



Traffic Assessment

Penshurst Public School

Perumal Pedavoli Architects



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1 Introduction

1.1 Background

TTM Consulting was engaged by NSW Department of Education to prepare a traffic assessment report for a proposed school expansion and upgrades at Penshurst Public School to accommodate a student population increase from around 439 students in 2016 to 1,012 in the future.

This report has been prepared to address the Transport and Accessibility issue (Key Issues No.5) of the Secretary's Environmental Assessment Requirements (SEARs), reissued by the Department of Planning and Environment on 29 September 2017.

The proposed upgrade of Penshurst Public School will result in approximately 59 full time equivalent staff and 31 other staff. The site is currently occupied by Penshurst Public School catering for students between kindergarten and year 6.

A survey was conducted of how students and staff currently travel to and from the school in September 2017. The survey asked students and staff to identify their time of arrival and departure and their mode of travel (car passenger, car driver, bus, walked, cycled etc.). Staff who drove were also asked where they parked.

1.2 Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand.
- Parking layout to provide efficient and safe internal manoeuvring.
- Identification of likely traffic volumes and traffic distribution from the future development.
- Identification of likely traffic impact of development on the public road network.
- Access configuration to provide efficient and safe manoeuvring between the site and the public road network.
- Access to suitable levels of public transport.

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- Hurstville Local Environmental Plan 2012.
- Hurstville Development Control Plan 2016.
- RTA (RMS) Guide to Traffic Generating Developments.

1.3 Site location

The subject site is located at 18 Arcadia Street Penshurst (see Figure 1-1 and Figure 1-2). Currently there are another two schools located near the subject site: St Declan's Catholic Primary School and Georges River College – Penshurst Girls Campus (see Figure 1-1). Each school has frontage to different roads.

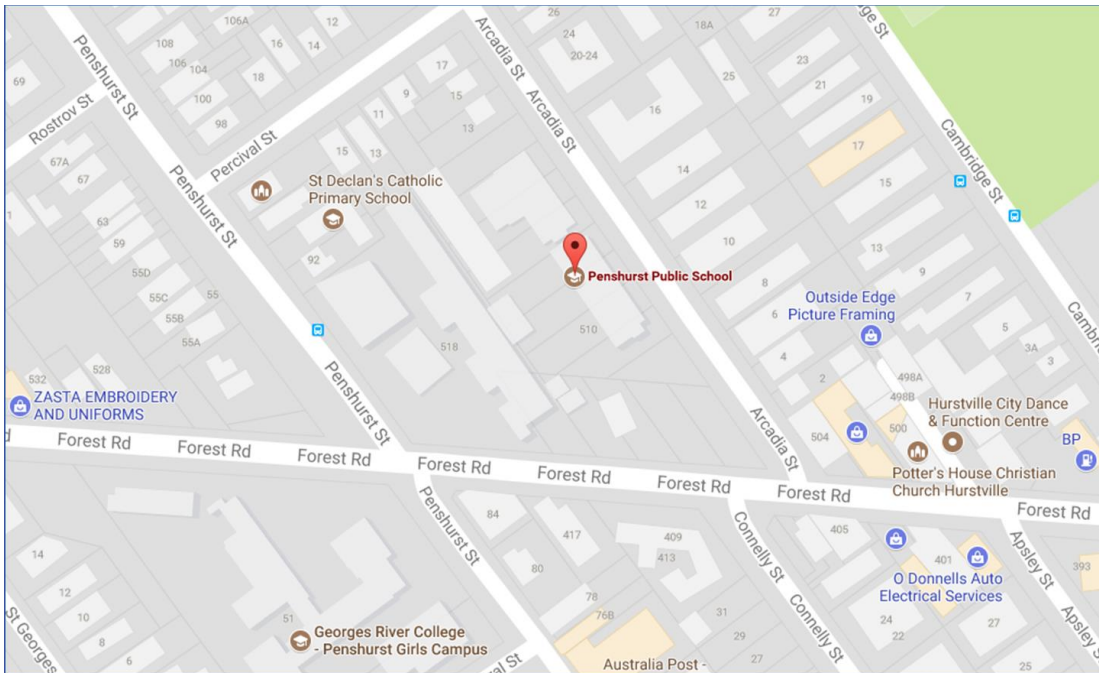


Figure 1-1: Site location



Figure 1-2: Aerial image of the site

1.4 Development profile

Penshurst Public School is currently operating as a primary school. 439 students and 34 full-time equivalent staff were at the school in 2016¹.

The proposed upgrade of Penshurst Public School will result in the following staffing arrangements:

- Full time equivalent staff from 34 to 59.
- Other staff from 18 to 31.

Student numbers will increase to 1,012 which will occur gradually over time.

15 car parking spaces will be provided on site, one of which will be an accessible parking space. This will match existing provision as noted below. Additional staff are expected to park on street or use alternative travel modes to access the school.

1.5 Parking

There are currently 15 parking spaces on site. The proposed development provides for 15 car parking spaces on site including one accessible space. The carpark layout is designed in accordance with AS2890.1 and AS2890.6.

TTM has been advised that provision of additional parking on site is not feasible due to limitations on the site area and the building footprint.

Nevertheless, there are opportunities to extend the Kiss and Ride provisions on Arcadia Street.

The car park layout is presented in Appendix A.

¹ Source: My School (<https://www.myschool.edu.au/SchoolProfile/Index/104412/PenshurstPublicSchool/41045/2016>)

2 Existing transport infrastructure

2.1 Road network

The subject site has frontages to Arcadia Street and Forest Road. These roads and the other roads near the site (except for King Georges Road) are maintained and controlled by Georges River Council.

The road characteristics are shown in Table 2-1.

Table 2-1: Road characteristics

Road	Speed Limit	Lanes	Road Authority
Arcadia Street	50kph	2 (undivided)	Council
Forest Road	60kph	4 (divided)	Council
King Georges Road	60kph	6 (divided)	RMS
Percival Street	50kph	2 (undivided plus parking)	Council
Penshurst Street	50kph	2 (divided plus parking)	Council

Arcadia Street has an 8 metre wide carriageway at the site frontage. The intersection of Arcadia Street and Forest Road is a priority controlled intersection. The intersection of Penshurst Street and Forest Road is traffic light controlled.

2.2 Public transport

The site is located within 700 metres walking distance of the Penshurst Railway Station which is on the T4 Eastern Suburbs and Illawarra Line. Bus stops are located within 400 metres walking distance from the site to Penshurst Street, and Cambridge Street. These routes include:

- Buses stopping on Penshurst Street:
 - Route 940: Hurstville to Bankstown via Riverwood
 - Route 941: Bankstown to Hurstville via Greenacre
 - Route 943: Lugarno to Hurstville
 - Route 944: Bankstown to Hurstville via Peakhurst Heights
 - Route 945: Hurstville to Bankstown via Mortdale
- Buses stopping on Cambridge Street:
 - Route M91: Hurstville to Parramatta via Padstow and Chester Hill

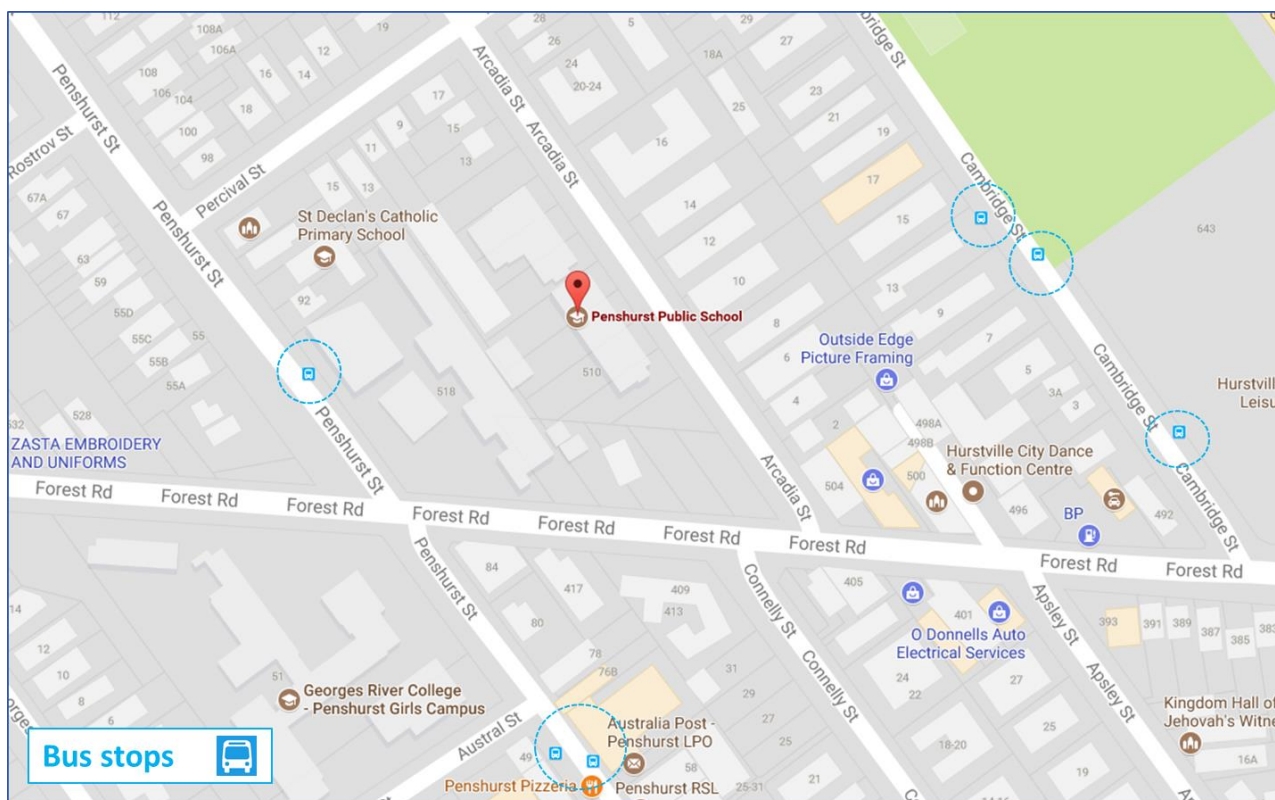


Figure 2-1: Bus stop locations

The M91 Route is a high frequency regional bus route connecting Parramatta to Hurstville via Bankstown Central Shopping Centre, Westfield Hurstville Shopping Centre, Parramatta Railway Station, Bankstown Railway Station and Eventide Village. This service provides buses every 10 minutes in morning and evening peak periods, and every 15 to 30 minutes during the off-peak periods.

