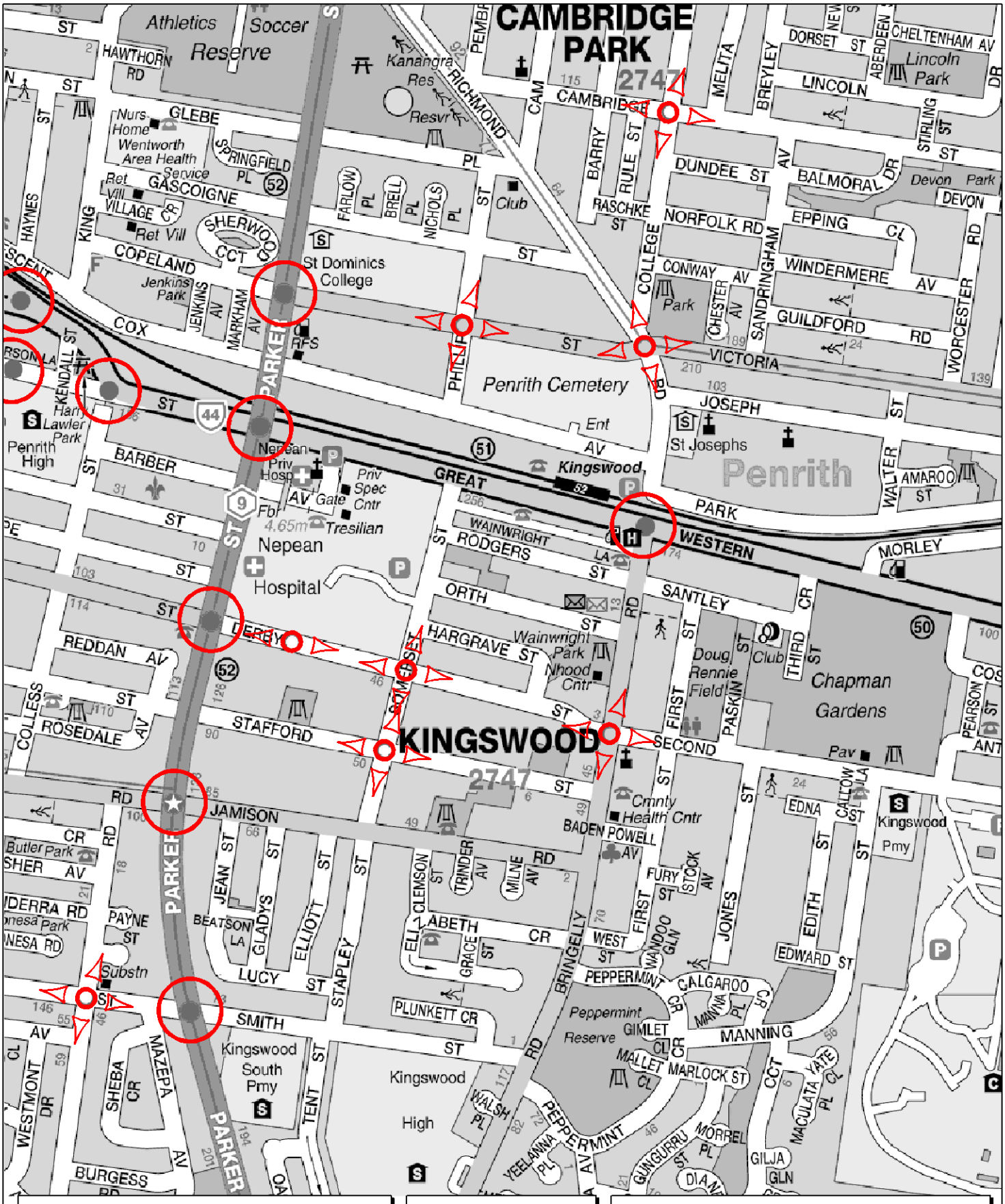
Orth Street in the vicinity of the site has one traffic lane in each direction with kerbside parking.

3.2 Traffic Controls

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

- The 60 kmph speed restriction on the highway and the 50 kmph speed restriction on the local and collector road system
- the roundabouts at the Second Avenue / Derby Street / Bringelly Road and Somerset Street / Derby Street intersections





- the traffic signals on the Great Western Highway at the Bringelly Road and Parker Street intersections
- the traffic signals on Parker Street at the Derby Street and Bringelly Road intersections

3.3 Traffic Conditions

An indication of the existing traffic conditions in the vicinity of the site is provided by data published by the RMS[1] and surveys undertaken as part of this study. The data published by the RMS is expressed in terms of Annual Average Daily Traffic (AADT) and the most recent recordings indicate the following:

	AADT
Great Western Highway, East of Bridge Street	33,800
Parker Street south of Cox Avenue	42,300

The results of traffic survey at the Great Western Highway/Somerset Street intersection during the weekday morning and afternoon peak periods are provided in Appendix B.

The operational performance of these intersections has been assessed using SIDRA. The results are provided in Appendix C and summarised in the following while the criteria for interpreting SIDRA results are reproduced overleaf.

	AM		PM	
	LOS	AVD (S)	LOS	AVD (S)
Great Western Highway/Somerset Street*	C	21s	B	16s

** Worst movement reported for unsignalised intersection.*

The results indicate acceptable levels of service with the intersection of Great Western Highway/Somerset Street under the prevailing peak circumstances.

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

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*

3.4 Transport Services

A number of public transport options are available in the vicinity of the site in the form of buses and rail. The available public transport services comprise:

Bus Services

The site is relatively well serviced by bus, with a number of routes and regular services (every 30 mins on weekdays).

The nearest bus stops are located some 600m to the east at the corner of Great Western Highway and Bringelly Road with a 10-minute frequency during weekday peak periods.

The site is serviced by the bus routes presented in the following:

Route No.	Description
677	Richmond to Penrith via Londonderry
774	Mount Druitt to Penrith via Nepean Hospital
775	Mount Druitt to Penrith via Erskine Park
776	Mount Druitt to Penrith via St Clair
780	Mount Druitt to Penrith via Ropes Crossing
785	Werrington to Penrith via Cambridge Park
789	Luddenham to Penrith

Rail Services

The Sydney Trains network is accessed via the nearby Kingswood Railway Station which is a 5-minute walk (650m) along Orth Street and Bringelly Road and across at the Great Western Highway signals, which is within reasonable walking distance for staff and visitors.

The station is on the T1 - Western Line (Gordon via Central, Emu Plains via Parramatta, Penrith via Parramatta and Penrith). Services operate every 5 – 15 minutes during peak hours, with services operating from 3.12am to 11.23pm.

Details of the bus and rail services available near the site are provided in Appendix D.

3.5 Cycling Facility

Off-road shared paths are provided on the northern side of the Great Western Highway between Parker Street and Bringelly Road, crossing at the intersection of the Great Western Highway /Bringelly Road, and continue on the southern side of the Great Western Highway towards Pages Road.

A range of on-road bicycle facilities are provided along the Great Western Highway, Parker Street, Richmond Road, College Street, Bringelly Road, Derby Street, Second Avenue, Jamison Road and O'Connell Street are available in the vicinity of the site.

Extracts from the RMS Cycleway Finder illustrating the cycleways in the vicinity of the site are shown in the figures below.

Access to and from these transport services are facilitated by the established footways and cycleways on:

- the southern side of Orth Street
- both sides of Bringelly Road and Somerset Street
- both sides of the Highway with the northern side being a shared cycleway

Pedestrian crossing opportunity across the Highway is controlled by the signalised intersection with Bringelly Road.

