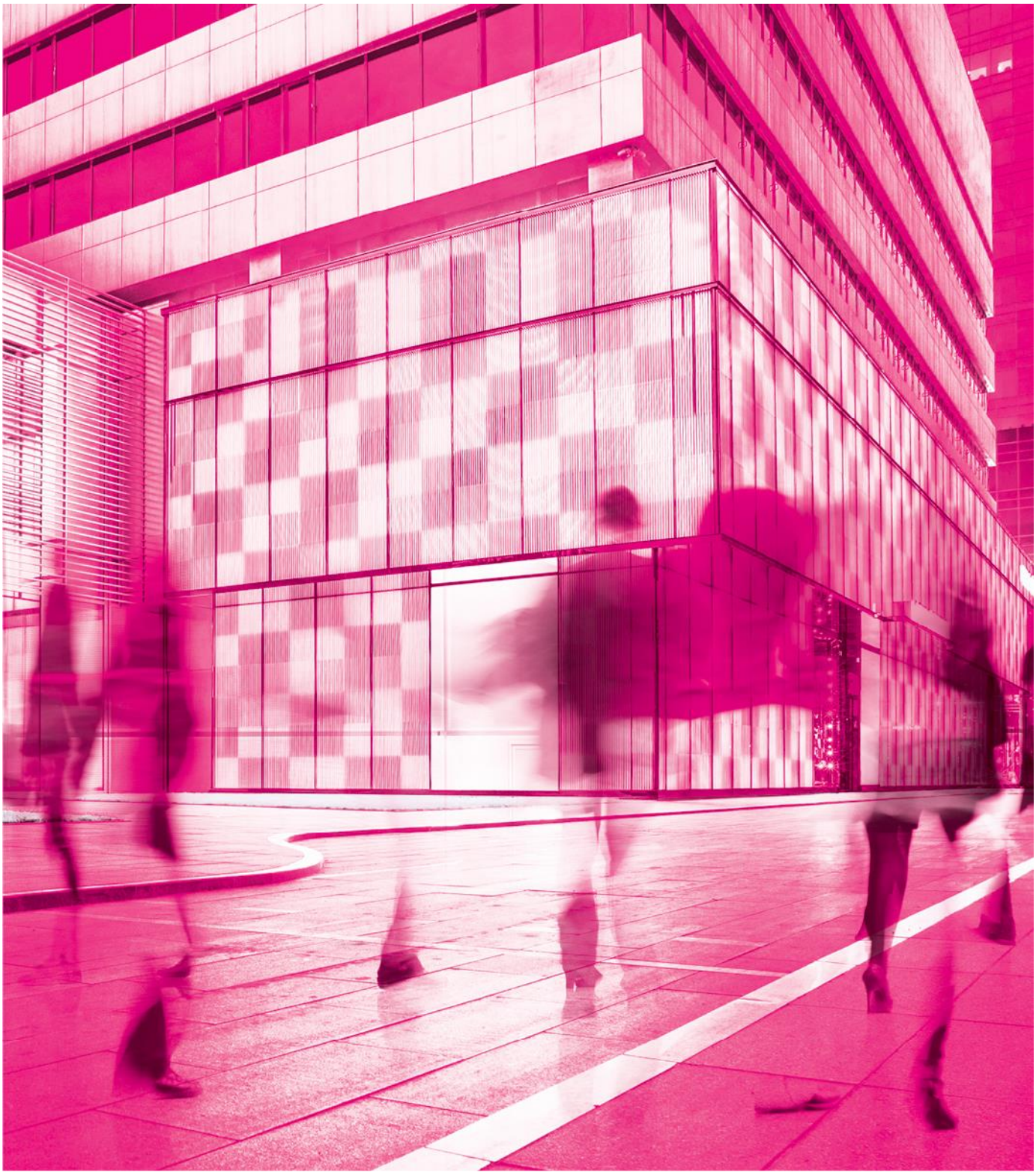

traffic impact assessment;

Roseville College SWELL Centre

For Roseville College

25 October 2019

parking;
traffic;
civil design;
communication;

ptc.

Document Control

Roseville College SWELL Centre, Traffic impact assessment

Issue	Date	Issue Details	Author	Reviewed
1	13/08/2019	1st Draft	EL/FL	AM
2	26/09/2019	Final	EL	FL
3	25/10/2019	Final (incorporating dfp comments)	EL	AM

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1. Introduction

1.1 Project Summary

ptc. has been engaged by Roseville College to undertake a traffic impact assessment study that is intended to accompany a State Significant Development Application by the Roseville College located at the address of 27 Bancroft Avenue, Roseville within the Ku-ring-gai Council Local Government Area (see Figure 1.1).

This report sets out the methodology and findings of the study to assess the traffic, parking and the road network related considerations associated with the following proposal:

- Demolition of the existing sports courts and the property at 37 Bancroft Avenue,
- Construction of a new semi-recessed three / four storey building including a 25m swimming pool and associated facilities,
- Construction of a two storey car park comprising a basement level and semi-basement level,
- Construction of rooftop sports courts above the new car park,
- Construction of a new access way to the new car park via Recreation Avenue.

This study addresses the key topics related to traffic and parking impacts typically associated with the College, being:

- Traffic activity associated with students and the impact on the road network,
- Traffic activity associated with staff and the impact on the road network,
- On-campus parking provision and demand associated with staff,
- The safety of pedestrians, students and other road users in the vicinity of the College,
- The warrants for providing additional traffic and/or parking facilities either within the road network or within the College.

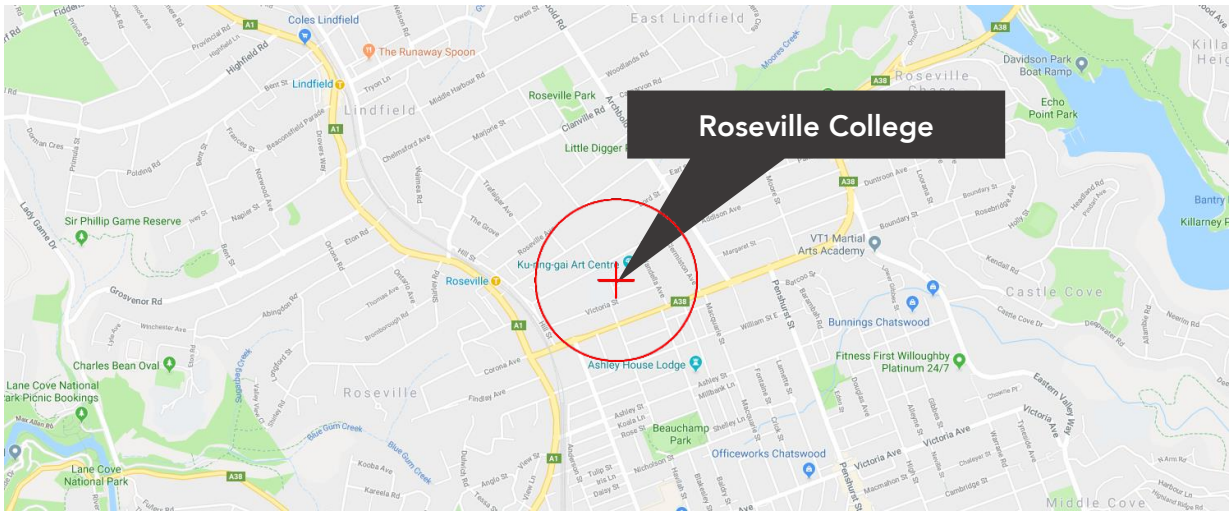

Figure 1.1 – Site Location

1.2 Purpose of this Report

This report presents the following considerations in relation to the Traffic and Parking assessment of the Proposal:

Section 2	A description of the project;
Section 3	A description of the road network serving the development property, and existing traffic volumes through key local intersections;
Section 4	College Travel Characteristic with a description of the survey results;
Section 5	Determination of the traffic activity associated with the development proposal, and the adequacy of the surrounding road network;
Section 6	Determination of the adequacy of the parking provisions
Section 7	Assessment of the proposed car park, vehicular access and internal circulation arrangements in relation to compliance with the relevant standards, and Council policies; and
Section 8	Conclusion and Recommendations.

2. The Development

2.1 Site Content

Roseville College is located at 27-29 Bancroft Avenue in the suburb of Roseville, which is approximately 10 kilometres north of Sydney CBD. The College campus is located between Victoria Street to the south and Bancroft Avenue to the north. The property of No. 37 Bancroft Avenue was recently acquired by the College containing a single detached dwelling with a tennis court to the rear.

The College is located within a predominantly residential area to the east of the T1 railway line, comprising a mix of large established dwellings and the Roseville Lawn Tennis Club to the west and medium density residential flat building to the south.

The Pacific Highway and Roseville railway station are located approximately 400 metres to the west of the site.

The aerial photograph in Figure 2.1 provides an overview of the area and context in relation to the surrounding land uses.

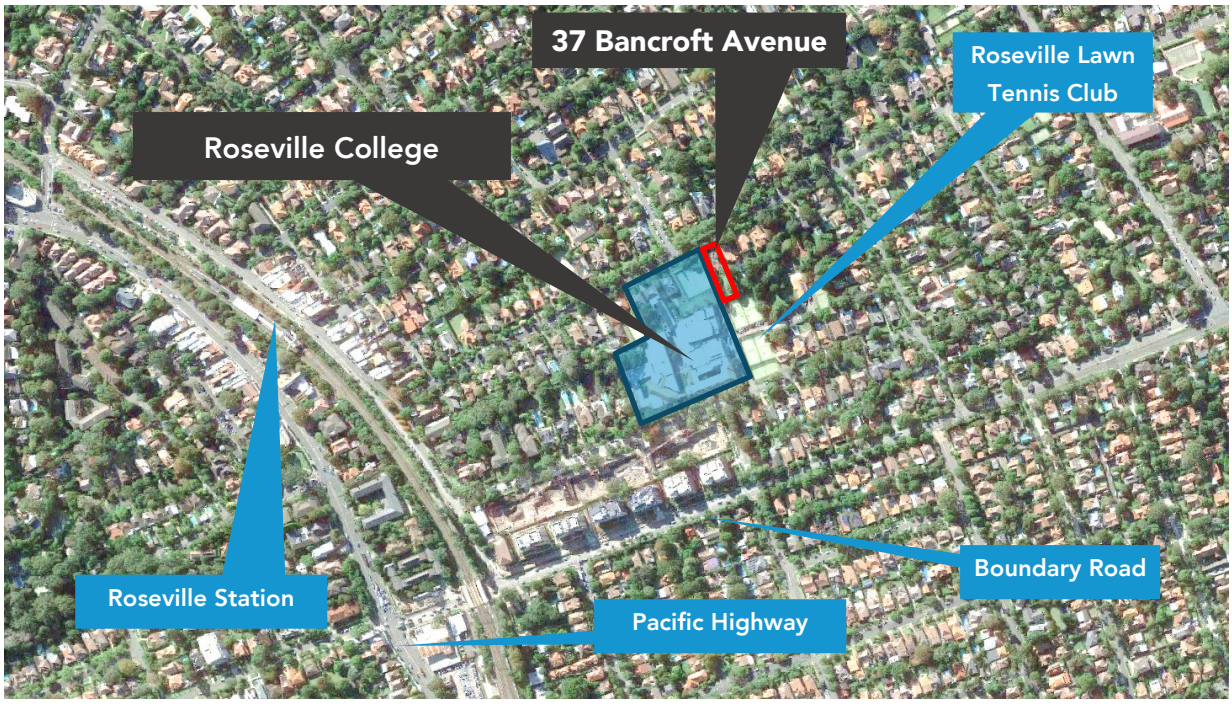

Figure 2.1 – Roseville College Context

2.2 Previous Development Applications and Consents

It is important to note that two Development Applications approved by Ku-ring-gai Council, which are relevant to the development of this SSD proposal. The Current development consents relating to 27-29 Bancroft Avenue are:

- DA0261/16 – *Progressive Increase of member of Students from 830 to a maximum of 1250 from the year 2016 to 2030.* Development consents were issues by Ku-ring-gai Council on 12 April 2017.
- DA0262/16 – *Demolish existing multi-purpose hardcourts, construct a building with one level of basement parking one level of semi-basement parking, roof level multi-purpose hardcourts, access and driveways and associated landscaping.* Development consents were issued by Ku-ring-gai Council on 3 February 2017.

2.3 Development Proposal

The proposed Sport and Wellbeing (SWELL) Centre will be built on the site of the current sports courts and the site of No. 37 Bancroft Avenue.

The development will include the following land uses:

- A 25m swimming pool;
- A rooftop sports court;
- A gym
- A two-storey car park; and
- Amenities

The proposed development of the SSD is shown in Figure 2.2 to Figure 2.4.