The M91 bus route is shown in Figure 2-2.

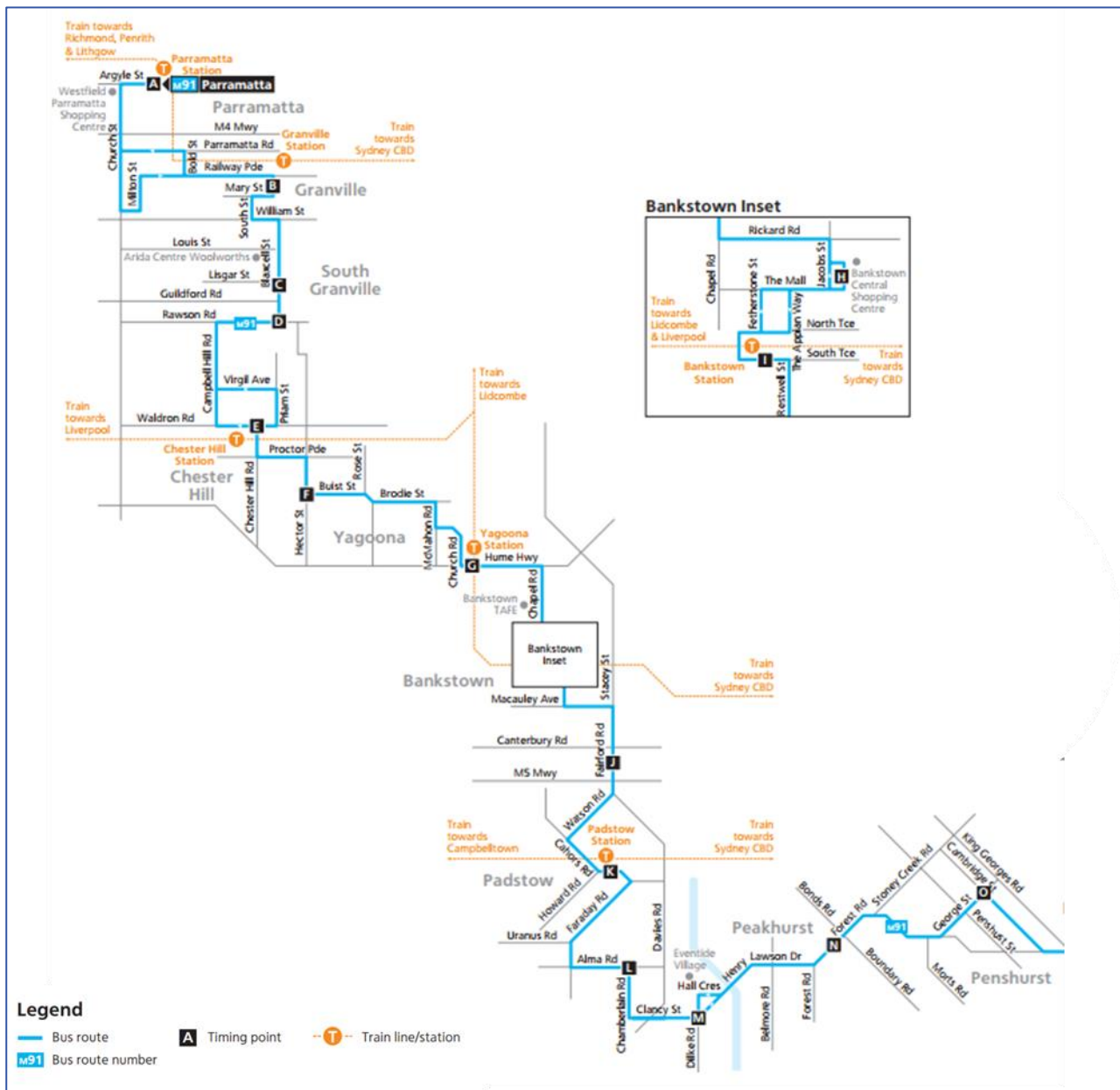


Figure 2-2: M91 Bus route

2.3 Walking and cycling infrastructure

Pedestrian footpaths are located on Arcadia Street, Forest Road, Percival Street and the streets surrounding the site, as shown in Figure 2-3.



Figure 2-3: Existing pedestrian footpath on Arcadia Street

Designated cycle routes are located within the vicinity of the site along Penshurst Street, Woniora Road and Hillcrest Avenue.

Bike network maps from Council and the NSW Roads and Maritime Services (RMS) are shown in Figure 2-4 and Figure 2-5, respectively.

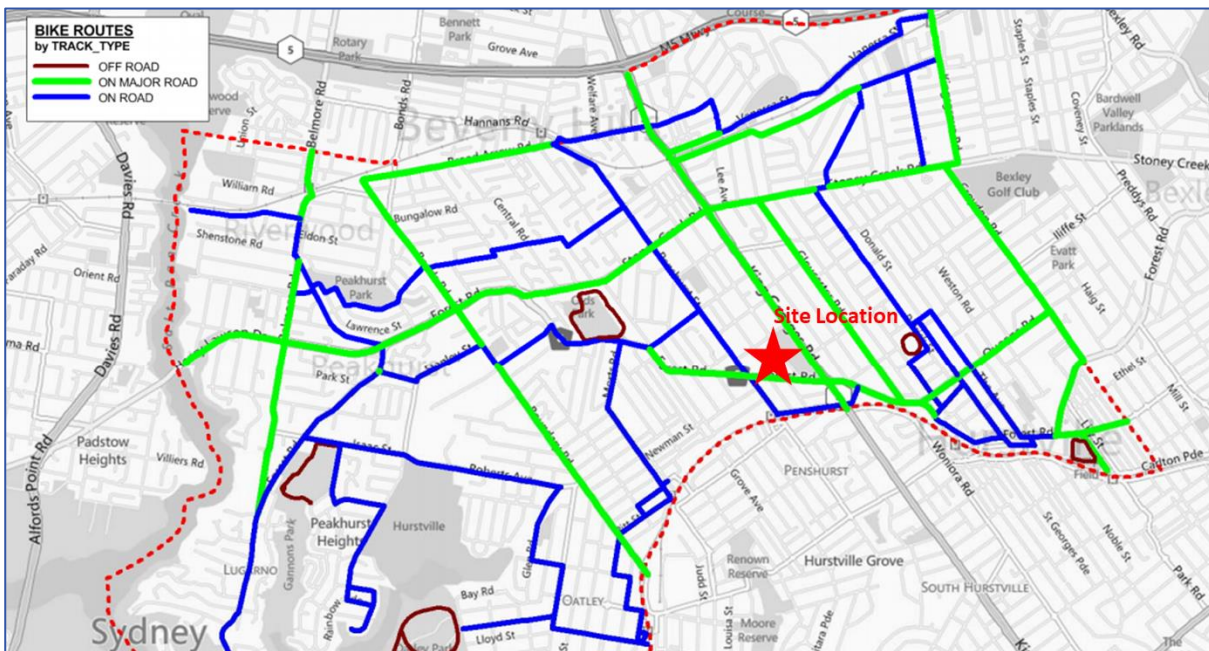


Figure 2-4: Hurstville cycleways map²

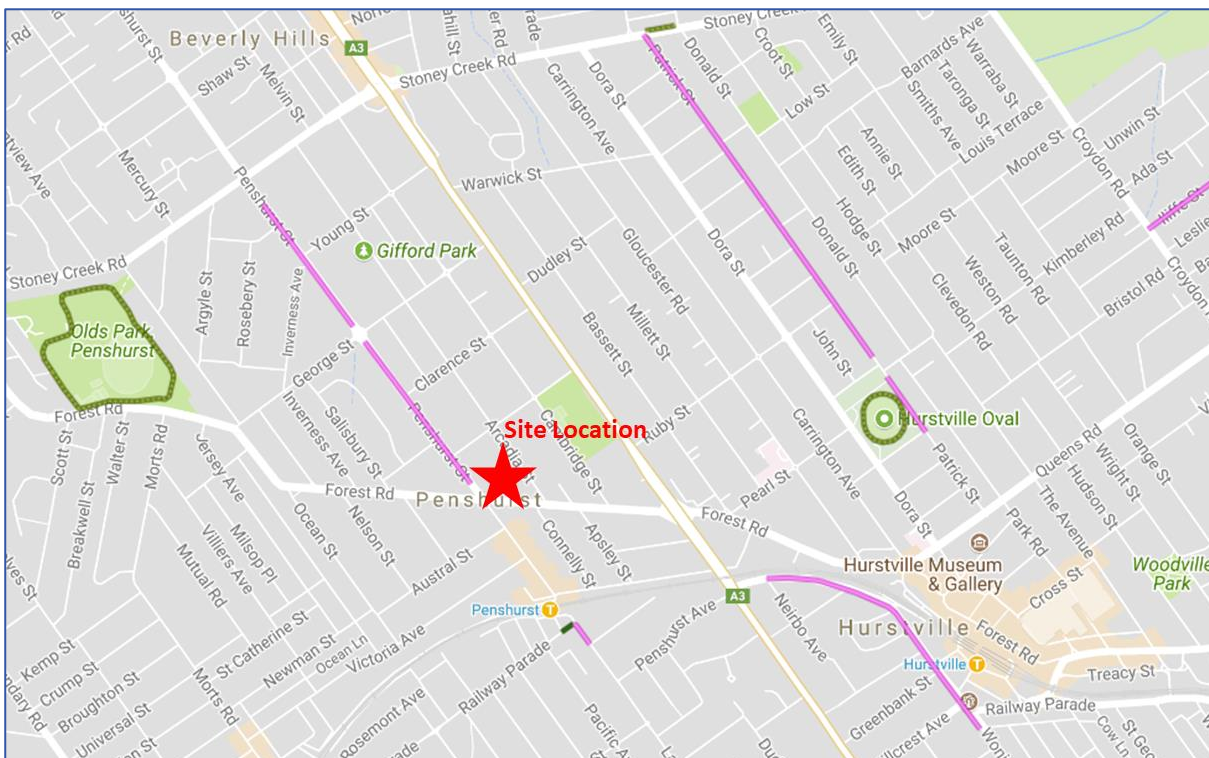


Figure 2-5: NSW RMS cycle network map³

² Source: <http://www.hurstville.nsw.gov.au/Cycleways.html>

³ Source: <http://www.rms.nsw.gov.au/roads/bicycles/cyclewayfinder/index.html>

2.4 On street parking

A review was undertaken of on-street parking around the proposed site. Parking controls are presented in Figure 2-6.