Access to and from these transport services are facilitated by the established footways and cycleways on:

- the southern side of Orth Street
- both sides of Bringelly Road and Somerset Street
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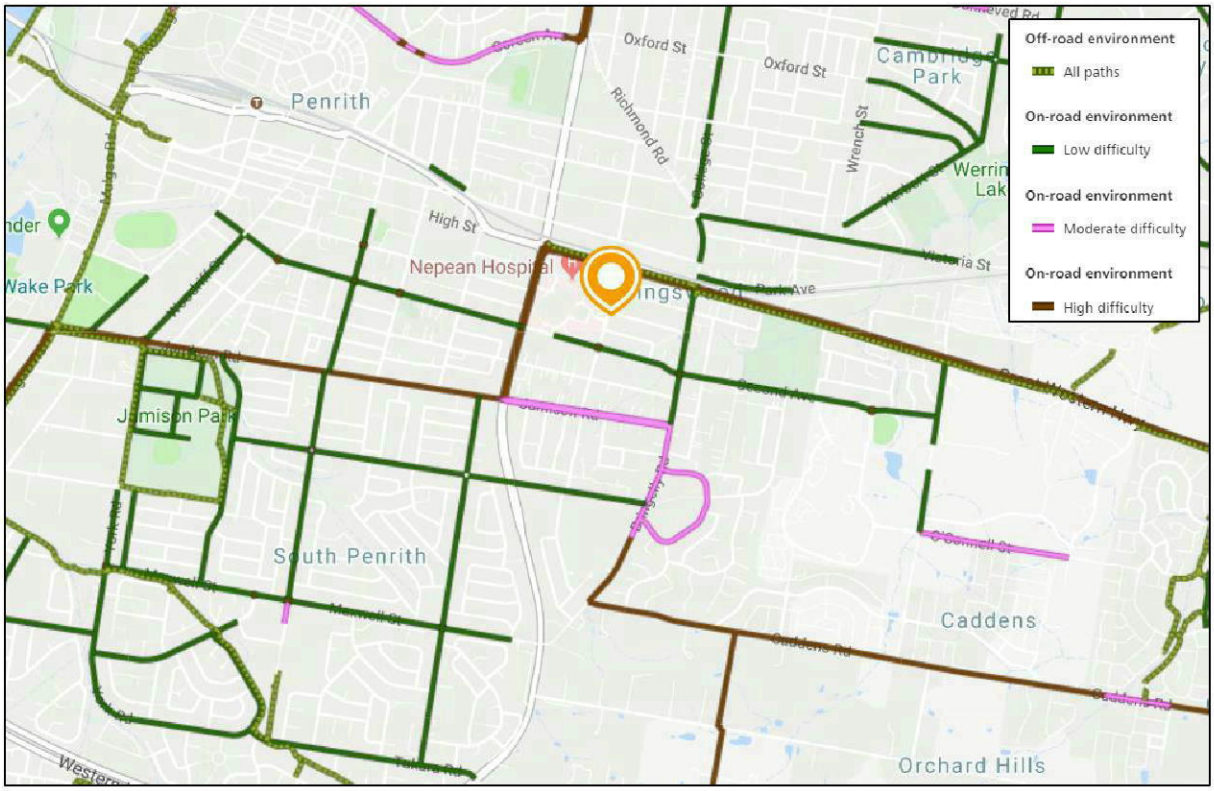
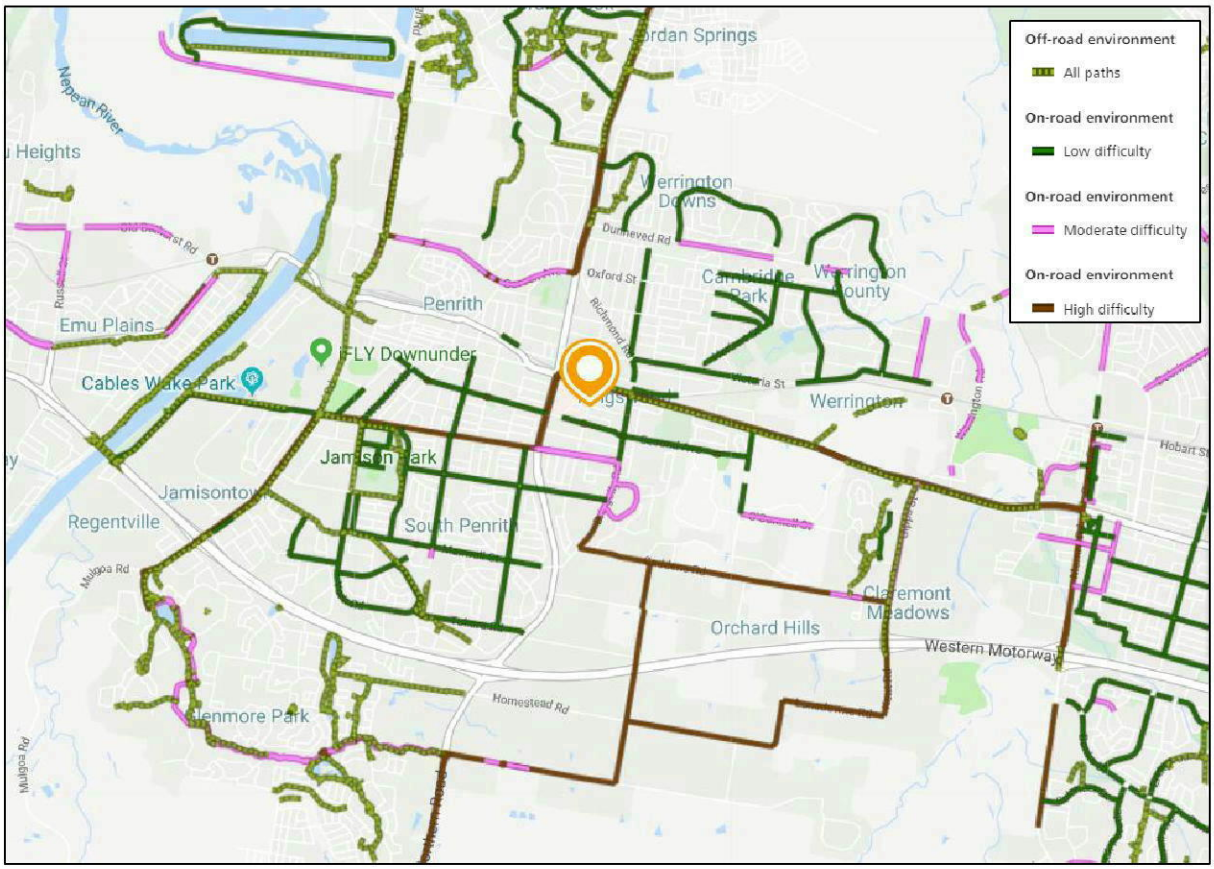




Source: https://www.rms.nsw.gov.au/maps/cycleway_finder

3.6 Pedestrian Facility

Access to and from these transport services are facilitated by the established footways and cycleways on:

- the southern side of Orth Street
- both sides of Bringelly Road and Somerset Street
- both sides of the Highway with the northern side being a shared cycleway

Pedestrian crossing opportunity across the Highway is controlled by the signalised intersection with Bringelly Road.

4.0 Parking

Car Parking

The Penrith City Council Development Control Plan specifies the following parking requirements in relation to the proposed development:

Residential Flat Buildings	
One Bedroom	1 space
Two Bedroom	1 space
Three Bedroom	2 spaces
Visitor Parking	1 space per 5 units
Commercial	
Business and Office Premises	1 space per 40m^2 GFA

Application of these rates to the proposed development would indicate the following requirement:

Residential Flat Buildings		
6 x One Bedroom		6 spaces
31 x Two Bedroom		31 spaces
4 x Three Bedroom		8 spaces
Visitors (41)		8 spaces
	Residential Subtotal	**53 spaces**
Commercial 1,148m^2		29 spaces
	Total	**82 spaces**

It is proposed to provide a total of 82 spaces in the basement carpark (including 6 accessible spaces) to serve the needs of the development in satisfaction of Council's DCP criteria.

