

Transport and Accessibility Report

Shore Physical Education Centre

Prepared for Shore School / 20th February, 2017

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Revision Register

Rev	Date	Prepared By	Approved By	Remarks
01	16/05/16	AK	PY	For review
02	25/05/16	AK	PY	Following comments
03	12/07/16	AK	PY	Following comments
04	20/12/17	GC	PY	Following adjustment of drop off arrangement

1.0 Executive Summary

This report provides a review assessment of the proposed Physical Education Centre located at Sydney Church of England Grammar (Shore) School in North Sydney. The proposed works include demolition of existing buildings and a swimming pool, construction of a new Physical Education Centre and additional landscaping.

This report covers the existing condition on the site and how the proposed development fits within a transport and accessibility framework. According to the Request for SEARs report completed by Robinson Urban Planning on the 15th of February 2016, the overall student numbers at the school campus are not expected to vary as a result of the development. There is an expectation of an increase of 2 staff members.

This report responds to the specific matters listed in the Secretary's Environmental Assessment Requirements (SEARs) dated 16th of March, 2016.

The main areas of attention of this study relate to:

- Transport and accessibility including active travel and public transport.
- Provision of parking and loading area facilities.
- On street parking demand.
- Traffic generation.
- Preliminary construction activity measures.

2.0 Response to Secretary's Environmental Assessment Requirements

Under Application Number SSD 7507 we have been provided with Secretary Environmental Assessment Requirements (SEARs). These have been issued on the 10th March 2016. Table 1 provides a response to the relevant SEARs.

Table 1: Response to Secretary's Environmental Assessment Requirements

No	Issue	Comments and References
5.1	The existing and proposed pedestrian and cycle routes and facilities within the vicinity of the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles;	Pedestrian and cycle routes within the vicinity of the site will be maintained as the work extent is only within the school boundary. The school currently provides shower and change facilities within the campus. The proposed development includes an upgrade to existing facilities and the provision of increased change room areas, showers and lockers. Safety measures will be addressed in the detailed design phase. Roads and Maritime Services have advised on the 9 December 2016 that additional school zone flashing lights will be installed on Union Street and Edward Street to increase safety for students. For further information refer to Sections 5.5.2 and 6.4.2.
5.2	An estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and cycle trips;	As there is no proposed increase in students and two additional staff as a result of the development, there is a minimal expected increase in the number of trips generated. As there will not be an increase in student numbers, Clause 104 of the Infrastructure State Environmental Planning Policy (Traffic Generating Developments) does not apply and there is no requirement for referral to Roads and Maritime Services.
5.3	The adequacy of public transport to meet the likely future demand of the proposed development;	The project will not increase existing student numbers. It is anticipated that an additional two staff members will be required as a result of the development. Public transport to the campus is

No	Issue	Comments and References
		currently sufficient and it is not likely to be affected by the development. The availability of public transport to the area is discussed in further detail in Section 5.6.
5.4	Impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site;	As the development occurs wholly within the bounds of Shore school, it will not affect any public transport routes. As student numbers are not expected to change and there are only two additional staff anticipated, minimal demand will be generated on public transport routes in the vicinity of the site. Any additional demand generated by the upgraded sporting facilities is expected to occur during the weekend outside of peak hours.
5.5	Measures to promote travel choices that support sustainable travel, such as a location-specific sustainable travel plan, provision of end of trip facilities, green travel plans and wayfinding strategies;	Shore School has a current Green Travel Plan which was prepared by TTW in 2017. This can be found in Appendix A. There is also a current Transport Access Guide incorporating sustainable travel modes into the campus as shown in Appendix B. The information within both the Transport Access Guide and Travel Plan are current to 2017 and include the expected impact of the proposed development.
5.6	The daily and peak (AM, PM and events) vehicle movements impact on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works (if required);	The development is not expected to increase student numbers across the campus and will not change the number of parking spaces. As a result, an increase in traffic generation around the campus is not expected and no major road works are proposed. Refer to Section 6.6 for more information. Approach intersections to the site are currently operating at a high level of service and this is not expected to change post development (see Section 7.0). The Transport and Accessibility

No	Issue	Comments and References
		Impact Assessment prepared by Halcrow (October 2011) also found that approach intersections were operating at a high level of service. Modifications to the drop off and pick up facility will affect the access and egress route of staff and visitors currently using the Bishopsgate Car Park driveway entrance. This modified route has been modelled to determine its impact on local intersections. It was found that the change could be accommodated within the local road network.
5.7	The proposed active transport access arrangements and connections to public transport services;	The development will not impact on the student numbers across the school campus as a whole, therefore current active transport networks are sufficient to accommodate the development. No additional impacts are anticipated on the networks. Active transport is discussed in further detail in Sections 5.5 and 6.4 and within the Green Travel Plan attached in Appendix A.
5.8	The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks;	The current bus pick up and drop off zones will not be affected by the proposed development. The current student drop off zone will be modified and expanded to improve conditions on Union Street. This is discussed in Section 6.2. Pedestrian safety measures will be addressed in the detailed design phase.
5.9	Identification of the intended users of the car park and assessment of the impacts of traffic generation arising from the use, including assessment of traffic volumes with reference to class timetabling, and use during and outside of school semesters, and how traffic generation will be managed holistically in relation to surrounding businesses and residences;	Shore has advised that the Bishopsgate Car Park will be restricted to staff and visitors during Monday to Friday. A total of 22 spaces within this carpark will be restricted to carpooling spaces. During weekends this parking provision will accommodate some demand from the sporting facilities within the school. This will occur outside of peak hours. As there is no increase in parking spaces it is not expected that further traffic will be generated. The traffic impact of the development is covered in

No	Issue	Comments and References
		Section 6.5.
5.10	Identification of any buses that may be used for the transport of sports teams, their volumes, frequency and parking provision, and assessment of impacts on the local road network and traffic safety;	Shore currently has two bus zones for use by the school located on Mount Street and William Street. Shore has advised that the current bus frequency will not change. These will be unaffected by the proposed works. Refer to Section 5.6.1.
5.11	Proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards;	There will be no increase in the onsite car parking provision. Car parking spaces within the site will be restricted to staff and visitors during Monday to Friday (including some spaces restricted to carpooling staff). There are 8 bicycle parking spaces to be incorporated into the development. Refer to Sections 6.3 and 6.4.
5.12	Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times); and	The proposed development includes additional loading facilities as discussed in Section 6.6. Service vehicle access is limited as required by Shore's Facilities Management.
5.13	Traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.	Prior to construction a construction traffic management plan will need to be prepared by the chosen builder. This will need to include access to the site for construction activities. It will also include access around the site for the public including pedestrians and cyclists. A preliminary construction traffic management plan is located in Appendix C. This details recommended travel routes for construction vehicles and will be finalised when a builder is engaged and the staging of the works is determined.
5.14	<i>Relevant Policies and Guidelines:</i> • <i>Guide to Traffic Generating Developments (Roads and Maritime Services)</i> • <i>EIS Guidelines – Road and Related Facilities (DoPI)</i>	These policies and guidelines have been reviewed as a part of the preparation of this transport and accessibility report.

No	Issue	Comments and References
	• <i>Cycling Aspects of Austroads Guides</i> • <i>NSW Planning Guidelines for Walking and Cycling</i> • <i>Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development</i> • <i>North Sydney Integrated Traffic & Parking Strategy (10/1/15)</i>	
6.4	Demonstrate that the development has been designed to promote the use of sustainable transport.	Public and active transport is readily available to the site and will not be negatively affected by the works. Shore School has updated their Green Travel Plan and Transport Access Guide to incorporate a number of actions to promote sustainable transport. Refer to Appendices A and B. The proposed rearrangement of car parking includes 22 secured access dedicated carpooling spaces to encourage sustainable transport. There will be an improvement to existing cyclist end use facilities and an increase in available change rooms, showers and lockers on the campus. Pedestrian amenity within the campus will be improved by provision of an additional pathway from Blue Street to Hunter Crescent. This pathway will be between the proposed swimming pool and Multipurpose Sports Building. This is discussed in further detail in Section 6.4.2 and 6.5.

3.0 Introduction

3.1 Background

Taylor Thomson Whitting (TTW) has been engaged by EPM Projects to give advice regarding transport and accessibility of the proposed Physical Education Centre development located at the Sydney Church of England Grammar School (Shore). The proposed building is located on Shore's main campus in North Sydney on Blue Street. In addition, the development includes 4 and 5 Hunter Crescent and 16 William Street.

This report responds to the specific matters listed in the Secretary's Environmental Assessment Requirements (SEARs) dated 10th of March 2016.

The main areas of attention of this study relate to:

- Transport and accessibility including active travel and public transport.
- Provision of parking and loading area facilities.
- Demand for on street parking.
- Traffic generation.
- Preliminary construction activity measures.

3.2 Scope of the Report

The report is divided into sections:

Section 1.0 gives an overview of the report.

Section 2.0 provides a detailed response to each of the project SEARs.

Section 3.0 includes background and the aim of the study.

Section 4.0 covers the strategic context of the site, including local and state requirements.

Section 5.0 covers the existing conditions at the site.

Section 6.0 covers the development of the Shore Physical Education Centre within a traffic and transport context.

Section 7.0 includes an assessment of the main approach intersections to the site pre and post development.

Section 8.0 provides a summary and conclusions.

3.3 Reference Documents

- Traffic Generating Developments (Roads and Maritime Services)
- EIS Guidelines – Road and Related Facilities (Department of Infrastructure and Planning)
- Cycling Aspects of Austroads Guides
- NSW Planning Guidelines for Walking and Cycling
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development
- NSW State Environmental Planning Policy (Infrastructure) 2007
- North Sydney Council Development Control Plan 2013
- North Sydney Integrated Traffic & Parking Strategy (10 January 2015)
- Transport & Accessibility Impact Assessment prepared by Halcrow (4 October 2011)

- Request for SEARs prepared by Robinson Urban Planning (19 February 2016)
- Traffic Count Data collected by R.O.A.R. Data (7 April 2016)
- Traffic Count Data collected by Matrix Traffic and Transport Data (15 February 2017)
- Shore School (North Sydney) Green Travel Plan prepared by GTA Consultants (22 April 2014)
- Communication with Shore School via Kathy Dickson including email correspondence and meetings.
- Meeting with Transport for New South Wales (TfNSW) (10 April 2016)
- Travel Mode Survey of Shore staff and students conducted by TTW (November 2016)

4.0 Planning Context

4.1 State Strategic Planning Policy and Plans

4.1.1 State Environmental Planning Policy (SEPP) (Infrastructure) 2007

The Infrastructure SEPP relates to traffic generating development. Schedule 3 of this SEPP stipulates that educational establishments need to be referred to the Roads and Maritime Services (RMS) given they generate “50 or more students”. As the proposed development will not impact on student numbers at the school, there is no formal requirement for referral to the RMS.

4.1.2 Planning Guidelines for Walking and Cycling

These guidelines relate to improved access and facilities for active travel modes. This planning has been incorporated within local policy such as the North Sydney Council Development Control Plan.

The key aim of this guideline is to integrate cycling and pedestrian paths within the development to those that already exist locally.

4.1.3 NSW Long Term Transport Master Plan 2012

This Master Plan aims to deliver “*an integrated, modern transport system*” by identifying key issues with regards to transport in NSW and a set of actions that can be used to address those challenges. The plan stresses the importance of maintaining access to public transport interchanges; this includes the area surrounding North Sydney Station.

4.1.4 Sydney’s Cycling Future 2013

This guideline focuses on promoting and increasing the rate of cycling for short duration trips by making it safer, more convenient and enjoyable. North Sydney is identified as a priority for increasing connectivity with regards to cycling to the CBD.

4.1.5 Sydney’s Walking Future 2013

Promoting walking as a transport mode and providing walking connections to public transport interchanges are key aims of this guideline. North Sydney is identified as a suburb with a high number of walking trips per day.

4.2 Local Planning and Policy

4.2.1 North Sydney Council Development Control Plan (DCP) 2013

Section 10 of the DCP stipulates the following:

- The maximum car parking rate for an educational establishment is 1 space per 6 staff members.
- Parking for motorcycles must be provided at the “*minimum rate of 1 space per 10 cars or part thereof*”.
- Disabled spaces are to be supplied at a rate of 1-2% of all non-residential parking.

The DCP does not stipulate the exact number of bicycle parking facilities to be provided for secondary educational establishments. It states that the Council will give consideration to the rates contained within the *Planning Guidelines for Walking and Cycling 2004*. These guidelines state that Primary and Secondary Schools shall provide bicycle parking at a rate of 3 to 5% of the number of staff.

According to the DCP, cycling end of use facilities are to be provided at the following rates:

- 1 personal locker for each bike parking space.
- 1 shower and change cubicle for up to 10 bike parking spaces.
- 2 showers and change cubicles for 11 to 20 or more bike parking spaces.
- 2 additional shower and change cubicles for each additional 20 bike parking spaces or part thereof.

Section 11 of the DCP provides traffic guidelines for development. This section only applies to development applications “which result in substantial traffic generation.” As there is a minimal increase in travellers to the school, there will be a negligible increase in trips to the site.

4.2.2 North Sydney Integrated Traffic and Parking Strategy 2015

This strategy was developed by North Sydney Council to address increasing traffic and parking demand in the area. The key aims of the strategy are:

- Improving traffic management;
- Encouraging sustainable transport; and
- Improving parking options and supply.

According to this strategy, Shore is located in an area of high parking demand.

5.0 Existing Conditions

5.1 Site Location

The proposed Physical Education Centre is located within the Shore Campus in North Sydney. The development will be located in the south-eastern corner of the Campus. The site also includes residential land at 4 and 5 Hunter Crescent and 16 William Street. Refer to Figure 1 for the location of the site.

The site is currently occupied by a 25 metre pool, gymnasium and three residential buildings.

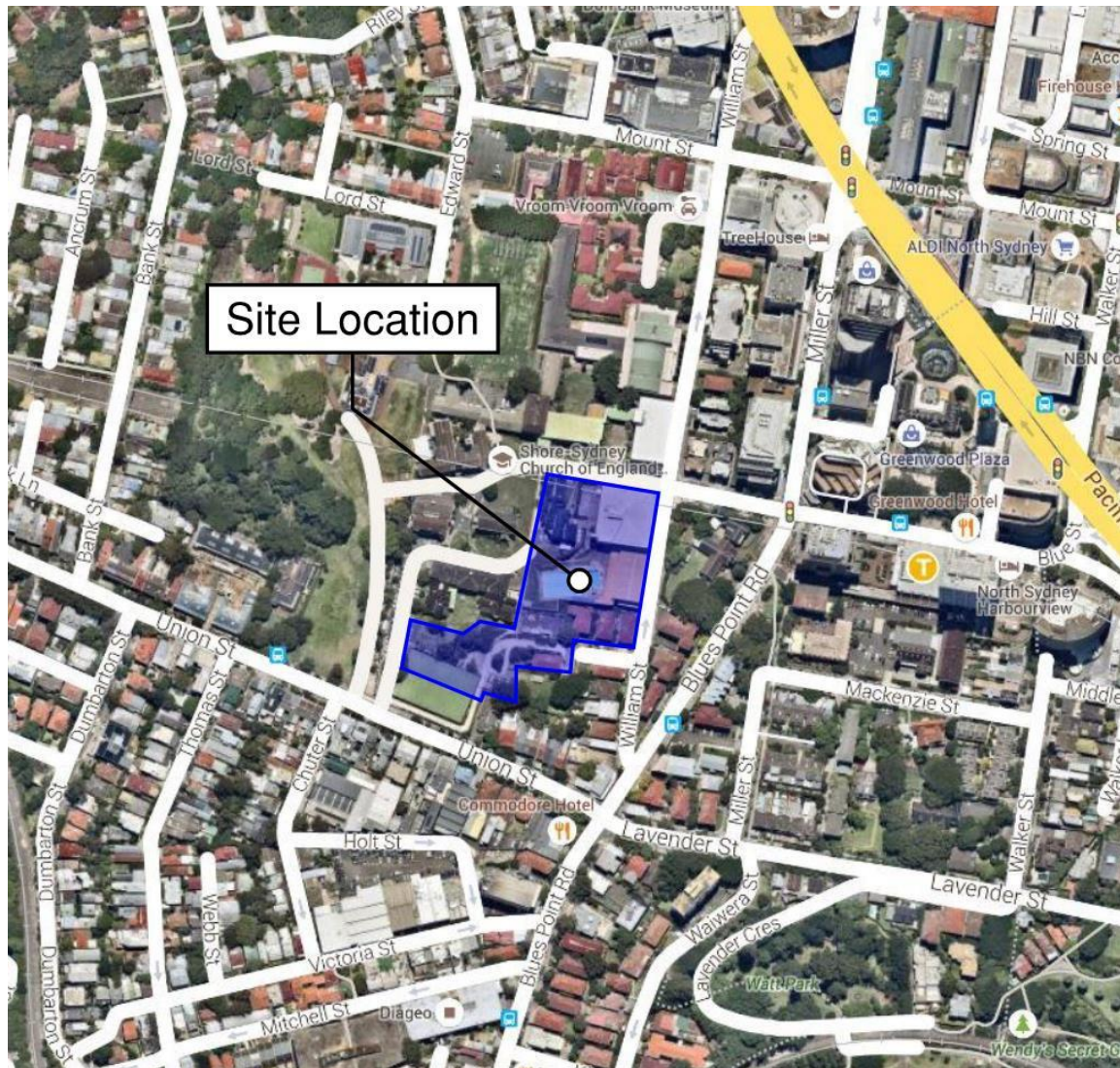


Figure 1: Site Location (Source: Nearmap)

5.2 Access to the Site

A pedestrian and vehicle access diagram has been prepared by Cox Richardson on the 21st of January, 2016. Refer to Figure 2.