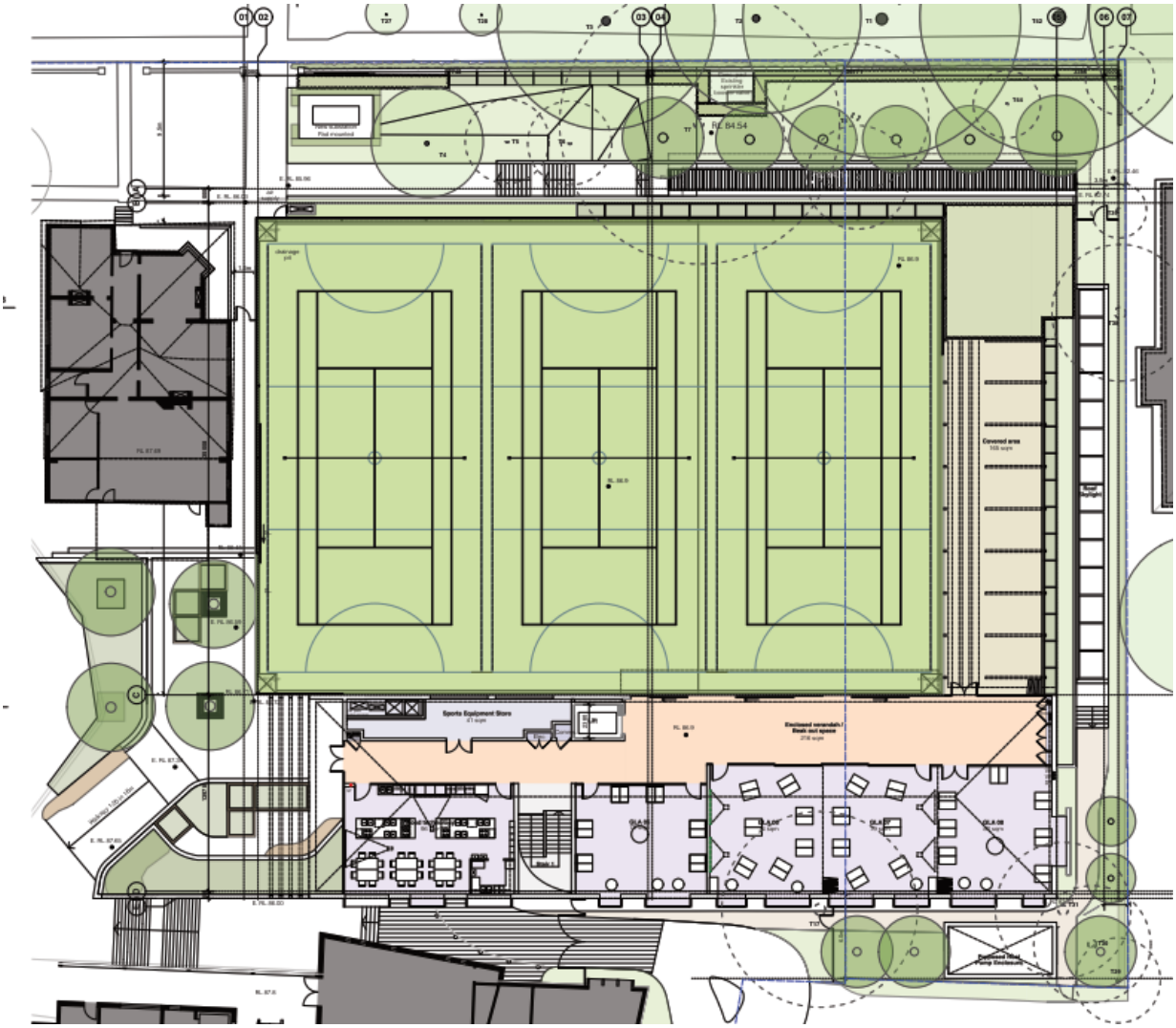

Figure 2.2 – Court Level

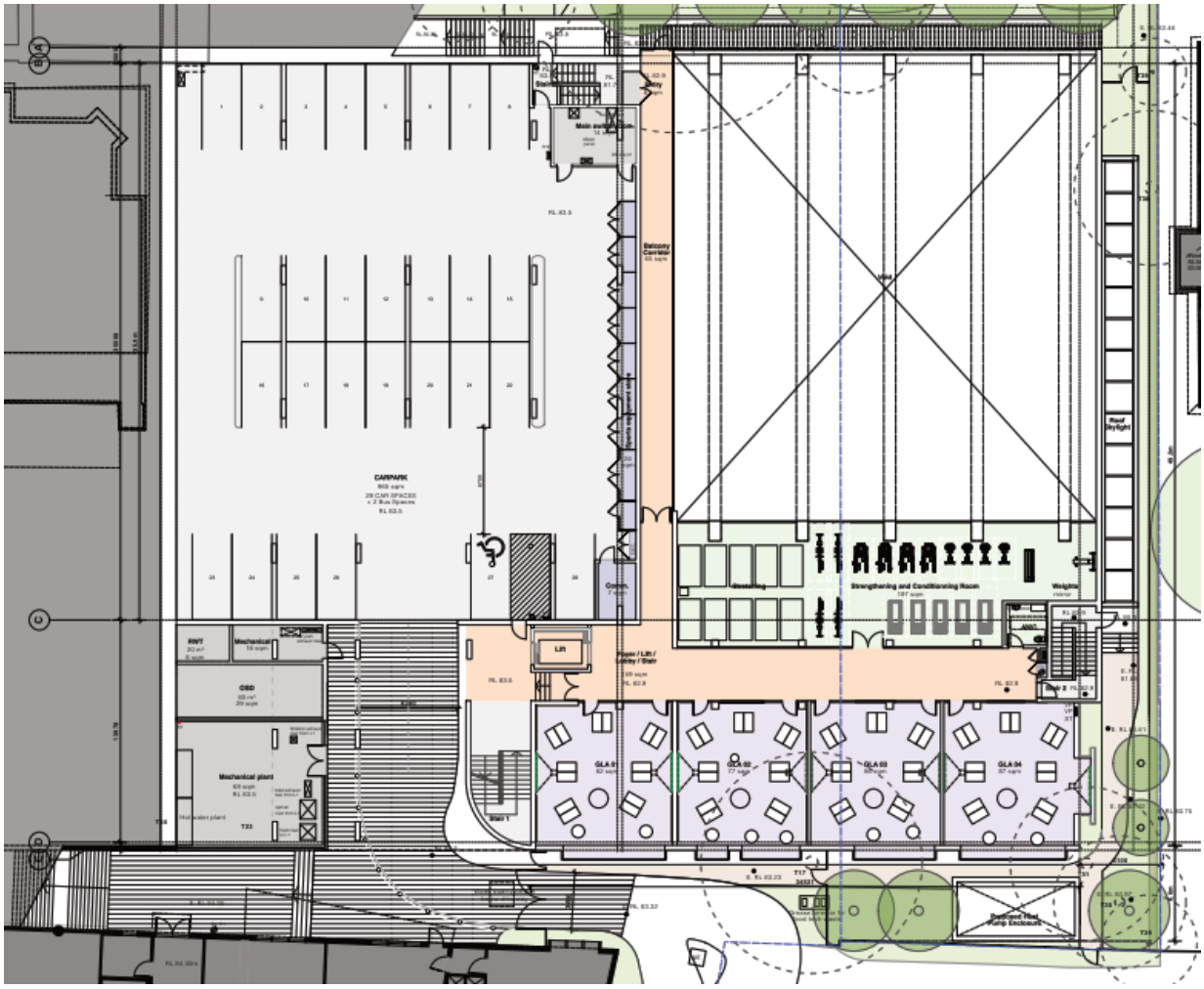

Figure 2.3 – Ground Level

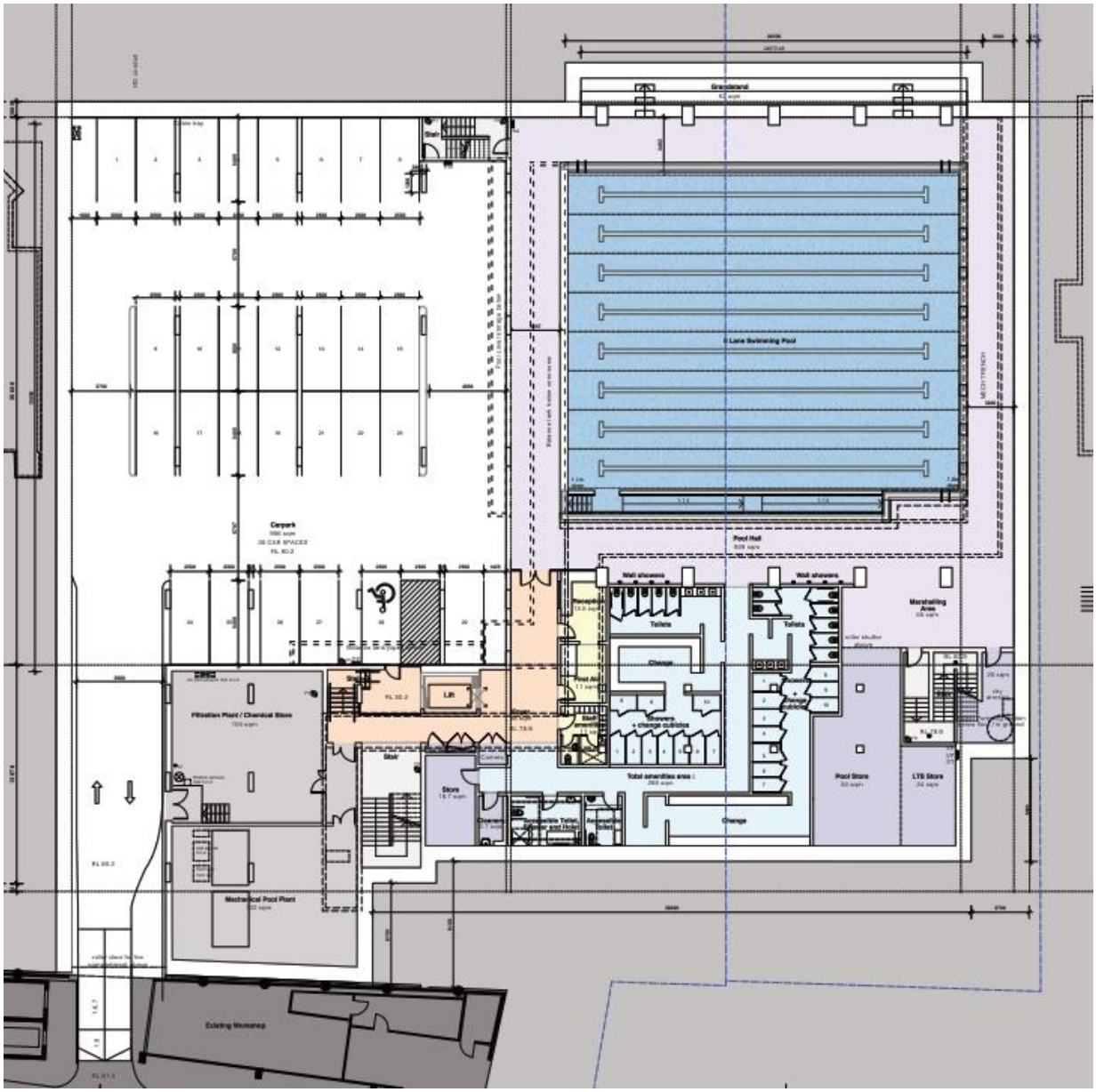

Figure 2.4 – Pool Concourse Floor

3. Existing Transport Facilities

3.1 Road Hierarchy

The College is located in Roseville to the east of the T1 railway and the Pacific Highway, and in this regard has reasonably good connections to the north shore arterial road network. However, connections to the west are somewhat limited by the North Shore Railway line, which acts as a barrier through the area.

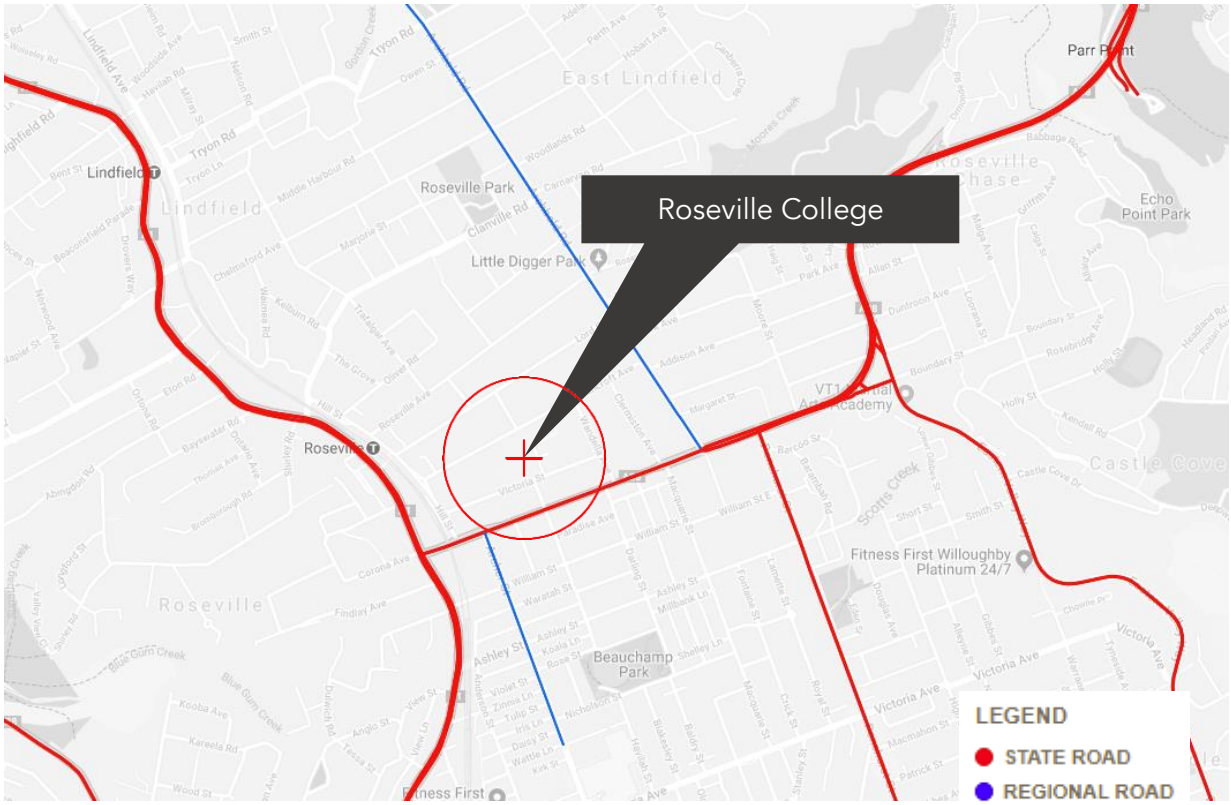

Figure 3.1 – Road Hierarchy

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

State Roads	- Freeways and Primary Arterials (RMS Managed)
Regional Roads	- Secondary or Sub Arterials (Council Managed, partly funded by the State)
Local Roads	- Collector and Local Access Roads (Council Managed)

The road network servicing the College includes:

The Pacific Highway, which is classified as a State Road and follows a north–south alignment. Within the suburb of Roseville, the carriageway accommodates three (3) traffic lanes in each direction with auxiliary turning lanes at major intersections.

Boundary Road, which is classified as a State Road and provides a connection between Pacific Highway to the west and Warringah Road to the east.

Recreation Avenue, which is a Local Road providing vehicular access to the existing and future car park in the College and the car park of Roseville Tennis Club. Recreation Avenue is a cul-da-sac with narrow carriageway in the width of approximately 5.5m. Access to Recreation Avenue is only available via Victoria Street.

Victoria Street, which is a Local Road providing access the local properties. Victoria Street provides strategic access to the College frontage. Dedicated pickup and drop-off areas are provided along the northern side of Victoria Street during the school time. Most of on-street parking spaces are unrestricted parking with the exception of 1/2P on the opposite side the College.

Bancroft Avenue, which is a Local Road parallel to Victoria Street to the north of the College. Currently the College's driveway along Bancroft Avenue only provide garbage truck access for waste collection. In the vicinity of the College the carriageway accommodates single marked traffic lanes in each direction, with parking along both sides.

3.2 Surrounding Traffic Controls

The traffic controls in the vicinity of the College comprise a general 50kph speed limit and a 40kph school zone applicable to Victoria Street and Bancroft Avenue.

Threshold Local Area Traffic Management treatments are installed on both Victoria Street and Bancroft Avenue at Hill Street, which intersect with Boundary Road on the south end. Wombat pedestrian crossings are provided in front of the College's main accesses at both Victoria Street and Bancroft Avenue.

3.3 College Traffic and Parking Arrangements

The College benefits from two road frontages comprising Victoria Street and Bancroft Avenue. Vehicular access to the basement car park is currently only available via two driveways off Recreation Avenue. There is another driveway off Bancroft Avenue, which is only used by emergency vehicles and garbage trucks for waste collection. Both of these roads are classified as "local roads" according to the RMS Road Classification map and are residential in character (refer to Section 3.1 for further details).

The primary on-street drop-off and pick-up area is provided along the Victoria Street with timed "No Parking" restriction control during school peak hours.

3.3.1 On-Street Parking Controls

The College has two road frontages; Victoria Street and Bancroft Avenue, each providing some areas of on-street parking. The on-street parking provision is subject to time restrictions and 'No Stopping' restrictions. The various parking controls are presented in Figure 3.2 which comprise either unrestricted parking, 'No Parking', or 'No Parking during student drop-off and pick-up periods' ('No Parking' permits a driver to stop for up to two minutes, however, they must remain within three metres of the vehicle) and 1/2P during school pickup and drop-off periods.

Figure 3.2 – Existing On-Street Parking Controls

3.3.2 On-Site Parking Supply

The current parking provision within the College comprises 127 car parking spaces (including six disabled parking spaces, two parking spaces for College's minibuses and one loading bay. The parking spaces are provided for staff and Year 12 students and are located across multiple basement car parks and at-grade car parks with accesses via Bancroft Avenue, Recreation Street and Victoria Street. There are currently no parking spaces or pick-up/drop-off areas for parents within the College.

3.4 Public Transport

The College is well serviced by both train and bus services operating on the T1 Railway Line and a number of buses operating along Boundary Road and Pacific Highway and Hills Street.