Bicycle Parking

Requirements for bicycle parking for new developments within the Penrith LGA are provided in the NSW Planning Guidelines for Walking and Cycling documents as follows:

Residential	
Residents	20%-30% of total units
Visitors	5%-10% of total units
Commercial	
Staff	3%-5% of total staff
Visitors	5%-10% of total staff

Application of the above criteria would indicate the following provision:

Residential	
41 apartments	8-12 spaces (residents)
	2-4 spaces (visitors)
Commercial	
Staff (estimated 100)	3-5 spaces (staff)
Visitors (estimated 20)	1-2 spaces (visitors)

On this basis, it is proposed that up to 24 secured bicycle spaces are provided for residents and staff members as well as visitors, in easily accessible areas of the basement carpark.

5.0 Traffic

A guide to the potential traffic generation of the proposed development is provided by the RMS Development Guidelines which indicate generation rates during the peak periods of 0.19 vtph (AM) and 0.15 vtph (PM) per apartment for sites located with convenient access to a railway station. The RMS Guidelines for commercial uses are 2 vtph per 100 m^2 of GFA.

Application of these criteria to the development scheme would indicate the following traffic generation and distribution outcome:

	AM		PM	
	IN	**OUT**	**IN**	**OUT**
Residential	3	11	9	2
Commercial	20	3	3	20
Total	**23**	**14**	**12**	**22**

The existing residences on the site based on the RMS criteria, generate some 3 vtph. Therefore, the net additional site traffic generation are some 34 vtph and 31 vtph during the AM and PM peak hours respectively.

Traffic generation of this order of magnitude being equivalent to 1 vehicle every 1-2 minutes during the peak hours is minor in the context of the local and arterial road system and will not act to create unacceptable traffic congestion or conflict either at the vehicle access point or at adjacent intersections.

6.0 Access, Internal Circulation and Servicing

Access

Vehicle access will involve a 6.1m wide combined ingress/egress driveway for the carpark on Orth Street at the north-eastern site boundary. Orth Street is straight and level at this location and the driveway location will comply with the requirements of AS2890.1.

Internal Circulation

Provisions made for the ramp, grades, circulation areas and carparking spaces will accord with the design criteria of AS2890.1. Suitable manoeuvring provision and clearances are also made for Council's 10.5m heavy rigid truck in the basement.

Details of these manoeuvring provisions are demonstrated satisfactorily in the swept path assessment diagrams provided in Appendix E.

Servicing

Refuse collection and servicing for the site will be accommodated by an on-site and dedicated loading bay which will be designed to accommodate Council's largest service vehicle i.e. a 10.5m heavy rigid vehicle.

Other smaller service vehicles (including couriers vans etc) will be able to rely on the available visitor parking spaces as is normal for residential based development of this nature.

7.0 Conclusion

The proposed development represents a valuable opportunity for mixed-use development scheme which is located close to the railway station. The traffic, transport and parking assessment provided in this report indicate that the development will:

- have a parking provision which is compliant with the Council's DCP criteria
- have no undue traffic implications on the surrounding road network and intersection operations
- incorporate suitable vehicle access, internal circulation and onsite servicing arrangements
- not have any impact on existing kerbside parking along the surrounding street frontages

Appendix A

Development Plans

Appendix B

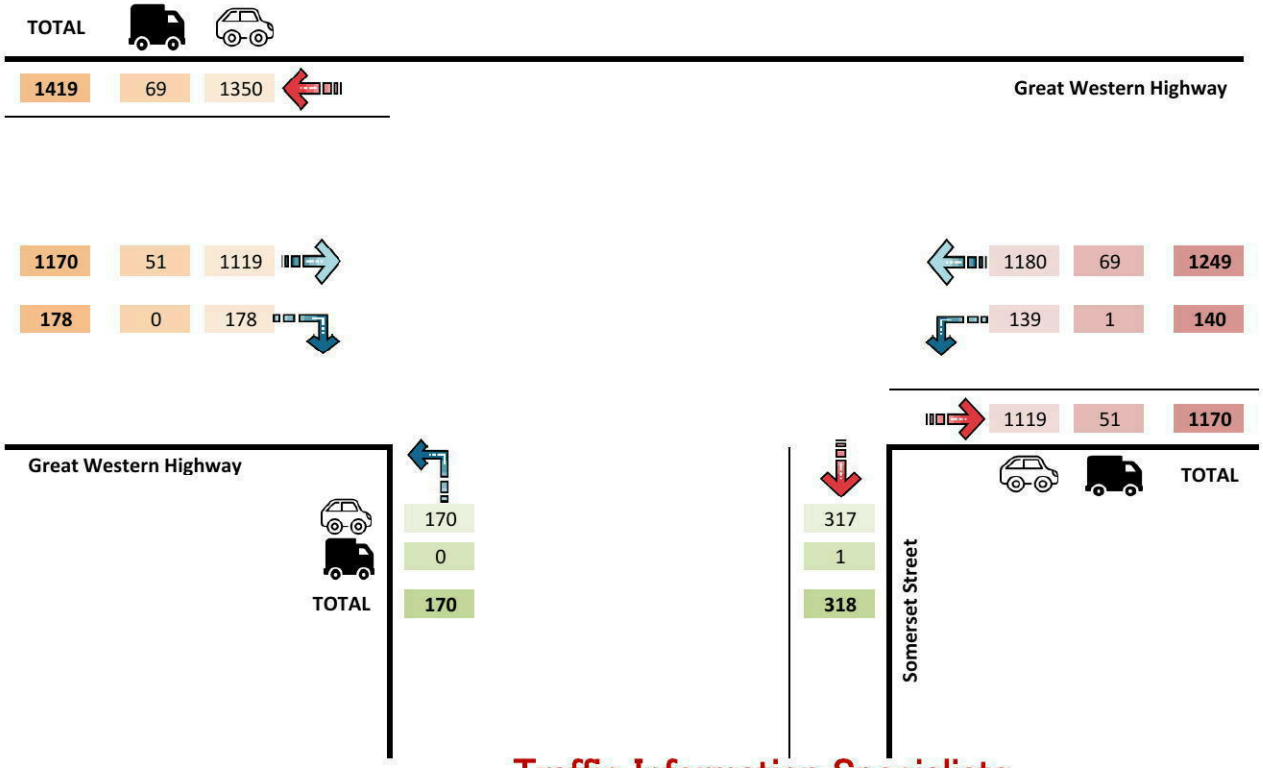
Traffic Surveys

Location	-	Duration	0700 - 1000
	Great Western Highway		1600 - 1900
	Somerset Street		-
	Great Western Highway	Day/Date	Tuesday, October 16, 2018
Suburb	PENRITH	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	AM
PEAK		
8:00	-	9:00