Currently the primary pedestrian access to the site is via the school entrance on Blue Street adjacent to the site.

There is a pick up and drop off zone internal to the school along the southern boundary of the site near Hunter Crescent and Union Street. The zone is accessed by Union Street and Hunter Crescent. The Union Street entrance is one way only, while Hunter Crescent has an

entry and exit lane. The posted speed limit of this internal road is 5 kilometres per hour. Traffic movements are detailed in Figure 3.

Shore has advised that this drop off and pick up zone is used primarily by students within the preparatory school in years 5 and 6. Access to this zone is controlled by boom gates which allow access from 7am to 9am and 2:30pm to 5pm.

There is an additional drop off zone accessed from Edward Street for the preparatory school students. This will be unaffected by the works.

Primary vehicle access to the site is from Union Street at the southern boundary of the school.

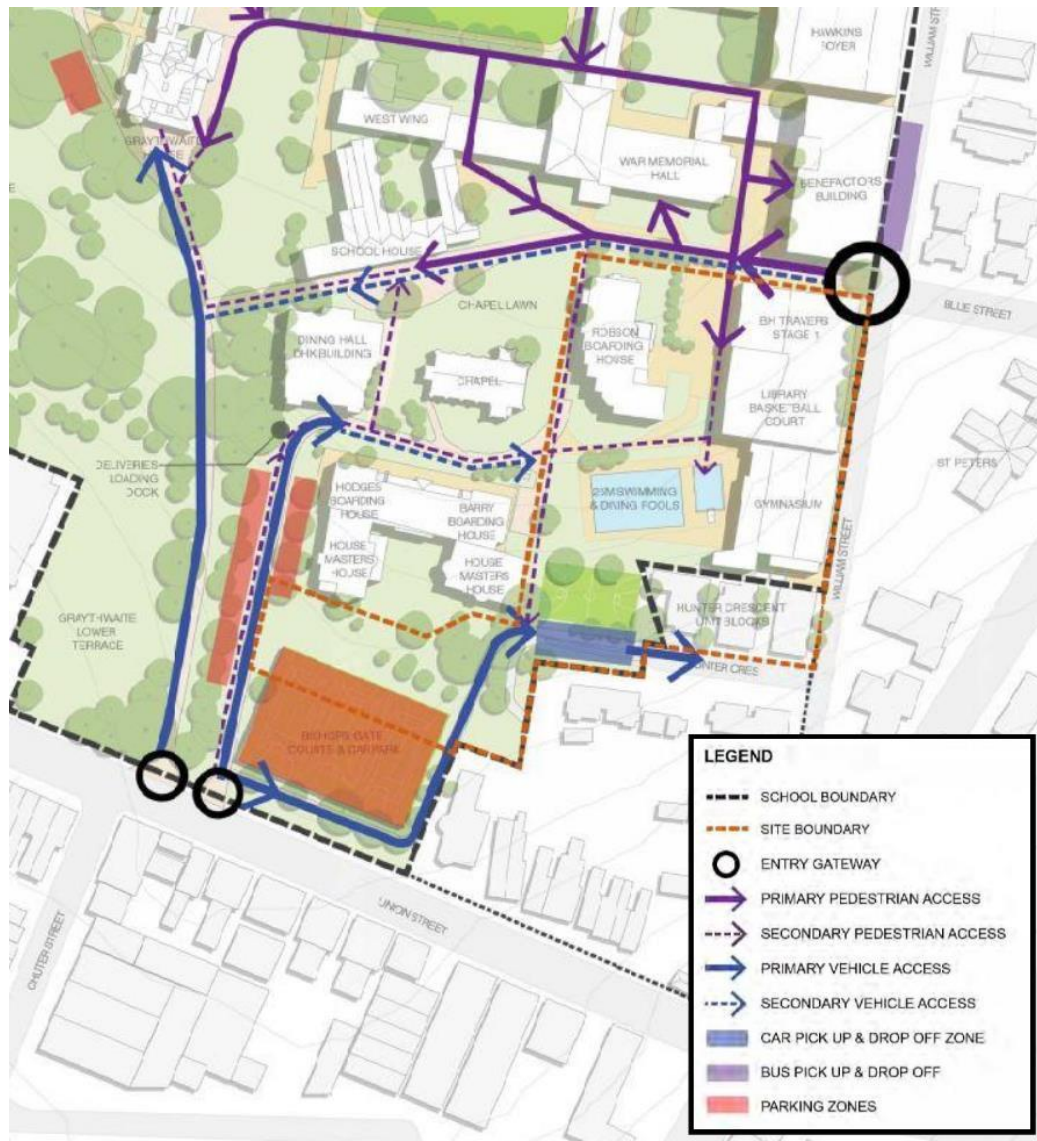


Figure 2: Pedestrian and Vehicle Access (Source: Cox Richardson, January 2016)



Figure 3: Drop Off/Pick Up Zone Internal Traffic Movements

5.3 Car Parking

There are three main parking areas located within the Campus accommodating 148 car parking spaces (refer to Figure 4):

- Centenary Car Park (50 spaces) which is restricted to staff and accessed via William Street in the north eastern corner of the Campus;
- Bishopsgate Car Park (68 spaces) located adjacent to Union Street, accessed by Gate 22 and restricted to staff;
- Unrestricted parking located near the entrance to Bishopsgate Car Park (23 spaces); and
- Parking located near the Graythwaite Building (6 visitor spaces and 1 caretaker space) which is accessed by Gate 1 on Union Street and used by staff and visitors.

Additionally, there are 41 spaces that have been approved as part of the recent Graythwaite Concept Plan. These have not yet been built and a further Development Application for detailed design (of the East Building) is required before construction can commence. If constructed, the spaces will be accessed by Gate 1 on Union Street.

Car parks that are restricted to staff only are accessed by remote controlled boom gates. Remotes are only issued to staff that are using these car parks. There is no parking provision for students within the School.

Shore has advised that the Centenary Car Park is open for use by visitors during events in the Smith Auditorium located above the car park. Bishopsgate Car Park is also available for use by visitors during weeknights and weekends.

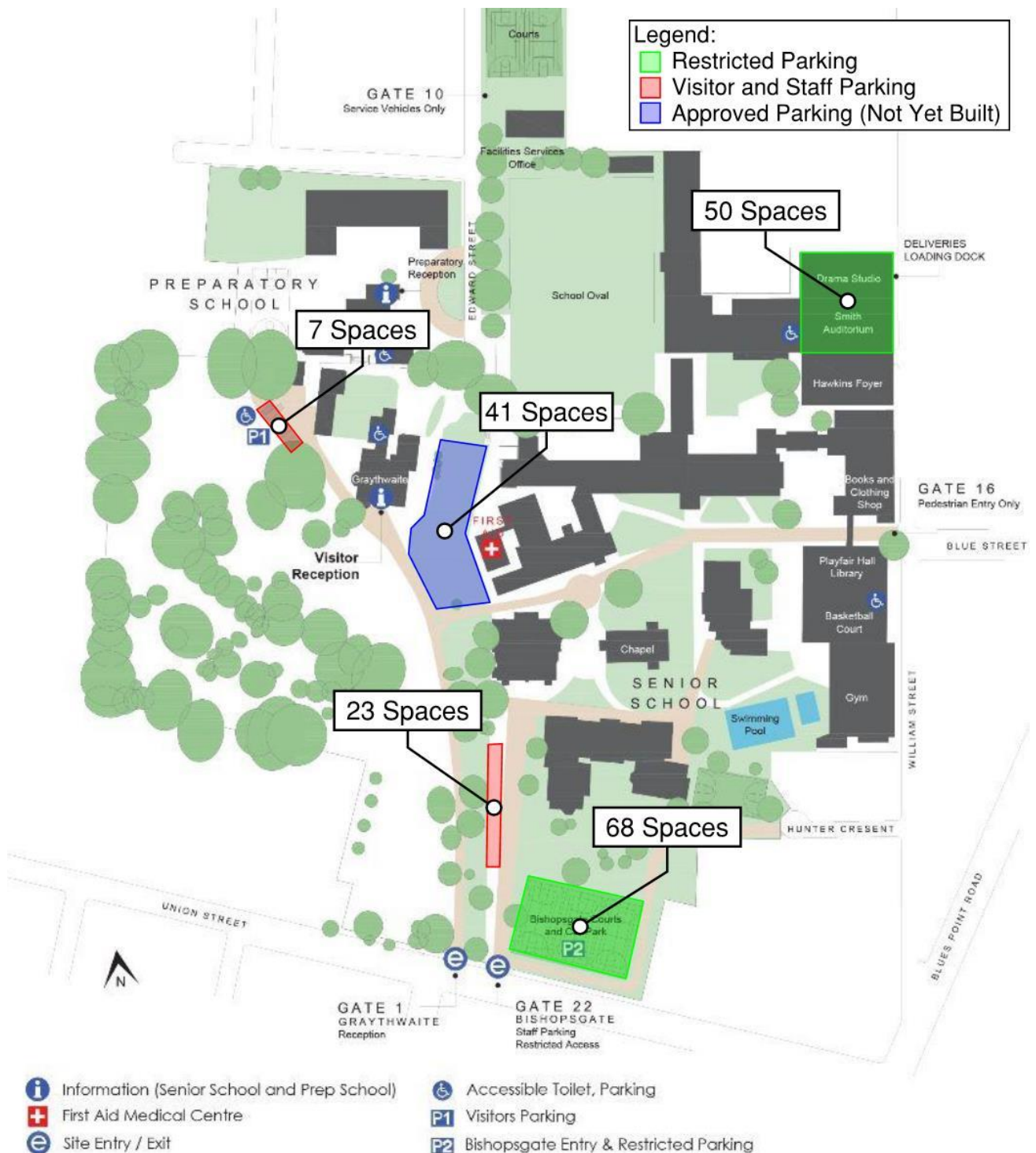


Figure 4: Off Street Parking Locations (Source: www.Shore.nsw.edu.au)

Limited short term parking spaces are available on surrounding streets to the school. According to the North Sydney Integrated Traffic and Parking Strategy 2015, metered parking is located on Mount Street, William Street and areas of Union Street.

5.3.1 Off Street Parking Demand

When considering the parking demand of the site there are a number of key factors to consider that are unique to Shore School. It is necessary for some staff to travel after

teaching hours between Shore's North Sydney and Northbridge campuses to coach sporting teams, resulting in a high rate of private vehicle use among staff.

Shore has advised that there are 14 resident staff members who currently live onsite to cater for students living within the campus. Since these staff members use the campus as a residency, there is a requirement for each of them to have a dedicated permanent parking space.

There are 6 visitor only spaces located outside of the Graythwaite Building. These spaces cannot be used by staff travelling to the school. There are also two restricted spaces for the school nurse and doctor.

5.4 Loading Access

Loading and service locations are at the following locations (refer to Figure 4):

- The maintenance building accessed via Gate 10 from Edward Street;
- A loading dock located in the Drama Theatre adjacent to William Street; and
- A loading dock located near the Dining Hall accessed via the Bishopsgate Car Park entrance from Union Street.

5.5 Active Travel

5.5.1 Pedestrian Movements

The pedestrian entrance into the school nearest to the site area is located at Gate 16 from Blue Street (as shown in Figure 4). This access point will be unaffected by the proposed development.

5.5.2 Cycling Facilities

The Campus is located near on-road cycling routes along Union Street, Blues Point Road, Lavender Street, Miller Street, Pacific Highway and Bay Road. Refer to Figure 5. The school does not provide any formal bicycle parking.

There are shower and change facilities currently within the school for use by cyclists. These facilities will be improved as part of the works.



Figure 5: Public Transport and Active Travel Network (Source: Shore Transport Access Guide)

5.6 Public Transport

5.6.1 Bus Services

There are five main bus stops serviced by Sydney Buses located near the site as shown in Figure 5. The route numbers servicing these bus stops are detailed in Table 2.

Table 2: Bus Services (Source: Shore Transport Access Guide)

Bus Stop	Bus Routes	Areas of Service	Frequency
A	265	McMahon's Point, Greenwich Wharf and Lane Cove	Every half hour during peak hours Every hour during off peak hours
B	265, 269	McMahon's Point, Kirribilli, Greenwich Wharf and Lane Cove	Every 15 minutes during peak hours Every half hour during off peak hours
C	168, 173, 183, 209, 227, 228, 230, 265, 287, 612X, 622, 653, E50, L78, L84	Balgowlah, Narrabeena, Narrabeen, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Ryde, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Dee Why and Mona Vale	Every 2 minutes during peak hours Every half hour during off peak hours
D	173, 209, 227, 228, 230, 265, 612X, 622, 653, E50, L87	Narrabeena, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Newport	Every 5 minutes during peak hours Every half hour during off peak hours
E	252, 254, 261, 343, 286, 287, 290, 622, 653, M20	Lane Cove West, Riverview, City, Northwood, Kingsford, Rosebery, Denistone East, Ryde, Epping, Dural, West Pennant Hills, Gore Hill, Redfern	Every 2 minutes during peak hours Every half hour during off peak hours

Additionally, there are two bus zones along the boundary of the Campus used by Shore:

- One is located along the southern kerbline of Mount Street between Edward Street and Wheeler Lane. This zone is used by Shore school buses transporting students from the North Sydney Campus to the Northbridge Campus. This restriction applies 10am to 4pm Monday to Saturday. This bus zone is used during the afternoon once on Monday and three times Tuesday to Thursday.
- The other is located on William Street along the western kerbline and to the north of the Blue Street entrance. This zone is operational between 2:30pm and 4pm during school days only. There are six bus services using this stop Monday to Thursday during the afternoon.

These school bus services are primarily used to transfer students to other locations for co-curricular activities such as sports practice at Shore's Northbridge campus.

5.6.2 Train Services

North Sydney Train Station is located approximately 160 metres walking distance to the east of the Campus. The station is serviced by the T1 North Shore and Northern Line connecting the Station to Central Station, Chatswood Station, Macquarie University and Hornsby. Train frequency is every 3 to 5 minutes during peak hours.

Waverton Train Station is located 800 metres to the north-west of the campus. It is also serviced by the T1 North Shore and Northern Line.

6.0 Proposed Development

6.1 Scope of Proposed Development

The Physical Education Centre is Stage 2 of the “B.H. Travers Project”. Stage 1 of the project was completed in May 2000 and involved construction of the B.H. Travers Centre located directly to the north of the proposed site. Stage 2 proposes the following:

- Demolition of the existing swimming pool and buildings located within the south-eastern corner of the school campus, as well as residential buildings located at 4 and 5 Hunter Crescent and 16 William Street.
- Construction of the new Shore Physical Education Centre including a 50 metre indoor swimming pool, a multipurpose sporting complex, additional classrooms, loading facilities and new car parking spaces.
- Additional open spaces, courtyards and landscaping.
- Alterations to Stage 1 of the BH Travers Development.
- An adjusted and expanded drop off facility, including revised circulation within the existing Bishopsgate Car Park drop off.

There is an expected increase of two additional staff as a result of the development, while student numbers within the school will remain unchanged.

6.2 Access to the Site

6.2.1 Student Pick Up and Drop Off

The existing drop off facility at Hunter Crescent will be improved as part of the works. An expanded drop off facility will be located above the dedicated carpooling spaces. To facilitate the revised drop off the current circulation will be reversed, with entry from Hunter Crescent and exit via Union Street. Refer to Figure 6 for the proposed vehicle and pedestrian circulation.