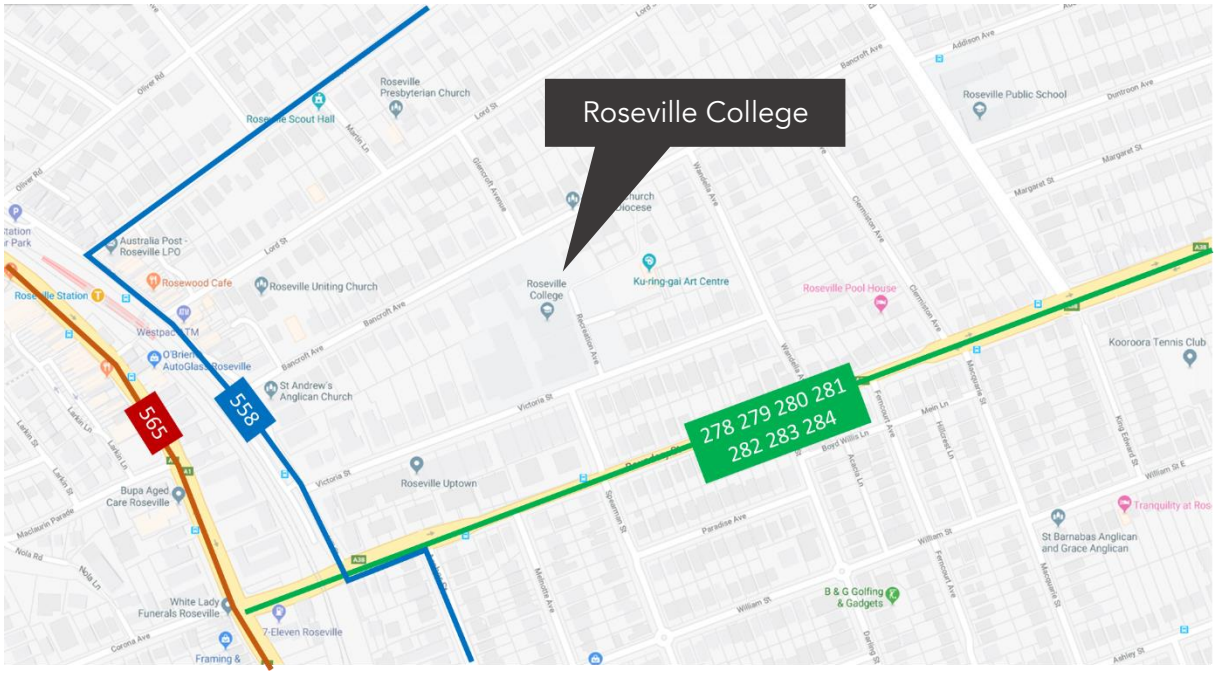

Figure 3.3 – Surrounding Public Transport (Bus and Train Services)

3.4.1 Rail

Roseville Station is located approximately 300m walking distance from the Bancroft Avenue entrance and is situated on the T1 North Shore Line, providing access to the College from Northern, Southern and Western suburbs (via interchange at Sydney CBD stations).

Table 3.1 – Rail Services

Rail Route	From	To	Frequency on Weekdays (approx.)
Northern Line (Southbound)	Berowra/Hornsby	Parramatta (via Central)	Arrive every 15 minutes (morning peak and afternoon school peak)
Northern Line (Northbound)	Parramatta (via Central)	Hornsby/Berowra	Arrive every 6-9 minutes (morning peak) Depart Every 6-9 minutes (afternoon school peak)

Services via the North Shore/Northern Line are frequent and provide excellent availability throughout the day, especially during peak hours.

3.4.2 Bus

A bus stop is located approximately a 2 min walk (120m) from the College at the corner of Boundary Road and Spearman Street. The buses on the opposite direction can be accessed via the signalised crossing at the intersection of Boundary Road and Archer Street.

3.5 Active Travel

In addition to public transport, the locality has been assessed for its active transport potential.

3.5.1 Walking

In terms of public infrastructure, the local road network offers a high level of amenity and safety for pedestrians, providing footpaths on either side of most roadways, wombat crossings, supporting signage and appropriate lighting throughout the locality.

3.5.2 Cycling

The subject site is located within a well-connected bicycle network with the planned upgrade works. Figure 3.4 presents a screenshot of the cycle map published by Council. This will encourage and promote cycling as an alternative mode of transport for its occupants which is a healthy, low cost and environmentally-friendly method of travel.

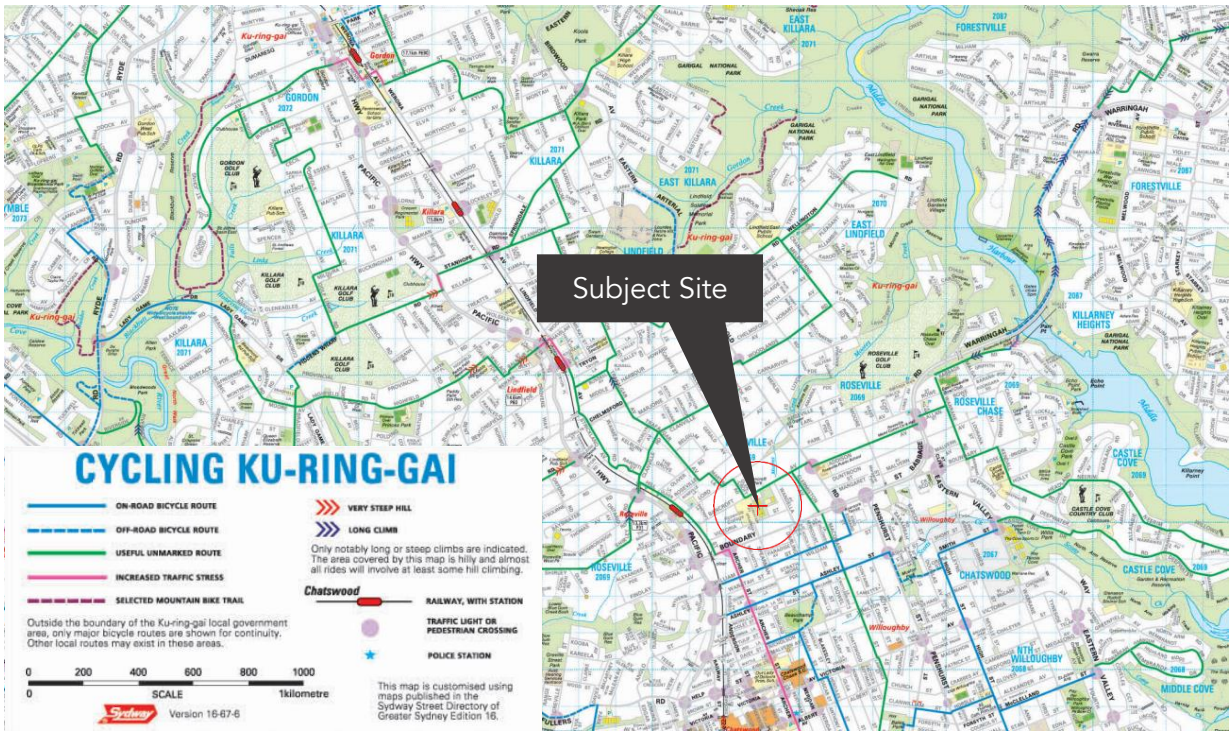

Figure 3.4: Surrounding cycle paths (Source: Ku-ring-gai Cycleways Map)

4. College Travel Characteristics

4.1.1 College Drop-Off and Pick-Up

In order to assess the current and projected traffic activity associated with the College, it is important to understand the current travel characteristics, such as the transport mode split, car occupancy rates, locations of pickup/drop-off, etc.

An existing on-street drop-off/pickup area is currently located along Victoria Street in front of the College with the capacity of approximately 13 vehicles.

Surveys were conducted in the existing drop-off/pickup area to identify the peak parking demands occurring during the morning and afternoon school peak periods.

The surveys found that demand was relatively low in the morning as drop-off activities occurred promptly and the activity was distributed throughout the surveyed period. The demand in the afternoons is higher since parents tend to arrive and park sometime prior to the beginning of the pickup period.

It has also been observed that there were two distinct pickup periods during the afternoon with an initial pickup at 3:10pm comprising mostly younger students and a second pickup period at 4:30pm for mostly senior students engaged in extracurricular activities after school such as music or sports.

The results of the parking surveys at the pickup/drop-off area are summarised in Figure 4.1 and Figure 4.2.

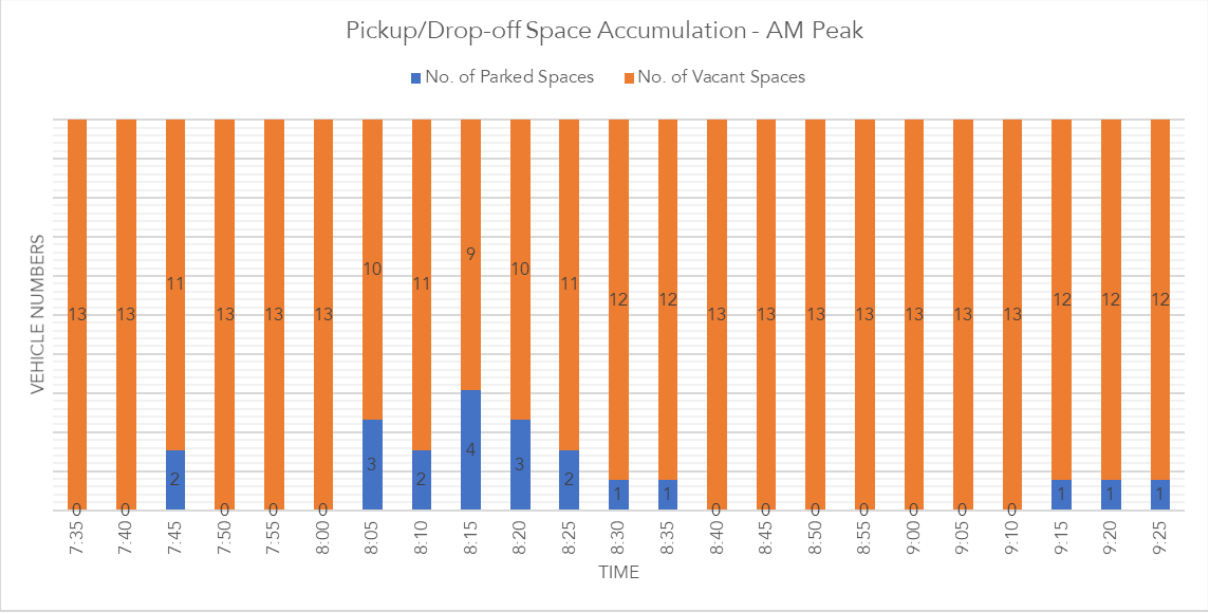

Figure 4.1 – Pickup/Drop-off survey results - AM

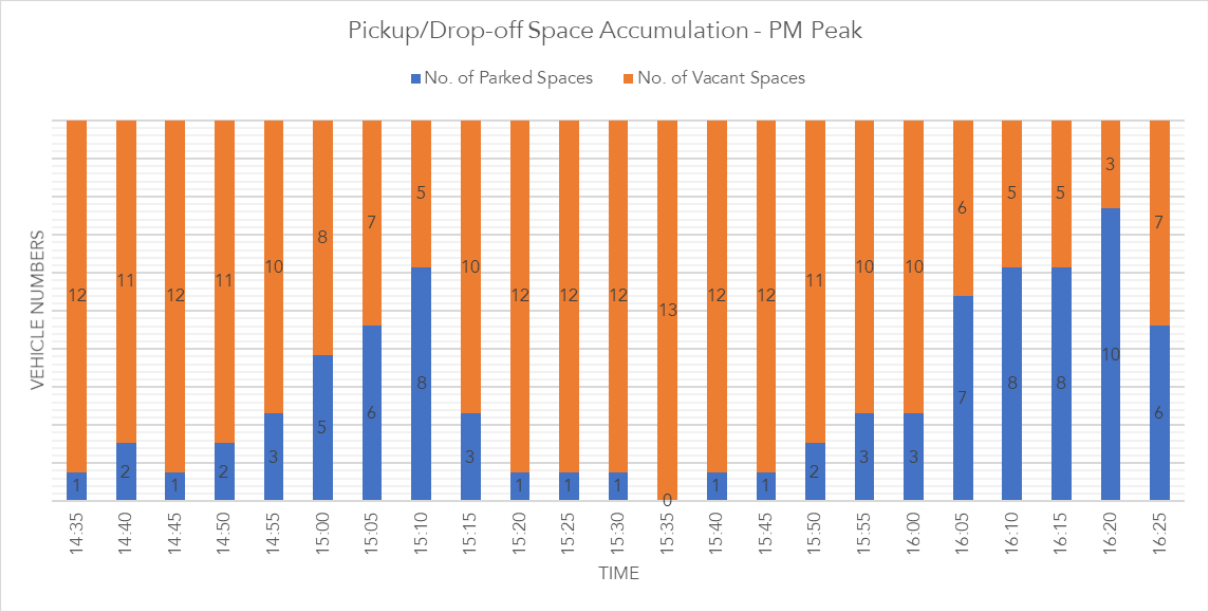

Figure 4.2 – Pickup/Drop-off survey results - PM

In summary, the pickup/drop-off surveys indicate the following:

- A peak demand of 4 vehicles for student being dropped off during morning school time, with the spare capacity of 9 spaces; and
- A peak demand of 10 vehicles for student being picked up in the afternoon school time, with the spare capacity of 3 spaces.

Expressed on a "per student" basis, the survey results equate to the following parking demand rates:

- AM peak drop-off: 1 space per 208 students
- PM peak pickup: 1 space per 83 students

4.2 Staff and Student Travel Survey and Results

4.2.1 Staff Travel Survey

An online questionnaire was prepared for the staff and distributed by the College. The survey was available for two weeks from 16th May 2019 to 28th May 2019 and 136 staff members completed the questionnaire. The results of this are outlined as follows:

- 92% of staff travelled to and from the College by car, in 123 vehicles. Of these:
  - 104 have allocated parking spaces within the College
  - 9 parked on Bancroft Avenue
  - 6 parked on Victoria Street
  - 3 parked on Glencroft Avenue
  - 1 parked on adjacent streets
- 7% of staff travelled to and from College by public transport.