Traffic Information Specialists

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Location	-	Duration	0700 - 1000
	Great Western Highway		1600 - 1900
	Somerset Street		-
	Great Western Highway	Day/Date	Tuesday, October 16, 2018
Suburb	PENRITH	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
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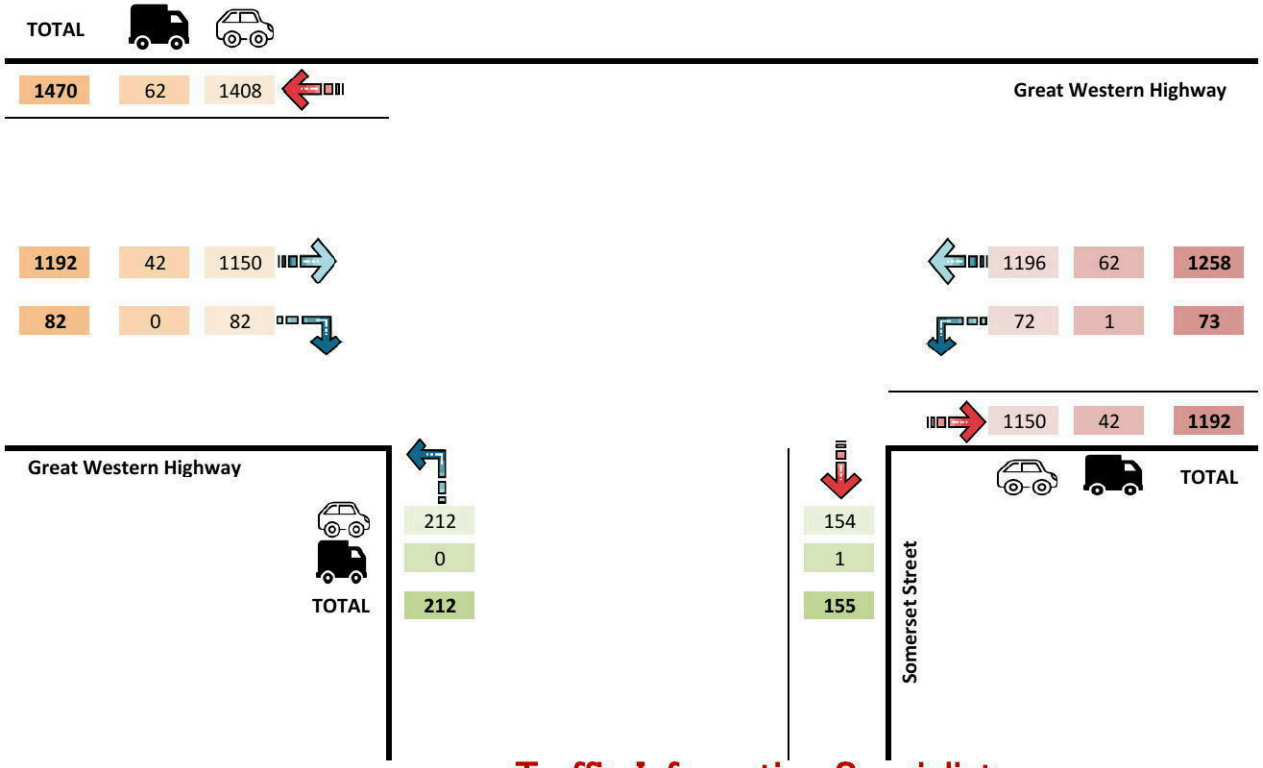
PEAK		
16:00	-	17:00



Traffic Information Specialists

ABN: 42 613 389 923

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Location	Parker Street	Duration	0700 - 1000
	Barber Avenue		1600 - 1900
	Parker Street		-
	Barber Avenue	Day/Date	Tuesday, October 16, 2018
Suburb	PENRITH	Weather	-

All Vehicles Time Per 15 Mins	NORTH Parker Street										EAST Barber Avenue											
	L			T			R				L			T			R				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	25	1	26	194	17	211				237	6	0	6							6	489	44	533
7:15 - 7:30	23	3	26	198	15	213				239	15	1	16							16	491	45	536
7:30 - 7:45	21	0	21	224	15	239				260	10	1	11							11	557	30	587
7:45 - 8:00	37	1	38	241	14	255				293	8	1	9							9	562	29	591
8:00 - 8:15	27	1	28	234	19	253				281	6	1	7							7	566	34	600
8:15 - 8:30	30	0	30	197	8	205				235	4	0	4							4	477	37	514
8:30 - 8:45	29	0	29	245	12	257				286	5	0	5							5	512	37	549
8:45 - 9:00	24	0	24	256	18	274				298	10	0	10							10	523	44	567
9:00 - 9:15	27	1	28	239	10	249				277	12	0	12							12	489	31	520
9:15 - 9:30	24	0	24	198	15	213				237	9	0	9							9	463	38	501
9:30 - 9:45	24	0	24	202	19	221				245	14	0	14							14	443	30	473
9:45 - 10:00	30	1	31	189	8	197				228	18	0	18							18	454	29	483
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16:00 - 16:15	18	0	18	287	18	305				323	33	1	34							34	645	37	682
16:15 - 16:30	9	0	9	284	8	292				301	37	0	37							37	646	18	664
16:30 - 16:45	7	0	7	269	12	281				288	35	0	35							35	579	29	608
16:45 - 17:00	8	0	8	266	15	281				289	30	0	30							30	558	32	590
17:00 - 17:15	6	0	6	300	8	308				314	24	0	24							24	620	17	637
17:15 - 17:30	5	0	5	300	5	305				310	25	0	25							25	574	15	589
17:30 - 17:45	5	0	5	337	11	348				353	11	0	11							11	599	20	619
17:45 - 18:00	5	0	5	240	8	248				253	22	0	22							22	501	14	515
18:00 - 18:15	3	0	3	269	5	274				277	23	0	23							23	522	10	532
18:15 - 18:30	4	0	4	211	3	214				218	12	0	12							12	440	10	450
18:30 - 18:45	8	0	8	235	4	239				247	12	0	12							12	491	7	498
18:45 - 19:00	10	0	10	180	4	184				194	5	0	5							5	382	9	391
Period End	88	0	88	3178	101	3279				3367	269	1	270							270	6557	218	6775

All Vehicles Time Per 15 Mins	SOUTH Parker Street										WEST Barber Avenue											
	L			T			R				L			T			R				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	12	1	13	249	23	272				285	3	2	5							5	489	44	533
7:15 - 7:30	4	0	4	246	26	272				276	5	0	5							5	491	45	536
7:30 - 7:45	8	0	8	289	14	303				311	5	0	5							5	557	30	587
7:45 - 8:00	2	0	2	271	13	284				286	3	0	3							3	562	29	591
8:00 - 8:15	3	1	4	289	12	301				305	7	0	7							7	566	34	600
8:15 - 8:30	6	0	6	236	28	264				270	4	1	5							5	477	37	514
8:30 - 8:45	1	0	1	229	25	254				255	3	0	3							3	512	37	549
8:45 - 9:00	1	1	2	228	25	253				255	4	0	4							4	523	44	567
9:00 - 9:15	3	0	3	204	20	224				227	4	0	4							4	489	31	520
9:15 - 9:30	2	1	3	228	22	250				253	2	0	2							2	463	38	501
9:30 - 9:45	1	0	1	201	11	212				213	1	0	1							1	443	30	473
9:45 - 10:00	4	0	4	210	20	230				234	3	0	3							3	454	29	483
Period End	47	4	51	2880	239	3119				3170	44	3	47							47	6026	428	6454
16:00 - 16:15	0	0	0	301	18	319				319	6	0	6							6	645	37	682
16:15 - 16:30	0	0	0	313	10	323				323	3	0	3							3	646	18	664
16:30 - 16:45	1	1	2	262	16	278				280	5	0	5							5	579	29	608
16:45 - 17:00	2	0	2	251	17	268				270	1	0	1							1	558	32	590
17:00 - 17:15	2	0	2	287	9	296				298	1	0	1							1	620	17	637
17:15 - 17:30	3	0	3	239	10	249				252	2	0	2							2	574	15	589
17:30 - 17:45	1	0	1	245	9	254				255	0	0	0							0	599	20	619
17:45 - 18:00	0	0	0	230	6	236				236	4	0	4							4	501	14	515
18:00 - 18:15	0	0	0	226	5	231				231	1	0	1							1	522	10	532
18:15 - 18:30	1	0	1	211	7	218				219	1	0	1							1	440	10	450
18:30 - 18:45	3	0	3	230	3	233				236	3	0	3							3	491	7	498
18:45 - 19:00	2	0	2	185	5	190				192	0	0	0							0	382	9	391
Period End	15	1	16	2980	115	3095				3111	27	0	27							27	6557	218	6775

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Location	Parker Street	Duration	0700 - 1000
	Barber Avenue		1600 - 1900
	Parker Street		-
	Barber Avenue	Day/Date	Tuesday, October 16, 2018
Suburb	PENRITH	Weather	-