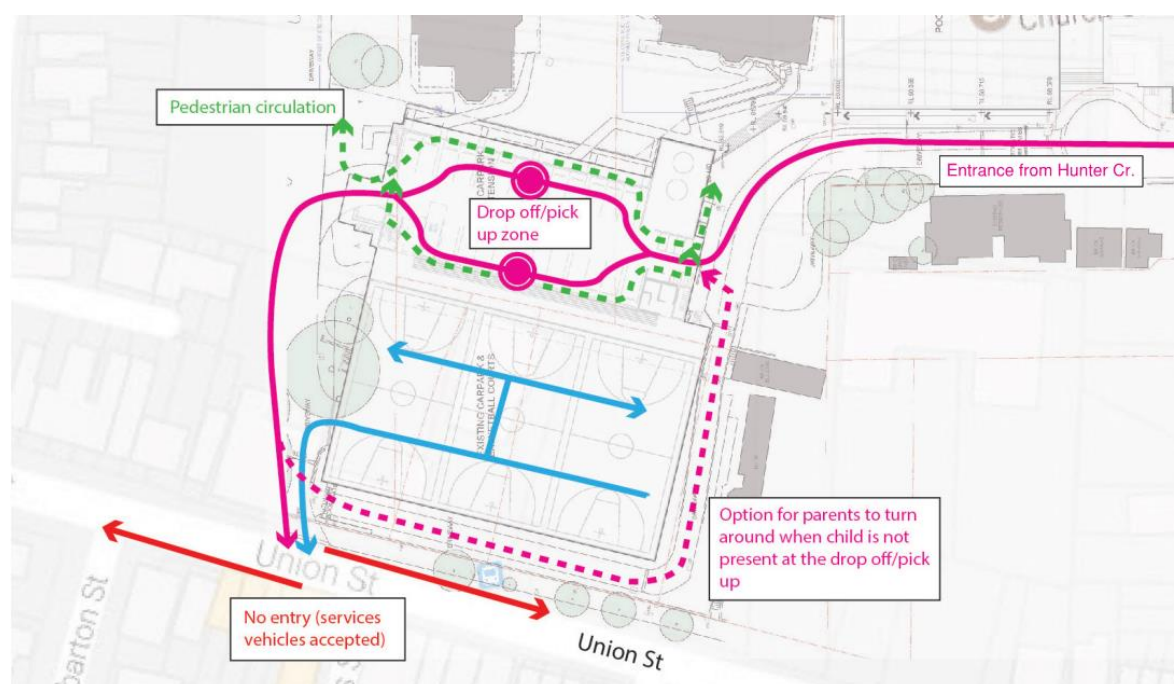


Figure 6: Proposed Circulation of Drop Off Facility (Source: Cox Richardson, February 2017)

The revised drop off will include provision for 8 vehicles to simultaneously drop off and pick

up students, with travelling lanes allowing for vehicles to continue through the drop off if their child is not present. The existing drop off facility will be used as an additional vehicle queueing area.

Pedestrian zones for students will be located to the north and south of the pick up and drop off locations, with pedestrian crossings located at the vehicle entry and exits. These pedestrian zones will connect to footpaths to the west and east of the drop off, leading into the School grounds.

Bollards are proposed adjacent to pedestrian zones and between the two travelling lanes. The location of these crossings and bollards will separate vehicular and pedestrian traffic and prevent students crossing the drop off areas. The pick up of students will continue to be supervised by a Shore staff member as in the existing situation. Refer to Figure 7 for the layout of the proposed drop off facility.

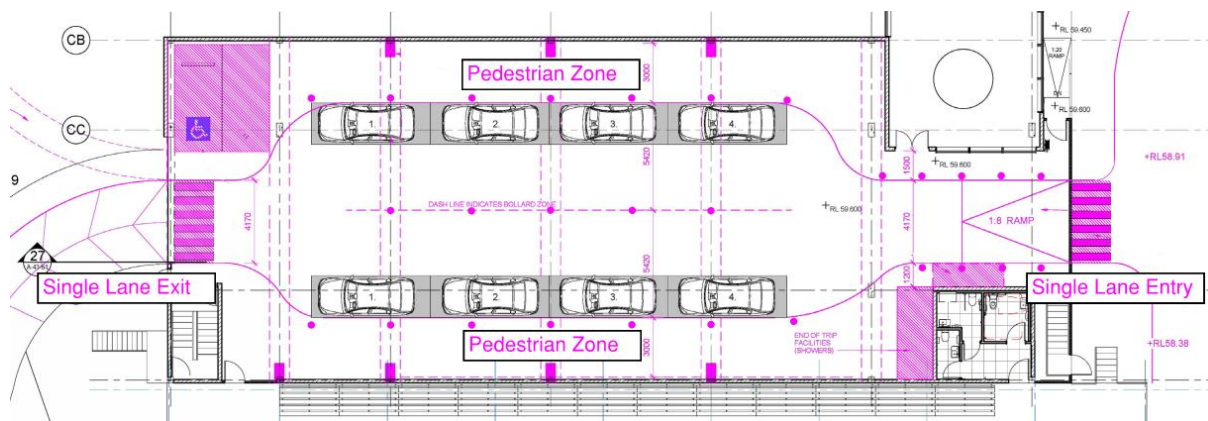


Figure 7: Internal Layout of Proposed Drop Off Facility (Source: Cox Richardson, February 2017)

6.2.2 Car Parking Access

To facilitate the proposed pick up and drop off facility, access to the existing staff car park (and proposed expansion) will be adjusted. Staff vehicles will be required to enter from Hunter Crescent and travel through the drop off zone to access the Bishopsgate Car Park. This allows the Union Street driveway to become exit only (service vehicles excepted), preventing any queuing within public roads.

It is not anticipated that staff using the Bishopsgate car park will experience queuing for car park access due to the following:

- Shore has advised that staff arrive prior to the drop off time for students. This is supported by the travel mode survey conducted by TTW in 2016 which found that 47% of staff arrive at Shore before 7:30am and 90% before 8am.
- Student drop off times in the morning are distributed evenly throughout the morning peak. Refer to Figure 8 for a comparison of student and staff arrival times.

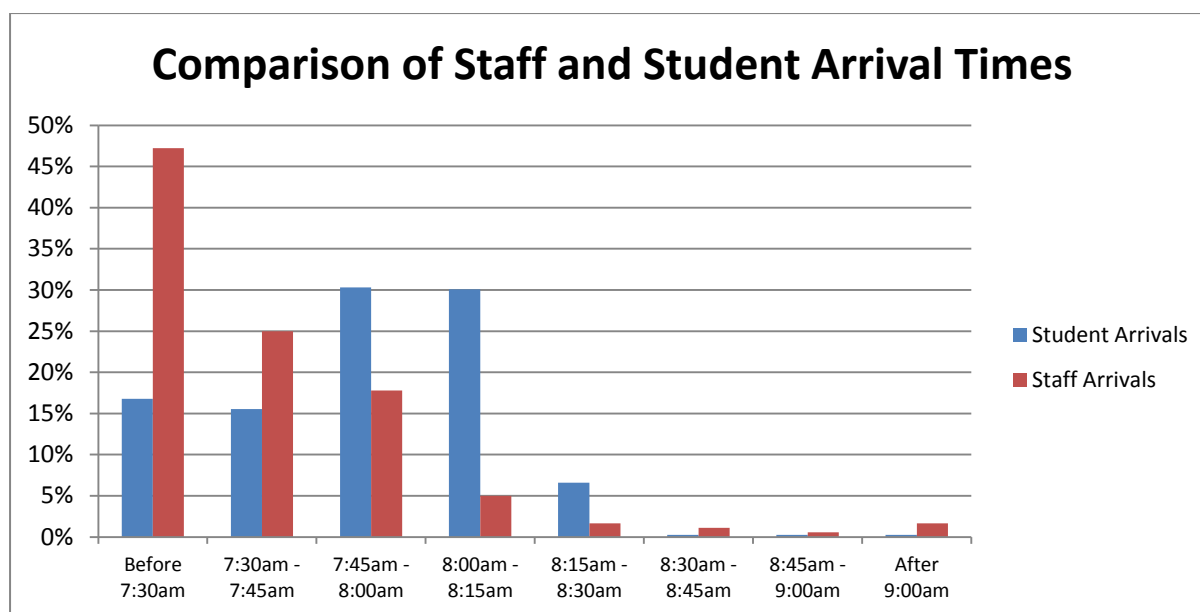


Figure 8: Student and Staff Arrival Times (Source: TTW Travel Mode Survey, November 2016)

- There are two through lanes within the drop off area to allow through movement of traffic while students are being picked up or dropped off.
- A queuing area separate to the pick up and drop off area is provided for vehicles whose child is not yet present. This will allow continual traffic flow within the through lanes of the pick up area and will prevent vehicles from queuing outside of the designated queue area.

6.3 Parking

6.3.1 Private Vehicle Parking

Shore has advised there are 257 full time and 72 part time staff members. This results in a total number of staff equal to 329. As discussed in Section 4.2.1, off street parking for educational establishments is to be provided at a rate of 1 space per 6 staff members. As the development results in an increase of 2 staff members, there will be a total of 331 staff post development. This results in a maximum allowable parking provision of 55 spaces in accordance with the DCP.

As part of the development the 23 non-compliant spaces located along the Bishopsgate driveway will be relocated into an extension of the existing Bishopsgate Car Park and the proposed loading area located on the Ground Floor of the Physical Education Centre. As a result the parking provision within Shore will remain the same both pre and post development.

The proposed car parking spaces will be restricted to staff and visitors Monday to Friday as advised by Shore. It is assumed that these additional spaces will be occupied by existing staff who currently are unable to park within the school grounds and those who are currently using the 23 non-compliant spaces that will be lost as a result of the development. During the weekend, these spaces will also be used by those involved in sporting events within the school. These events will occur largely outside of peak hours.

The proposed development includes 22 dedicated carpooling spaces. These spaces will be located within the Bishopsgate Car Park extension and will be secured by boom gates. Staff who have committed to carpooling with others would receive access via swipe card to these secured spaces. As an added incentive the location of these spaces has been chosen closest to the School's main pedestrian walkways.

The proposed extension to Bishopsgate Car Park will have access and egress points at the existing Gate 22 entrance and the Hunter Crescent access point. The additional spaces underneath the Physical Education Centre will be accessed by Hunter Crescent.

The school continues to encourage students to use the public transport network by restricting onsite parking to staff and visitors. This combination of public transport use by students and onsite parking for staff and visitors minimises the impact of staff related parking on the surrounding residential streets while still encouraging public transport use. Public transport is encouraged by the school through the provision of a current Green Travel Plan which can be found in Appendix A.

6.3.2 Motorcycle Parking

As discussed in Section 4.2.1, there must be 1 motorcycle space per 10 car parking spaces or part thereof according to North Sydney Council's DCP. A total of 6 motorcycle spaces have been provided within the car park extension.

6.3.3 Disabled Parking

As discussed in Section 4.2.1, 1 to 2% of non-residential car parking spaces need to be designated for the disabled. This results in 1 to 2 disabled spaces required as part of the works. There is a provision of 2 disabled spaces as part of the works.

6.4 Active Travel

The School has a current Green Travel Plan prepared by TTW in February 2017. The plan covers detailed strategies to encourage walking, cycling, public transport and carpooling for travel to and from Shore School. These methods all support sustainable travel. The Plan is current and therefore contains the proposed works. This Plan is attached in Appendix A.

6.4.1 Pedestrian Movements

Primary pedestrian access to the site is proposed to be via the existing Senior School central driveway. Pedestrians can access this area from the existing Blue Street entrance to the school.

The development is likely to improve pedestrian amenity by providing a new pedestrian pathway from Blue Street to Hunter Crescent. This pathway will be between the proposed swimming pool and Multipurpose Sports Building.

Footpaths and pedestrian zones will be added to support the revised drop off facility. Refer to Section 6.2.1 for further details about the pedestrian facilities adjacent to the drop off area.

Pedestrian pathways surrounding the school will not be affected by the proposed works.

6.4.2 Cyclist Facilities

The site is located near on-road cycle ways as discussed in Section 5.5.2. No works are proposed that will affect cyclist access to the school as the proposed works are contained within the school boundary.

Bicycle parking rates are to follow 3% of staff. As discussed in Section 6.2, there will be 331 staff working at the school post development. This results in a requirement of 8 bicycle parking spaces across the Shore Campus.

The proposed development will include an additional 8 bicycle parking spaces located within the Bishopsgate Car Park extension as indicated on floor plans of the extension produced by Cox Richardson dated 10th of February, 2017. Due to the nature of the development, numerous change rooms, showers and lockers will be provided within the Physical Education Centre and the extension of the Bishopsgate Car Park.

As discussed in Section 4.2.1, North Sydney Council's DCP requires 1 locker per bicycle parking space and 1 shower and change cubicle for up to 10 spaces. Therefore the proposed facilities will exceed the DCP requirements.

6.5 Public Transport

As discussed in Section 5.6, the site is located in an area of high frequency public transport which will be unaffected by the proposed works.

Shore has developed a Green Travel Plan and Transport Access Guide to encourage public transport usage to the school and active travel modes. These can be found in Appendices A and B.

6.6 Traffic Impact of the Development

It is expected that the proposal will not increase the number of vehicles on the surrounding road network. The reasons for this are as follows:

- Given the baseline that this development will have a minimal effect on staff numbers and no effect on student numbers, there is little additional traffic generated by the development.
- According to the travel survey conducted by TTW in November 2016, approximately 34% of those travelling to the school (combining students and staff) do so by car. This is a relatively low rate of private vehicle usage and is likely due to the extensive public transport network near to the school. Shore has updated their Green Travel Plan which aims to further decrease private vehicle usage (see Appendix A).
- The proposed development is wholly contained within the school boundary and as such will have no road closures or road changes external to the campus.

6.6.1 Revised Pick Up and Drop Off Facility

The alternate access and egress arrangement of the pick up and drop off facility and Bishopsgate car park will result in different vehicular routes to the school as shown in Figure 9.

The adjustment of these routes will result in changed traffic conditions around the site, particularly at the following intersections:

- William Street and Blues Point;
- William Street, Union Street and Lavender Street; and
- Hunter Crescent and William Street.

This adjustment of routes will result in minor impacts. For further details about the SIDRA modelling results refer to Section 7.3.



Figure 9: Comparison of Existing and Proposed Vehicular Routes

6.6.2 Peak Demand Activities

A meeting was held with Transport for NSW (TfNSW) on the 4th of May 2016 to consult the project. Shore advised that the largest event held within the campus is School Speech Day. As there is only an increase of two staff members, no increase in student numbers and there is no proposed change to the operation of School Speech Day as a result of the development, it can be assumed that the effect on the transport network of this peak demand activity will be unchanged.

Shore has also advised that other key demand activities include careers night and Basketball games during Saturdays. These activities are accommodated by the road network currently and it is expected that the proposed development will have limited impact on the anticipated traffic generation.

The School will also hold swim meets in the proposed development. These meets will be held for the Senior and Preparatory School and will occur on Fridays during the first school term, between 5:00pm and 7:00pm. As these will occur in the afternoon, many staff will have left the premises and parking will be available within the Bishopsgate Car Park. It is anticipated that 200 spectators will attend each of these swim meets and the parking demand generated will be largely met by the existing facilities at the School.

Currently, visitors arriving to Shore as part of the School Speech Day require use of overflow parking located on grassed areas within the Campus. Visitors during other peak activities typically use off street parking areas.

6.7 Loading Areas

Additional onsite loading facilities are proposed as part of the development. There will be a loading dock located within the Ground Floor of the Multipurpose Sporting Complex which will be accessed by Hunter Crescent. The location of this area is shown in Figure 10.