- On average, 87.9% of staff attend the College all day
- The reasons for travelling by car were as follows:

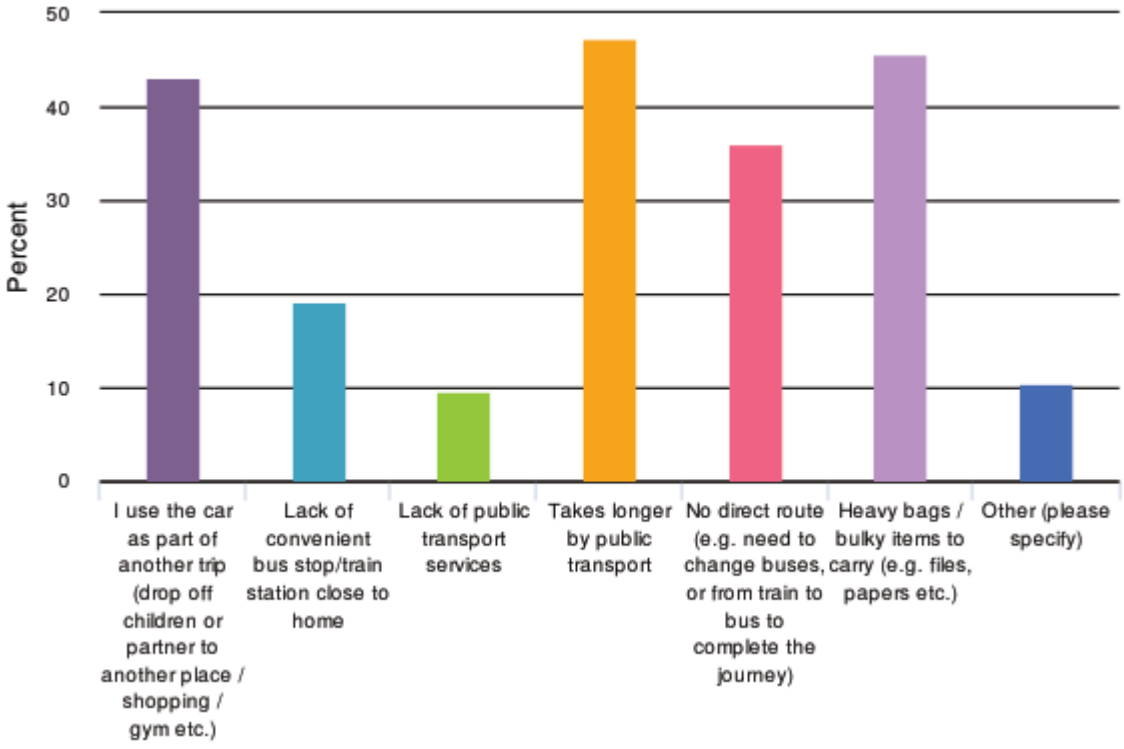

Figure 4.3 – Reasons for driving

- The staff arrival and departure times are presented as follows:

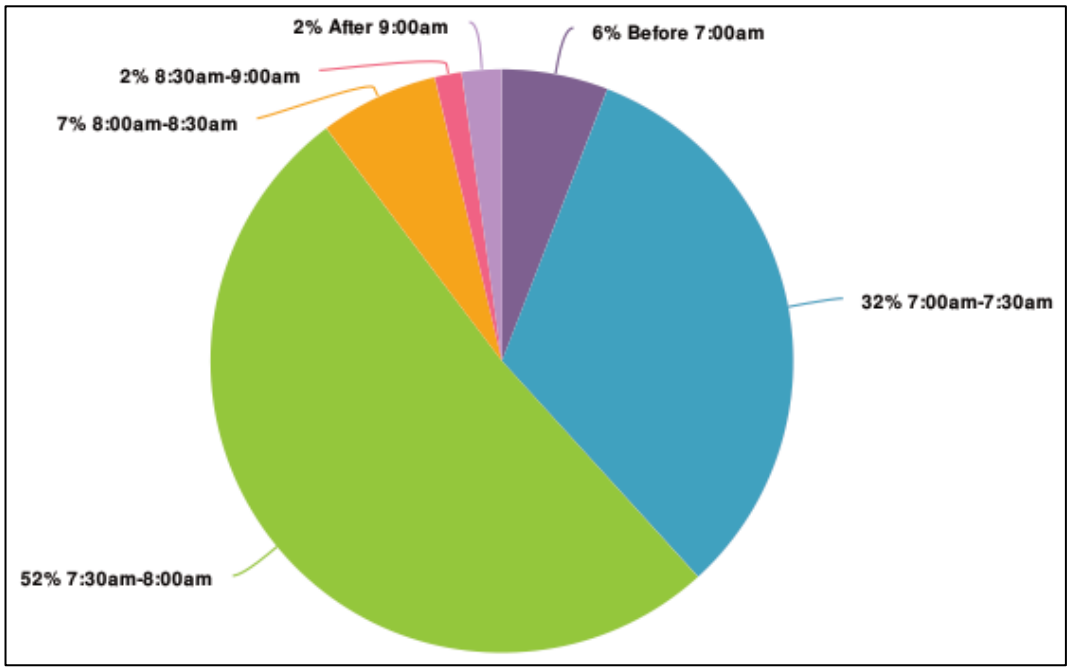

Figure 4.4 – Staff Arrival Times

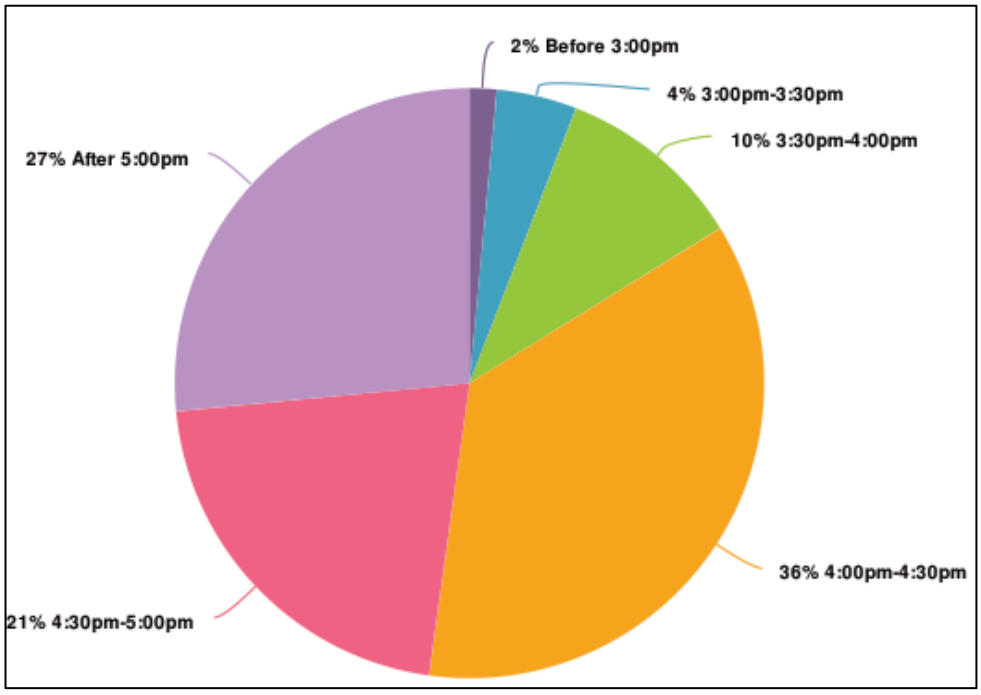

Figure 4.5 – Staff Departure Times

4.2.2 Student Travel Survey

Of the 970 students enrolled in the College, 657 completed the online questionnaire. The survey was made available at the same time period as the staff survey. The results of the survey are outlined below:

- The composition of the surveyed students were as follows:
    - 9.1% in Year 1-6
    - 51.0% in Year 7-9
    - 39.9% in Year 10-12
- The mode of travel is presented in the following figures:

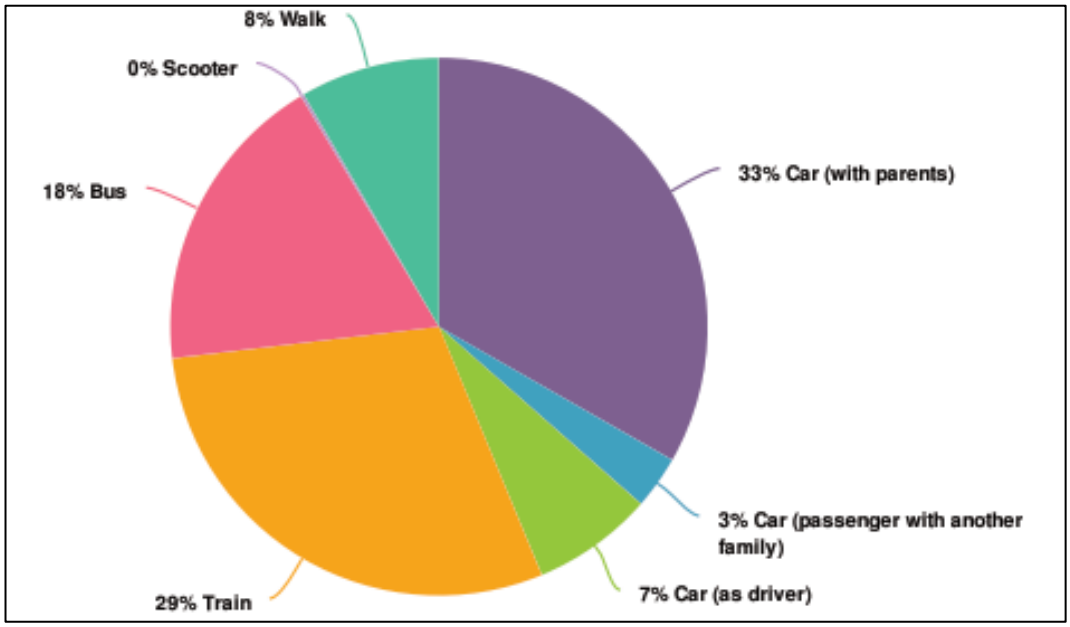

Figure 4.6 – Travel mode (From Home to College)

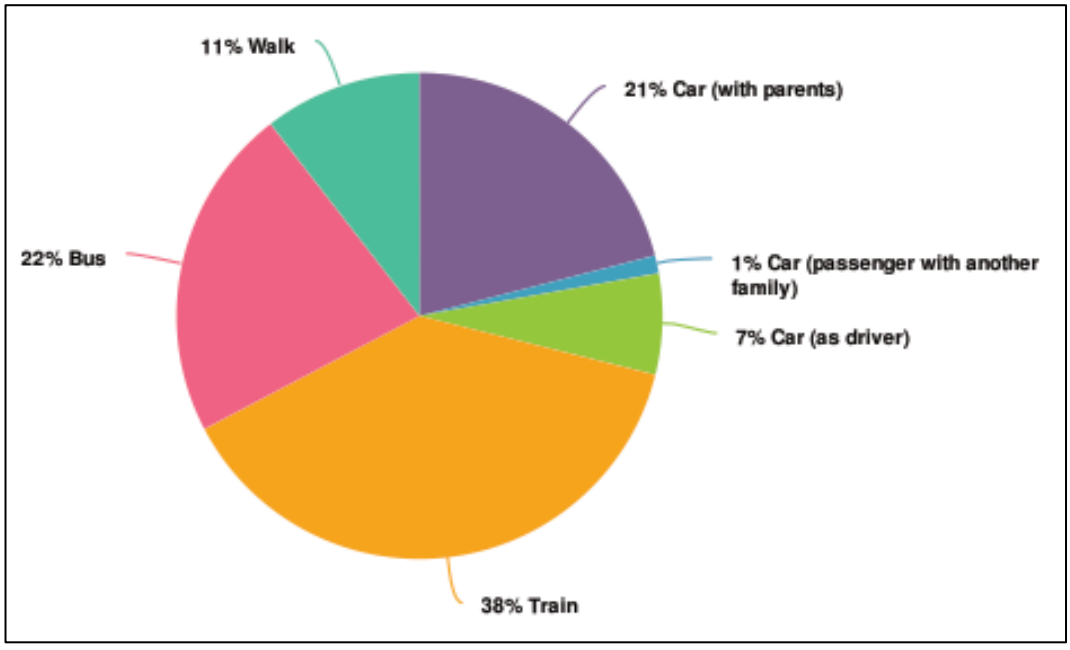

Figure 4.7 – Travel mode (From College to Home)

- The number of Roseville College students travel together to and from the College by car were as follows:

To College		From College	
Alone	= 80.3%	Alone	= 80.3%
Two	= 17.2%	Two	= 17.9%
Three	= 2.1%	Three	= 1.8%
Four	= 0.3%	Four	= 0.0%

5. Traffic Assessment

5.1 Existing Traffic Conditions

In order to determine the existing traffic conditions within the road network serving the College, traffic count surveys were undertaken at the following intersections on 26/03/2019 between 7am and 9am as well as between 2:30pm and 4:30pm:

- Victoria Street and Spearman Street
- Victoria Street and Recreation Avenue
- Victoria Street and Wandella Avenue
- Bancroft Street and Glencroft Avenue

The four intersections were studied as a network and the AM and PM peak hours were from 7:30am to 8:30am and from 3:15pm to 4:15pm respectively. The results of the intersection surveys are illustrated in the following figures:

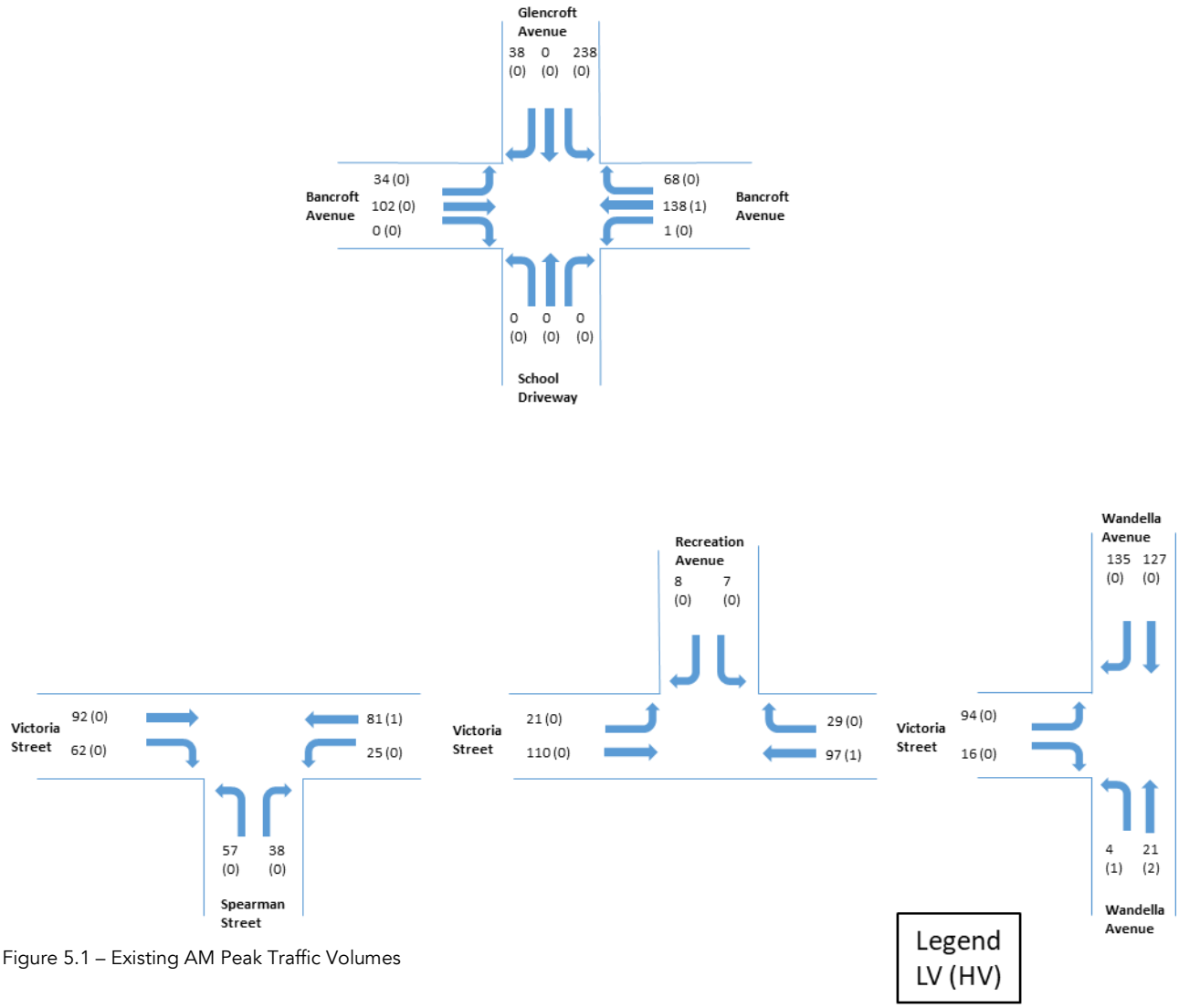

Figure 5.1 – Existing AM Peak Traffic Volumes

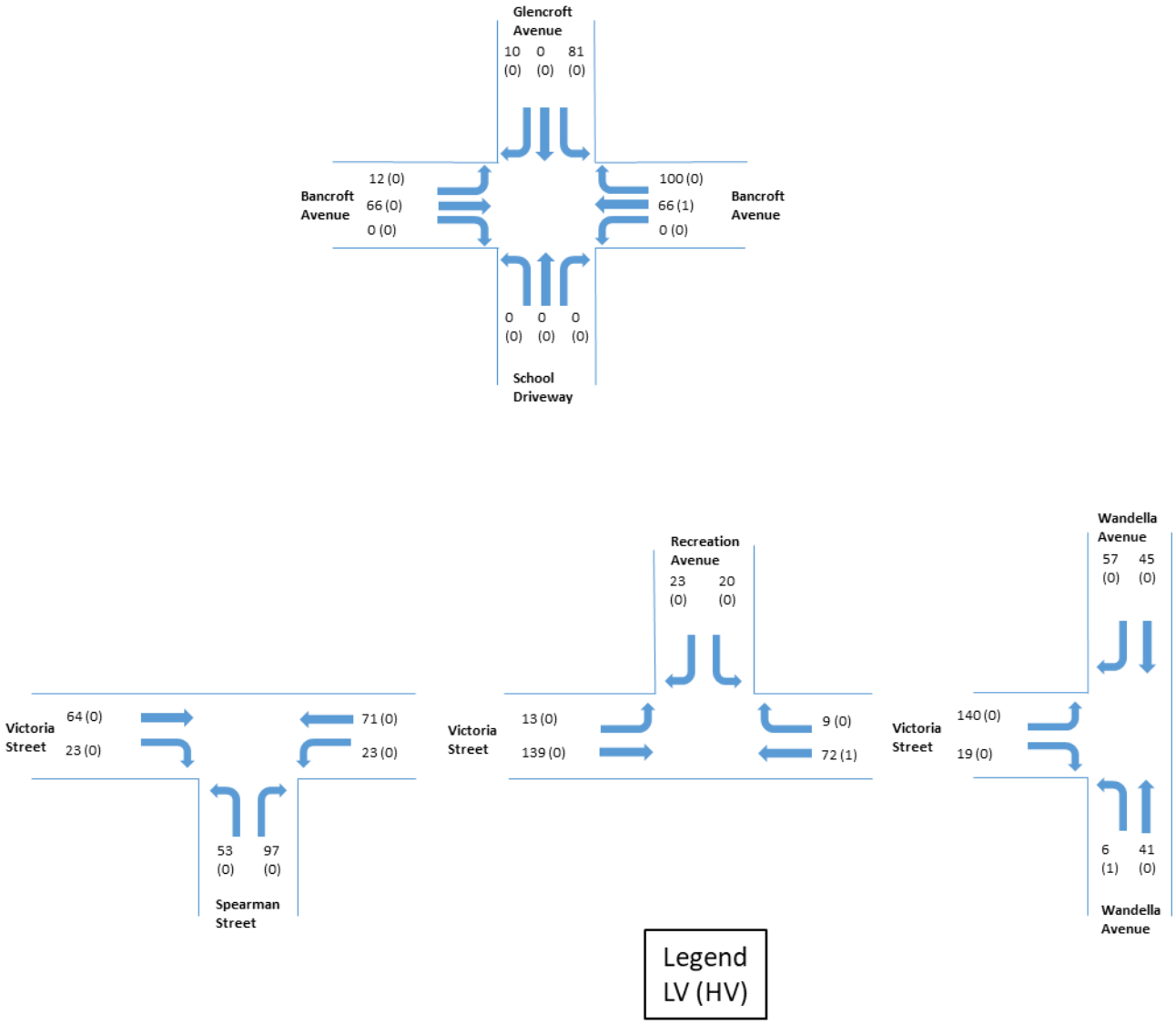

Figure 5.2 – Existing PM Peak Traffic Volumes

5.2 Development Traffic

With the proposed increase of student population from 1000 students to 1,250 students by Year 2030, the additional traffic associated with the college activities will be generated., which is presented in the following sections.

5.2.1 Minibuses

Currently, there are two minibuses parked within the campus, it is proposed that the demand for the minibuses will remain unchanged.

5.2.2 Private Vehicles - Students

Traffic generation rates for a school development are not set out in either the Roads and Maritime Services Guide to Traffic Generating Development (2002) nor in the relevant Technical Direction, published in 2013.

The outcomes extracted from the survey at the pickup/drop-off area has been adopted in this study to determine the future traffic generation with increasing student population.

The survey indicated a total of 165 vph dropping-off students during the AM school peak hour and 91 vph picking-up students during the PM school peak hour within the dedicated pickup / drop-off area. These pickup/drop-off rates expressed on a "per student" basis are:

- AM School Peak hour: 0.2 vph per student; and
- PM School Peak hour: 0.11 vph per student

It should be noted that above data was collected within the dedicated pickup / drop-off area. Additional vehicle trips associated with the College, such as other pickup/drop-off activities and Year-12 students driving may be generated and occur in other on-street parking areas along Victoria Street, Bancraft Avenue or adjacent streets rather than the dedicated pickup/drop-off spaces.

The net future traffic generation within the dedicated pickup / drop-off area with the increasing student population of 250 by 2030 and the above rates is forecasted to be 50 vph dropping-off students additionally during the AM school peak period and an additional 28 vph picking-up students during the PM school peak period. In term of the projected traffic activity, the proposal is entirely consistent with the previous approval.

5.2.3 Private Vehicles – Staff

The increase of 250 students over time would result in an increase in staff to 152 FTE. Using the assumption that the ratio of staff to FTE and their travel mode split remains unchanged between the survey sample and the 2030 population (see Section 4.2), the vehicular trips from the survey would translate into 156 trips in 2030 (123 trips x 152FTE/120FTE) – a net increase of 33 trips. The additional staff arrival and departure timing distribution based on the survey is therefore calculated as follows:

Table 5.1 – Projected Additional Staff Arrival Trips in Year 2030

Arrival	Percent	Vehicle Trips (Year 2030)
Before 7:00am	5.90%	2
7:00am-7:30am	32.40%	11
7:30am-8:00am	51.50%	17
8:00am-8:30am	6.60%	2
8:30am-9:00am	1.50%	0
After 9:00am	2.20%	0

Table 5.2 – Projected Additional Staff Departure Trips in Year 2030

Departure	Percent	Vehicle Trips (Year 2030)
Before 3:00pm	1.50%	0
3:00pm-3:30pm	4.40%	1
3:30pm-4:00pm	10.30%	3

4:00pm-4:30pm	36.00%	12
4:30pm-5:00pm	21.30%	7
After 5:00pm	26.50%	9

It should be noted that the actual PM peak traffic in the road network is typically between 5-6pm on weekdays. Although the road network is not saturated during the afternoon school peak, traffic modelling is undertaken considering the actual PM peak as a conservative approach.

5.2.4 Private Vehicles – Swimming Pool users

The proposed swimming pool will accommodate the following user groups:

- Learn to Swim
- Mini Squads (swimmers aged from 8 to 12)
- Senior Squads (swimmers aged from 13 to 65)

Based on the existing squads program at Roseville Swim School, the starting time of the attendees are provided for the AM and PM periods of a typical weekday:

Table 5.3 – Typical AM Swim Class Attendance

AM	Learn to Swim 30min classes	Mini Squads 30-60min classes	Senior Squads 120min classes	Swim Fit & Adult 60min classes
5:30am	-	-	15 swimmers	10 swimmers
6:30am	-	12 swimmers	-	-
7:00am	-	12 swimmers	-	-

Table 5.4 – Typical PM Swim Class Attendance

PM	Learn to Swim 30min classes	Mini Squads 30-60min classes	Senior Squads 120min classes	Swim Fit & Adult 60min classes
3:30pm	16 swimmers	16 swimmers	-	-
4:00pm	16 swimmers	-	30 swimmers	-
4:30pm	16 swimmers	16 swimmers	-	-
5:00pm	10 swimmers	-	-	-
5:30pm	8 swimmers	8 swimmers	-	-
6:00pm	-	-	-	20 swimmers

In addition to the above class schedule it has been also advised of the following:

- 40% of the attendees are students of Roseville College, thus their trips have already been incorporated in the existing survey data; and
- 15% of the attendees have siblings that are also attending the swim class, and thus arriving and leaving in one car.

Allowing a changing/shower time of 15 minutes before and after classes, the traffic generations and parking demand are calculated on a 15-minute interval, as follows:

Time Period	Mini Squad		Senior Squads	Swim Fit & Adult	Before justified		After justified	
					Traffic Generation	Parking Demand	Traffic Generation	Parking Demand
05:00-05:15								
05:15-05:30			15	10	25	25	13	13
05:30-05:45					0	25	0	13
05:45-06:00					0	25	0	13
06:00-06:15					0	25	0	13
06:15-06:30	12				12	37	7	19
06:30-06:45				10	10	37	6	19
06:45-07:00		12			12	39	7	20
07:00-07:15					0	39	0	20
07:15-07:30					0	39	0	20
07:30-07:45	12		15		27	39	14	20
07:45-08:00					0	12	0	7
08:00-08:15		12			12	12	7	7
08:15-08:30								

Table 5.5: Traffic Generation and Parking Demand from Learn to Swim Programme on a typical Weekday AM

Time Period	Learn to Swim					Mini Squads			Senior Squads	Swim Fit & Adult	Before justified		After justified	
											Traffic Generation	Parking Demand	Traffic Generation	Parking Demand
15:00-15:15														
15:15-15:30	16					16					32	32	17	17
15:30-15:45											0	32	0	17
15:45-16:00		16							30		46	78	24	40
16:00-16:15	16										16	78	9	40
16:15-16:30			16				16				32	94	17	48
16:30-16:45		16				16					32	94	17	48
16:45-17:00				10							10	72	6	37
17:00-17:15			16								16	72	9	37
17:15-17:30					8			8			16	72	9	37
17:30-17:45				10			16				26	72	14	37
17:45-18:00										20	20	66	11	34
18:00-18:15					8				30		38	66	20	34
18:15-18:30											0	28	0	15
18:30-18:45								8			8	28	5	15
18:45-19:00											0	20	0	11
19:00-19:15										20	20	20	11	11
19:15-19:30														

Table 5.6: Traffic Generation and Parking Demand from Learn to Swim Programme on a typical Weekday PM

It should be noted that the traffic and parking analysis of the Swim School is based on the session times and the number of students within the existing swim programme. While a management plan is not required at this stage, it may be warranted in the future if the programme grows in size to manage the arrival and departure of swimmers.

5.2.5 Service Vehicle

The waste collection vehicle movements will occur during mid-day off-peak periods and will not impact on the peak hour traffic flow.

5.2.6 Trip Generation Summary

From the intersection survey, it was found that the AM and PM peak hours were from 7:30am to 8:30am and from 3:15pm to 4:15pm respectively.

The parent drop off/pick up survey indicates that the abovementioned time period made up 76.2% (16/21) and 37.3% (31/83) of occupied spaces, assuming the trend continues into the Year 2030, the drop-off/pick up vehicular trips therefore become 38 (50x76.2%) and 11 (28x37.3%) trips respectively.

With regard to the staff traffic, there are 19 (17+2) arrival trips during the morning peak hour (7:30am to 8:30am); during the afternoon peak hour (3:15pm to 4:15pm) the trip distribution of 30.5% (4.4%/2+10.3%+36%/2) would result in 10 trips, based on the 33 departure trips over the entire afternoon.

The trip generations for the AM and PM peak hours were summarised in Table 5.7.

Table 5.7 – Trip Generation

Trip Classification	Morning Peak (7:30am to 8:30am)	Afternoon Peak (3:15pm to 4:15pm)
Drop-off/Pick up by Parents	38	11
College Staff	19	10
Swimming Pool Users	21	50
Total	78	71

5.3 Trip Distribution

The origins and destinations of the AM peak hour trips are as follows:

- Drop-off /Pick up – 50% inbound & 50% outbound
- College Staff - Inbound
- Swimming Pool Users – Outbound

The origins and destinations of the PM peak hour trips are as follows:

- Drop-off /Pick up – 50% inbound & 50% outbound
- College Staff - Outbound
- Swimming Pool Users – 78/94=83% Inbound & 17% Outbound

The inbound and outbound trips in the AM and PM peak hours are presented in Table 5.8.

Table 5.8 – Inbound and Outbound Trips

Peak Hour	Inbound	Outbound	Total
AM	38	40	78
PM	47	24	71

It has been assumed that the generated trips will follow the distribution of the existing network. The trip distribution is presented in Figure 5.3 and Figure 5.4 for AM and PM peak hours respectively.