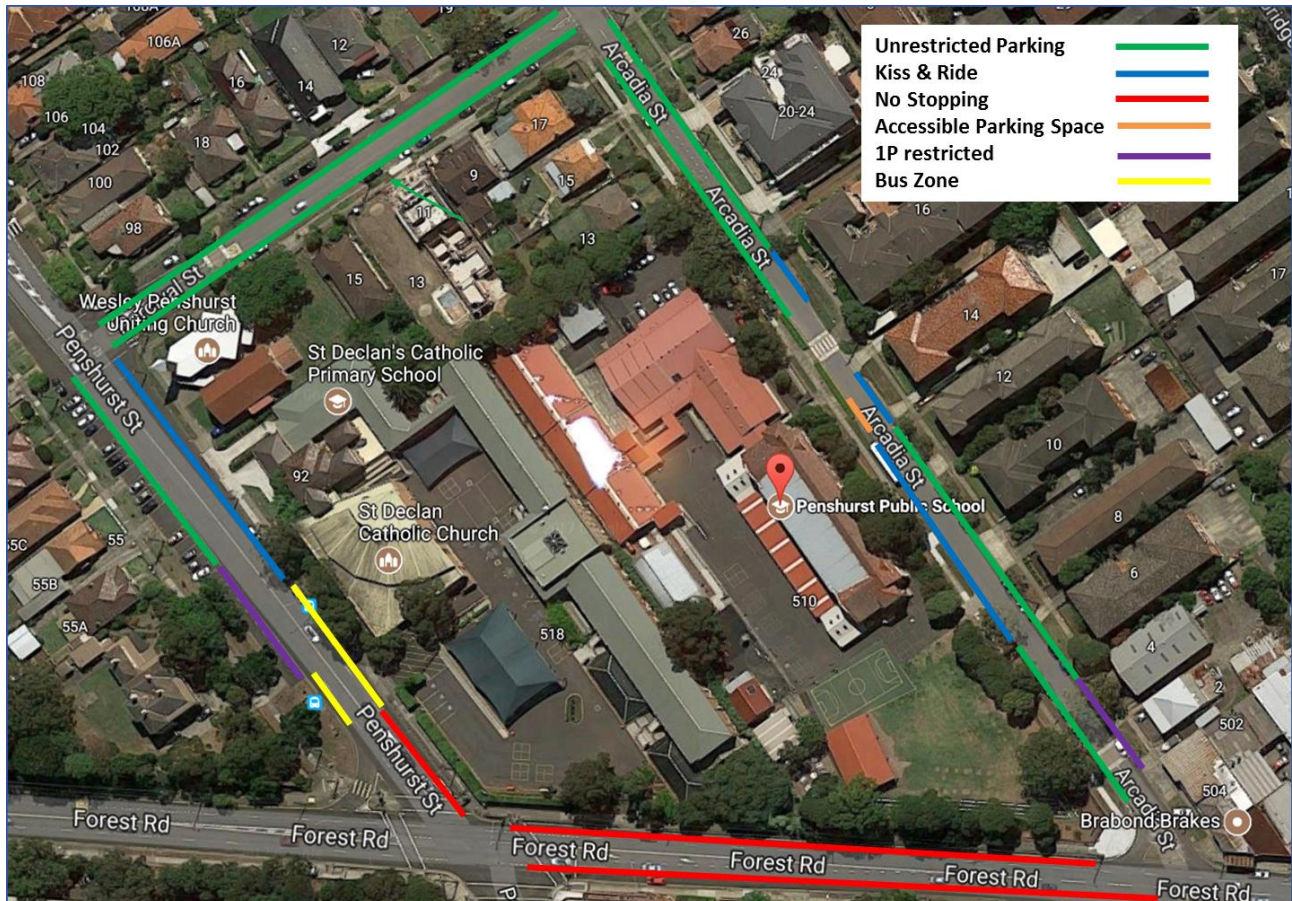


Figure 2-6: Street parking near the site

A traffic light crossing is located at the intersection of Forest Road and Penshurst Street. A Children's crossing is located on Arcadia Street at a raised pedestrian crossing. Flags for the crossing are put out in the morning and afternoon by the school (see Figure 2-7). The crossing is manned before and after school.



Figure 2-7: Children's crossing on Arcadia Street

2.5 Staff parking

Staff parking is currently located on-site in one car parks via Arcadia Street. Up to 15 staff cars can be accommodated on site.

Unrestricted on-street parking spaces are available near the school on Arcadia Street, Percival Street, Penshurst Street and Clarence Street. A site inspection was conducted by TTM staff between 8am and 10am on 31st July 2017. It was observed that on street parking on Arcadia Street between Forest Road and Percival Street was nearly fully occupied in the morning. There were vacant spaces in surrounding streets. It is our view that supply is adequate for the current parking demand.



Figure 2-8: School on-site car park

2.6 Pick-up and Drop-off Facilities

Pick-up and drop-off facilities are provided in the frontage of the site on Arcadia Street (see Figure 2-9). Currently here are about 12 standard car spaces and one accessible space are designed as pick-up and drop-off facilities.



Figure 2-9: Kiss & Ride zone on Arcadia Street

2.7 Surveys of existing student and staff travel

2.7.1 Student Mode of travel to school

Table 2-2 presents a summary of the existing modes used by students to travel to and from school. A separation has been provided for arrivals and departures during school peak hour (8 to 9 am & 2:45 to 3:45 pm) and other times.

The weighted percentages of student related cars arriving and departing as car passengers are presented. This weighted average provides an allowance for car occupancies where some parents drive more than one student to or from school.

Table 2-2: Existing student mode of travel to and from school (2017)

	Travel Mode					
	Bus	Bicycle	Car Passenger	Train	Walked	Total
Morning Peak						
Student Arrivals in School Peak (8.00 to 9.00 am)	0.5%	0.3%	40.4%	0.3%	46.3%	87.7%
Student Arrivals outside School Peak Hour	0.0%	0.0%	7.5%	0.0%	4.9%	12.3%
All Student Arrivals	0.5%	0.3%	47.8%	0.3%	51.2%	100.0%
Weighted Car Passengers (% of students)			36.2%			
Evening Peak						
Student Departures in School Peak (2.45 to 3.45 pm)	0.8%	0.3%	42.4%	0.3%	51.7%	95.9%
Student Departures outside School Peak Hour	0.0%	0.0%	2.8%	0.0%	1.3%	4.1%
All Student Departures	0.8%	0.3%	45.2%	0.3%	53.0%	100.0%
Weighted Car Passengers (% of students)			33.3%			

From Table 2-2 it can be seen that:

- 48% of the students are driven to school in the morning. The remainder generally walk. Bus usage is low. This reflects the small catchment of the school.
- Percentage of car passenger reduces to 45% in the afternoon when students are departing.

The weighted car passenger estimates can be applied in determining increase in future parking demands.

2.7.2 Staff Mode of travel to school

Table 2-3 presents a summary of the existing staff travel patterns as surveyed in September 2017. The number of staff on site at any one time varies from day to day, particularly in relation to part time staff.

Table 2-3: Existing staff travel patterns (2017)

	Tuesday
Staff present	52
Staff who drove	43
Car drivers (%)	83%
Staff who parked on-site	16
Staff Parked on-street	27

The majority of staff drove to school (83%). More than half of the staff who drove parked their car outside the school on the street.

The staff survey shows that 16 cars were parked in the school carpark. 15 spaces are marked. One of the cars is likely to have occupied on a vacant space on the carpark instead of a designated space.

2.8 Traffic surveys

TTM Data conducted traffic surveys at the intersections of Penshurst Street / Forest Road and Arcadia Street / Forest Road / Connelly Street from 6:00 to 10:00 am and 2:00 to 6:00 pm on Tuesday 25th July 2017.

The morning and evening school peak hours were found to be from 8:00 to 9:00 am and 2:45 to 3:45 pm for the Penshurst Street / Forest Road and intersection Arcadia Street / Forest Road / Connelly Street intersections.

The results for the Penshurst Street / Forest Road intersection are presented in Figure 2-10 and Figure 2-11, and the results for the Arcadia Street / Forest Road / Connelly Street intersection are presented in Figure 2-12 and Figure 2-13.



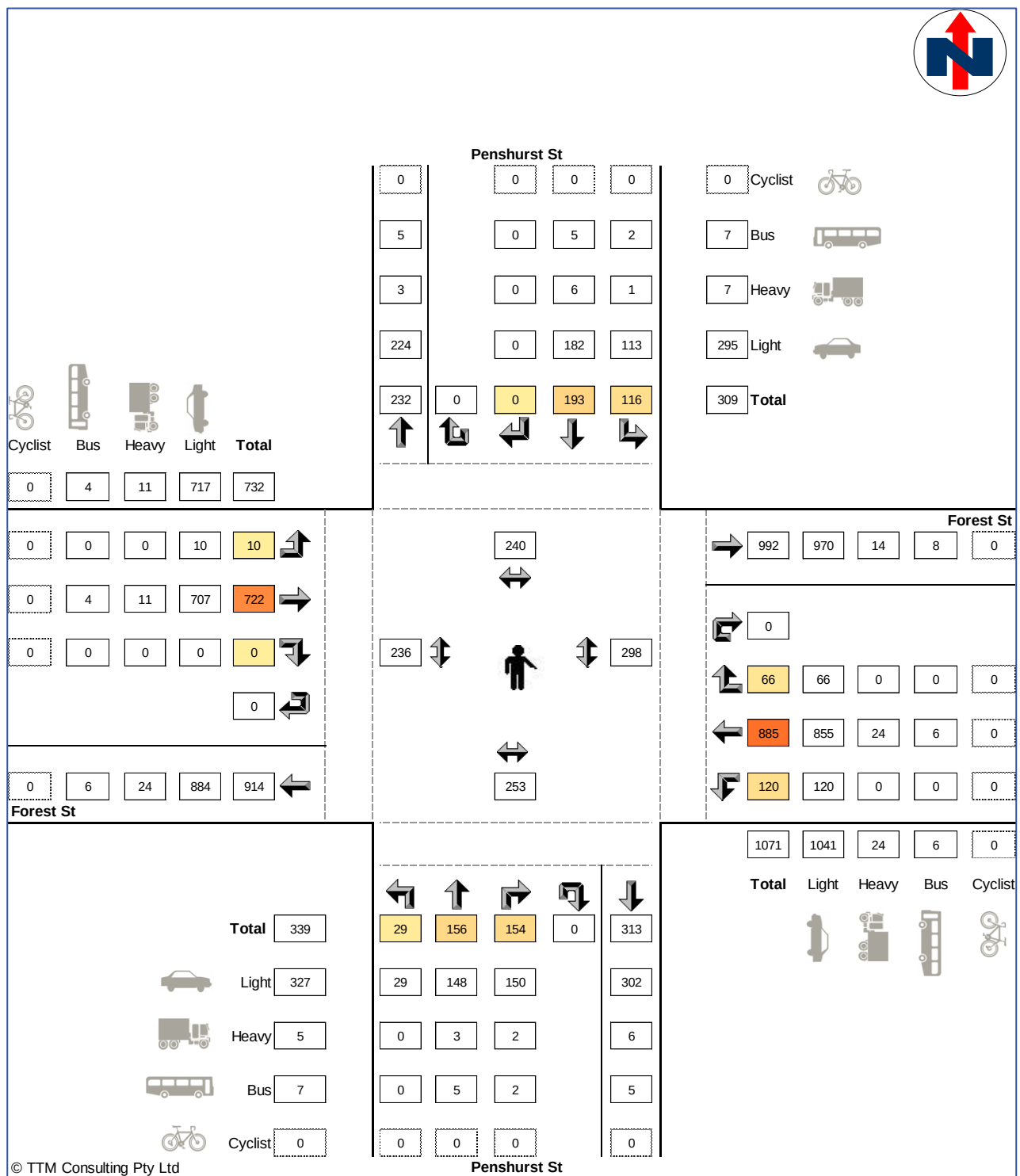


Figure 2-11: Evening School Peak - Penshurst Street and Forest Road intersection (2:45 to 3:45 pm)