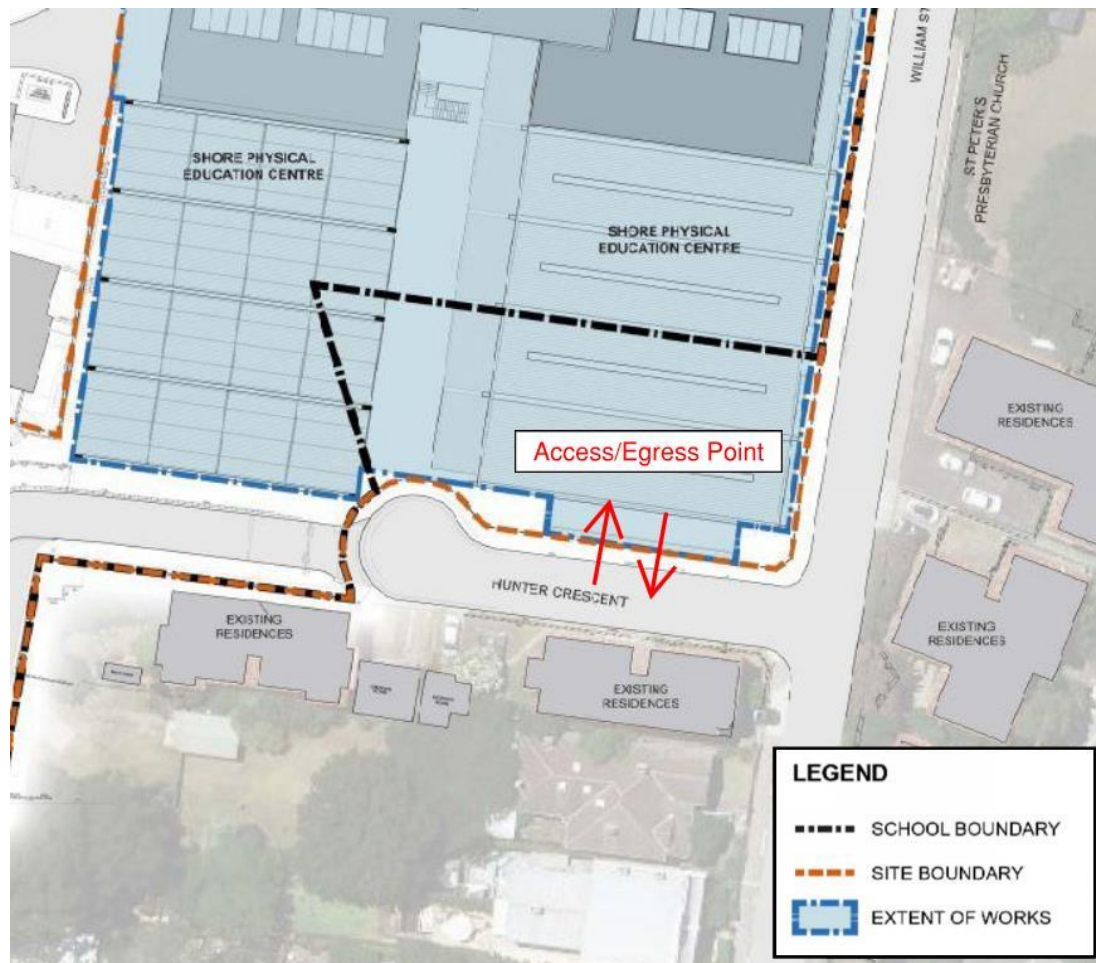


Figure 10: Proposed Loading Facility Access Point (Source: Cox Richardson Site Plan, January 2016)

It is anticipated that the number of deliveries and size of vehicles will not change significantly as a result of the development.

6.8 Construction Access

A draft Construction Traffic Management Plan (CTMP) has been prepared for the project and can be seen in Appendix C. A detailed and final CTMP will need to be prepared and approved prior to construction once a builder has been appointed and details are known about the staging of works.

7.0 Intersection Operation

The term “level of service” for road capacity has been defined by Austroads as: “A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and or passengers”. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. In general there are six levels of service designated from A to F, with level of service A representing the best operating conditions (free flow) and level of service F the worst (forced or breakdown flow).

One-way hourly volumes for urban roads during peak hours and recommended level of service are shown in Table 3.

Table 3: Urban Road Peak Hour Flows per Direction (Source: RMS Guidelines 2002)

Level of Service	One Lane (vehicles/hour)	Two Lanes (vehicles/hour)
A: Good operation	200	900
B: Good operation	380	1400
C: Satisfactory	600	1800
D: Poor, but manageable	900	2200
E: At capacity	1400	2800

7.1 Traffic Count Survey

An existing traffic count was completed on Thursday the 7th of April, 2016 of the main three approach intersections near the school (see Figure 11):

- Blue Street and William Street
- Union Street and Chuter Street
- William Street and Hunter Crescent

It is important to note that the traffic count survey was undertaken on the final day of the school term. This represents the worst case scenario as an additional 150 full time boarding students of the school were departing the school grounds during the afternoon peak.

An additional traffic count was completed on Thursday the 9th of February, 2017 of the three main intersections that will be affected by the revised drop off (see Figure 11):

- Blues Point Road and William Street
- Blues Point Road, Union Street and Lavender Street
- The existing Bishopsgate Driveway entrance

The two surveys identified traffic and pedestrian volumes in 15 minute time periods for the given intersections and identified both the AM and PM demand peaks. From these counts, traffic volumes for AM and PM peak hours were found. These peak hours are detailed in Table 4.

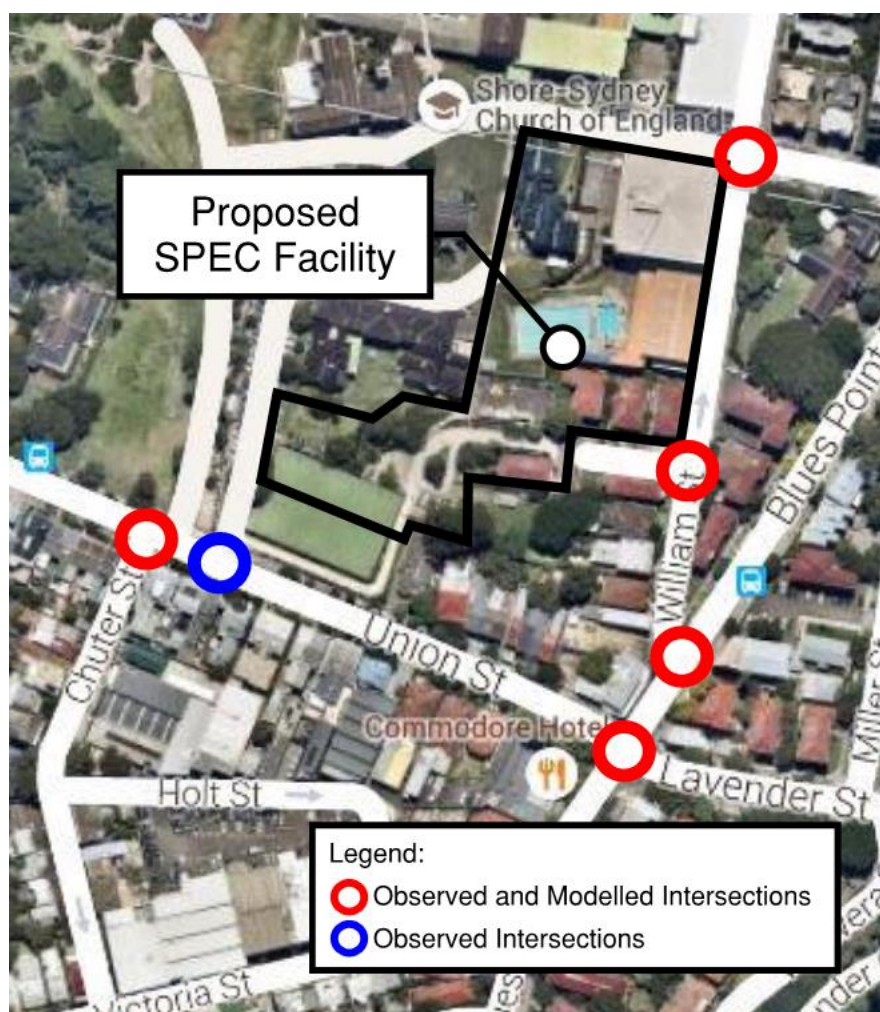


Figure 11: Main Approach Intersections

Table 4: Peak Hours of the Observed Intersections

Intersection	AM Peak Hour	PM Peak Hour
Blue Street & William Street	7:30-8:30am	3:00-4:00pm
Union Street & Chuter Street	8:00-9:00am	3:00-4:00pm
William Street & Hunter Crescent	7:45-8:45am	3:00-4:00pm
Blues Point Road & William Street	8:00-9:00am	4:30-5:30pm
Blues Point Road, Union Street & Lavender Street	8:00-9:00am	5:00-6:00pm
The existing Bishopsgate Driveway entrance	6:45-7:45am	3:00-4:00pm

7.2 Pre Development Modelling

Satisfactory operation of an intersection would normally continue up to 42 seconds average delay per vehicle. At this Level of Service (LoS), operating speeds are still reasonable and acceptable delays are experienced. The recommended criteria for evaluating capacity of intersections are shown in Table 5.

Table 5: Criteria for Evaluating Capacity of an Intersection (Source: RMS Guidelines 2002)

Level of Service	Average Vehicle Delay (sec)
A: Good operation	Less than 14
B: Good with acceptable delays	28-42
C: Satisfactory	43-56
D: Operating near Capacity	57-70
E: At capacity	Over 70

Sidra is a software package that models an intersection to determine how well it is performing under its demand. Its results take into account traffic volumes, pedestrian volumes, lane geometry, sign control and the nature of the intersection.

Sidra modelling was undertaken to determine the existing performance of the network at the three main approach intersections near the school in both the AM and PM peak. Existing traffic and pedestrian volumes were sourced from the traffic count survey conducted in April 2016.

Modelling results indicate that the intersections currently operate at a high level of service as detailed in Table 6. The average vehicle delays for all three intersections during peak hours are less than 3 seconds.

Table 6: Pre Development SIDRA Modelling Results for the Main Approach Intersections

Intersection	Peak	Level of Service	Average Vehicle Delay (sec)
Blue Street & William Street	7:30-8:30am	A	2.9
	3:00-4:00pm	A	2.8
Union Street & Chuter Street	8:00-9:00am	A	0.6
	3:00-4:00pm	A	0.3
William Street & Hunter Crescent	7:45-8:45am	A	0.1
	3:00-4:00pm	A	0.9
Blues Point Road & William Street	8:00-9:00am	A	0.4
	4:30-5:30pm	A	0.3
Blues Point Road, Union Street & Lavender Street	8:00-9:00am	A	12.8
	5:00-6:00pm	A	12.2

7.3 Post Development Modelling

7.3.1 Trip Generation and Distribution

The revised drop off location will redirect traffic currently accessing the Bishopsgate Car Park to a different travel route as discussed in Section 6.6.1. To determine the trip distribution and vehicles that will be travelling on this route, the following assumptions have been made:

- As parking spaces are being relocated from the Bishopsgate driveway entrance to the Car Park extension, users of these spaces will remain the same. Therefore the number of vehicles accessing the Hunter Crescent driveway will be equal.
- The peak hour volumes entering into and exiting the car park will remain the same post development. This assumption has been made as there is no expected increase in student numbers as a result of the development. The existing numbers are as detailed in Table 7.

Table 7: Vehicles Accessing the Existing Driveway

Traffic Movement	AM Peak Volumes	PM Peak Volumes
Right from Union Street into the driveway	52	9
Left from Union Street into the driveway	24	44
Left out of the driveway onto Union Street	15	38
Right out of the driveway onto Union Street	0	6

- Staff, students and visitors accessing the drop off facility will do so by the following two routes:
 - Route 1: A left turn from Union Street onto Blues Point Road, followed by a left turn onto William Street, followed by a left turn onto Hunter Crescent and entry into the drop off.
 - Route 2: A right turn from Blues Point Road onto William Street, followed by a left turn onto Hunter Crescent

Following the current vehicular movements and with consideration to the current left in only restriction for the drop off facility, it can be assumed that approximately 80% of vehicles will use Route 1. This is reinforced by staff and student residence data provided to TTW by Shore.

- Staff, students and visitors leaving the drop off facility will do so by the following two routes:
 - Route 3: Left turn onto Union Street, followed by a left turn onto Blues Point Road.
 - Route 4: Right turn onto Union Street.

Following the current vehicular movement pattern it can be assumed that approximately 85% of those exiting the car park in the afternoon will do so following

Route 3.

- Of those entering the driveway during the AM peak hour, 50% are drop offs that will continue to exit the car park within the hour. During the afternoon 80% of traffic entering the driveway will exit within the hour.
- Although the peak hours of the driveway entrance do not align with the peak hours of the impacted intersections, to be conservative these additional volumes have been added to the peak hours of each intersection.
- Only the weekday peak hours have been modelled as any additional traffic generated by the development during weekends will be largely outside of peak hours. Given the current high performance of these intersections during the weekday peak it is expected that the level of service of these intersections will continue to operate sufficiently during the weekend.

The assumed trip distribution to the drop off facility and Bishopsgate Car Park is summarised in Figure 12.

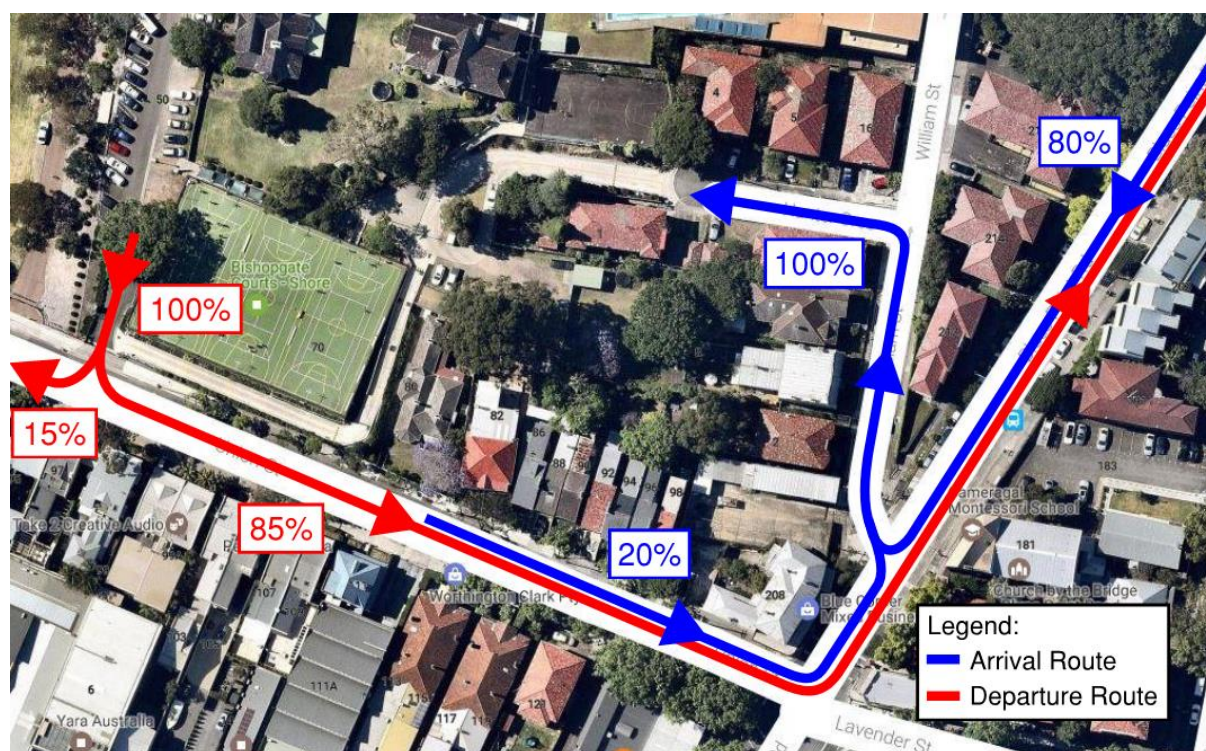


Figure 12: Trip Distribution

7.3.2 Modelling Results

The trip generation of the car park was applied to the travel route distribution and added to the existing peak hours of the intersections impacted by the change in access and egress. The resultant levels of service and average vehicle delays as well as a comparison with the existing condition are detailed in Table 8. As shown by the SIDRA results, the change in access can be accommodated by the existing road network, with the intersections still operating at a high level of service in the post development condition.

Table 8: Post Development SIDRA Modelling Results for the Main Approach Intersections

Intersection	Level of Service	Average Vehicle Delay (sec)	Change in Average Vehicle Delay from Existing (sec)
Blues Point Road & William Street	A	0.8	+ 0.4
	A	0.6	+ 0.3
Blues Point Road, Union Street & Lavender Street	A	12.9	+ 0.1
	A	12.3	+ 0.1

A sensitivity analysis was conducted to determine possible impacts if there is increased use of the drop off facility following its improvement. To be conservative the projected volumes were doubled and distributed onto the network. The intersections continued to operate at a high level of service "A". Table 9 provides a summary of the expected impacts both post development and with doubling the projected traffic volumes.

Table 9: Comparison of SIDRA Modelling Results

Intersection	Existing Average Vehicle Delay (sec)	Post Development Average Vehicle Delay (sec)	Sensitivity Analysis Average Vehicle Delay (sec)
Blues Point Road & William Street	0.4	0.8	1.0
	0.3	0.6	0.8
Blues Point Road, Union Street & Lavender Street	12.8	12.9	13.6
	12.2	12.3	13.2

8.0 Conclusions

This report has outlined the impacts of the Shore Physical Education Centre within a transport and accessibility framework and addressed the SEARs issued on the 10th of March 2016. It is anticipated that the number of students within the campus will not change and there will be an additional two staff members as a result of the development.

It is proposed that there be 23 relocated car parking spaces as a result of the development. This results in no net increase in parking provision onsite. Shore has advised that the parking provided by the development will be restricted for use by existing staff and visitors during the week. During weekends those using sporting facilities at the school will also be able to occupy the spaces. As part of the development 22 secured access carpooling spaces will be located within the Bishopsgate car park. This aligns with sustainable travel measures detailed within Shore's current Green Travel Plan.

The development will improve the current pick up and drop off facility by providing an increase in temporary drop off and pick up spaces and queuing areas available. To facilitate this pick up and drop off, the current access and egress arrangements will be modified. Entry will occur from Hunter Crescent and exit via Union Street. The Bishopsgate driveway will be restricted to exit only excluding service vehicles.