All Vehicles Time Per Hour	NORTH Parker Street										EAST Barber Avenue										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	
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7:45 - 8:45	123	2	125	917	53	970				1095	23	2	25							25	2117	137	2254
8:00 - 9:00	110	1	111	932	57	989				1100	25	1	26							26	2078	152	2230
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9:00 - 10:00	105	2	107	828	52	880				987	53	0	53							53	1849	128	1977
Period End	980	20	1000	8097	507	8604				9604	319	13	332							332	18387	1275	19662
16:00 - 17:00	42	0	42	1106	53	1159				1201	135	1	136							136	2428	116	2544
16:15 - 17:15	30	0	30	1119	43	1162				1192	126	0	126							126	2403	96	2499
16:30 - 17:30	26	0	26	1135	40	1175				1201	114	0	114							114	2331	93	2424
16:45 - 17:45	24	0	24	1203	39	1242				1266	90	0	90							90	2351	84	2435
17:00 - 18:00	21	0	21	1177	32	1209				1230	82	0	82							82	2294	66	2360
17:15 - 18:15	18	0	18	1146	29	1175				1193	81	0	81							81	2196	59	2255
17:30 - 18:30	17	0	17	1057	27	1084				1101	68	0	68							68	2062	54	2116
17:45 - 18:45	20	0	20	955	20	975				995	69	0	69							69	1954	41	1995
18:00 - 19:00	25	0	25	895	16	911				936	52	0	52							52	1835	36	1871
Period End	223	0	223	9793	299	10092				10315	817	1	818							818	19854	645	20499

All Vehicles Time Per Hour	SOUTH Parker Street										WEST Barber Avenue										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	
7:00 - 8:00	26	1	27	1055	76	1131				1158	16	2	18							18	2099	148	2247
7:15 - 8:15	17	1	18	1095	65	1160				1178	20	0	20							20	2176	138	2314
7:30 - 8:30	19	1	20	1085	67	1152				1172	19	1	20							20	2162	130	2292
7:45 - 8:45	12	1	13	1025	78	1103				1116	17	1	18							18	2117	137	2254
8:00 - 9:00	11	2	13	982	90	1072				1085	18	1	19							19	2078	152	2230
8:15 - 9:15	11	1	12	897	98	995				1007	15	1	16							16	2001	149	2150
8:30 - 9:30	7	2	9	889	92	981				990	13	0	13							13	1987	150	2137
8:45 - 9:45	7	2	9	861	78	939				948	11	0	11							11	1918	143	2061
9:00 - 10:00	10	1	11	843	73	916				927	10	0	10							10	1849	128	1977
Period End	120	12	132	8732	717	9449				9581	139	6	145							145	18387	1275	19662
16:00 - 17:00	3	1	4	1127	61	1188				1192	15	0	15							15	2428	116	2544
16:15 - 17:15	5	1	6	1113	52	1165				1171	10	0	10							10	2403	96	2499
16:30 - 17:30	8	1	9	1039	52	1091				1100	9	0	9							9	2331	93	2424
16:45 - 17:45	8	0	8	1022	45	1067				1075	4	0	4							4	2351	84	2435
17:00 - 18:00	6	0	6	1001	34	1035				1041	7	0	7							7	2294	66	2360
17:15 - 18:15	4	0	4	940	30	970				974	7	0	7							7	2196	59	2255
17:30 - 18:30	2	0	2	912	27	939				941	6	0	6							6	2062	54	2116
17:45 - 18:45	4	0	4	897	21	918				922	9	0	9							9	1954	41	1995
18:00 - 19:00	6	0	6	852	20	872				878	5	0	5							5	1835	36	1871
Period End	46	3	49	8903	342	9245				9294	72	0	72							72	19854	645	20499

Appendix C

SIDRA Output Results

MOVEMENT SUMMARY

Site: 101v [EX AM GWH-SOMERSET]

Network: N101 [AM PEAK]

New Site
Site Category: (None)
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
South: SOMERSET STREET														
1	L2	170	0.0	170	0.0	0.173	6.2	LOS A	0.3	2.0	0.41	0.62	0.41	41.4
Approach		170	0.0	170	0.0	0.173	6.2	LOS A	0.3	2.0	0.41	0.62	0.41	41.4
East: GREAT WESTERN HIGHWAY														
4	L2	140	0.7	140	0.7	0.246	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	56.0
5	T1	1249	5.5	1249	5.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	58.9
Approach		1389	5.0	1389	5.0	0.246	0.6	NA	0.0	0.0	0.00	0.06	0.00	58.3
West: GREAT WESTERN HIGHWAY														
11	T1	1170	4.4	1170	4.4	0.311	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	178	0.0	178	0.0	0.937	68.2	LOS E	2.8	19.6	0.99	1.54	3.19	24.7
Approach		1348	3.8	1348	3.8	0.937	9.0	NA	2.8	19.6	0.13	0.20	0.42	50.4
All Vehicles		2907	4.2	2907	4.2	0.937	4.8	NA	2.8	19.6	0.08	0.16	0.22	52.4

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: 101v [EX PM GWH-SOMERSET]

Network: N101 [PM PEAK]

New Site
Site Category: (None)
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
South: SOMERSET STREET														
1	L2	212	0.0	212	0.0	0.227	6.6	LOS A	0.3	2.4	0.39	0.64	0.39	41.0
Approach		212	0.0	212	0.0	0.227	6.6	LOS A	0.3	2.4	0.39	0.64	0.39	41.0
East: GREAT WESTERN HIGHWAY														
4	L2	73	1.4	73	1.4	0.235	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	56.8
5	T1	1258	4.9	1258	4.9	0.235	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.3
Approach		1331	4.7	1331	4.7	0.235	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.0
West: GREAT WESTERN HIGHWAY														
11	T1	1192	3.5	1192	3.5	0.314	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	82	0.0	82	0.0	0.394	25.7	LOS B	0.5	3.6	0.87	0.99	1.07	38.5
Approach		1274	3.3	1274	3.3	0.394	1.7	NA	0.5	3.6	0.06	0.06	0.07	57.8
All Vehicles		2817	3.7	2817	3.7	0.394	1.4	NA	0.5	3.6	0.05	0.09	0.06	57.0

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

Transport Services

Sydney rail network

Metro Trains

Sydney metro and train lines

M Metro North West Line: Chatswood, Tallawong	T1 North Shore & Western Line: North Shore, Western, Richmond	T2 Inner West & Leppington Line: Inner West, Leppington, City	T3 Bankstown Line: Liverpool, Lidcombe, City	T4 Eastern Suburbs & Illawarra Line: Eastern Suburbs, Illawarra, Cronulla
T5 Cumberland Line: Leppington, Richmond	T6 Carlingford Line: Carlingford, Clyde	T7 Olympic Park Line: Olympic Park, Lidcombe	T8 Airport & South Line: Airport, South, City	T9 Northern Line: Northern, Gordon