Site: Penshurst Public School – Traffic Assessment
Reference: 17SYT0030



2.9 Assessment of existing traffic conditions

TTM has assessed the performance of the intersections using the SIDRA Intersection Analysis Software. Performance criteria for intersections are based on the RTA (RMS) Guide to Traffic Generating Developments. A qualitative rating and its corresponding Level of Service (LoS) are applied to the average delay per vehicle as shown in Table 2-4.

Table 2-4: Level of Service Criteria for Intersections

Level of Service (LoS)	Average Delay per Vehicle (seconds)	Traffic Signals, Roundabouts
A	Less than 15	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals incidents will cause excessive delays

For signals, average delays per vehicle are for the intersection as a whole. If the average delay for the worst movement is greater than the cycle time, a Level of Service F is assigned, regardless of the average delay for the intersection as a whole. For Roundabouts / Give Way / Stop Signs, average delay per vehicle is for the worst movement.

2.9.1 Analysis of Penshurst Street and Forest Road intersection

The existing intersection configuration of Penshurst Street / Forest Road is shown in Figure 2-14.



Figure 2-14: Existing intersection configuration Penshurst Street and Forest Road

Table 2-5 gives a summary of the SIDRA results for the current volumes applied to the existing intersection configuration.

Table 2-5: Summary of SIDRA Outputs for Penshurst Street and Forest Road Intersection – Existing Conditions

Case	Degree of Saturation (%)	Average Delay (sec)	Level of Service (LoS)
Morning (8:00 to 9:00 am)	0.92	45	D
Afternoon (2:45 to 3:45 pm)	0.83	32	C

The current intersection configuration of Penshurst Street and Forest Road is operating near capacity with a Level of Service (LoS) D for the morning school peak period. This intersection is operating at a satisfactory Level of Service (LoS) C for the afternoon school peak period.

The results indicate that the current intersection configuration has ample capacity for future traffic demands from the proposed development.

2.9.2 Analysis of Arcadia Street, Forest Road and Connelly Street Intersection

The existing intersection configuration of Arcadia Street, Forest Road and Connelly Street is shown in Figure 2-15.



Figure 2-15: Existing intersection configuration Arcadia Street, Forest Road and Connelly Street

Table 2-6 gives a summary of the SIDRA results for the current volumes applied to the existing intersection configuration.

Table 2-6: Summary of SIDRA Outputs for Arcadia Street, Forest Road and Connelly Street Intersection – Morning Peak

Direction	Degree of Saturation (%)	Average Delay (sec)	Level of Service (LoS)
South: Connelly Street	4.2	See Note 1 below	F
East: Forest Road	0.2	5.6	A
North: Arcadia Street	0.7	33.9	C
West: Forest Road	0.5	14.9	B

Table 2-7: Summary of SIDRA Outputs for Arcadia Street, Forest Road and Connelly Street Intersection – Afternoon Peak

Direction	Degree of Saturation (%)	Average Delay (sec)	Level of Service (LoS)
South: Connelly Street	3.1	See Note 1 below	F
East: Forest Road	0.3	5.6	A
North: Arcadia Street	0.1	12.2	A
West: Forest Road	0.3	20.2	B

The current intersection configuration of Forest Road and Arcadia Street is operating at a Level of Service (LoS) C or better for both the morning and evening peak periods.

Note 1

SIDRA Outputs for Connelly Street showed a high degree of delay for right-turn vehicle movements. This is not correct. The right-turn traffic flow is small (average 20 vehicles per hour). Video footage from traffic surveys showed that the maximum holding time for the right-turn vehicle on Connelly Street was less than one minute. The proposed development will have no association with the Connelly Street intersection apart from some parents who may choose to use this route to drive their children to School.

The future traffic demands from the proposed development will mainly be vehicles turning left from Forest Road onto Arcadia Street and vehicles turning left from Arcadia Street onto Forest Road. The results indicate that the current intersection configuration will have ample capacity for future traffic demands from the proposed development.

2.10 Cumulative impacts from nearby developments

The traffic survey data and the intersection modelling have taken into account the current traffic flows generated by the nearby developments.

There are another two schools located near the subject site: St Declan's Catholic Primary School and Georges River College – Penshurst Girls Campus (see Figure 1-1). Each school has frontage to different roads. We

understand that there are no proposals at this stage to expand those schools. St Declan's has advised that they are not looking at an expansion until after 2020.

Potential residential development could occur. However, most of the surrounding sites already have residential flat buildings. Increases in traffic flows on Arcadia Street from potential development would be low. Impacts on the school related traffic are not expected to be significant.

3 Car parking arrangement

3.1 Council requirement

Car parking requirements for primary schools are specified in the 'Hurstville Development Control Plan (Amendment No.5) Section 3.1 Vehicle, Access, Parking and Manoeuvring' requires the below:

Table 3-1: Council Car Parking Rates

Development Type	Car Parking Spaces required on-site
Educational establishments	1 car parking space per 2 employees

Table 3-2 presents the parking requirements for compliance with Council's DCP. Note that the calculation is for full time equivalent staff as defined in the DCP. It excludes other staff employed at the school.

Table 3-2: Parking Supply Requirement

	Current	Proposed
Full time equivalent staff	34	59
Car Parking requirements	17	30

15 on-site car parking spaces are provided on the current car park. TTM has been advised that no additional on-site car parking space can be provided in the proposed development due to the limitation of the building footprint and site area. NSW Department of Education guidelines state that "a school is not obliged to provide parking on site to anyone at any time⁴ (copy on following page).

We recommend that the school address this difference by implementing a green travel plan encouraging staff to use the M91 bus service, other bus services, and train services via Penshurst Station which is within 650 metres walking distance.

It was observed by TTM staff that there were vacant spaces in surrounding streets in the morning in typical school day. With the high convenient access to public transport and available on street parking the proposed parking arrangement is workable. Regardless, the increase in on-street parking demands will impact on parking currently available for residents and their visitors.

⁴ <https://education.nsw.gov.au/teaching-and-learning/curriculum/learning-across-the-curriculum/road-safety-education/safety-around-schools/parking-on-school-grounds>

ON SITE PARKING
• Anyone parking a vehicle on school premises does so at their own risk. Principals need to make sure they are aware of this as outlined in Legal Issues Bulletin 8, (intranet) • A school is not obliged to provide parking on site to anyone at any time. • If a school has space available they may offer disabled parking spaces and parking for visitors and staff.
ON SITE PARKING BY STUDENTS
• Principals may give permission for students to park in school grounds if there is adequate space available and that no one is in danger. • Principals wishing to allow students to park in school grounds may request vehicle users and/or owners sign a disclaimer. • Refer to Legal Issues Bulletin 8 (intranet).

Figure 3-1: NSW Education Department guidelines in relation to provision of on-site parking

3.2 Existing on-street parking occupancy

TTM have conducted on-street parking surveys on Arcadia Street, Percival Street, Cambridge Street and Clarence Street from 7:30 am to 10:00 am and from 2:00pm to 4:00pm on 11/04/2018 (Wednesday).

The surrounding on-street parking has been divided into five different areas:

- Area A: Arcadia Street
- Area B: Percival Street
- Area C: Arcadia Street
- Area D: Cambridge Street
- Area E: Clarence Street

Figure 3-2 identifies the areas surveyed.



Figure 3-2: Parking survey areas

The results of the existing on-street parking surveys are summarised in Table 3-3.

Table 3-3: Existing on-street parking occupancy

	Time	Occupied	Vacant	%vacant
AM Peak (total 260 parking spaces)	7:30	151	109	42%
	8:00	147	113	43%
	8:30	160	100	38%
	9:00	187	73	28%
	9:30	153	107	41%
	10:00	153	107	41%
PM Peak (total 260 parking spaces)	14:00	159	101	39%
	14:30	170	90	35%
	15:00	183	77	30%
	15:30	217	43	17%
	16:00	147	113	43%

Figure 3-3 presents the existing on street parking occupancy during morning drop-off hours. Figure 3-4 presents the existing on-street parking occupancy during evening pick-up hours.