There are no proposed changes to pedestrian and cyclist access around the extent of the Shore school boundary. Within the school, pedestrian amenity is expected to increase with an improved north-south pedestrian pathway from Blue Street to Hunter Crescent. Cyclist end use facilities such as showers, lockers and change rooms will be improved as a result of the proposed development.

The Campus is well serviced by public transport with many routes and services. Shore school has a current Green Travel Plan and Transport Access Guide both prepared in 2017. These have been updated to include the proposed works.

As there is a minimal increase in staff, no increase in student numbers and no increase in the number of parking spaces, there will be negligible traffic generation as a result of the development. SIDRA modelling of the main approach intersections to the site indicated that the surrounding road network is currently operating at a high level of service during peak times. Intersections impacted by the revised access to the car park and drop off facility were also modelled with the expected resultant increase in traffic volumes. Additionally, a sensitivity analysis was also conducted by doubling the expected traffic distribution. Modelling indicated that the intersections would continue to operate at a high level of service "A" in both scenarios.

An additional loading facility accessed via Hunter Crescent is proposed as part of the works. It is anticipated that the number of deliveries and size of vehicles will not change significantly as a result of the development.

A Preliminary Construction Traffic Management Plan has been prepared for the site. This plan has considered the movements required by construction vehicles as well as the movement of pedestrians and cyclists around the site. This plan will need to be finalised once a contractor is engaged and the staging of works is decided

Prepared by
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



GRACE CARPP
Traffic Engineer

Authorised By
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



PAUL YANNOULATOS
Technical Director

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Appendix A

Shore Green Travel Plan

Green Travel Plan

Shore School

Prepared for Shore School / 17nd February, 2017

141522 UTA

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Revision Register

Rev	Date	Prepared By	Approved By	Remarks
0	14/12/16	MB	PY	Draft
1	16/12/16	MB	PY	For issue
2	17/02/17	MB	PY	Following revised drop off access

1 Introduction

1.1 Background

This Green Travel Plan has been prepared by Taylor Thomson Whitting (TTW) for the Sydney Church of England Grammar School (Shore) as part of the proposed development of the Shore Physical Education Centre (SPEC).

A Green Travel Plan is a way to manage the transport needs of staff, students, contractors, volunteers, and visitors of the proposed development. The aim of the Plan is to reduce the environmental impact of travel to and from the development and it typically includes support for walking, cycling, public transport and car sharing, while reducing dependence on private vehicles and parking.

A previous Green Travel Plan was developed for the School in April 2014 as part of the Concept Plan and Stage 1 Project Application for the Graythwaite development (previous initiatives listed in Appendix B). This Plan reviews and updates the previous Green Travel Plan, including an updated travel mode survey and proposed target mode shares. This allows for identification of any changes in travel patterns and allow for further recommendations based on the findings of the survey.

1.2 Objectives

This Plan has been formulated in response to the Department of Planning and Environment Requirements dated the 5th of September 2016 (reference number SSD 7507).

This Green Travel Plan aims to reduce the environmental impact of travel to and from the School through recommendations of programs to encourage walking, cycling and public transport use. This Plan considers the School as a whole, including the Shore Physical Education Centre (SPEC), which is expected to result in an increase of two full-time staff and no change to the student population.

This document is divided into sections as follows:

- Section 1 details the background and benefits of the Green Travel Plan.
- Section 2 outlines existing conditions of the site including available travel modes.
- Section 3 outlines the expected existing travel modes to the site.
- Section 4 details recommendations to reduce the impact of travel to and from the site.

1.3 Green Travel Plan Benefits

The aim of this Plan is to encourage active and sustainable travel behaviours. Environmental and social benefits commonly result from Green Travel Plans.

1.4 References

- NSW Premiers' Council for Active Living – Workplace Travel Plan
- Green Travel Plan for Shore School (GTA Consultants, 22 April 2014)
- Shore Physical Education Centre Environmental Impact Statement (14 July 2016)
- Department of Planning and Infrastructure Guidelines for Walking and Cycling

2 Existing Conditions

2.1 Site Location

Shore School's North Sydney Campus is located on Blue Street, North Sydney. The School contains frontages to William Street, Mount Street, Edward Street, Lord Street, Union Street and Hunter Crescent. Refer to Figure 1 for the location of the School within the local road network. Note that this figure includes residential land at 4 and 5 Hunter Crescent and 16 William Street, which will form part of the School's campus post development of the proposed SPEC.



Figure 1: Site Location

2.2 Active Transport

2.2.1 Pedestrian Facilities

The Campus has five entry gateways located along the school boundaries. Of these entries, three are designated pedestrian entry points. One is along the eastern boundary located at the conclusion of Blue Street, one at the northern boundary accessed via Mount Street, and the other at the western entry bounded by Edward Street.

Pedestrian paths are provided along each of the frontages to the School and along the routes between the Campus and North Sydney Station. The pathway to the Station includes a pedestrian crossing at William Street and signalised intersections for pedestrian priority for students and staff.

2.2.2 Bicycle Facilities

The Campus is located near on-road cycling routes along Union Street, Blues Point Road, Lavender Street, Miller Street, Pacific Highway and Bay Road. Refer to Figure 2 for the active travel and public transport networks around the School. The School provides bicycle parking within its grounds in the form of inverted U-rails. Space for an additional 8 bicycles will be included in the expansion of the Bishopsgate Car Park, with space available for future expansion if demand requires.

There are shower and change facilities currently within the school for use by cyclists. These will be improved as part of the development of the SPEC.

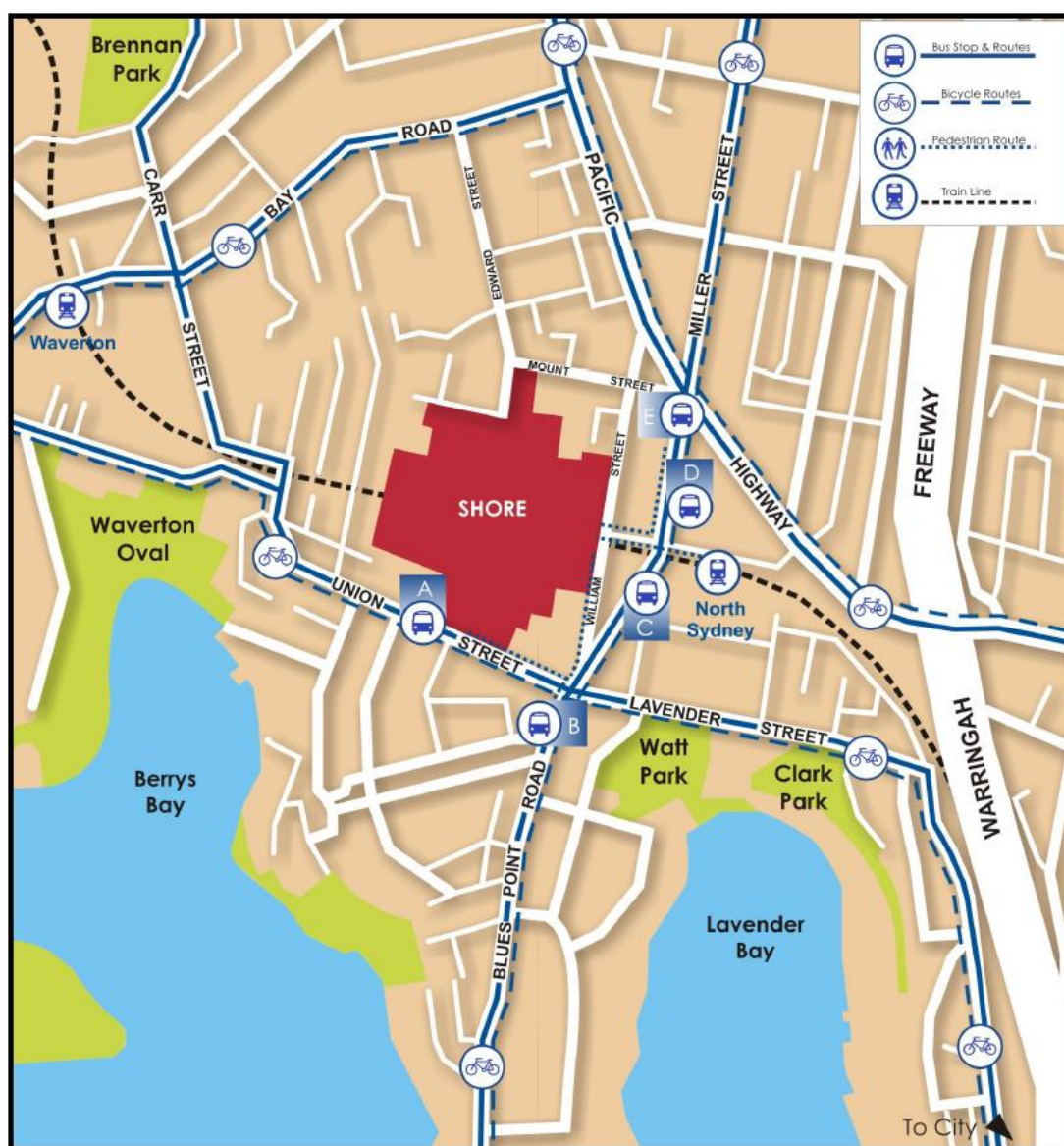


Figure 2: Active Travel and Public Transport Facilities

2.3 Public Transport

2.3.1 Bus Services

There are five main bus stops serviced by Sydney Buses located near the site as shown in Figure 2. The route numbers servicing these bus stops are detailed in Table 1.

Table 1: Bus Services

Bus Stop	Bus Routes	Areas of Service	Frequency
A	265	McMahon's Point, Greenwich Wharf and Lane Cove	Every half hour during peak hours Every hour during off peak hours
B	265, 269	McMahon's Point, Kirribilli, Greenwich Wharf and Lane Cove	Every 15 minutes during peak hours Every half hour during off peak hours
C	168, 173, 183, 209, 227, 228, 230, 265, 287, 612X, 622, 653, E50, L78, L84	Balgowlah, Narrabeena, Narrabeen, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Ryde, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Dee Why and Mona Vale	Every 2 minutes during peak hours Every half hour during off peak hours
D	173, 209, 227, 228, 230, 265, 612X, 622, 653, E50, L87	Narrabeena, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Newport	Every 5 minutes during peak hours Every half hour during off peak hours
E	252, 254, 261, 343, 286, 287, 290, 622, 653, M20	Lane Cove West, Riverview, City, Northwood, Kingsford, Rosebery, Denistone East, Ryde, Epping, Dural, West Pennant Hills, Gore Hill, Redfern	Every 2 minutes during peak hours Every half hour during off peak hours

There are also two bus zones located along the boundary of the Campus for use by students travelling to after-school activities, sport, excursions, camps etc.:

- Along the southern kerbline of Mount Street between Edward Street and Wheeler Lane. This zone is used by Shore School buses transporting students from the North Sydney Campus to the Northbridge Campus for training for the School's co-curricular sporting programs. This designated bus zone is used by Shore during the afternoon once on Mondays and three times Tuesday to Thursday.
- On William Street along the western kerbline and to the north of the Blue Street entrance. During the afternoon Monday to Thursday there are six school bus services using this stop. Buses that use this zone are transporting students to after-school training as part of the School's co-curricular sporting programs.

2.3.2 Train Services

North Sydney Train Station is located approximately 160 metres walking distance to the east of the Campus. The station is serviced by the T1 North Shore and Northern Line connecting the Station to Central, Chatswood, Macquarie University and Hornsby Stations. Train frequency is every 3 to 5 minutes during peak hours.

Waverton Train Station is located 800 metres to the north-west of the Campus. It is also serviced by the T1 North Shore and Northern Line.

2.4 Car Share Services

North Sydney Council supports car share spaces provided by GoGet and Popcar. There are a number of GoGet car share spaces located near to the Campus (refer to Figure 3).

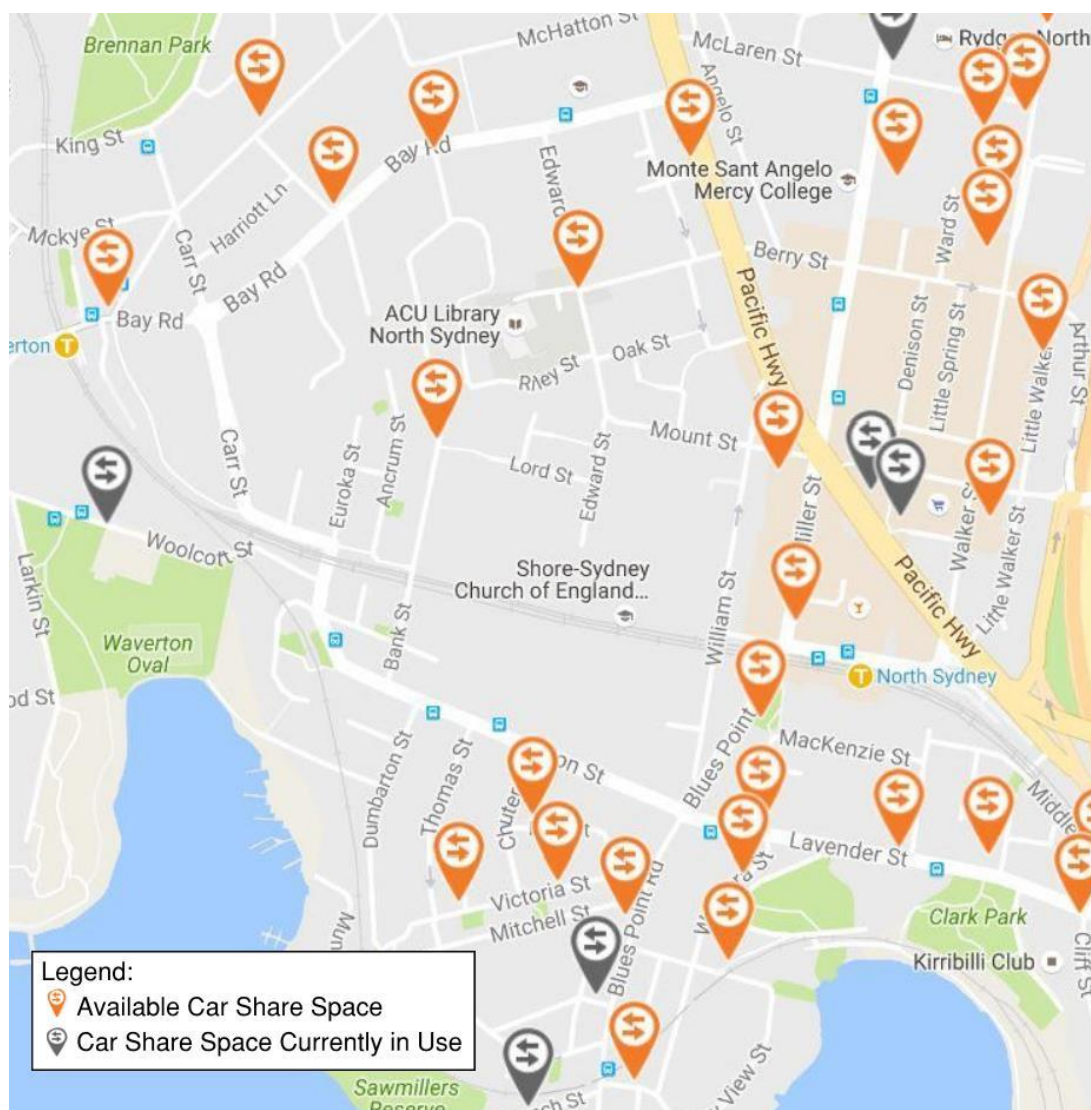


Figure 3: Car Share Services

2.5 Car Parking

2.5.1 On-Street Parking

Limited short-term parking spaces are available on surrounding streets to the School. Metered parking is located on Mount Street, William Street and areas of Union Street.

2.5.2 Off-Street Parking

There are three main existing parking areas located within the Campus accommodating 148 car parking spaces:

- Centenary Car Park (50 spaces) accessed via William Street in the north-eastern corner of the Campus, which is restricted to staff with remote control access;
- Bishopsgate Car Park (68 spaces) accessed via Gate 22 on Union Street, which is restricted to staff with remote control access;
- Bishopsgate driveway parking (23 spaces), which is unrestricted; and
- Graythwaite Building parking (6 visitor spaces and 1 caretaker space) accessed via intercom at Gate 1 on Union Street, used by staff, contractors, volunteers, and visitors.

After completion of the proposed SPEC facility, the 23 unrestricted parking spaces near the Bishopsgate Car Park will be removed and relocated into an extension to the Bishopsgate car park. This car park will be accessed via Hunter Crescent. Post-development there will be a total of 148 parking spaces located within the Campus in locations shown in Figure 4.

A total of 22 spaces within the Bishopsgate car park will be restricted to carpooling staff only. These spaces will be secured by boom gates, with access remotes given only to staff who have committed to carpooling.