Stop · Interchange · Interchange · End of line

Line under construction

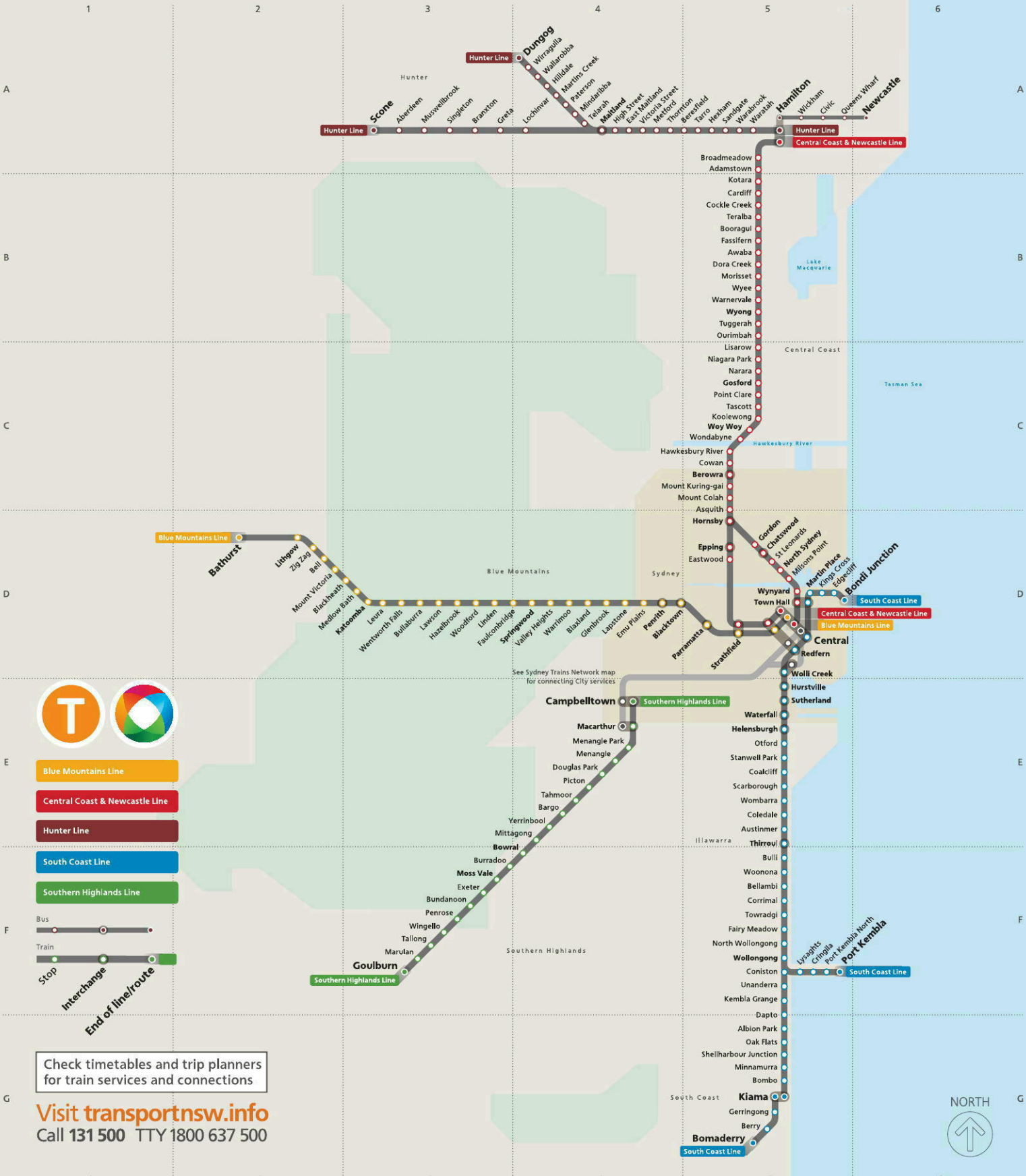
NORTH

Check timetables and trip planners for train services and connections

Visit transportnsw.info

Intercity Trains Network

Transport NSW TrainLink



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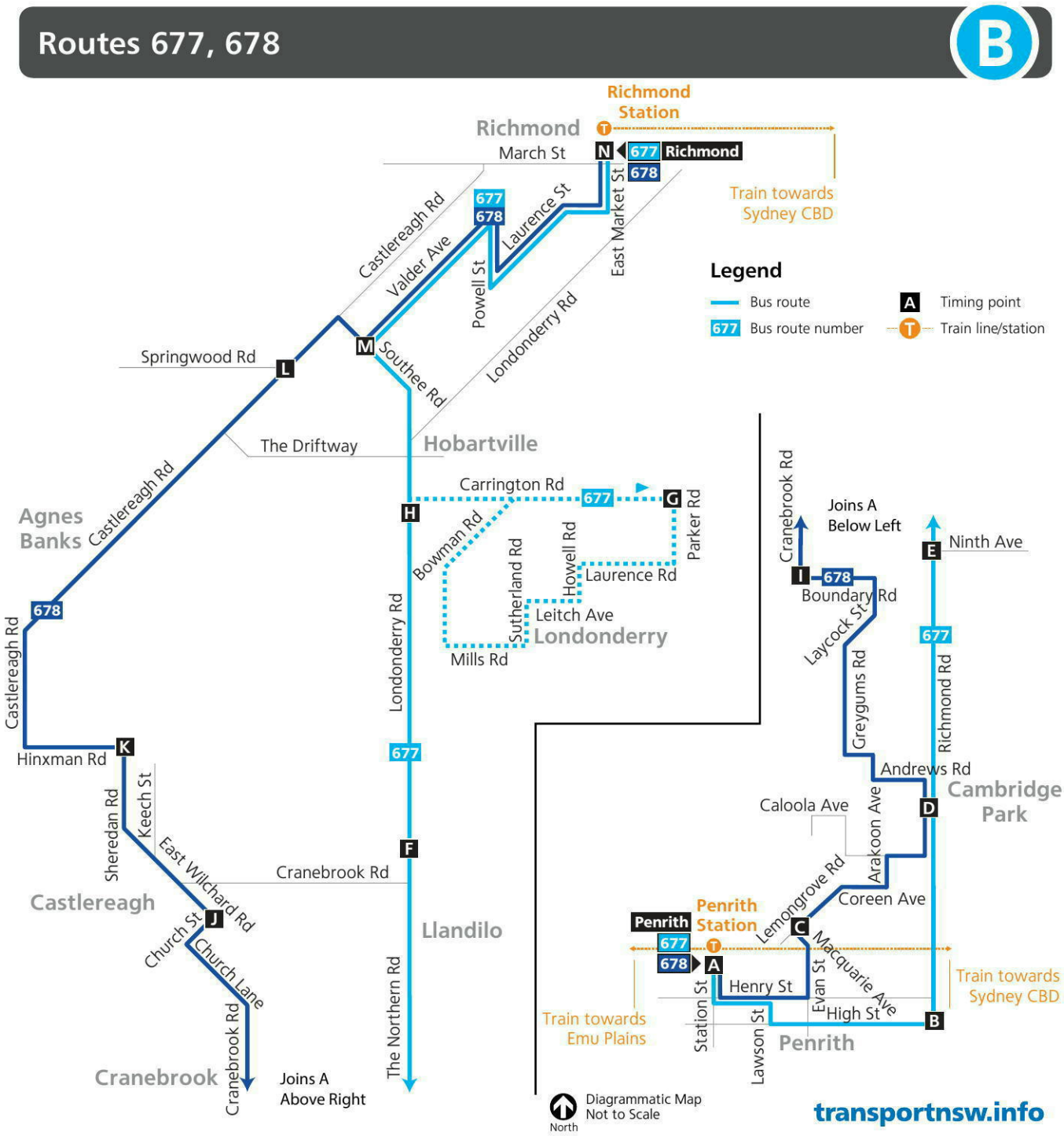
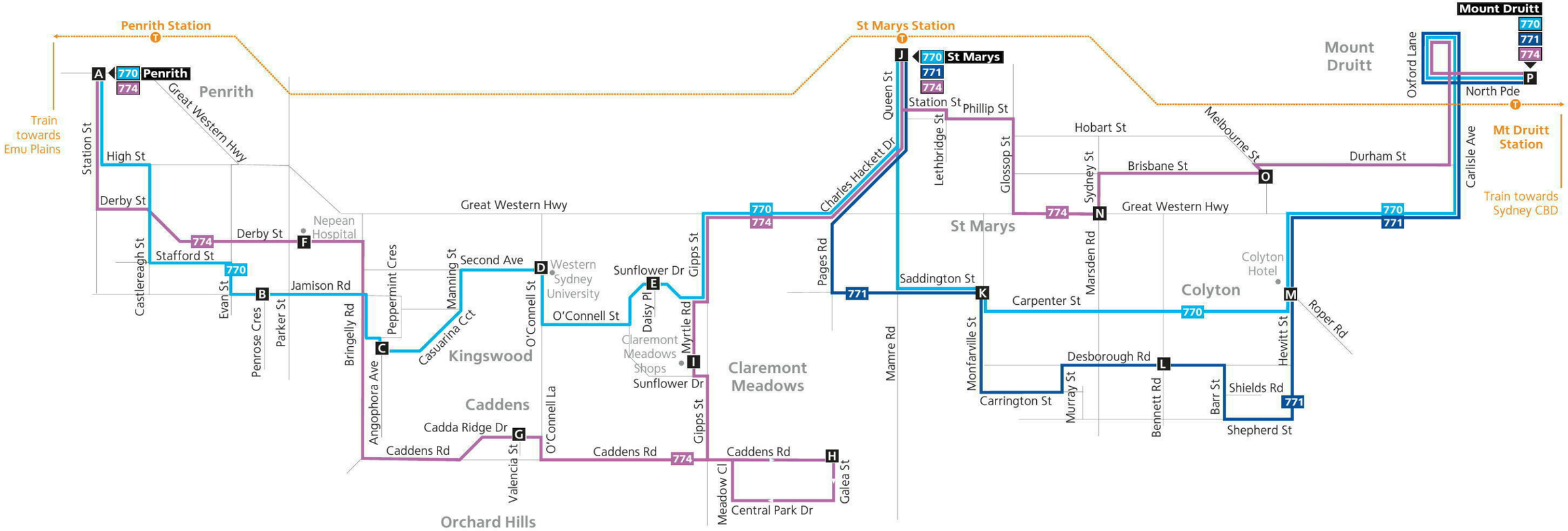
Questions and feedback
Phone 131 500
TTY 1800 637 500