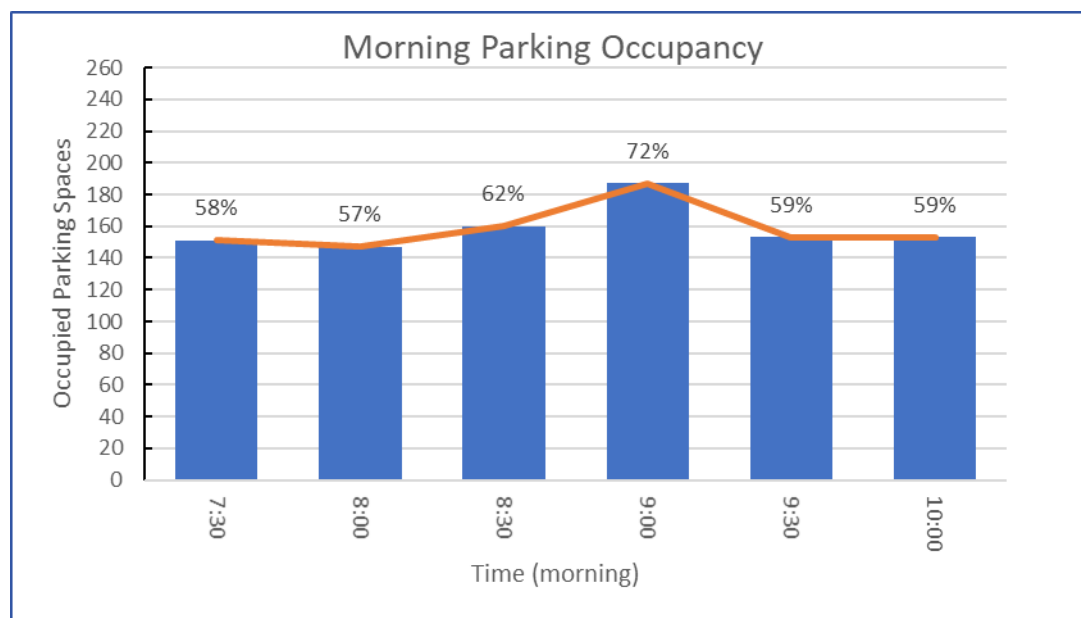


Figure 3-3: Morning peak on-street parking occupancy

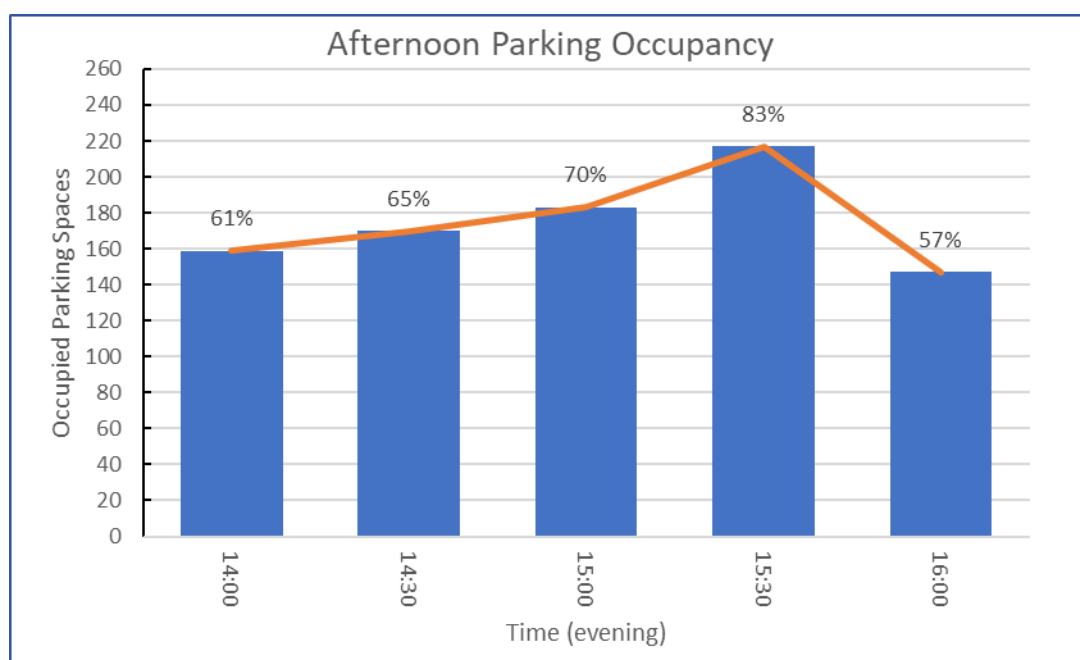


Figure 3-4: Evening peak on-street parking occupancy

The survey results show that the existing on-street parking supply is able to accommodate the existing drop-off and pick-up activities during school zone periods. The parking facilities around the school had a maximum occupancy of 72% in the morning at 9 am. The survey results for the afternoon period showed that parking occupancy reached a maximum of 83% at 3:30 pm.

Table 3-4: Vacant spaces near the site

	Time	Vacant Spaces			
		Arcadia Street (between Percival St. & Clarence St.)	Cambridge Street	Clarence Street	Total
AM Peak	7:30	31	34	14	79
	8:00	30	37	13	80
	8:30	18	37	15	70
	9:00	16	37	14	67
	9:30	24	35	15	74
	10:00	25	35	14	74
PM Peak	14:00	23	32	19	74
	14:30	21	29	18	68
	15:00	18	27	19	64
	15:30	6	24	16	46
	16:00	30	22	19	71

Error! Reference source not found. presents the vacant car parking spaces near the school on Acadia Street (between Percival Street and Clarence Street), Cambridge Street and Clarence Street, which could be utilised

by the school staff. All these parking spaces are located within 500 metres walking distance from the School. There are approximately 70 on-street car parking spaces which could be utilised by additional staff of the new Penshurst Public School.

We have been advised that the upgrading of the school will increase:

- Full time equivalent staff from 34 to 59.
- Other staff from 18 to 31.

The existing on-street parking supply near the school will be able to accommodate the parking demand generated by the additional staff. This will impact on on-street parking currently available for residents and their visitors.

4 Traffic impacts

4.1 Assessment of future traffic conditions

TTM has assessed the performance for Penshurst Street / Forest Road and Arcadia Street / Forest Road / Connelly Street intersections using SIDRA Intersection Analysis Software, for two scenarios applied over the existing road network as follows:

Current traffic scenario

This scenario includes the 2017 traffic volumes modelled over the existing road network. This analysis has been performed for both the morning and evening school peak periods (refer to Section 2.9).

Traffic scenario 1: future (1,012 Students)

This scenario includes the 2017 traffic volumes modelled over the existing road network with the additional traffic generation of the increase in student population. 40% of the additional students are assumed to come and leave by car (based on the survey results of weighted car passengers). This would generate 229 additional vehicle trips during the morning and afternoon school peak hour. This is a conservative upper bound.

It is our advice that the traffic impacts from additional 25 staff are considered insignificant on the surrounding road network. From the Staff travel survey, most staff who drove would arrive before 8am in the morning and leave after 4pm in the afternoon. This is different from the school peak hours.

Assumption of the distributions of additional vehicle trips are presented in Figure 4-1.

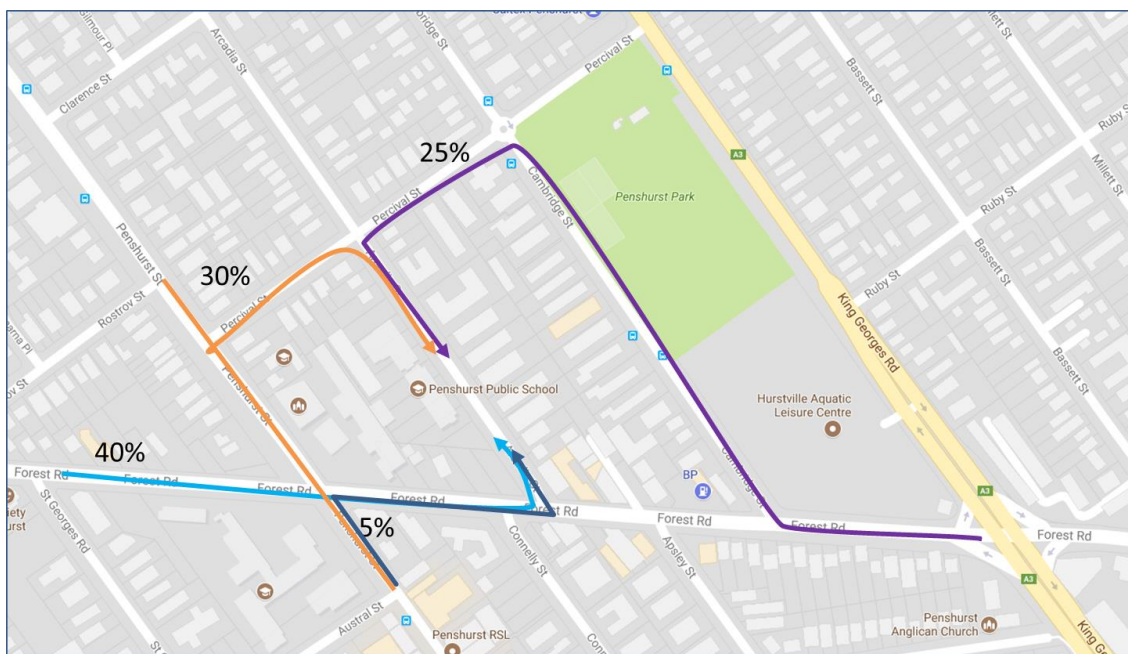


Figure 4-1: Assumption of the distributions of additional vehicle trips

4.2 Traffic impacts

The traffic impacts of the proposed development are compared against existing conditions. Table 4-1 gives a summary of the outputs for the various traffic cases applied to the intersections.

The detailed outputs for this analysis are provided in Appendix B.

Table 4-1: SIDRA Intersection Performance Results

Intersection	Scenarios	Morning Peak Hour		Afternoon Peak Hour	
		Average Delay	Level of Service	Average Delay	Level of Service
Penshurst Street and Forest Road	Base	45	D	32	C
	Future	57	E	33	C
Arcadia Street at Forest Road (Arcadia Street delays reported)	Base	31	C	12	A
	Future	44	D	11	A

Note: The traffic volumes on Arcadia Street (left turn movements) can clear the intersection with minor delays. It is also noted that drivers turn with shorter gaps within the traffic as observed from the site inspection, this has been accommodated into the model.

From Table 4-1 the increase in traffic flows does not have a significant impact on the intersection operations. The additional traffic generated from the proposed development is considered acceptable.

4.3 Kiss and Ride impacts

An extension of the pick-up and drop off facilities is required. Other on-street parking areas can also be utilised by parents who drive the kids to school by car (see Figure 2-6). It is our advice that the unrestricted on-street parking area on the frontage of the site on Arcadia Street can be redesigned as Kiss and Ride Zone, to accommodate the demand from the future development. This could provide up to 17 kiss and ride spaces (including the existing kiss and ride area) and one accessible bay (existing). Indicative locations are shown in Appendix C.

We have been advised that the School provides special needs classes at the site. There are currently 23 special needs students. The special needs education will also form part of the School in the future. We estimate that there will be up to 27 special needs students in the new school.

Some of the special needs students will be picked up and dropped off by taxi. Taxis are currently accommodated in the kiss and ride areas. We have been advised by the school that the special needs students are picked up by taxi or parent cars at 2:45 pm. This was also indicated in the questionnaire surveys conducted in September 2017. The remaining school students collected by parents were picked up at about 3:10 pm.