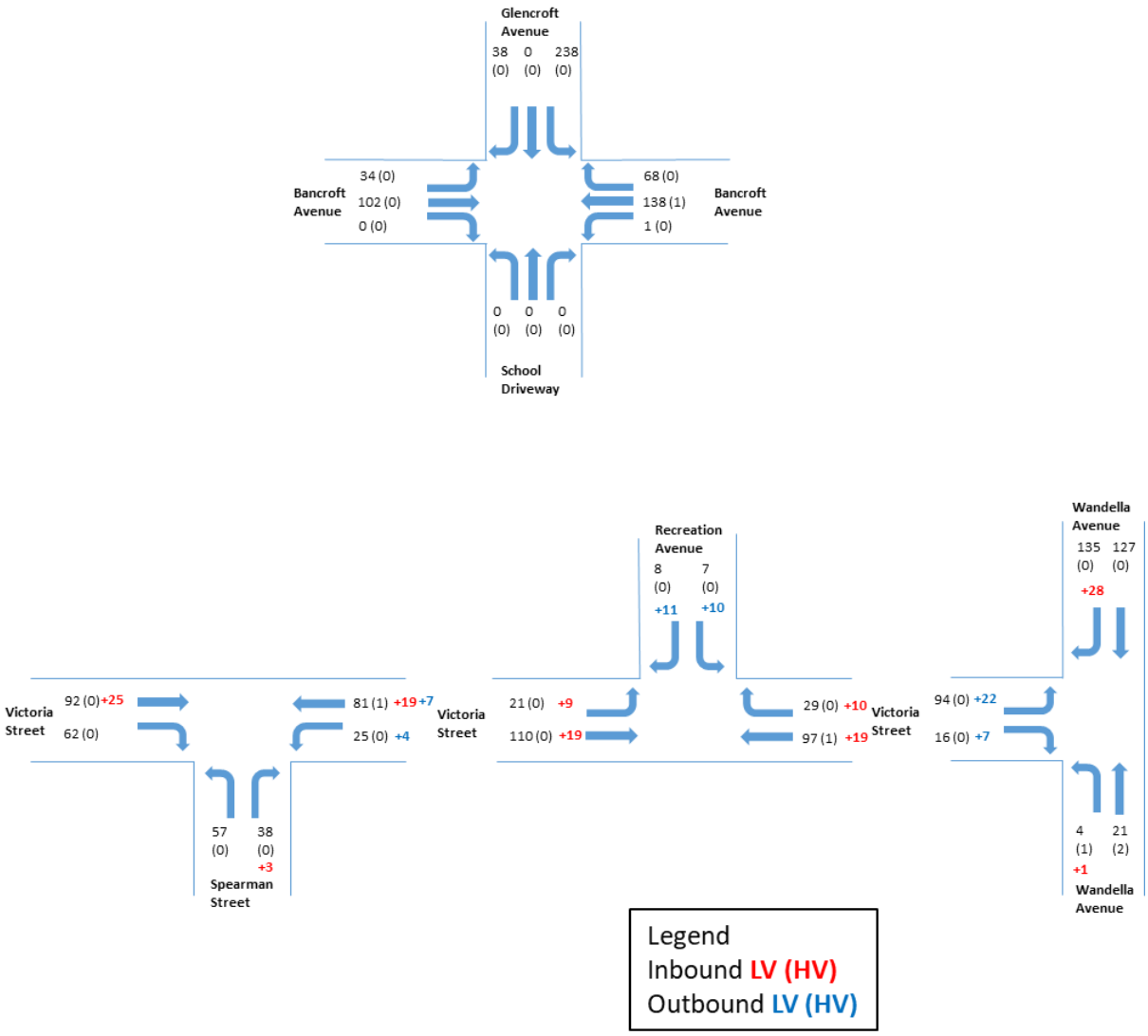

Figure 5.3 – Existing AM Peak Traffic Volumes with Development Traffic

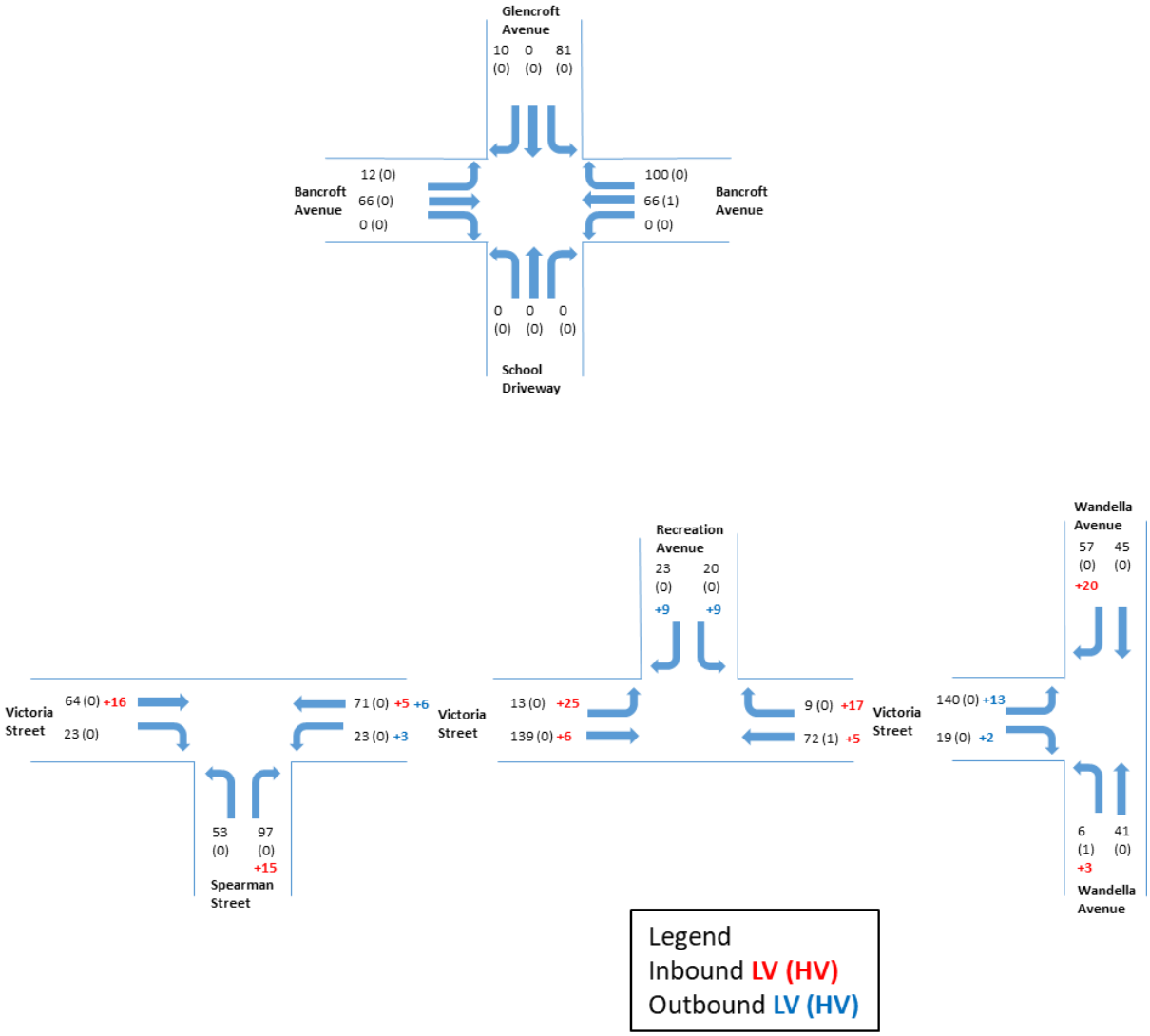

Figure 5.4 – Existing PM Peak Traffic Volumes with Development Traffic

5.4 Intersection Modelling

In order to confirm the current operation of the intersection, an assessment has been undertaken using the SIDRA modelling software, which presents a range of performance indicators (Level of Service, Average Delay, etc.).

Typically, there are three performance indicators used to summarise the performance of an intersection, being:

- Average Delay- The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- 95% Queue lengths (Q95) - is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.

- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference. The RMS adopts the following bands:

Table 5.9 – Level of Service Criteria

Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Extra capacity required	Extreme delay, major treatment required

The modelling includes the intersections of:

- Victoria Street and Spearman Street
- Victoria Street and Recreation Street
- Victoria Street and Wandella Avenue
- Bancroft Street and Glencroft Avenue

A summary of the modelling results is presented in the following table:

Table 5.10 – SIDRA Modelling Results for pre and post-development

Intersection	Time	Period	Level of Service	Average Delay (s)	Degree of Saturation (%)	95% Queue Length (veh)
Victoria Street / Spearman Street	AM Peak	Existing	A	7.2	0.091	2.5
		Development	A	7.5	0.105	2.7
	PM Peak	Existing	A	7.1	0.146	3.9
		Development	A	7.4	0.166	4.4
Victoria Street / Recreation Street	AM Peak	Existing	A	0.4	0.073	1.3
		Development	A	5.5	0.091	1.9
	PM Peak	Existing	A	4.1	0.082	0.9
		Development	A	4.9	0.100	1.4
Victoria Street / Wandella Avenue	AM Peak	Existing	A	4.8	0.151	4.9
		Development	A	5.1	0.168	5.8
	PM Peak	Existing	A	4.7	0.111	3.2
		Development	A	4.9	0.122	3.6
Bancroft Street / Glencroft Avenue	AM Peak	Existing	A	4.7	0.220	6.9
		Development	A	4.7	0.220	6.9

Intersection	Time	Period	Level of Service	Average Delay (s)	Degree of Saturation (%)	95% Queue Length (veh)
	PM Peak	Existing	A	3.9	0.101	3.3
		Development	A	3.9	0.101	3.4

The SIDRA results in the above table demonstrate that the net traffic impact at the four analysed intersection is minor. In the Year 2030, all the intersections will continue to operate at LoS A with significant spare capacity to accommodate additional traffic activity. The average vehicular delay and queuing will also be reasonable without affecting the non-development traffic.

6. Parking Provisions

6.1 Planning Policy Requirements

The development site falls within the zone controlled by the Ku-ring-gai Local Centres Development Control Plan. Ku-ring-gai Local Centres DCP 2015 Part 22R.1 stipulates the following parking provisions:

- *School*
    - *1 space per full time equivalent (FTE) employee*
    - *1 space per 8 Year-12 students*
    - *Provision for on-site set down / pick-up of students and a set down / pick-up management plan is required*
- *Swimming Pool*
    - *Requirement will be assessed on merit*

It is evident that the DCP makes the assumption that all staff drive to work at a car usage ratio of 1:1, whereas the survey results (discussed at Section 4.2) indicate that only 92% of staff drive to the College and therefore the actual parking demand is in fact less than that contemplated by the DCP.

It should also be noted that the existing site accommodates 127 parking spaces and the remaining staff park in the vicinity of the College in available on-street unrestricted parking spaces.

6.2 Proposed Car Parking Provision

The development application proposes 56 car spaces across the ground and basement levels of the new car park. The increase in staff parking demand will be accommodated within the new car park. The number of staff who currently park on-street are expected to remain the same in Year 2030.

It has been approved under a separate DA that there will be an increase to student population to 1250 students with 152 staff by Year 2030. It is estimated that there will be 145 Year-12 students. The car parking requirement catering for Year 2030 is therefore:

- 152 x 1 =152 staff spaces
- 145 x 0.125 = 18 student spaces for Year 12 students
- A total of 170 spaces required

It is also noted that there is a loss of one disabled space since the development building outline currently includes one parking space.

Therefore, the proposed parking provision of 127+56-1=182 spaces complies with the school parking requirements outlined in the DCP.

In terms of the swimming pool parking demand, an analysis has been performed to identify the parking demand based on the staff and student questionnaire.

Table 6.1 and Table 6.2 present the projected morning and afternoon parking demand and availability in Year 2030. For the purpose of the analysis, it is assumed that Year 12 students will all arrive between 7:30am and 8:00am and will depart proportionally after school from 3:00pm to 5:00pm (4 per half hour).

Table 6.1 – Weekday AM Parking Demand and Availability in 2030

Staff and Student Arrival	Before 7:00am	7:00am-7:30am	7:30am-8:00am	8:00am-8:30am	8:30am-9:00am	After 9:00am
Staff parking demand – from questionnaire	8	51	119	128	130	133
Y12 Student parking demand – from DCP	0	0	18	18	18	18
Pool parking demand – from operational information	20	20	20	7	0	0
Combined parking demand	28	71	157	153	148	151
Parking Availability	154	111	25	29	34	31

Table 6.2 – Weekday PM Parking Demand and Availability in 2030

Staff and Student Departure	Before 3:00pm	3:00pm-3:30pm	3:30pm-4:00pm	4:00pm-4:30pm	4:30pm-5:00pm	After 5:00pm
Staff parking demand – from questionnaire	131	125	111	64	36	1
Y12 Student parking demand – from DCP	18	14	10	6	2	0
Pool parking demand – from operational information	0	17	40	48	48	37
Combined parking demand	149	156	161	118	86	38
Parking Availability	33	26	21	64	96	144

The results show that adequate parking availability is achieved even when taken into account of the swimming pool classes. Detailed calculations of the parking demands are presented in Attachment 3.

6.3 Accessible parking

The minimum accessible parking provision rate for education establishments is presented in Council's Local Centres DCP Part 22.5 as follows:

- Education establishment: schools – 2% to 3%

The proposal provides two accessible spaces in the new car park, which increasing the total number of accessible parking to 7 spaces, which complies with the DCP.

6.4 Pick-Up/Drop-Off Analysis

Student transport to and from the College is via two main modes of transport, buses and private vehicles. For the private vehicle mode, pick-up/drop-off facilities are provided to facilitate safe and efficient movement from vehicle to College and vice-versa.

Future operation will be largely unchanged from the existing operation at the College.

Staff entry and exit from the car park is proposed to take place outside of these time periods, and hence will not conflict with the movement of vehicles dropping off and picking up students.

6.4.1 School Buses

Operation

School bus drop-off/pick-up area is located on Bancroft Avenue at the intersection with Glencroft Avenue. The length of the bus zone is able to accommodate the two mini buses that are currently used.

The school buses are currently dwelling at the area with access from Recreation Avenue. The area is secured by lock-up fence. And the school buses will be remained in the same location.

6.4.2 Private Vehicles - Parents

Operation

Currently there are no drop-off/pick-up facilities within the College, parent pick-up and drop-off students by either one of the two methods:

- Stopping their vehicle on Victoria Street at the No Parking area and waiting for their child to come out
- Parking their vehicle on Victoria Street at the 1/2P parking area, walking into the College, and collecting their child

The No Parking and 1/2P parking restrictions currently apply from 7am to 9am and from 2:30pm to 3:30pm. However, the parking survey conducted at the No Parking area indicates that the parking demand peaks at 4:20pm for 10 car spaces out of approximately 13 car spaces. This is mostly as a result of senior students who was engaged in extracurricular activities after school. By extrapolation, the expected increase of 50.6% of students from 830 to 1250 will result in a demand of 15 car spaces. In order to prevent queuing on street and unnecessary circulation, the undersupply of 2 on street car spaces can be easily accommodated by the increasing drop-off/pick-up spaces from 13 to 15 car spaces.

7. Access and Car Park Assessment

The following section presents an assessment of the proposed development with reference to the requirements of AS2890.1:2004 *(Off-street car parking)* and AS2890.6:2009 *(Off-street parking for people with disabilities)*. This section is to be read in conjunction with the architectural drawings in Attachment 1.

7.1 Vehicular Access

The basement level and the ground level car parks are not inter-connected. Access to the basement level car park is via the existing staff car park off Recreation Avenue; while a new driveway is proposed on Recreation Avenue to the ground level car park.

The new basement level ramp to the existing staff car park has a width of 3.4m between kerbs and 28 car spaces (less than 30 car movements in peak hours) which satisfies the minimum 3.0m width of one-way ramp requirement as per *AS2890.1 Section 3.2.2*.

The gradients of the ramp are as follows and comply with *AS2890.1 Section 2.5.3:*

- 12.5 percent for 2 metres
- 14.9 percent for 6.4 metres

The new ground level driveway has a minimum width of 3.5m and will be controlled by a traffic signal system.

7.2 Car Parking Arrangement

The existing car parking arrangement of the 129 car spaces will remain in place.

The car park access and parking arrangements of the basement car park have been assessed against the requirements of AS2890.1:2004, with reference to Class 2 (sporting) facilities. In addition to the typical requirements of AS2890.1, Class 2 facilities are to provide the following dimensions (90° angle parking):

- Car Spaces: 2.5m x 5.4m
- Aisle Width: 5.8m

All general parking spaces have been individually assessed, and found to be 2.5m x 5.4m minimum, with a minimum aisle width of 6.7m. All spaces meet the clearance requirements (door opening, entry flanges, and column locations) of the parking space envelope requirements provided in Figure 5.2 of AS2890.1.

Regarding headroom clearance, the proposal provides a minimum height clearance of 2.2m. All overhead obstructions (ceiling-mounted services) shall allow for a minimum of 2.2m height clearance, or 2.5m immediately above any accessible and shared spaces.

It is assumed that teachers will access the car park outside the pick-up and drop-off hours and the College will manage staff access accordingly so as to avoid conflicts with student drop-off / pick-up.

7.3 Accessible Car Spaces

The accessible car spaces are 2.5m wide and 5.4m long and are provided with a shared area of the same dimensions. A bollard is also provided in the appropriate locations as per AS2890.6.

7.4 Sight Distance

The location of the proposed access driveway is considered appropriate, in regards to sight distance. AS2890.1 Clause 3.2.4 stipulates that a roadway with a speed limit of 50kph must accommodate a desirable sight distance of 69m or a minimum stopping sight distance of 45m. The proposed driveway is located at the end of a cul-de-sac and runs parallel to the roadway. Vehicle Sight distance to the left and right is met.

The triangular pedestrian sight splays (2.0m x 2.5m) with a maximum height of 1.15m is provided at the driveway as per AS2890.1.

8. Conclusion & Recommendations

The development proposes to develop a swimming pool, tennis court and associated amenities within Roseville College. The development meets the criteria for State Significant Development (SSD).

The assessment of the traffic activity has established that the development is likely to have a minor increase in traffic activity and will have minimal impact on the surrounding road network. The intersections adjacent to the College will continue operate in Level of Service A during peak hours.

The development proposes to extend the drop-off and pick-up areas from 13 spaces to 15 spaces.

The proposed car park aligns with the expected car parking demand and is considered suitable for the proposed development.

Attachment 1 Architectural Drawings

01 02 1 03 04 2 05 06 07

1000 27750 300 28771 3386 1000

26700 2000 515
24672.48

HD conduit

B A 1000

Cable tray

Stair FH FHR

1 2 3 4 5 6 7 8 300 1200 5400

1600 2500 2500 2500 2500 2500 2500 2500 2550

6700

2500 2500 2500 2500 2500 2500 2500

9 10 11 12 13 14 15 5400

3750 4896

16 17 18 19 21 22 23 5400

6707

Carpark
956 sqm
30 CAR SPACES
RL 80.2

2500 2500 300 2500 2500 2500 2500 300 2500 1425

24 25 5400 26 27 28 29

Balance tank pipes below

C

5500

car park exhaust riser to L2

Filtration Plant / Chemical Store
104 sqm

filtration exhaust riser to L2

RL 80.2

Mechanical Pool Plant
102 sqm

hoist exhaust riser to L2
spill air riser to L2
fresh riser from L2

E D 500

roller door for fire compartment above

1:6.7 1:8

RL 81.4

Existing Workshop

1

35008 35008

13978

Grandstand
62 sqm

3452

8 Lane Swimming Pool

3157

Balance tank below concourse

Pool cover storage below

1.1m deep 1.8m deep

1:14 1:14

MECH TRENCH 3000

Pool Hall
939 sqm
RL 78.9

Wall showers Wall showers

Reception
13.5 sqm

Toilets Toilets

Change

First Aid
11 sqm

Showers + change cubicles

Staff amenities
11 sqm

Foyer
88 sqm
RL 78.9

Total amenities area :
266 sqm

Marshalling Area
55 sqm

roller shutter above

Showers + change cubicles

Pool Store
50 sqm

RL 80.9

Stair

20 sqm
dry arrestor

Sewer Pumping Station below floor / in ground

RL 78.9 FH

VP VP ST

LTS Store
24 sqm

6585

Stair

Services Elec

Comms.