Staff parking spaces are access-controlled by remote controlled boom gates. Remotes are only issued to staff that are using these car parks. Parking is not permitted for students within the Campus. Visitors to the School are able to use the Centenary Car Park during events and the Bishopsgate Car Park during the weekend and weekday nights. However, parking in these areas is restricted if staff are also required to attend these events.

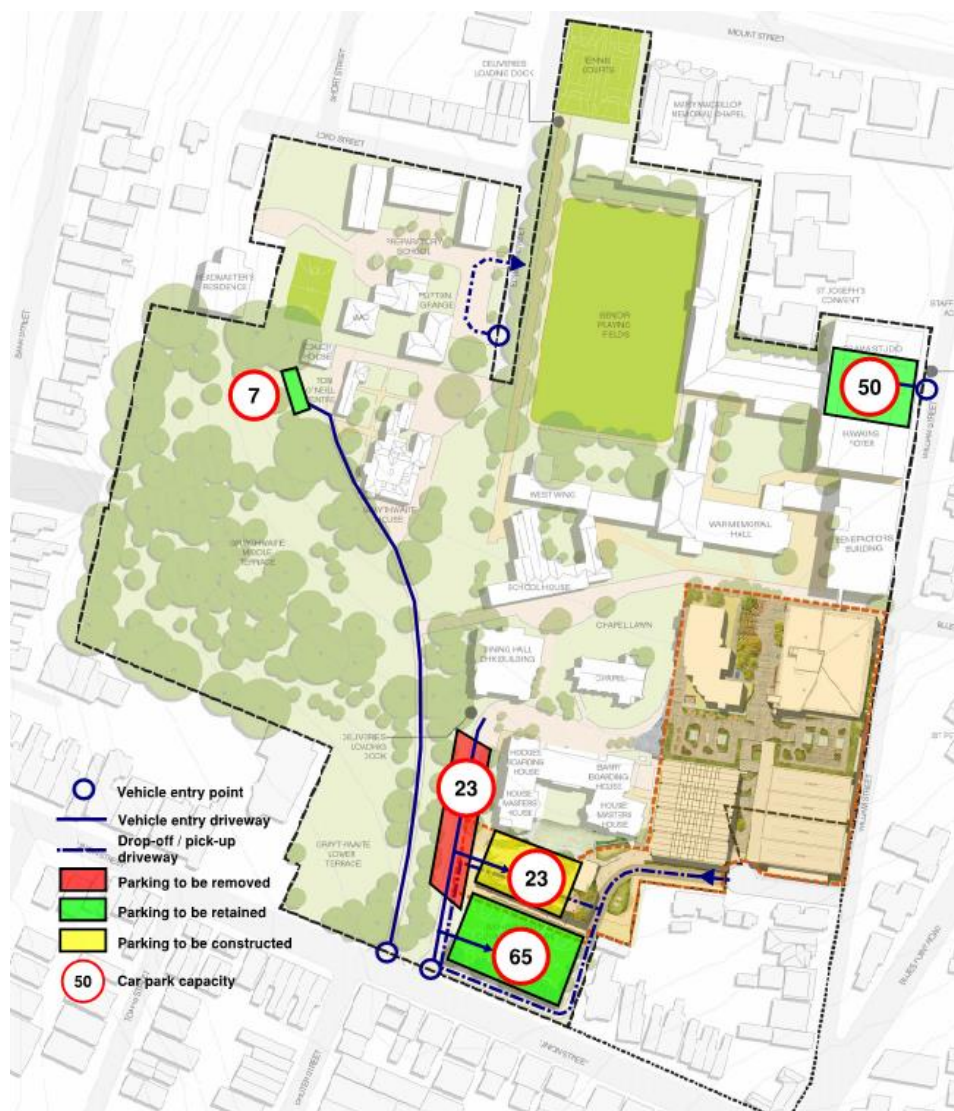


Figure 4: Off-street parking area capacities before and after completion of SPEC

2.6 Drop-Off and Pick-Up Facilities

The School operates two drop-off and pick-up facilities, located at Edward Street and at Union Street.

The Edward Street facility is located at the southern end of Edward Street. The area operates in a one-way movement and is gated outside of school hours. The area is only for use by Preparatory School students in Year 3 – 6.

In the afternoon, boys in Years 4 – 6 are picked up from the Union Street pick-up zone. This facility is located adjacent to the southern boundary of the school and is accessed from Union Street. The entrance is one-way only. The posted speed limit of this internal road is 5 kilometres per hour. While typically used for afternoon pick-ups, it is also available during the morning drop-off period.

The Union Street drop off will be improved after completion of the proposed SPEC facility and its access will be modified. The new drop off will be accessed from Hunter Crescent and

egress will occur from Union Street. Vehicles will be able to circulate around the drop off when their child is not yet present (as indicated by the dashed line in Figure 5).

See Figure 5 for the movements permitted around the two drop off and pick up zones post completion of the SPEC facility.



Figure 5: Circulation of Drop-off and Pick-Up Facilities

2.7 Motorcycle Parking

After completion of the SPEC facility and associated extension to the Bishopsgate Car Park, six spaces for motorcycle parking will be provided. Provision of these spaces is intended to encourage increased usage of motorcycles, which have a reduced environmental impact compared to single occupancy car journeys.

3 Existing Travel Patterns

3.1 Journey to Work Data

The 2011 Census Journey to Work (JTW) data provides an estimate of travel modes into and out of the surrounding area. JTW data is defined by travel zones (TZ) and the school is located within Travel Zone 1954 (refer to Figure 6).

JTW data includes details about the travel modes used by those travelling to the travel zone for work. This can provide details on how staff are likely to be travelling to the School. JTW data indicates that the majority of workers travelling to the zone do so by private vehicle (56%) and train (23%).

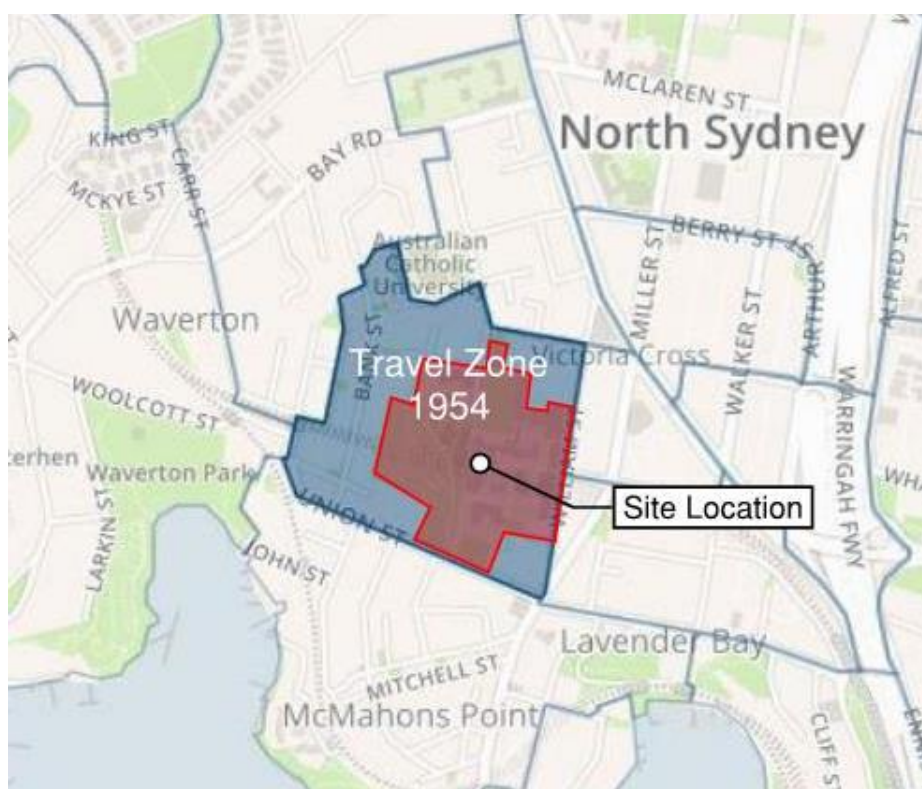


Figure 6: Shore Campus Travel Zone

3.2 Travel Mode Survey

3.2.1 Students

A Travel Mode survey was conducted of the students at Shore by TTW distributed via email. The survey was open for the period of the 14th of November to the 18th of November, 2016. Students were asked to answer travel questions based on their actions on Tuesday the 15th of November.

The survey aimed to provide an understanding of how students currently travel to the Campus and to identify how transport could be improved. It also included details on when students arrive and leave the Campus. A total of 805 student responses from Years 3 to 11 were collected, representing 64% of total students at the North Sydney Senior and Preparatory Schools (excluding boarders who were included in a separate survey).

The survey indicated that for arrivals private vehicle was the most common form of transport (42% of students) and public bus the second most common (25% of students). The school buses catered towards 9% of students.

When departing the school, 33% of students take a public bus, while 25% use private vehicle and 22% take the train. The school bus accounted for 13% of students' trips home. Refer to Figure 7 and Figure 8.

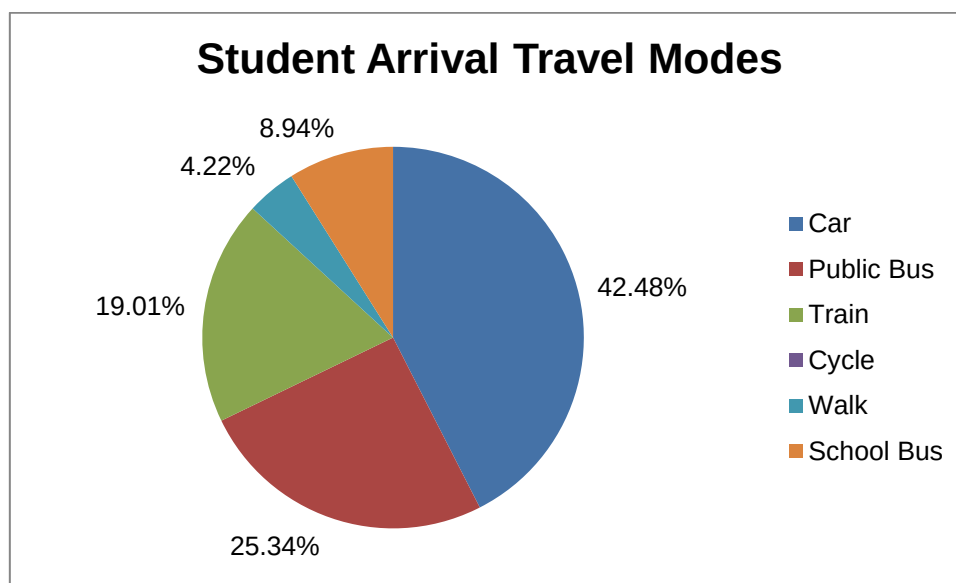


Figure 7: Student Arrival Travel Mode Split

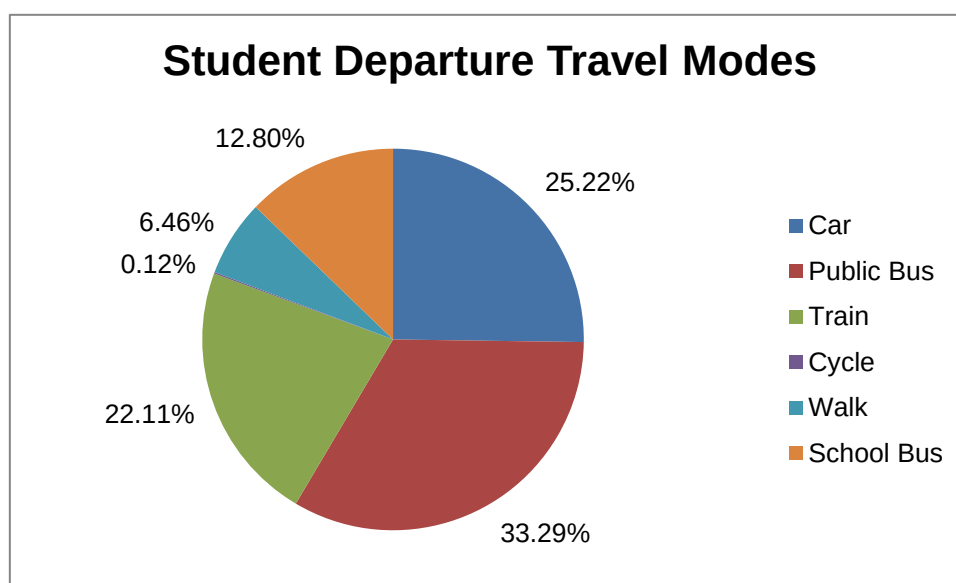


Figure 8: Student Departure Travel Mode Split

Of those students arriving by private vehicle, 88% were a passenger being dropped off. Most drop offs occurred outside the Preparatory School drop-off accessed via Edward Street or at outside the front gate on Blue Street. In the afternoon 69% of those travelling by car were picked up. Common pick up locations were similar to those for arrivals.

Active travel modes are uncommon among students, with walking rates of 4% and 6% for arrival and departure respectively. Only one student reported cycling home from the school.

The survey separated results into Year Groups to gain an accurate picture of travel habits by school year and age. Results are categorised as Preparatory School (Years 3 to 6, ages 9 to 12), and Lower (Years 7 to 10, ages 13 to 16) and Upper (Years 11 and 12, ages 17 to 18) Senior School.

The majority of students in the Preparatory School travel by car when arriving to the School (71%) and the most common mode of transport to leave is also by car (48%).

In the Lower Senior School, public bus is the most common for both arriving (33%) and departing (40%). This age bracket shows the highest rate of usage of school buses, with 12% arriving and 14% departing by school bus.

For Upper Senior students, the most common mode of transport for arriving (45%) and leaving (33%) is private vehicle. Train is the next most common mode of transport for both arriving (23%) and leaving (25%).

3.2.2 Boarding Students

Given Shore has students living within their Campus, a separate survey was conducted to determine if they had travelled outside of the Campus during the day. The survey was conducted in person by a staff member of Shore and concerned the students' travel on Tuesday the 15th of November.

A total of 141 boarders were surveyed. This represents 68% of the reported boarders at Shore. A portion (8%) of these students left the North Sydney Campus via school bus for sport at 3:00pm. Other students stayed within the Campus or walked to local shops. Also at 3:00pm one student left the Campus by private car and another took a public bus to a medical appointment.

Some boarding students stay weekly and therefore generate a tidal demand on Monday mornings and Friday afternoons. This travel pattern was not observed with the survey being conducted on a Tuesday.

3.2.3 Staff

A Travel Mode survey was conducted of the staff of Shore by TTW distributed via email. The survey was open for the period of 14th of November to the 18th of November, 2016. The survey concerned staff travel patterns on the 15th of November.

As with the student survey, this survey aimed to provide information on the travel patterns of staff and any transport issues they have experienced. Shore currently has 257 full time staff and 72 part time staff. The survey had a response rate of 55% of total staff.

The majority of staff (71%) travelled both to and from the Campus by private vehicle, with train being the second most common travel mode (14% arriving and 15% departing). Refer to Figure 9 and Figure 10 for the staff arrival and departure mode splits.