It is our advice that the increase of four special needs students will have no significant impacts on the kiss and ride facilities.

attendees will be residents from the local community. With the high convenient access to the public transports, it is our advice that on-street parking and the school car park will be able to accommodate the parking demands from a typical community event (up to 100 people).

5 Additional Transport Related Issues

5.1 Service Vehicle Arrangement

No change is proposed for service vehicle access, delivery and loading arrangements. Vehicular access for deliveries and waste vehicles will all be facilitated at the existing car park as per existing arrangements off Arcadia Street. 1 to 2 service vehicles are expected to access the school each day. This includes courier deliveries.

5.2 Emergency Vehicle Access

No change is proposed for emergency vehicle access arrangement. Emergency vehicles will be accommodated at the existing carpark via Arcadia Street.

5.3 Pedestrian Access

Pedestrian access to the site is good with pedestrian facilities along the site frontage, and from local roads surrounding the site.

6 Green travel plan

A Green Travel Plan will be developed by the school to encourage travel behaviour change through raising awareness of other alternatives to using a private vehicle.

The Green Travel Plan is a collection of initiatives and actions to encourage travel behaviour change. The plan will provide students, staff and parents with information on sustainable transport and encourages them to make alternative transport choices than the use of a private vehicle. The implementation of the Green Travel Plan will reduce traffic congestion and parking problems.

This Green Travel Plan has been prepared in the interests of providing guidance to current/future members, staff and visitors of the proposed development to reduce car trips and encourage the use of sustainable transport.

To provide guidance for the preparation of a Green Travel Plan for members, staff and visitors of the development, the following 'generic' Green Travel Plan includes:

Carpooling

Carpooling is considered as an opportunity to significantly reduce cars on the road network. The school would set up a system to manage and display the real-time carpool information from participants. This system can be a cloud, google maps or various smartphone applications.

Carpooling should be a long term initiative which requires consistent promotion of this travel mode and incentives. It is recommended to have the initiative operated through parents on a carpooling forum. The school will manage and encourage parents to be proactive in offering carpooling services. The benefits of carpooling can be promoted in parent teacher meetings, school newsletters and by educating students.

A range of free apps are currently available online to assist with the implementation of carpooling. Examples are presented below. The School would need to consider the Child Protection Policies before promoting the initiative.

Carpool – School Edition

This app is designed specifically for students who carpool to school. Parents can form a carpool group, and add members into the group manually or import from contacts. This app let parents manually create a schedule, or it will automatically generate one based on the driver's preferences. For example, if one person like to drop off in the morning, or prefers pick-up.

This app is free for iOS devices. Parents can also email the carpool schedule to those members who do not have an iOS device. They can view it on their computers and print it.

Cozi

Cozi is a free mobile app for iOS and Android devices. It allows parents to create shared calendars jam-packed with information. Parents can make a calendar of driving assignments, and share the calendar with other parents in the carpool.

Provide Information on Public Transport Services

The proposed development site enjoys a high level of public transport accessibility in the form of bus and train services being within close proximity to the subject site. The Green Travel Plan will provide the following information on the public transport services to include:

Railway Services

Details of conveniently accessible train services to include:

- A copy of the Sydney Railway Network Map showing the extent of the rail service throughout the Sydney Metropolitan Area and the location of Penshurst Train Station
- Details of current train time tables for Penshurst Train Station
- A map showing the shortest and safest pedestrian route from the site to Penshurst Train Station

Bus Services

Details of conveniently accessible bus services to include:

- Route Service Number
- Origin and Destination
- Travel route along streets near the site
- Bus stops located around the site
- A map showing the shortest and safest pedestrian route from the site to various bus stop locations

Provide Information on Active Transport Options

The proposed development site is near cycle facilities located on Penshurst Street, Woniora Road and Hillcrest Avenue. The Green Travel Plan will provide the following information on the cycle network to include:

- **Bicycle Access**

The Travel plans will identify

- The location of designated bicycle parking spaces for occupants for the proposed development
- A map showing cycle ways conveniently accessible from the site and the surrounding facilities

6.1 Implementation

Just prior to the initial expansion of the development, the Green Travel Plan will be finalised with the inclusion of relevant information such as train and bus timetables, illustrations showing the shortest and most convenient routes between the site and various destinations.

Hard copies of the Green Travel Plan will be produced for distribution.

The school website will have a link to the Green Travel Plan. The administration staff will be responsible for updating the Travel Plan on a regular basis.

7 Construction traffic management plan

The purpose of a Construction Traffic Management Plan (CTMP) is to ensure that the impacts of the construction activities on the public domain and road network, in particular with respect to temporary interruptions to vehicular and pedestrian traffic are limited and acceptable.

The demolition of existing buildings and construction of the new school will occur after all existing students and staff have been temporarily relocated to another site.

7.1 Limitations of this CTMP

The CTMP developed by TTM only considers the impact of works on traffic and pedestrians. As the project is in its preliminary stages, the CTMP is based on anticipated information, and advice supplied by Perumal Pedavoli Architects.

7.2 Duration of Works and Construction Schedule

The duration of construction activities will be subject to the contractor once it is appointed for the project. The daily/ weekly schedule of the construction work will be subject to Council's conditions of consent.

7.3 Construction Permits

7.3.1 Works Zone

An application for a works zone fronting the subject site on Arcadia Street will be submitted to Council if required. This would be a separate application to the CTMP.

7.3.2 Other Permits

A Standing Plant permit, temporary road/footpath closure, hoarding and will be applied and submitted to the relevant authorities, when required.

This would be a separate application to the CTMP.

7.4 Construction Vehicles

Various types of trucks will visit the site. The maximum sized design vehicle will be a heavy rigid vehicle. A truck and dog may access the site during demolition and excavation. Both vehicles are legally allowed on the local road system. The length of most other vehicles will be less than the standard heavy rigid 12.5 metre vehicle. Typical lengths are around 8 metres.

All heavy goods such as girders or machinery plants are likely to be delivered outside of peak traffic hours.

7.5 Haulage Routes

During construction vehicle movements for the project will be required to:

- Comply with relevant environment approvals.
- Minimise the number of vehicle movements by balancing earthworks and recycling excavated materials.
- Enter and exit the site in a forward facing direction.
- Promote safe driving principles.
- Evaluate the need for temporary traffic control.
- Plan on-site vehicle movements.
- Avoid or minimise truck reversing and three point turns on site.

The proposed haulage route is shown in Figure 7-1.

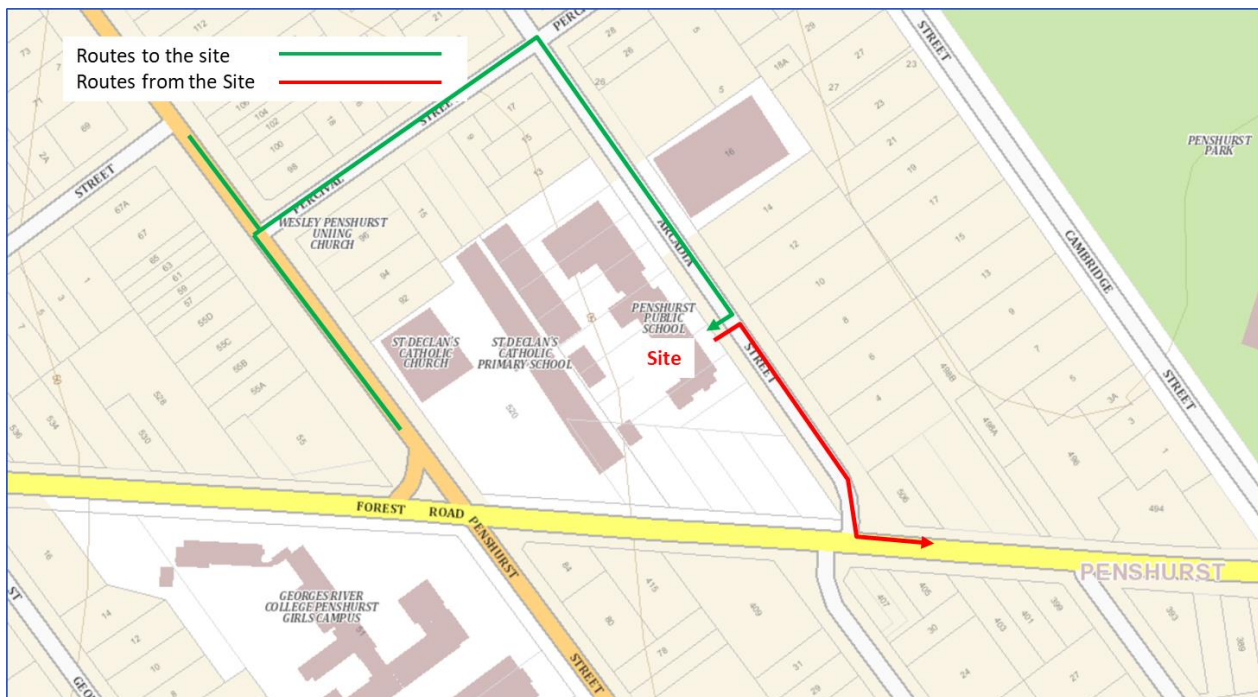


Figure 7-1: Construction vehicle routes

7.8 Employee Parking

Employees, tradespeople and small construction vehicles will park on site and around the surrounding streets of the subject site.

7.9 Driver Code of Conduct

Management of vehicular access to and from the site is essential to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site:

- Utilisation of only the designated transport routes.
- Drivers to maintain a sufficient distance from the temporary barriers that will be implemented around trees that form part of the endangered plant community.
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.

8 Summary and conclusions

8.1 Development access

The access arrangements will remain unchanged. TTM considers the proposed access arrangements for this development is acceptable.

8.2 Car parking arrangements

TTM advises the proposed car parking arrangement for this development is acceptable.

8.3 Impact on surrounding road network

Assessment of the proposed development indicates that the development will not have a significant impact on the future road network. No mitigating road works are required.

8.4 Active transport facilities

The current public transport infrastructure is adequate for the development.

8.5 Conclusion

TTM see no traffic engineering reason why the relevant approvals should not be granted.