Store
18.7 sqm

Cleaners
6.1 sqm

Accessible Toilet, Shower and Hoist

Accessible Toilet

Change

38200 3700

6700 8100

2

0 1 2 3 5 10m

No 39

3 3 4 4

F
4/10/19 SSDA Submission

02
Level 1 - Plan

roseville college - swell centre

27-29 Bancroft Avenue, Roseville

1:100 @ A0 + 1:200 @ A2

Boundary Line

brewster hjorth architects

21903 Floor Plans v2017.vwx

BANCROFT AVENUE

ELP

RL 83.7

RL 82.44

Conc. pad

Existing sprinkler booster valve

RL 84.1

RL 83.95

RL 83.8

RL 85.30

RL 84.70

RL 84.10

RL 83.5

RL 82.9

E. RL 84.54

E. RL 82.46

1000

27748

300

28773

3386

1485

1.5m

3.5m

24080

7527

27014

T1 T2 T3 T5 T6 T7 T9 T38 T39 T40 T41 T42 T43 T44

01 02 03 04 05 06 07

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

Stair 3

RL 83.5

RL 81.7

RL 82.9

Entry
8 sqm

Main switchboard

Main switch room
14 sqm

Meter panel

FHR

DB-LG.01

Balcony Corridor
65 sqm

Void

Sports equipment store
26 sqm

CARPARK
965 sqm
29 CAR SPACES
+ 2 Bus Spaces
RL 83.5

6700

Comm.
7 sqm

Roof Skylight

49.2m

Stretching

Strengthening and Conditionning Room
197 sqm

Weights
mirror

AWC

RL 80.9

RL 80.9

E. RL 81.88

Stair 2 RL 82.9

VP
VP
ST

RWT
20 m³
8 sqm

Mechanical
16 sqm

car park exhaust riser

OSD
80 m³
29 sqm

6200

Lift

Foyer / Lift / Lobby / Stair
159 sqm
RL 82.9

RL 83.5

RL 82.9

GLA 01
82 sqm

GLA 02
77 sqm

GLA 03
86 sqm

GLA 04
87 sqm

E. RL 81.61

E. RL 81.42

E. RL 80.75

5100

Mechanical plant
68 sqm
RL 83.5

toilet exhaust riser from L1

spill air riser from L1

fresh riser to L1

filtration exhaust riser from L1

Hot water plant

T23 T24

Stair 1

RL 83.5

E. RL 83.23

T17
34521

T31

E. RL 80.97

T30

T29

6.0m

Grease arrestor for food tech waste

Prpposed Heat Pump Enclosure

Water quality device below driveway

3600

E. RL 83.32

E. RL 84.35

EX FH

RL 84.40m

pit

13978

35008

35.0m

T33

No 39

Window
84.94 Top
82.83 Sill

Window
84.78 Top
83.38 Sill

Window
84.54 Top
83.06 Sill

Window
84.96 Top
82.83 Sill

Window
84.51 Top
82.23 Sill

0 1 2 3 5 10m

1:100 @ A0 + 1:200 @ A2

Existing tree (kept)

New tree

Existing tree (removed)

Boundary Line

F
4/10/19 SSDA Submission

03
Level 2 - Plan

roseville college - swell centre

27-29 Bancroft Avenue, Roseville

brewster hjorth architects

BANCROFT AVENUE

1 2 3 4

01 02 03 04 05 06 07

T1 T2 T3 T4 T5 T6 T7 T8 T27 T28 T33 T38 T39 T40 T41 T42 T43 T44

1000 27748 300 28771 3385 1000

9.5m

New substation
Pad mounted

Conc. pad
Existing
sprinkler
booster valve

RL 84.54

FL 82.9

E. RL 85.96

E. RL 86.03

air
supply

E. RL 82.46

3.5m

E. RL 82.74

1000

drainage
pit

1.5m

RL 86.9

RL 87.69

35508

RL 86.9

Covered area
165 sqm

Roof
Skylight

39 BANCROFT AVE

RL 86.45

50

E. RL 86.59

RL 86.71

RL 86.72

Sports Equipment Store
41 sqm

Lift

2380

Comms

Elec

RL 86.9

Enclosed verandah /
Beak out space
216 sqm

E. RL 87.34

13978

Walkway 1:20 in 16m

E. RL 87.65

Food technology
96 sqm

Stair 1

GLA 05
76 sqm

GLA 06
76 sqm

GLA 07
79 sqm

GLA 08
82 sqm

3300

E. RL 86.00

E. RL 82.74

T31

1.5m

T17

6.0m

Prpposed Heat
Pump Enclosure

T30

T29

RL 87.8

0 1 2 3 5 10m

1:100 @ A0 + 1:200 @ A2

Existing tree (kept)

New tree

Existing tree (removed)

Boundary Line

F
4/10/19 SSDA Submission

04
Level 3 - Plan

roseville college -
swell centre

27-29 Bancroft Avenue, Roseville

brewster
hjorth
architects

21903 Floor Plans v2017.vwx

Attachment 2 SIDRA Results

MOVEMENT SUMMARY

Site: [Existing Bancroft Ave with Glencroft Rd AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: School Driveway												
1	L2	1	0.0	0.004	3.8	LOS A	0.0	0.1	0.32	0.47	0.32	37.9
2	T1	1	0.0	0.004	3.5	LOS A	0.0	0.1	0.32	0.47	0.32	37.2
3	R2	1	0.0	0.004	6.8	LOS A	0.0	0.1	0.32	0.47	0.32	37.1
Approach		3	0.0	0.004	4.7	LOS A	0.0	0.1	0.32	0.47	0.32	37.4
NorthEast: Bancroft Avenue												
4	L2	1	0.0	0.122	3.9	LOS A	0.4	3.1	0.18	0.17	0.18	39.1
5	T1	146	0.7	0.122	0.2	LOS A	0.4	3.1	0.18	0.17	0.18	38.6
6	R2	72	0.0	0.122	4.0	LOS A	0.4	3.1	0.18	0.17	0.18	37.3
Approach		219	0.5	0.122	1.5	NA	0.4	3.1	0.18	0.17	0.18	38.3
NorthWest: Glencroft Road												
7	L2	251	0.0	0.220	3.8	LOS A	1.0	6.9	0.23	0.48	0.23	35.6
8	T1	1	0.0	0.220	3.9	LOS A	1.0	6.9	0.23	0.48	0.23	37.4
9	R2	40	0.0	0.220	5.8	LOS A	1.0	6.9	0.23	0.48	0.23	36.2
Approach		292	0.0	0.220	4.1	LOS A	1.0	6.9	0.23	0.48	0.23	35.8
SouthWest: Bancroft Avenue												
10	L2	36	0.0	0.075	3.4	LOS A	0.0	0.1	0.01	0.12	0.01	39.5
11	T1	107	0.0	0.075	0.0	LOS A	0.0	0.1	0.01	0.12	0.01	39.3
12	R2	1	0.0	0.075	4.0	LOS A	0.0	0.1	0.01	0.12	0.01	39.3
Approach		144	0.0	0.075	0.9	NA	0.0	0.1	0.01	0.12	0.01	39.4
All Vehicles		658	0.2	0.220	2.5	NA	1.0	6.9	0.16	0.29	0.16	37.6

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.
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: [Existing Bancroft Ave with Glencroft Rd PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: School Driveway												
1	L2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.21	0.44	0.21	38.3
2	T1	1	0.0	0.003	3.0	LOS A	0.0	0.1	0.21	0.44	0.21	37.7
3	R2	1	0.0	0.003	5.1	LOS A	0.0	0.1	0.21	0.44	0.21	37.5
Approach		3	0.0	0.003	3.9	LOS A	0.0	0.1	0.21	0.44	0.21	37.8
NorthEast: Bancroft Avenue												
4	L2	1	0.0	0.101	3.7	LOS A	0.5	3.3	0.18	0.29	0.18	38.5
5	T1	71	1.5	0.101	0.2	LOS A	0.5	3.3	0.18	0.29	0.18	38.0
6	R2	105	0.0	0.101	3.8	LOS A	0.5	3.3	0.18	0.29	0.18	36.3
Approach		177	0.6	0.101	2.4	NA	0.5	3.3	0.18	0.29	0.18	37.2
NorthWest: Glencroft Road												
7	L2	85	0.0	0.068	3.6	LOS A	0.3	1.9	0.15	0.45	0.15	36.0
8	T1	1	0.0	0.068	3.1	LOS A	0.3	1.9	0.15	0.45	0.15	37.6
9	R2	11	0.0	0.068	4.9	LOS A	0.3	1.9	0.15	0.45	0.15	36.4
Approach		97	0.0	0.068	3.7	LOS A	0.3	1.9	0.15	0.45	0.15	36.1
SouthWest: Bancroft Avenue												
10	L2	13	0.0	0.043	3.4	LOS A	0.0	0.1	0.01	0.08	0.01	39.8
11	T1	69	0.0	0.043	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	39.6
12	R2	1	0.0	0.043	3.7	LOS A	0.0	0.1	0.01	0.08	0.01	39.5
Approach		83	0.0	0.043	0.6	NA	0.0	0.1	0.01	0.08	0.01	39.6
All Vehicles		360	0.3	0.101	2.3	NA	0.5	3.3	0.13	0.28	0.13	37.6

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.
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: [Existing Victoria St with Recreation Ave AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
NorthEast: Victoria Street												
5	T1	103	1.0	0.073	0.1	LOS A	0.2	1.3	0.12	0.11	0.12	37.7
6	R2	31	0.0	0.073	4.0	LOS A	0.2	1.3	0.12	0.11	0.12	37.7
Approach		134	0.8	0.073	1.0	NA	0.2	1.3	0.12	0.11	0.12	37.7
NorthWest: Recreation Avenue												
7	L2	7	0.0	0.013	3.7	LOS A	0.0	0.3	0.23	0.47	0.23	35.1
9	R2	8	0.0	0.013	4.4	LOS A	0.0	0.3	0.23	0.47	0.23	16.6
Approach		16	0.0	0.013	4.1	LOS A	0.0	0.3	0.23	0.47	0.23	25.3
SouthWest: Victoria Street												
10	L2	22	0.0	0.071	2.6	LOS A	0.0	0.0	0.00	0.07	0.00	39.7
11	T1	116	0.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	39.2
Approach		138	0.0	0.071	0.4	NA	0.0	0.0	0.00	0.07	0.00	39.3
All Vehicles		287	0.4	0.073	0.9	NA	0.2	1.3	0.07	0.11	0.07	37.4

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.
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: [Existing Victoria St with Recreation Ave PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
NorthEast: Victoria Street												
5	T1	77	1.4	0.046	0.1	LOS A	0.1	0.4	0.07	0.06	0.07	38.8
6	R2	9	0.0	0.046	4.0	LOS A	0.1	0.4	0.07	0.06	0.07	38.5
Approach		86	1.2	0.046	0.5	NA	0.1	0.4	0.07	0.06	0.07	38.8
NorthWest: Recreation Avenue												
7	L2	21	0.0	0.038	3.8	LOS A	0.1	0.9	0.25	0.49	0.25	35.0
9	R2	24	0.0	0.038	4.4	LOS A	0.1	0.9	0.25	0.49	0.25	16.5
Approach		45	0.0	0.038	4.1	LOS A	0.1	0.9	0.25	0.49	0.25	25.2
SouthWest: Victoria Street												
10	L2	14	0.0	0.082	2.6	LOS A	0.0	0.0	0.00	0.04	0.00	40.4
11	T1	146	0.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	39.6
Approach		160	0.0	0.082	0.2	NA	0.0	0.0	0.00	0.04	0.00	39.6
All Vehicles		292	0.4	0.082	0.9	NA	0.1	0.9	0.06	0.11	0.06	36.2

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.
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: [Existing Victoria St with Spearman St AM]

Site Category: (None)
Stop (Two-Way)

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
SouthEast: Spearman Street												
1	L2	60	0.0	0.090	7.0	LOS A	0.3	2.4	0.21	0.90	0.21	34.3
3	R2	40	0.0	0.090	7.6	LOS A	0.3	2.4	0.21	0.90	0.21	24.3
Approach		100	0.0	0.090	7.2	LOS A	0.3	2.4	0.21	0.90	0.21	32.0
NorthEast: Victoria Street												
4	L2	26	0.0	0.059	2.6	LOS A	0.0	0.0	0.00	0.11	0.00	39.1
5	T1	86	1.2	0.059	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	39.2
Approach		113	0.9	0.059	0.6	NA	0.0	0.0	0.00	0.11	0.00	39.2
SouthWest: Victoria Street												
11	T1	97	0.0	0.091	0.2	LOS A	0.4	2.5	0.17	0.20	0.17	37.6
12	R2	65	0.0	0.091	3.9	LOS A	0.4	2.5	0.17	0.20	0.17	37.5
Approach		162	0.0	0.091	1.7	NA	0.4	2.5	0.17	0.20	0.17	37.6
All Vehicles		375	0.3	0.091	2.8	NA	0.4	2.5	0.13	0.36	0.13	36.4

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.
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: [Existing Victoria St with Spearman St PM]

Site Category: (None)
Stop (Two-Way)

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
SouthEast: Spearman Street												
1	L2	56	0.0	0.146	7.0	LOS A	0.6	3.9	0.22	0.90	0.22	34.4
3	R2	102	0.0	0.146	7.2	LOS A	0.6	3.9	0.22	0.90	0.22	24.3
Approach		158	0.0	0.146	7.1	LOS A	0.6	3.9	0.22	0.90	0.22	29.9
NorthEast: Victoria Street												
4	L2	24	0.0	0.051	2.6	LOS A	0.0	0.0	0.00	0.11	0.00	39.0
5	T1	75	0.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	39.2
Approach		99	0.0	0.051	0.6	NA	0.0	0.0	0.00	0.11	0.00	39.2
SouthWest: Victoria Street												
11	T1	67	0.0	0.050	0.1	LOS A	0.1	1.0	0.11	0.13	0.11	38.4
12	R2	24	0.0	0.050	3.8	LOS A	0.1	1.0	0.11	0.13	0.11	38.2
Approach		92	0.0	0.050	1.1	NA	0.1	1.0	0.11	0.13	0.11	38.3
All Vehicles		348	0.0	0.146	3.7	NA	0.6	3.9	0.13	0.47	0.13	34.9

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.
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: [Existing Wandella Ave with Victoria St AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: Wandella Avenue												
1	L2	5	20.0	0.016	4.7	LOS A	0.0	0.0	0.00	0.10	0.00	46.0
2	T1	24	8.7	0.016	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	48.5
Approach		29	10.7	0.016	0.8	NA	0.0	0.0	0.00	0.10	0.00	48.0
NorthWest: Wandella Avenue												
8	T1	134	0.0	0.151	0.1	LOS A	0.7	4.9	0.10	0.28	0.10	44.7
9	R2	142	0.0	0.151	4.7	LOS A	0.7	4.9	0.10	0.28	0.10	43.9
Approach		276	0.0	0.151	2.4	NA	0.7	4.9	0.10	0.28	0.10	44.2
SouthWest: Victoria Street												
10	L2	99	0.0	0.079	4.6	LOS A	0.3	2.2	0.07	0.52	0.07	42.2
12	R2	17	0.0	0.079	5.8	LOS A	0.3	2.2	0.07	0.52	0.07	39.1
Approach		116	0.0	0.079	4.8	LOS A	0.3	2.2	0.07	0.52	0.07	41.9
All Vehicles		421	0.7	0.151	3.0	NA	0.7	4.9	0.08	0.33	0.08	43.7