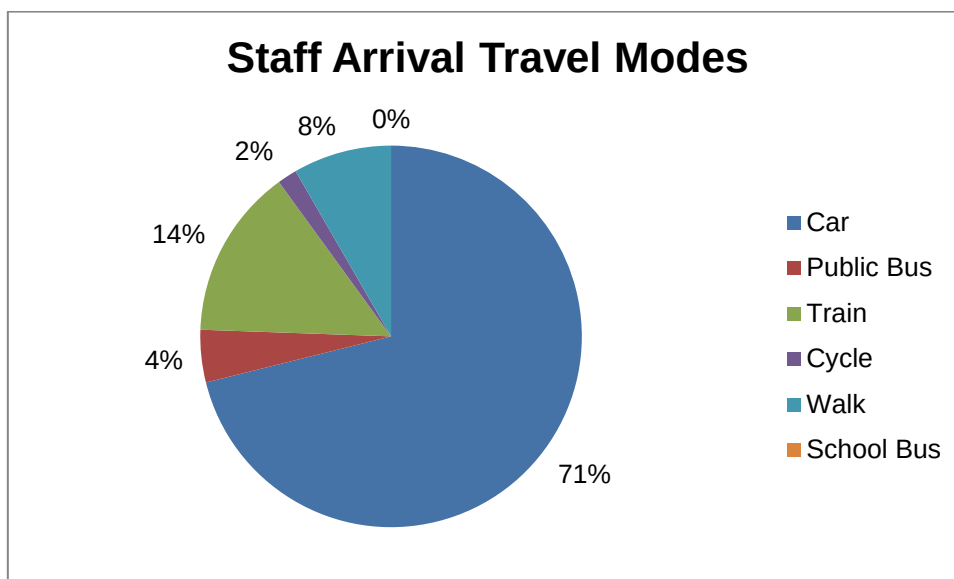


Figure 9: Staff Arrival Travel Mode Split

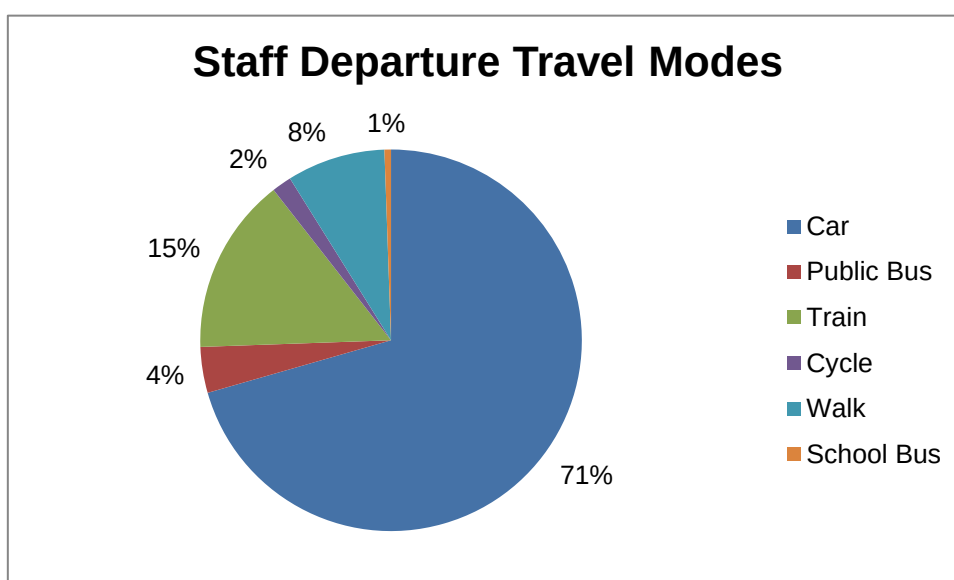


Figure 10: Staff Departure Travel Mode Split

A total of 47% of staff arrive at the school before 7:30am, with 90% of staff arriving before 8:00am. In the afternoon departure times vary, with the most common leaving times being after 5:00pm (27%) and 4:00pm to 4:15pm (14%).

3.2.4 Visitors, Volunteers and Contractors

The school has a number of regular visitors including volunteers, tutors, examiners, contractors and various specialist professionals to assist with the teaching and learning program. On average there are 14 visitors and 7 contractors signing into the school on a regular basis. This can reach as high as 25 visitors and 15 contractors depending on the day.

Following the results of the staff survey, it is estimated that these visitors, volunteers and contractors follow a similar travel pattern.

3.2.5 Comparison to Previous Survey

The previous Green Travel Plan relied on a survey undertaken in 2010. This survey did not separate student and staff travel modes and included boarders. There were a total of 830 respondents to the survey, consisting of 667 students (inclusive of 86 boarding students) and 163 staff.

The two surveys showed relatively similar travel mode splits. The 2016 survey shows an increase in car drivers, while car passengers have decreased. Walking has experienced a slight increase. A comparison of the two surveys is shown in Table 2.

Table 2: Comparison of 2011 and 2016 Surveys

	Travelling to School		Travelling from School	
	2011 Survey	2016 Survey	2011 Survey	2016 Survey
Car Driver	14%	22%	13%	21%
Car Passenger	32%	24%	20%	13%
Train	18%	15%	18%	18%
Bus*	22%	23%	34%	30%
Cycle	1%	0%	0%	1%
Walk	3%	5%	3%	6%
Live on Site	10%	11%	9%	11%
Others	-	-	3%	-

*School and public buses were not separated in the 2011 survey and therefore have been combined for comparison.

4 Recommendations

4.1 Key Issues

The following key issues have been considered when developing this revised Green Travel Plan for Shore:

- The surrounding topography that can be seen as a barrier to active travel;
- Distances that staff and students travel each day;
- Requirements of Shore staff including mandatory participation in co-curricular programs; and
- The need to educate and encourage more staff to use active and public transport or to explore a car-pooling option.

4.2 Targets

4.2.1 Students

Analysis of existing student locations shows that 23% of Senior students (in Years 7 – 12) live within approximately 5km of the School. 8% of students in the same range live within 3km of the School. These students living in close proximity to the School are best suited to choosing walking or cycling as a travel option each day. While nearly 30% of students in the Prep School (Years 3 – 6) live within 5km, for safety and confidence reasons active travel is typically limited in this demographic. Figure 11 and Figure 12 illustrate the distribution of living distances for Prep and Senior students respectively.

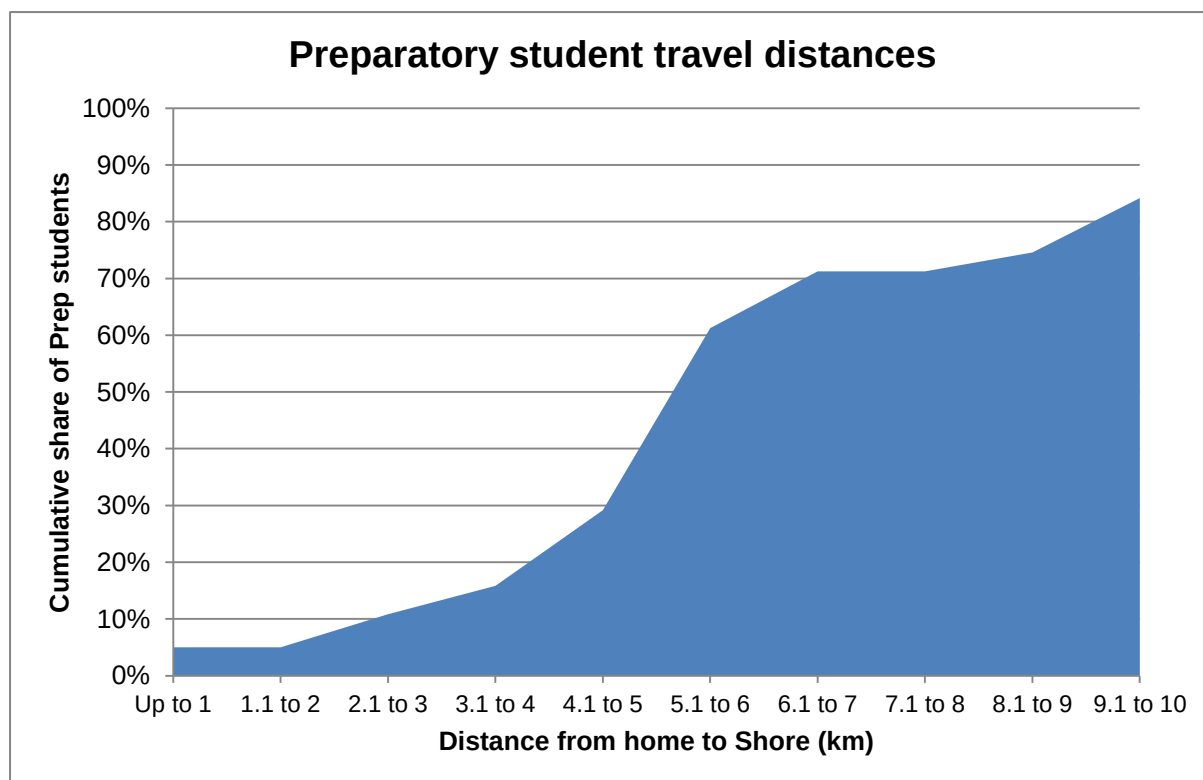


Figure 11: Prep student travel distances

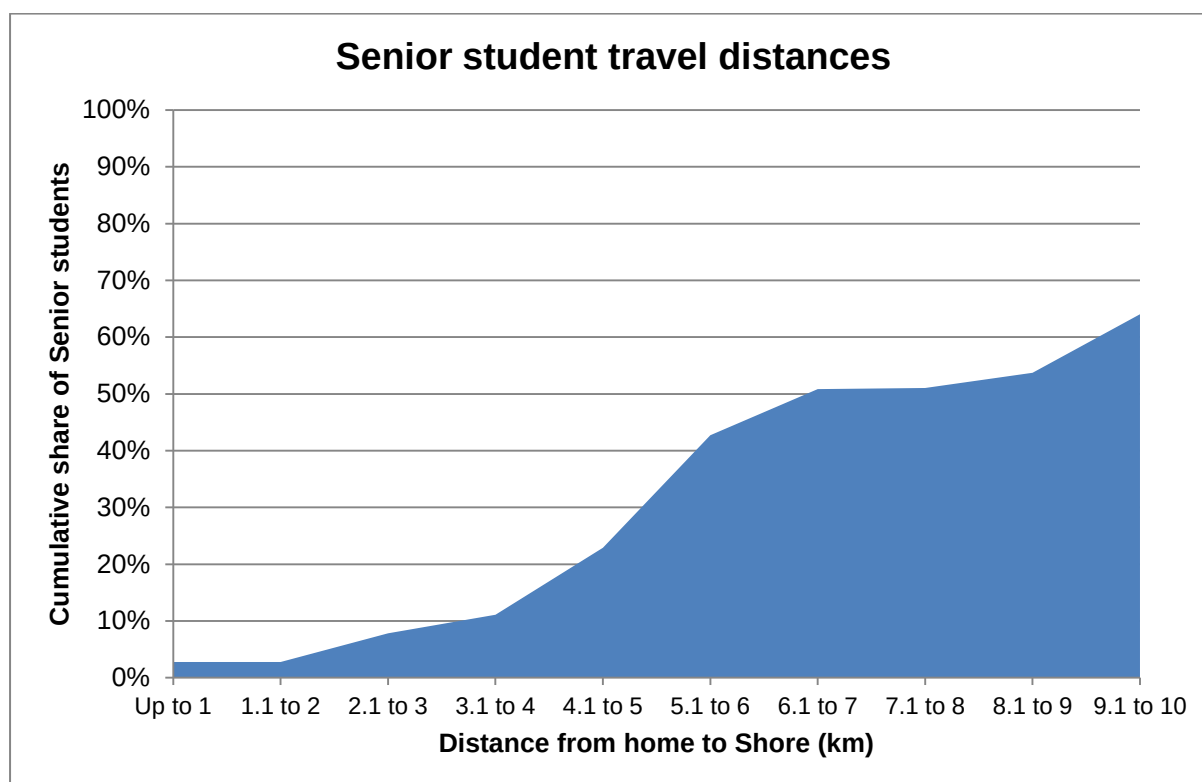


Figure 12: Senior student travel distances

Given the results of the travel mode surveys (refer to Section 3.2), initiatives could be utilised to increase the rate of green travel. Realistic goals for the travel mode share of students to the site are as follows, being a 10% reduction in private vehicle usage distributed to other travel modes. Usage of school buses is not expected to change significantly due to the continued travel habits of students to co-curricular activities.

Table 3: Mode share targets for students

Travel Mode	Existing Share (average AM & PM)	Proposed Target	Change
Public bus	29%	32%	+ 3%
School bus	11%	11%	-
Walking	5%	6%	+ 1%
Cycling	0%	3%	+ 3%
Train	21%	24%	+ 3%
Private vehicle	34%	24%	- 10%

4.2.2 Staff

Analysis of existing staff locations shows that 19% of staff live within approximately 5km of the School. Almost 10% of staff live within 3km of the School. Figure 13 illustrates the distribution of living distances for the existing staff. These values exclude the Housemasters and Assistant Housemasters who live on-site.

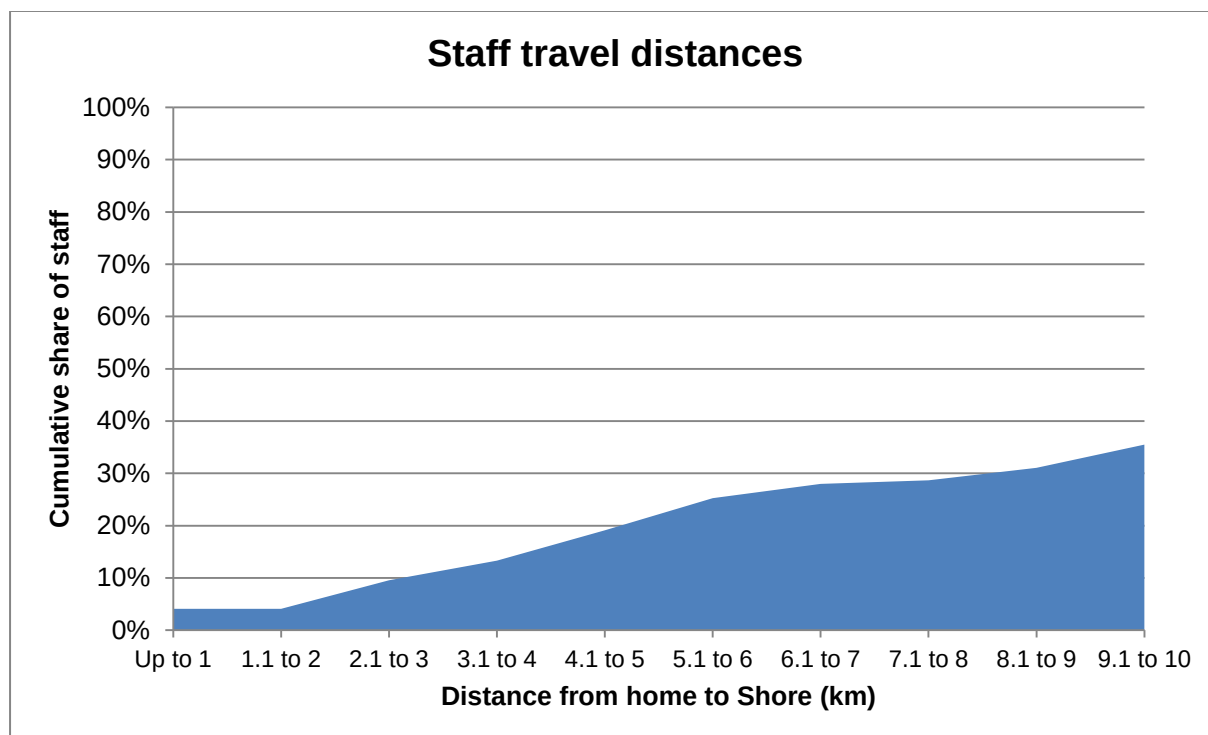


Figure 13: Staff travel distances

The results of the staff travel mode survey show that there is a high dependence on single occupancy vehicle trips, with 94% of those leaving by car doing so with only one person in the vehicle. Realistic goals for the travel mode share of staff are as follows, being a 31% reduction in single occupancy vehicle trips distributed to other travel modes.

Table 4: Mode share targets for staff

Travel Mode	Existing Share	Proposed Target	Change
Public bus	4%	7%	+ 3%
Walking	8%	11%	+ 3%
Cycling	2%	4%	+ 2%
Train	14%	23%	+ 9%
Private vehicle (single occupant)	64%	33%	- 31%
Carpooling	7%	22%	+ 15%

4.2.3 Visitors, Volunteers and Contractors

Assuming visitors, volunteers and contractors have similar travel patterns to the staff, it follows that the majority are currently travelling by private vehicle. Realistic travel mode share targets are therefore proposed to match those of the staff (refer to Table 4).

4.3 Existing Initiatives

The School currently utilises a number of methods to incentivise green travel, including:

- A Transport Access Guide (TAG) made available on the School's website informing students, staff, and visitors of transport options to the Campus. This features:
 - Information on nearby public transport stations and stops.
 - Local walking and cycling routes.
 - Contact details and links to Transport for NSW and trip planning.
 - Indication of limited parking availability at the site.
- Provision of School buses for transferring students to co-curricular activities.
- Bicycle parking and end-of-trip facilities for students and staff.
- On-site car parking policy:
 - Some parking areas have spaces allocated to specific staff.
 - No student parking permitted on-site.
 - Event management (such as bus hire for off-site activities).

Refer to Appendix B for a summary of the actions currently completed by the School.

4.4 Actions

Following the proposed travel mode targets, the main aims of this Green Travel Plan are to:

- Decrease private vehicle usage among staff, visitors, volunteers and contractors
- Increase carpooling
- Increase active transport (walking and cycling)
- Increase public transport (buses and trains)
- Implement management systems for ongoing review of this document

In order to achieve these changes, a number initiatives and programs are to be implemented. These initiatives, in the form of a checklist for ease of reference by the School, are attached in Appendix A. The School should review this Plan on a regular basis to ensure that programs are being implemented and progress is being made.

5 Conclusions

This Green Travel Plan is a critical step in outlining the actions to be undertaken by the Shore, to ensure that sensible and thoughtful travel choices are made by all members of the school community. Situated in the centre of North Sydney, Shore is in a strong position to encourage public transport usage and to provide the programs and information to ensure that its community is aware of their many transport options.