Appendix A Proposed Site Plan

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AMMENDMENTS			
REV	BY	DATE	DESCRIPTION
-		26-03-18	ISSUE FOR INFORMATION

LEGEND

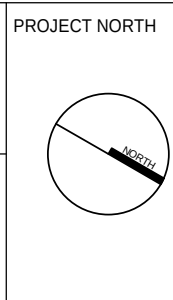


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PEDAVOLI
ARCHITECTS

PENSHURST PUBLIC SCHOOL
18 Arcadia Street, Penshurst
DRAWING NAME
SITE PLAN



PROJECT NORTH			
0	2500	5000	7500
10000	12500	15000	25000
SCALE 1: 250 @ A3			
DRAWN	CHECKED	VERIFIED	DATE
Author	Checker	Approver	26-03-18
REVISION			
DRAWING NUMBER	PROJECT CODE	DISCIPLINE	PHASE
3199-ARC-DA_00_004			

ISSUE FOR INFORMATION

Appendix B Sidra Intersection Analysis

MOVEMENT SUMMARY



Site: 1 [Base Case: Forest Rd - Penshurst St - Morning School Peak]

Base Case

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Penshurst Street South											
1	L2	25	4.2	0.355	43.6	LOS D	11.4	81.8	0.81	0.69	33.4
2	T1	196	3.2	0.355	38.1	LOS C	11.4	81.8	0.81	0.69	34.1
3	R2	146	4.3	0.758	75.7	LOS F	10.3	75.0	1.00	0.86	16.7
Approach		367	3.7	0.758	53.4	LOS D	11.4	81.8	0.88	0.76	26.4
East: Forest Road East											
4	L2	88	2.4	0.311	21.0	LOS B	11.5	84.0	0.54	0.55	36.8
5	T1	594	6.0	0.311	15.5	LOS B	11.6	85.2	0.54	0.51	42.8
6	R2	71	3.0	0.543	76.4	LOS F	4.9	35.0	1.00	0.76	20.3
Approach		753	5.3	0.543	21.8	LOS B	11.6	85.2	0.59	0.53	38.1
North: Penshurst Street North											
7	L2	176	2.4	0.484	55.4	LOS D	12.3	88.4	0.91	0.81	24.9
8	T1	196	5.4	0.484	55.1	LOS D	12.3	88.4	0.94	0.78	28.6
Approach		372	4.0	0.484	55.2	LOS D	12.3	88.4	0.93	0.79	26.9
West: Forest Road West											
10	L2	16	0.0	0.012	7.6	LOS A	0.2	1.2	0.21	0.59	52.7
11	T1	1637	3.2	0.920	51.6	LOS D	61.7	443.5	1.00	1.03	26.2
Approach		1653	3.2	0.920	51.2	LOS D	61.7	443.5	0.99	1.02	26.4
All Vehicles		3144	3.9	0.920	44.9	LOS D	61.7	443.5	0.87	0.85	28.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	60	25.3	LOS C	0.1	0.1	0.60	0.60	
P2	East Full Crossing	76	58.7	LOS E	0.3	0.3	0.92	0.92	
P3	North Full Crossing	75	25.3	LOS C	0.2	0.2	0.60	0.60	
P4	West Full Crossing	46	55.9	LOS E	0.2	0.2	0.89	0.89	
All Pedestrians		257	40.7	LOS E			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 1 [Base Case: Forest Rd - Penshurst St - Evening School Peak]

Base Case

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Penshurst Street South											
1	L2	31	0.0	0.315	43.0	LOS D	9.9	71.6	0.79	0.68	33.6
2	T1	164	5.1	0.315	37.5	LOS C	9.9	71.6	0.79	0.68	34.2
3	R2	162	2.6	0.830	79.2	LOS F	11.9	84.9	1.00	0.91	16.2
Approach		357	3.5	0.830	56.9	LOS E	11.9	84.9	0.89	0.79	25.0
East: Forest Road East											
4	L2	126	0.0	0.501	23.5	LOS B	21.8	156.2	0.63	0.62	35.2
5	T1	932	3.4	0.501	17.5	LOS B	21.8	156.2	0.62	0.58	41.3
6	R2	69	0.0	0.524	76.2	LOS F	4.8	33.5	1.00	0.76	20.3
Approach		1127	2.8	0.524	21.8	LOS B	21.8	156.2	0.64	0.59	38.2
North: Penshurst Street North											
7	L2	122	2.6	0.451	57.3	LOS E	10.4	74.9	0.92	0.79	24.6
8	T1	203	5.7	0.451	54.8	LOS D	10.4	74.9	0.94	0.77	28.6
Approach		325	4.5	0.451	55.7	LOS D	10.4	74.9	0.93	0.78	27.2
West: Forest Road West											
10	L2	11	0.0	0.008	7.3	LOS A	0.1	0.7	0.19	0.58	53.0
11	T1	760	2.1	0.426	25.8	LOS B	17.1	122.1	0.71	0.62	36.5
Approach		771	2.0	0.426	25.5	LOS B	17.1	122.1	0.70	0.62	36.7
All Vehicles		2580	2.9	0.830	32.0	LOS C	21.8	156.2	0.73	0.65	33.4

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	266	25.5	LOS C	0.6	0.6	0.61	0.61	
P2	East Full Crossing	314	59.3	LOS E	1.2	1.2	0.93	0.93	
P3	North Full Crossing	253	25.5	LOS C	0.6	0.6	0.61	0.61	
P4	West Full Crossing	248	56.4	LOS E	0.9	0.9	0.90	0.90	
All Pedestrians		1081	42.4	LOS E			0.77	0.77	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 1 [Base Case: Forest Rd - Arcadia St - Connelly St - Morning School Peak]

Base Case
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connelly Street											
1	L2	43	2.4	0.054	10.1	LOS A	0.2	1.4	0.42	0.90	43.0
2	T1	8	0.0	4.211	3221.0	LOS F	20.8	145.7	1.00	1.32	0.8
3	R2	17	0.0	4.211	3213.8	LOS F	20.8	145.7	1.00	1.32	0.7
Approach		68	1.5	4.211	1193.9	LOS F	20.8	145.7	0.63	1.06	1.5
East: Forest Road East											
4	L2	24	4.3	0.195	5.6	LOS A	0.0	0.0	0.00	0.04	56.8
5	T1	709	5.5	0.195	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		734	5.5	0.195	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Arcadia Street											
7	L2	160	1.3	0.517	30.7	LOS C	2.9	20.8	0.91	1.13	38.1
Approach		160	1.3	0.517	30.7	LOS C	2.9	20.8	0.91	1.13	38.1
West: Forest Road West											
10	L2	26	0.0	0.537	5.6	LOS A	0.0	0.0	0.00	0.02	57.2
11	T1	1889	3.3	0.537	0.6	LOS A	1.8	13.2	0.08	0.02	58.3
12	R2	43	0.0	0.537	14.9	LOS B	1.8	13.2	0.17	0.03	53.2
Approach		1959	3.2	0.537	1.0	NA	1.8	13.2	0.08	0.02	58.1
All Vehicles		2921	3.6	4.211	30.3	NA	20.8	145.7	0.12	0.11	29.9

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.

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Project: O:\Synergy\Projects\17SYT\17SYT0030 Penshurst Public School – Traffic Assessment\6 - Analysis\17SYT0030 Rev 01 SIDRA Modelling.sip7

MOVEMENT SUMMARY

 **Site: 1 [Base Case: Forest Rd - Arcadia St - Connelly St - Evening School Peak]**

Base Case
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connelly Street											
1	L2	67	0.0	0.105	11.6	LOS A	0.4	2.6	0.52	0.96	41.8
2	T1	3	0.0	3.062	2176.7	LOS F	18.2	127.1	1.00	1.37	1.2
3	R2	22	0.0	3.062	2228.7	LOS F	18.2	127.1	1.00	1.37	1.0
Approach		93	0.0	3.062	614.5	LOS F	18.2	127.1	0.65	1.07	2.7
East: Forest Road East											
4	L2	36	0.0	0.287	5.6	LOS A	0.0	0.0	0.00	0.04	57.1
5	T1	1060	3.0	0.287	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		1096	2.9	0.287	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Arcadia Street											
7	L2	73	0.0	0.088	12.1	LOS A	0.5	3.2	0.66	0.89	48.7
Approach		73	0.0	0.088	12.1	LOS A	0.5	3.2	0.66	0.89	48.7
West: Forest Road West											
10	L2	33	0.0	0.310	5.5	LOS A	0.0	0.0	0.00	0.03	57.1
11	T1	982	2.0	0.310	1.5	LOS A	1.8	13.1	0.12	0.04	56.2
12	R2	29	10.7	0.310	20.2	LOS B	1.8	13.1	0.28	0.05	48.1
Approach		1044	2.2	0.310	2.2	NA	1.8	13.1	0.12	0.04	56.0
All Vehicles		2305	2.4	3.062	26.2	NA	18.2	127.1	0.10	0.10	31.8

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.

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MOVEMENT SUMMARY



Site: 1 [Scenario 1: Forest Rd - Penshurst St - Morning School Peak]

Scenario 1 (School Expansion)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Penshurst Street South											
1	L2	25	4.2	0.373	43.9	LOS D	12.0	86.6	0.81	0.70	33.3
2	T1	207	3.0	0.373	38.3	LOS C	12.0	86.6	0.81	0.70	34.0
3	R2	158	4.0	0.816	78.4	LOS F	11.5	83.1	1.00	0.90	16.3
Approach		391	3.5	0.816	54.9	LOS D	12.0	86.6	0.89	0.78	25.9
East: Forest Road East											
4	L2	88	2.4	0.311	21.0	LOS B	11.5	84.0	0.54	0.55	36.8
5	T1	594	6.0	0.311	15.5	LOS B	11.6	85.2	0.54	0.51	42.8
6	R2	71	3.0	0.543	76.4	LOS F	4.9	35.0	1.00	0.76	20.3
Approach		753	5.3	0.543	21.8	LOS B	11.6	85.2	0.59	0.53	38.1
North: Penshurst Street North											
7	L2	176	2.4	0.484	55.4	LOS D	12.3	88.4	0.91	0.81	24.9
8	T1	196	5.4	0.484	55.1	LOS D	12.3	88.4	0.94	0.78	28.6
Approach		372	4.0	0.484	55.2	LOS D	12.3	88.4	0.93	0.79	26.9
West: Forest Road West											
10	L2	16	0.0	0.012	7.6	LOS A	0.2	1.2	0.21	0.59	52.7
11	T1	1733	3.0	0.973	73.2	LOS F	77.5	556.6	1.00	1.15	21.2
Approach		1749	3.0	0.973	72.6	LOS F	77.5	556.6	0.99	1.15	21.4
All Vehicles		3264	3.7	0.973	56.8	LOS E	77.5	556.6	0.88	0.92	25.0