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.
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: [Existing Wandella Ave with Victoria St PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: Wandella Avenue												
1	L2	7	14.3	0.027	4.7	LOS A	0.0	0.0	0.00	0.08	0.00	46.5
2	T1	43	0.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	48.8
Approach		51	2.1	0.027	0.7	NA	0.0	0.0	0.00	0.08	0.00	48.4
NorthWest: Wandella Avenue												
8	T1	47	0.0	0.060	0.1	LOS A	0.3	1.9	0.13	0.30	0.13	44.2
9	R2	60	0.0	0.060	4.7	LOS A	0.3	1.9	0.13	0.30	0.13	43.5
Approach		107	0.0	0.060	2.7	NA	0.3	1.9	0.13	0.30	0.13	43.7
SouthWest: Victoria Street												
10	L2	147	0.0	0.111	4.7	LOS A	0.5	3.2	0.12	0.51	0.12	42.0
12	R2	20	0.0	0.111	5.1	LOS A	0.5	3.2	0.12	0.51	0.12	38.9
Approach		167	0.0	0.111	4.7	LOS A	0.5	3.2	0.12	0.51	0.12	41.7
All Vehicles		325	0.3	0.111	3.4	NA	0.5	3.2	0.10	0.37	0.10	43.1

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.
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: [Future Bancroft Ave with Glencroft Rd AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: School Driveway												
1	L2	1	0.0	0.004	3.8	LOS A	0.0	0.1	0.32	0.47	0.32	37.9
2	T1	1	0.0	0.004	3.5	LOS A	0.0	0.1	0.32	0.47	0.32	37.2
3	R2	1	0.0	0.004	6.8	LOS A	0.0	0.1	0.32	0.47	0.32	37.1
Approach		3	0.0	0.004	4.7	LOS A	0.0	0.1	0.32	0.47	0.32	37.4
NorthEast: Bancroft Avenue												
4	L2	1	0.0	0.123	3.9	LOS A	0.4	3.1	0.18	0.16	0.18	39.1
5	T1	147	0.7	0.123	0.2	LOS A	0.4	3.1	0.18	0.16	0.18	38.7
6	R2	72	0.0	0.123	4.0	LOS A	0.4	3.1	0.18	0.16	0.18	37.4
Approach		220	0.5	0.123	1.5	NA	0.4	3.1	0.18	0.16	0.18	38.4
NorthWest: Glencroft Road												
7	L2	251	0.0	0.220	3.8	LOS A	1.0	6.9	0.23	0.48	0.23	35.6
8	T1	1	0.0	0.220	3.9	LOS A	1.0	6.9	0.23	0.48	0.23	37.4
9	R2	40	0.0	0.220	5.9	LOS A	1.0	6.9	0.23	0.48	0.23	36.2
Approach		292	0.0	0.220	4.1	LOS A	1.0	6.9	0.23	0.48	0.23	35.8
SouthWest: Bancroft Avenue												
10	L2	36	0.0	0.075	3.4	LOS A	0.0	0.1	0.01	0.12	0.01	39.5
11	T1	107	0.0	0.075	0.0	LOS A	0.0	0.1	0.01	0.12	0.01	39.3
12	R2	1	0.0	0.075	4.0	LOS A	0.0	0.1	0.01	0.12	0.01	39.3
Approach		144	0.0	0.075	0.9	NA	0.0	0.1	0.01	0.12	0.01	39.4
All Vehicles		659	0.2	0.220	2.5	NA	1.0	6.9	0.16	0.29	0.16	37.6

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.
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: [Future Bancroft Ave with Glencroft Rd PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: School Driveway												
1	L2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.21	0.44	0.21	38.3
2	T1	1	0.0	0.003	3.0	LOS A	0.0	0.1	0.21	0.44	0.21	37.7
3	R2	1	0.0	0.003	5.1	LOS A	0.0	0.1	0.21	0.44	0.21	37.5
Approach		3	0.0	0.003	3.9	LOS A	0.0	0.1	0.21	0.44	0.21	37.8
NorthEast: Bancroft Avenue												
4	L2	1	0.0	0.101	3.7	LOS A	0.5	3.4	0.18	0.29	0.18	38.6
5	T1	72	1.5	0.101	0.2	LOS A	0.5	3.4	0.18	0.29	0.18	38.2
6	R2	105	0.0	0.101	3.8	LOS A	0.5	3.4	0.18	0.29	0.18	36.4
Approach		178	0.6	0.101	2.3	NA	0.5	3.4	0.18	0.29	0.18	37.3
NorthWest: Glencroft Road												
7	L2	85	0.0	0.068	3.6	LOS A	0.3	1.9	0.15	0.45	0.15	36.0
8	T1	1	0.0	0.068	3.1	LOS A	0.3	1.9	0.15	0.45	0.15	37.6
9	R2	11	0.0	0.068	4.9	LOS A	0.3	1.9	0.15	0.45	0.15	36.4
Approach		97	0.0	0.068	3.7	LOS A	0.3	1.9	0.15	0.45	0.15	36.1
SouthWest: Bancroft Avenue												
10	L2	13	0.0	0.043	3.4	LOS A	0.0	0.1	0.01	0.08	0.01	39.8
11	T1	69	0.0	0.043	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	39.6
12	R2	1	0.0	0.043	3.7	LOS A	0.0	0.1	0.01	0.08	0.01	39.5
Approach		83	0.0	0.043	0.6	NA	0.0	0.1	0.01	0.08	0.01	39.6
All Vehicles		361	0.3	0.101	2.3	NA	0.5	3.4	0.13	0.28	0.13	37.6

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.
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: [Future Victoria St with Recreation Ave AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
NorthEast: Victoria Street												
5	T1	136	0.8	0.098	0.2	LOS A	0.3	1.9	0.15	0.13	0.15	41.5
6	R2	41	0.0	0.098	4.7	LOS A	0.3	1.9	0.15	0.13	0.15	40.9
Approach		177	0.6	0.098	1.3	NA	0.3	1.9	0.15	0.13	0.15	41.3
NorthWest: Recreation Avenue												
7	L2	18	0.0	0.033	5.2	LOS A	0.1	0.8	0.27	0.56	0.27	39.7
9	R2	20	0.0	0.033	6.0	LOS A	0.1	0.8	0.27	0.56	0.27	20.4
Approach		38	0.0	0.033	5.6	LOS A	0.1	0.8	0.27	0.56	0.27	30.0
SouthWest: Victoria Street												
10	L2	32	0.0	0.094	2.8	LOS A	0.0	0.0	0.00	0.09	0.00	42.3
11	T1	149	0.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	45.5
Approach		181	0.0	0.094	0.5	NA	0.0	0.0	0.00	0.09	0.00	45.1
All Vehicles		396	0.3	0.098	1.3	NA	0.3	1.9	0.09	0.15	0.09	41.3

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.
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: [Future Victoria St with Recreation Ave PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
NorthEast: Victoria Street												
5	T1	86	1.2	0.063	0.2	LOS A	0.2	1.3	0.16	0.14	0.16	40.4
6	R2	27	0.0	0.063	5.5	LOS A	0.2	1.3	0.16	0.14	0.16	41.0
Approach		114	0.9	0.063	1.5	NA	0.2	1.3	0.16	0.14	0.16	40.5
NorthWest: Recreation Avenue												
7	L2	31	0.0	0.055	4.6	LOS A	0.2	1.4	0.27	0.54	0.27	37.7
9	R2	34	0.0	0.055	5.2	LOS A	0.2	1.4	0.27	0.54	0.27	18.6
Approach		64	0.0	0.055	4.9	LOS A	0.2	1.4	0.27	0.54	0.27	27.9
SouthWest: Victoria Street												
10	L2	40	0.0	0.101	2.8	LOS A	0.0	0.0	0.00	0.15	0.00	41.0
11	T1	155	0.0	0.101	0.2	LOS A	0.0	0.0	0.00	0.15	0.00	43.8
Approach		195	0.0	0.101	0.7	NA	0.0	0.0	0.00	0.15	0.00	43.4
All Vehicles		373	0.3	0.101	1.7	NA	0.2	1.4	0.09	0.21	0.09	38.8

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.
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: [Future Victoria St with Spearman St AM]

Site Category: (None)
Stop (Two-Way)

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
SouthEast: Spearman Street												
1	L2	60	0.0	0.099	7.2	LOS A	0.4	2.6	0.26	0.90	0.26	34.2
3	R2	43	0.0	0.099	8.2	LOS A	0.4	2.6	0.26	0.90	0.26	24.1
Approach		103	0.0	0.099	7.6	LOS A	0.4	2.6	0.26	0.90	0.26	31.7
NorthEast: Victoria Street												
4	L2	31	0.0	0.082	2.8	LOS A	0.0	0.0	0.00	0.10	0.00	42.4
5	T1	126	0.8	0.082	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	44.8
Approach		157	0.7	0.082	0.5	NA	0.0	0.0	0.00	0.10	0.00	44.6
SouthWest: Victoria Street												
11	T1	137	0.0	0.113	0.3	LOS A	0.4	2.8	0.18	0.16	0.18	41.3
12	R2	65	0.0	0.113	4.1	LOS A	0.4	2.8	0.18	0.16	0.18	40.3
Approach		202	0.0	0.113	1.5	NA	0.4	2.8	0.18	0.16	0.18	40.9
All Vehicles		462	0.2	0.113	2.5	NA	0.4	2.8	0.14	0.30	0.14	39.6

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.
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: [Future Victoria St with Spearman St PM]

Site Category: (None)
Stop (Two-Way)

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
SouthEast: Spearman Street												
1	L2	56	0.0	0.167	7.1	LOS A	0.6	4.4	0.25	0.90	0.25	34.5
3	R2	118	0.0	0.167	7.6	LOS A	0.6	4.4	0.25	0.90	0.25	24.5
Approach		174	0.0	0.167	7.4	LOS A	0.6	4.4	0.25	0.90	0.25	29.7
NorthEast: Victoria Street												
4	L2	27	0.0	0.061	2.7	LOS A	0.0	0.0	0.00	0.11	0.00	40.9
5	T1	91	0.0	0.061	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	42.3
Approach		118	0.0	0.061	0.6	NA	0.0	0.0	0.00	0.11	0.00	42.2
SouthWest: Victoria Street												
11	T1	86	0.0	0.060	0.1	LOS A	0.1	1.0	0.11	0.11	0.11	41.8
12	R2	24	0.0	0.060	3.9	LOS A	0.1	1.0	0.11	0.11	0.11	40.7
Approach		111	0.0	0.060	0.9	NA	0.1	1.0	0.11	0.11	0.11	41.5
All Vehicles		402	0.0	0.167	3.6	NA	0.6	4.4	0.14	0.45	0.14	36.7

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.
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: [Future Wandella Ave with Victoria St AM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: Wandella Avenue												
1	L2	6	16.7	0.017	4.7	LOS A	0.0	0.0	0.00	0.12	0.00	46.0
2	T1	24	8.7	0.017	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.9
Approach		31	10.3	0.017	1.0	NA	0.0	0.0	0.00	0.12	0.00	49.1
NorthWest: Wandella Avenue												
8	T1	134	0.0	0.176	0.1	LOS A	0.9	6.1	0.11	0.32	0.11	44.6
9	R2	184	0.0	0.176	4.9	LOS A	0.9	6.1	0.11	0.32	0.11	44.3
Approach		318	0.0	0.176	2.9	NA	0.9	6.1	0.11	0.32	0.11	44.4
SouthWest: Victoria Street												
10	L2	136	0.0	0.111	4.9	LOS A	0.5	3.2	0.07	0.53	0.07	43.4
12	R2	24	0.0	0.111	6.4	LOS A	0.5	3.2	0.07	0.53	0.07	40.0
Approach		160	0.0	0.111	5.1	LOS A	0.5	3.2	0.07	0.53	0.07	43.0
All Vehicles		508	0.6	0.176	3.5	NA	0.9	6.1	0.09	0.37	0.09	44.2

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.
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: [Future Wandella Ave with Victoria St PM]

Site Category: (None)
Giveway / Yield (Two-Way)

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
SouthEast: Wandella Avenue												
1	L2	11	10.0	0.028	4.7	LOS A	0.0	0.0	0.00	0.12	0.00	46.5
2	T1	43	0.0	0.028	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	50.2
Approach		54	2.0	0.028	1.0	NA	0.0	0.0	0.00	0.12	0.00	49.5
NorthWest: Wandella Avenue												
8	T1	47	0.0	0.074	0.1	LOS A	0.3	2.4	0.14	0.35	0.14	44.1
9	R2	84	0.0	0.074	5.0	LOS A	0.3	2.4	0.14	0.35	0.14	44.1
Approach		132	0.0	0.074	3.2	NA	0.3	2.4	0.14	0.35	0.14	44.1
SouthWest: Victoria Street												
10	L2	163	0.0	0.123	4.8	LOS A	0.5	3.6	0.12	0.51	0.12	42.5
12	R2	22	0.0	0.123	5.4	LOS A	0.5	3.6	0.12	0.51	0.12	39.2
Approach		185	0.0	0.123	4.9	LOS A	0.5	3.6	0.12	0.51	0.12	42.1
All Vehicles		371	0.3	0.123	3.7	NA	0.5	3.6	0.11	0.40	0.11	43.6

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.
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.

Attachment 3 Car Parking Demand Calculation

	2019	2030	Growth factor	Comment
Survey Sample	136			
FTE by Sample	120			Survey indicates there was an average of 120 staff working all days
FTE by Estimation	135	152	1.1	FTE growth rate (from 2019 to 2030)
Staff parking onsite by Sample	104			Survey indicates there was 104 staff parking onsite out of the 136 sample
Staff parking onsite by Estimated FTE	117			This is justified based on the FTE number from Sample (120) to Estimation (135)
Onsite parking provision	127	182		Existing parking on multi locations is based on car park audit
Y12 Student	108	145		Based on table in the Email on 9 May
Y12 Student parking (1:8 ratio as per DCP)	14	18		Based on the CP audit, these 14 spaces are located in 19 Bancroft Ave and sharing with staff and trading. It is assumed that other onsite parking are allocated.

Arrival	Percent	Count	2019-onsite parking by FTE	2030-onsite parking by FTE	2030-Parking cumulative parking demand by FTE	2030-Y12 Student parking demand	2030- total Parking demand	2030- Parking available onsite	2030-Parking demand by pool	2030- Parking available onsite with pool
									Roseville	Roseville
Before 7:00am	5.90%	8	7	8	8	0	8	174	20	154
7:00am-7:30am	32.40%	44	38	43	51	0	51	131	20	111
7:30am-8:00am	51.50%	70	60	68	119	18	137	45	7	38
8:00am-8:30am	6.60%	9	8	9	128	18	146	36	0	36
8:30am-9:00am	1.50%	2	2	2	130	18	148	34	0	34
After 9:00am	2.20%	3	3	3	133	18	151	31	0	31
	Totals	136				Note: All students (driver) arrive at 7:30-8:00am				

Departure	Percent	Count	2019-onsite parking by FTE	2030-onsite parking by FTE	2030-Parking cumulative parking demand by FTE	2030-Y12 Student parking demand	2030- total Parking demand	2030- Parking available onsite	2030-Parking demand by pool	2030- Parking available onsite with pool
									Roseville	Roseville
Before 3:00pm	1.50%	2	2	2	131	18	149	33	0	33
3:00pm-3:30pm	4.40%	6	5	6	125	14	139	43	17	26
3:30pm-4:00pm	10.30%	14	12	14	111	10	121	61	40	21
4:00pm-4:30pm	36.00%	49	42	47	64	6	70	112	48	64
4:30pm-5:00pm	21.30%	29	25	28	36	2	38	144	37	107
After 5:00pm	26.50%	36	31	35	1	0	1	181	37	144
	Totals	136				Note: All driving students depart proportionly after 3:00pm (4 per hour)				