Routes 677, 678



Routes 770, 771, 774

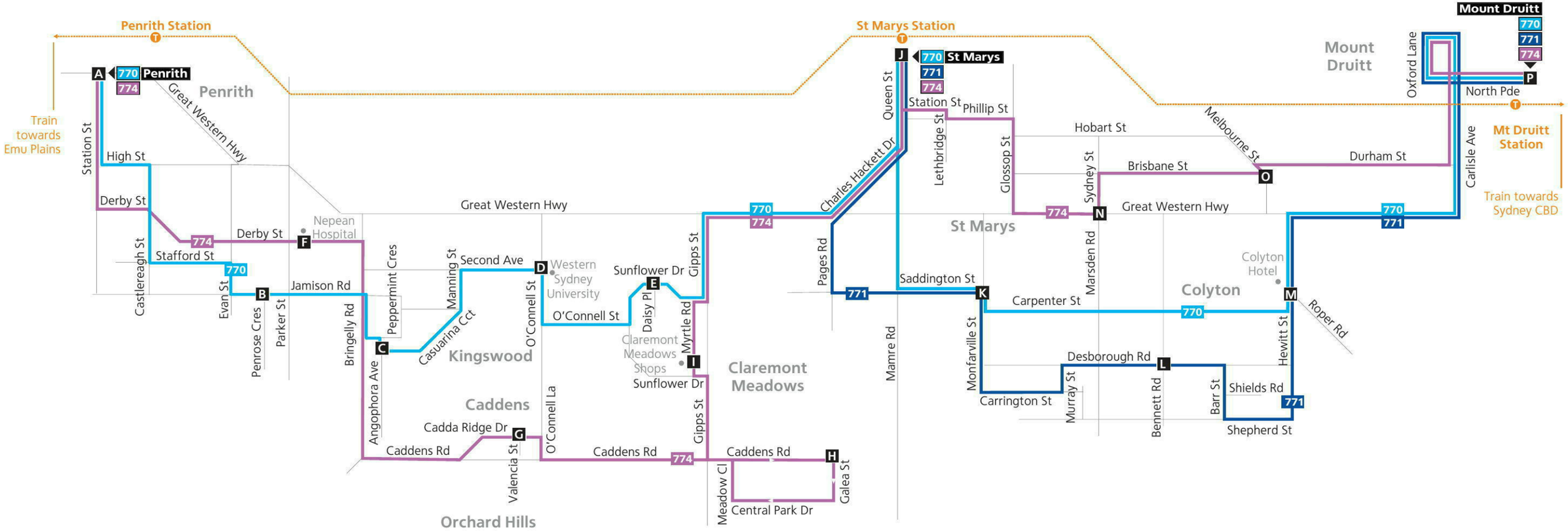


Legend

- Bus route
- 770 Bus route number
- A Timing point
- T Train line/station

North Diagrammatic Map Not to Scale

Routes 770, 771, 774



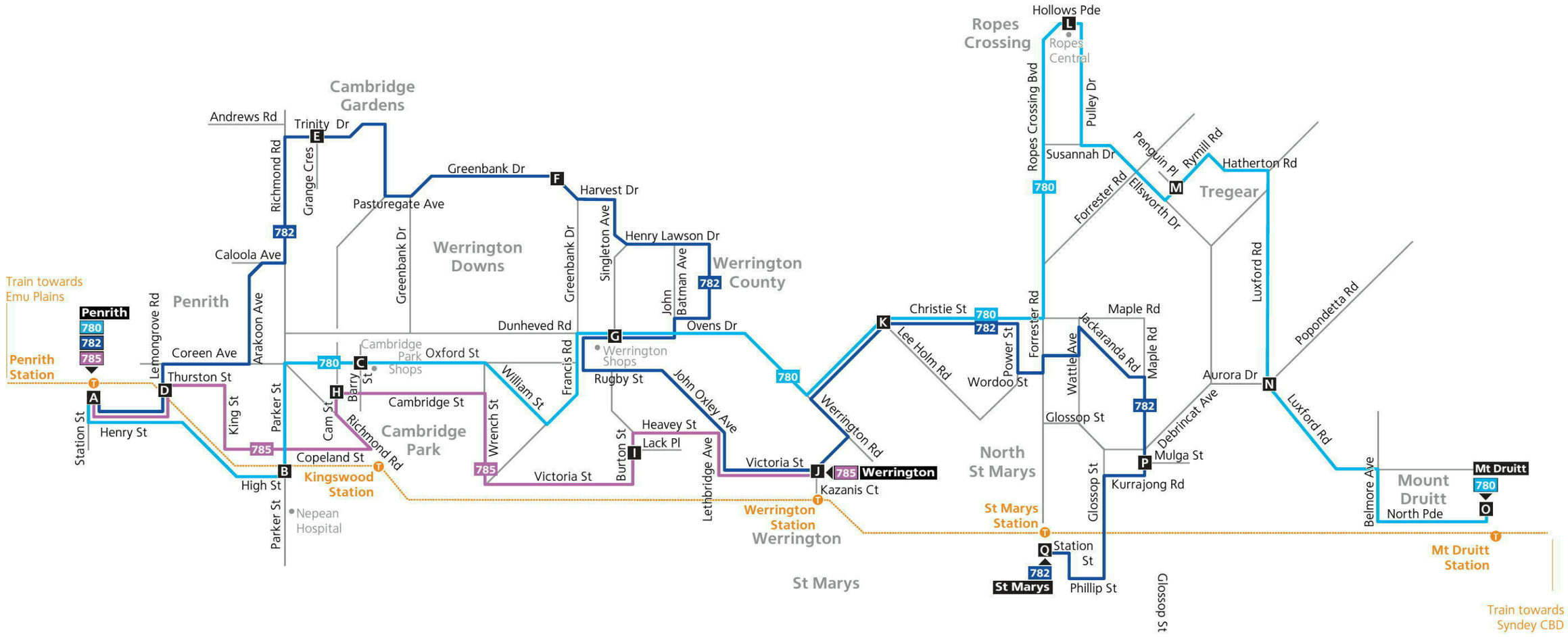
Legend

- Bus route
- 770 Bus route number
- A Timing point
- T Train line/station

North Diagrammatic Map Not to Scale

Routes 780, 782, 785

B



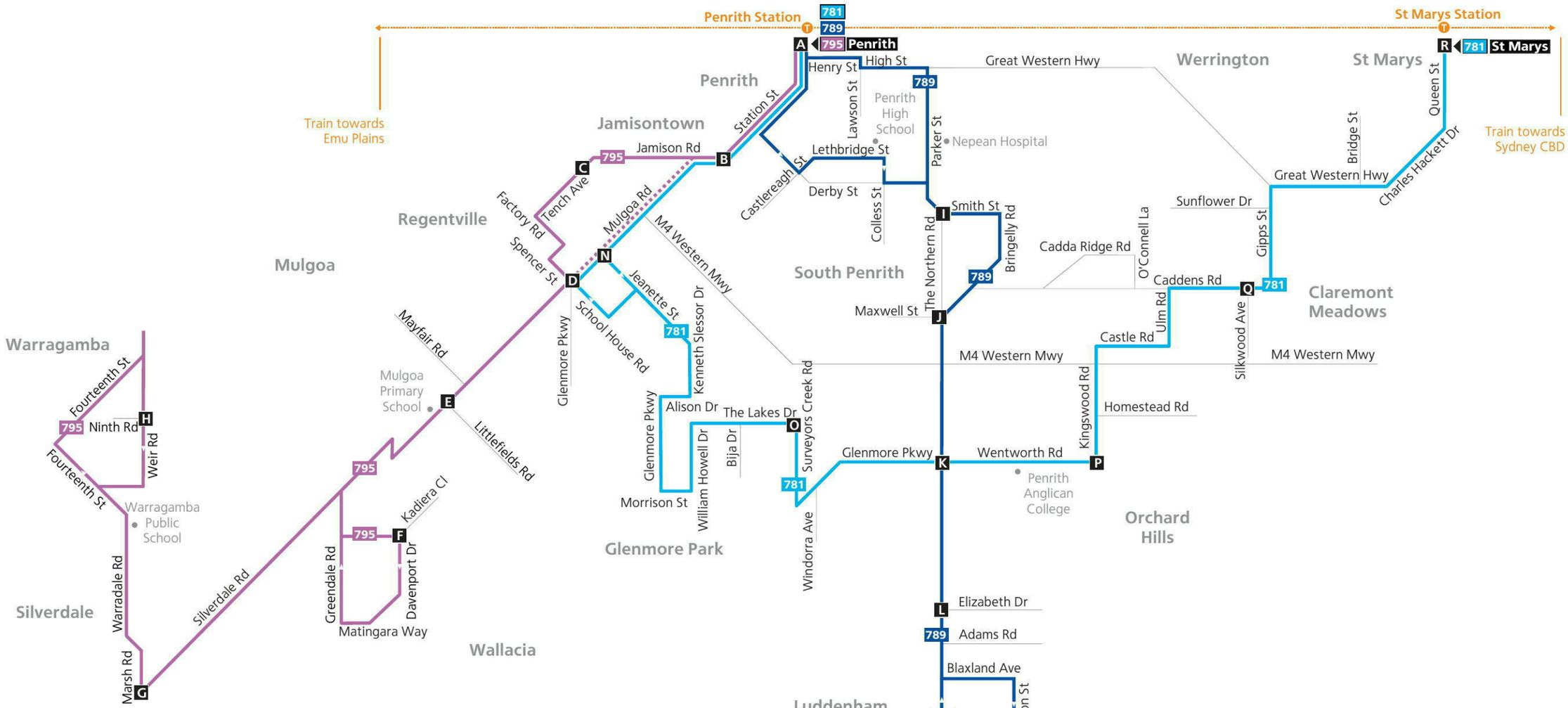
Legend

- Bus route
- 780 Bus route number