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	60	25.3	LOS C	0.1	0.1	0.60	0.60	
P2	East Full Crossing	76	58.7	LOS E	0.3	0.3	0.92	0.92	
P3	North Full Crossing	75	25.3	LOS C	0.2	0.2	0.60	0.60	
P4	West Full Crossing	46	55.9	LOS E	0.2	0.2	0.89	0.89	
All Pedestrians		257	40.7	LOS E			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Scenario 1: Forest Rd - Penshurst St - Evening School Peak]

Scenario 1 (School Expansion)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Penshurst Street South											
1	L2	31	0.0	0.333	43.3	LOS D	10.5	76.2	0.80	0.69	33.5
2	T1	176	4.8	0.333	37.7	LOS C	10.5	76.2	0.80	0.69	34.1
3	R2	174	2.4	0.890	84.9	LOS F	13.4	95.7	1.00	0.96	15.4
Approach		380	3.3	0.890	59.8	LOS E	13.4	95.7	0.89	0.81	24.3
East: Forest Road East											
4	L2	126	0.0	0.501	23.5	LOS B	21.8	156.2	0.63	0.62	35.2
5	T1	932	3.4	0.501	17.5	LOS B	21.8	156.2	0.62	0.58	41.3
6	R2	69	0.0	0.524	76.2	LOS F	4.8	33.5	1.00	0.76	20.3
Approach		1127	2.8	0.524	21.8	LOS B	21.8	156.2	0.64	0.59	38.2
North: Penshurst Street North											
7	L2	122	2.6	0.451	57.3	LOS E	10.4	74.9	0.92	0.79	24.6
8	T1	203	5.7	0.451	54.8	LOS D	10.4	74.9	0.94	0.77	28.6
Approach		325	4.5	0.451	55.7	LOS D	10.4	74.9	0.93	0.78	27.2
West: Forest Road West											
10	L2	11	0.0	0.008	7.3	LOS A	0.1	0.7	0.19	0.58	53.0
11	T1	841	1.9	0.470	26.5	LOS B	19.5	138.4	0.73	0.64	36.1
Approach		851	1.9	0.470	26.2	LOS B	19.5	138.4	0.72	0.64	36.3
All Vehicles		2684	2.8	0.890	32.7	LOS C	21.8	156.2	0.74	0.66	33.1

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	266	25.5	LOS C	0.6	0.6	0.61	0.61	
P2	East Full Crossing	314	59.3	LOS E	1.2	1.2	0.93	0.93	
P3	North Full Crossing	253	25.5	LOS C	0.6	0.6	0.61	0.61	
P4	West Full Crossing	248	56.4	LOS E	0.9	0.9	0.90	0.90	
All Pedestrians		1081	42.4	LOS E			0.77	0.77	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Scenario 1: Forest Rd - Arcadia St - Connelly St - Morning School Peak]**

Scenario 1 (School Expansion)
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connelly Street											
1	L2	43	2.4	0.054	10.1	LOS A	0.2	1.4	0.42	0.90	43.0
2	T1	8	0.0	4.211	3209.2	LOS F	20.6	144.4	1.00	1.33	0.8
3	R2	17	0.0	4.211	3202.4	LOS F	20.6	144.4	1.00	1.33	0.7
Approach		68	1.5	4.211	1189.7	LOS F	20.6	144.4	0.63	1.06	1.5
East: Forest Road East											
4	L2	24	4.3	0.195	5.6	LOS A	0.0	0.0	0.00	0.04	56.8
5	T1	709	5.5	0.195	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		734	5.5	0.195	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Arcadia Street											
7	L2	293	0.7	0.808	43.8	LOS D	7.9	55.8	0.95	1.47	33.0
Approach		293	0.7	0.808	43.8	LOS D	7.9	55.8	0.95	1.47	33.0
West: Forest Road West											
10	L2	135	0.0	0.566	5.6	LOS A	0.0	0.0	0.00	0.07	56.4
11	T1	1889	3.3	0.566	0.6	LOS A	2.0	14.1	0.08	0.05	57.7
12	R2	43	0.0	0.566	15.5	LOS B	2.0	14.1	0.17	0.03	53.2
Approach		2068	3.1	0.566	1.2	NA	2.0	14.1	0.08	0.05	57.5
All Vehicles		3162	3.4	4.211	30.7	NA	20.6	144.4	0.15	0.20	30.4

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.

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MOVEMENT SUMMARY

 **Site: 1 [Scenario 1: Forest Rd - Arcadia St - Connelly St - Evening School Peak]**

Scenario 1 (School Expansion)

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connelly Street											
1	L2	67	0.0	0.105	11.6	LOS A	0.4	2.6	0.52	0.96	41.8
2	T1	3	0.0	4.026	3083.1	LOS F	21.4	149.6	1.00	1.32	0.8
3	R2	22	0.0	4.026	3122.9	LOS F	21.4	149.6	1.00	1.32	0.7
Approach		93	0.0	4.026	858.8	LOS F	21.4	149.6	0.65	1.06	1.9
East: Forest Road East											
4	L2	36	0.0	0.287	5.6	LOS A	0.0	0.0	0.00	0.04	57.1
5	T1	1060	3.0	0.287	0.0	LOS A	0.0	0.0	0.00	0.02	59.6
Approach		1096	2.9	0.287	0.2	NA	0.0	0.0	0.00	0.02	59.5
North: Arcadia Street											
7	L2	205	0.0	0.227	11.8	LOS A	1.3	8.9	0.67	0.91	48.9
Approach		205	0.0	0.227	11.8	LOS A	1.3	8.9	0.67	0.91	48.9
West: Forest Road West											
10	L2	141	0.0	0.339	5.5	LOS A	0.0	0.0	0.00	0.13	55.8
11	T1	982	2.0	0.339	1.6	LOS A	2.0	14.0	0.13	0.09	55.3
12	R2	29	10.7	0.339	20.9	LOS B	2.0	14.0	0.26	0.04	48.4
Approach		1153	2.0	0.339	2.6	NA	2.0	14.0	0.12	0.09	55.2
All Vehicles		2547	2.1	4.026	33.5	NA	21.4	149.6	0.13	0.16	28.7

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).

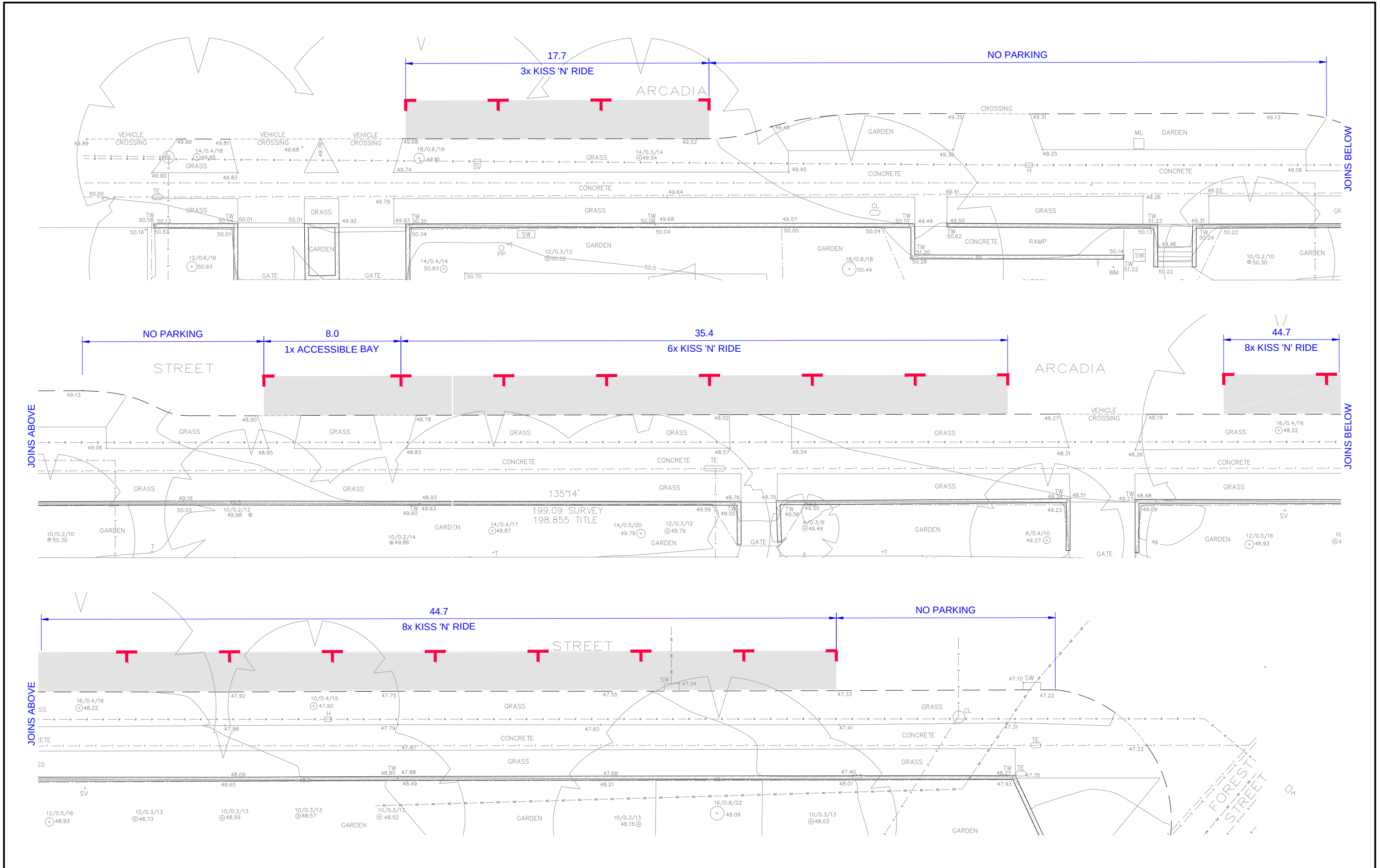
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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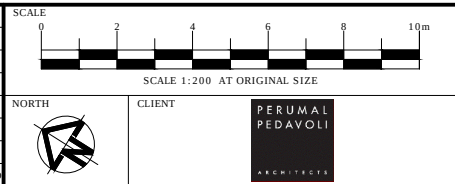
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Appendix C Potential Kiss and Ride Spaces



REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	20-09-17	ORIGINAL ISSUE	HT	PC	



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PROJECT	PENSHURST PUBLIC SCHOOL - TRAFFIC ASSESSMENT
DRAWING TITLE	KERBSIDE PARKING ALLOCATION ARCADIA STREET FRONTAGE

PROJECT NUMBER	17SYT0030	ORIGINAL SIZE	A3
DRAWING NUMBER	17SYT0030-01	REVISION	A
DATE	20 SEPT 2017	SHEET	1 OF 1