- A Timing point
- T Train line/station

Diagrammatic Map
Not to Scale
North

Routes 781, 789, 795

B



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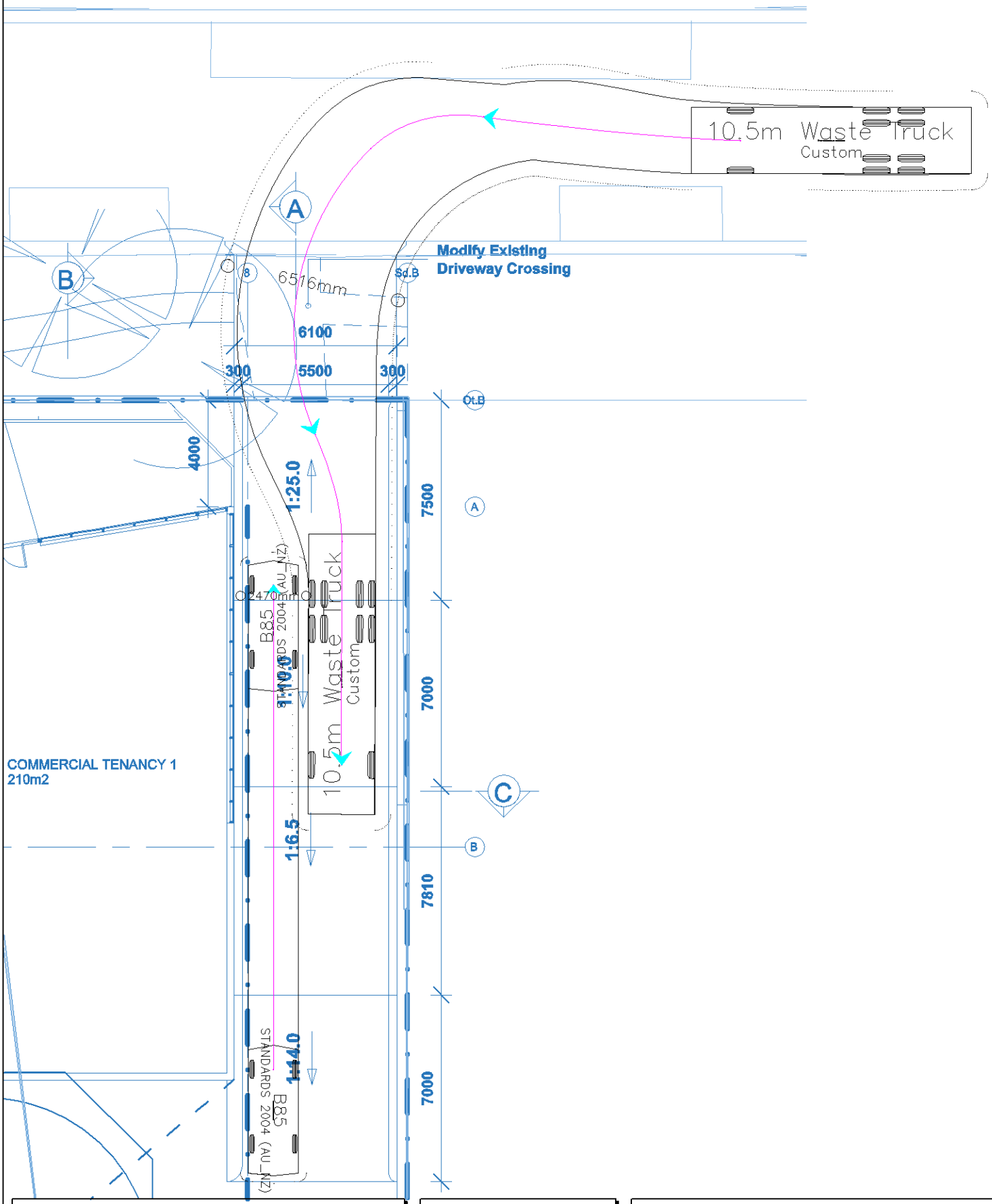
Version: 1, Version Date: 31/10/2019

Appendix E

Turning Path Assessment



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTURN PRO10 in conjunction with AutoCAD 2018. 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 10.5m REFUSE VEHICLE ENTERING THE SITE WHILE PASSING A B85 CAR EXITING THE SITE

SP 3