One of Shore's key aims is to raise responsible citizens through its teaching of boys through their developmental years. As a premier school in Sydney, Shore wishes to lead by example and encourage all staff, students, and visitors to the site to consider their choices and to travel in a responsible manner.

Prepared by
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



MICHAEL BABBAGE
Traffic Engineer

Authorised By
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



PAUL YANNOULATOS
Technical Director

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Appendix A – Green Travel Initiatives

Actions and Checklists

Decrease private vehicle usage

Action	Target Year	Date Completed
Revise the permissions for car park access. The existing remote system is to be investigated for replacement with a programmable smart card system (or similar) for more granular control. Part-time staff, staff involved in co-curricular activities, and other relevant user groups can have access restricted to necessary periods. This is intended to assist in changing travel habits and ensuring parking is available when necessary.	2020*	
Reduce reliance on cars by contractors. Provide a storage area for regular contractors to store any equipment and/or tools required on a regular basis.	2020*	
Encourage active travel and public transport by volunteers. Provide regular volunteers with a transport package including the Transport Access Guide and travel information showing public transport and active travel routes. The package would include information about the location of end-of-trip facilities available.	2017	
Include travel information into the induction process for new staff and parents. Information slides will be included in the School's presentation to new parents and staff detailing transport access to the site and the travel mode share targets detailed within this Green Travel Plan.	2017	
Provide information about the Green Travel Plan within the School's newsletter. The School currently publishes a weekly newsletter and quarterly review on their website. Information about the travel initiatives within this Green Travel Plan will be included once each term. An update will be included annually detailing the review of the Green Travel Plan and the new mode share survey results.	2017	

Increase carpooling usage

Action	Target Year	Date Completed
Dedicated parking spaces for staff who choose to carpool. Staff committed to carpooling with others would receive access via swipe card to 22 secured carpooling spaces. These spaces will be located closest to the School pedestrian walkways.	2020*	
Carpooling phone app for volunteers and regular visitors. Develop an app that can be used by volunteers and regular visitors to connect potential carpooling pairs.	2018	
Encourage carpooling for Shore visitors. Parents and family members will be encouraged to use carpooling when visiting Shore, through publications and discussions with the Parent Association.	2017	

Increase active transport usage (walking and cycling)

Action	Target Year	Date Completed
Clarify uniform requirements for students cycling to school. During the most recent review of Shore travel habits, a number of boys noted that the existing rules on uniform requirements can be unclear. The current uniform policy is to be reviewed and clarified for boys who wish to cycle to Shore.	2017	
Improved bicycle parking facilities. Additional areas for bicycle parking are to be included in the expansion of the Bishopsgate Car Park. Layout and entry to the parking areas are to ensure ease of access for cyclists.	2020*	
Improved end-of-trip facilities. Change rooms, lockers, and showers are to be included in the development of the SPEC facility. These facilities are to be advertised to students to encourage increased usage.	2020*	

Increase public transport usage (buses and trains)

Action	Target Year	Date Completed
Provide a top-up facility for Opal cards. Shore is to investigate the feasibility of providing an Opal top-up facility for staff and students at the school reception. In addition to providing a convenient service, presence of such a facility would create a continued reminder of public transport availability and encourage changes to travel habits.	2017	

Encourage increased flexibility for students to use public transport. A number of students indicated in the travel mode surveys that their parents have discouraged them from using public transport. Many students live in areas that are well serviced by public transport. Shore is to work with the Parent Association to encourage families to allow their students to use the transport available to them.	2017	
Develop Transport Access Guides (TAGs) for co-curricular activity locations. Many staff and students travel home via private vehicle after attending co-curricular activities at locations away from the North Sydney campus. Development of TAGs for these locations, particularly those that are most used by significant numbers of staff and students, will encourage people to use public transport when travelling home. This will also help to break travel habits in car usage and improve overall public transport usage.	2017	

Management and updates of Green Travel Plan

Action	Target Year	Date Completed
Update the existing Transport Access Guide (TAG). The School is currently in the process of updating the existing TAG, which is expected to be ready prior to the commencement of the 2017 school year.	2017	January 2017
Review this Green Travel Plan regularly. This Plan is to be reviewed annually, and updated as required. This annual review will include an updated travel mode survey, consultation with staff and students, and adjustments to initiatives and targets.	Ongoing	
Allocate responsibility for this Plan to a staff member. To ensure that the ongoing review of this Plan is carried out as expected, responsibility of this task will be allocated to a specific staff member. It is expected that monitoring of the Plan will be carried out by a member of the Facilities team.	2017	

** The Target Year for these initiatives is dependent on completion of the SPEC Facility and Bishopsgate Car Park expansion. It is expected this will be completed in 2020, if this does not occur the initiatives will be completed 12 months after completion of the SPEC facility and Bishopsgate Car Park expansion.*

Appendix B – Previous Green Travel Plan

Progress from 2014 Travel Plan

Comments in "Date Completed" column as per advice provided by a Shore representative

Transport Programs

Action	Date Completed
Identify a staff member or student to complete travel coordinator duties involved in this plan (initially 1-2 hours per week to set up, then 1-2 hours per month in the subsequent year).	Term 2, 2014
Rerun the travel demand survey to gauge current travel patterns of staff and students and to identify those that may be interested in walking, cycling or using public transport / car-pooling to work (staff) and other destinations (students).	Term 4, 2016
Prepare a new student / staff starter kit. • Prepare maps: • showing public transport routes near the site • showing safe walking routes with travel time, to local facilities, such as shops, bus stops and local stations The transport access guide (TAG) to be produced in conjunction with this travel plan may be useful. Provide map, travel options and timetables: • on the School website • on the School notice board. • include in School community communications (ie. The Shore Weekly Record)	Term 2, 2014
Based on staff and student interest (from the survey): • link interested walk-to-work or ride-to-work staff and students with walking or cycling buddies • set up a car-pooling database to match rides and passengers	Outstanding
Conduct 'Getting around Sydney' sessions as part of the induction for students.	Not applicable
Further utilise existing social media opportunities to keep staff / students up to date with transport programs, initiatives and user groups.	Not applicable
Include bus / train modes as preferred transport modes for any event / special occasion where students are transferred off site.	Public transport used for major School sporting events – Head of the River, Athletics Carnivals etc

Public Transport

Action	Date Completed
Develop and maintain a map showing public transport routes to the School (i.e. a TAG).	Term 2, 2014
Put TAG up on Lampada with maps showing the main public transport routes to and from the School.	Term 2, 2014
Place information on the School website with links to appropriate external transport websites (e.g. 131500.com).	Term 2, 2014
Provide information about timetables for staff and administrative information	Term 2, 2014

Walking

Action	Date Completed
Identify employees living near work that may be interested in walking to work.	Outstanding
Produce a map showing safe walking routes to and from the School with times, not distances, to local facilities, such as shops and public transport stops.	Published on TAG
Review the condition of existing footpaths and negotiate with North Sydney Council for improvements to footpaths used by staff and resident students.	Outstanding
Have a few umbrellas handy at reception for rainy day - perhaps bearing the School logo.	Outstanding
Take part in 'National Walk to Work Day'.	This tends to fall during a holiday period so is not an applicable event to support
Have some TravelSmart Get to Work days encouraging staff to attend and Students to travel by alternative modes of transport.	Outstanding

Cycling

Action	Date Completed
Introduce student and staff bike parking facilities which are secure and weather proof.	Completed
Monitor student and staff bike parking to ensure it remains well maintained, accessible and is used by staff and students.	Completed
Provide bicycle parking for visitors in an easily accessible location. Ensure parking is clearly visible or provide signage to direct people to cycle bays.	Completed
Establish an internal Bicycle Users Group (BUG). BUGs are formed by people who want to work together to improve facilities for cyclists and encourage cycling. The BUG could include both staff and students and expanded to include other nearby educational facilities or workplaces.	Outstanding

Develop a 'bike buddy' scheme for inexperienced cyclists.	Outstanding
Participate in annual events such as 'Ride to Work Day' and/ or sponsor entries to community bicycle events (e.g. Spring Cycle).	This event falls very early in Term 4 and the School is not in a position to support it. The School staff and boys do participate in many other charity and fun rides.

Car-pooling

Action	Date Completed
Set up a car-pooling database of likely users.	Outstanding
Implement car-pool management activities to promote car-sharing.	Outstanding
Liase with car sharing providers (e.g. GoGet) to investigate the opportunity for a vehicle to be located along the School's frontage (i.e. William Street).	Outstanding

Car Parking

Action	Date Completed
Maintain car parking allocation policy.	Completed
Maintain a policy of no student parking on site.	Completed

Communications Plan

Action	Date Completed
Develop a communications plan for sustainable transport initiatives which aims to aid in improving staff / student travel behaviour through information supply, feedback and support new programs and services adopted by the School.	Completed – TAG
Provide opportunities for staff and students to provide feedback about transport safety and programs run by the School. Feedback should be received by the School's sustainable transport representative.	Outstanding
Create an online notice board for transport information and initiatives run by the School.	Outstanding
Keep Lampada and the website up to date, with helpful information for students and staff.	Completed

Appendix C – Travel Mode Survey

Existing Travel Mode Questionnaire

Note: This 2016 travel mode survey was completed online, where relevant questions were filtered when not applicable. The survey related to travel on a specific date, to capture a snapshot of school travel modes.

1. Please select the category that applies to you:
 - a. Student – Year 3 to Year 6
 - b. Student – Year 7 to Year 10
 - c. Student – Year 11 or Year 12
 - d. Staff member
2. What postcode do you travel from?
3. What time did you arrive at Shore in Tuesday 15th November, 2016? *(Options provided)*
4. How did you travel to Shore? *(Options provided)*
5. If you arrived by car, were you a passenger or the driver?
6. How many other people were in the car with you?
7. Was anyone in the car going somewhere else, rather than Shore?
8. Were you being dropped off or were you (or the driver) parking the car?
9. Where did you get out of the car? *(Options provided)*
10. Where did you park the car? *(Options provided)*
11. Where did you park your bike?
12. What time did you leave Shore on Tuesday 15th November, 2016? *(Options provided)*
13. How did you leave Shore? *(Options provided)*
14. If you left by car, were you a passenger or the driver?
15. Were you being picked up or had the car been parked?
16. Where did you get into the car? *(Options provided)*
17. Where was the car parked? *(Options provided)*
18. How many people were in the car with you when you left Shore?
19. Would any changes make you more likely to take public transport to and from Shore?
20. Would any changes make you more likely to ride a bike to and from Shore?
21. Would any changes make you more likely to walk to and from Shore?
22. Do you have any other comments relating to travel and parking at Shore?

Appendix B

Shore Transport Access Guide

Shore Transport Access Guide



SHORE



Shore

Transport Access Guide



Walking

Shore is a 5 minute walk from North Sydney station.



Bicycle

Shore is accessible via a number of on-road cycling routes that travel through North Sydney and onto surrounding suburbs. Bicycle routes are shown on Figure 1.



Train

The closest railway station is North Sydney station on the T1 North Shore Line, approximately 160 metres from Shore. North Sydney station is serviced by regular trains to the city as well as the northern suburbs. Waverton stations is located 800 metres from Shore and is also serviced by the T1 North Shore Line.



Car Share Services

North Sydney Council supports car share spaces provided by GoGet and Popcar. There are a number of GoGet car spaces located near to the campus as shown on Figure 2.



Car

Shore has limited onsite parking for visitors travelling by car. Access to vehicular parking is via Gate 1, 50 Union Street as shown on Figure 3. This driveway is a shared Pedestrian/Vehicle area and visitors are required to travel within the designated speed limited. Short term parking is available on the surrounding streets with metered and timed parking on William, Mount, Edward, Union and Lord Streets.



Mobility Parking

Mobility parking for visitors is provided via Gate 1, 50 Union Street.



Bus

Shore can be easily accessed by a number of nearby bus stops. A stop is located directly outside the campus on Union Street with stops located less than 5 minutes away on Blues Point Road and Miller Street. Buses service these stops very frequently on school days.

Bus Stop	Bus Routes	Areas of Service	Frequency
A	265	McMahon's Point, Greenwich Wharf and Lane Cove	Half hour during peak hours Hourly during off peak hours
B	265, 269	McMahon's Point, Kirribilli, Greenwich Wharf and Lane Cove	15 minutes during peak hours Half hour during off peak hours
C	168, 173, 183, 209, 227, 228, 230, 265, 287, 612X, 622, 653, E50, L78, L84	Balgowlah, Narrabeena, Narrabeen, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Ryde, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Dee Why and Mona Vale	Every 2 minutes during peak hours Half hour during off peak hours
D	173, 209, 227, 228, 230, 265, 612X, 622, 653, E50, L87	Narrabeena, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Newport	Every 5 minutes during peak hours Every half hour during off peak hours
E	252, 254, 261, 343, 286, 287, 290, 622, 653, M20	Lane Cove West, Riverview, City, Northwood, Kingsford, Rosebery, Denistone East, Ryde, Epping, Dural, West Pennant Hills, Gore Hill, Redfern	Every 2 minutes during peak hours Every half hour during off peak hours



Shore

Transport Access Guide



Figure 1



Shore

Transport Access Guide

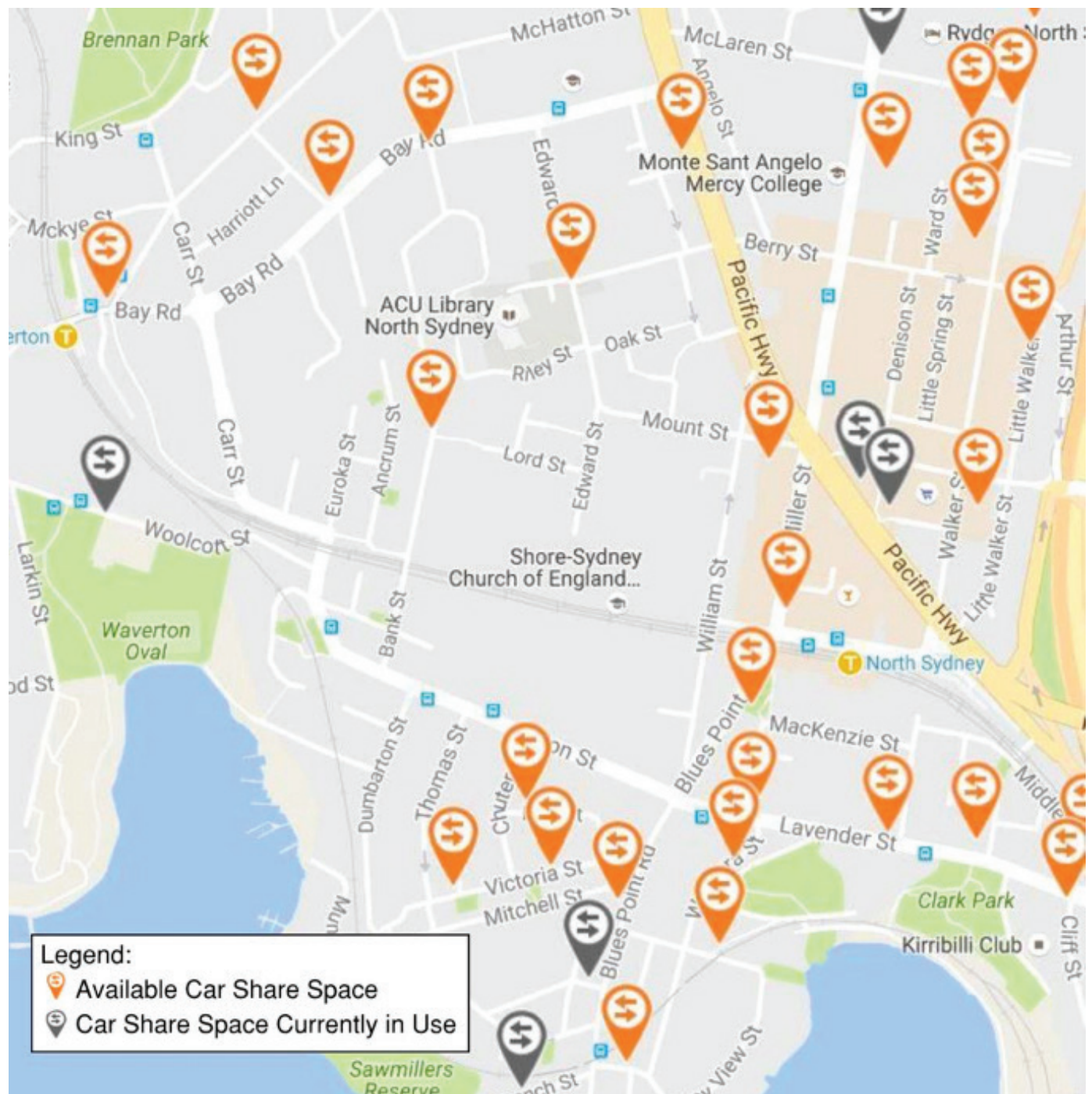


Figure 2

Shore
Transport Access Guide

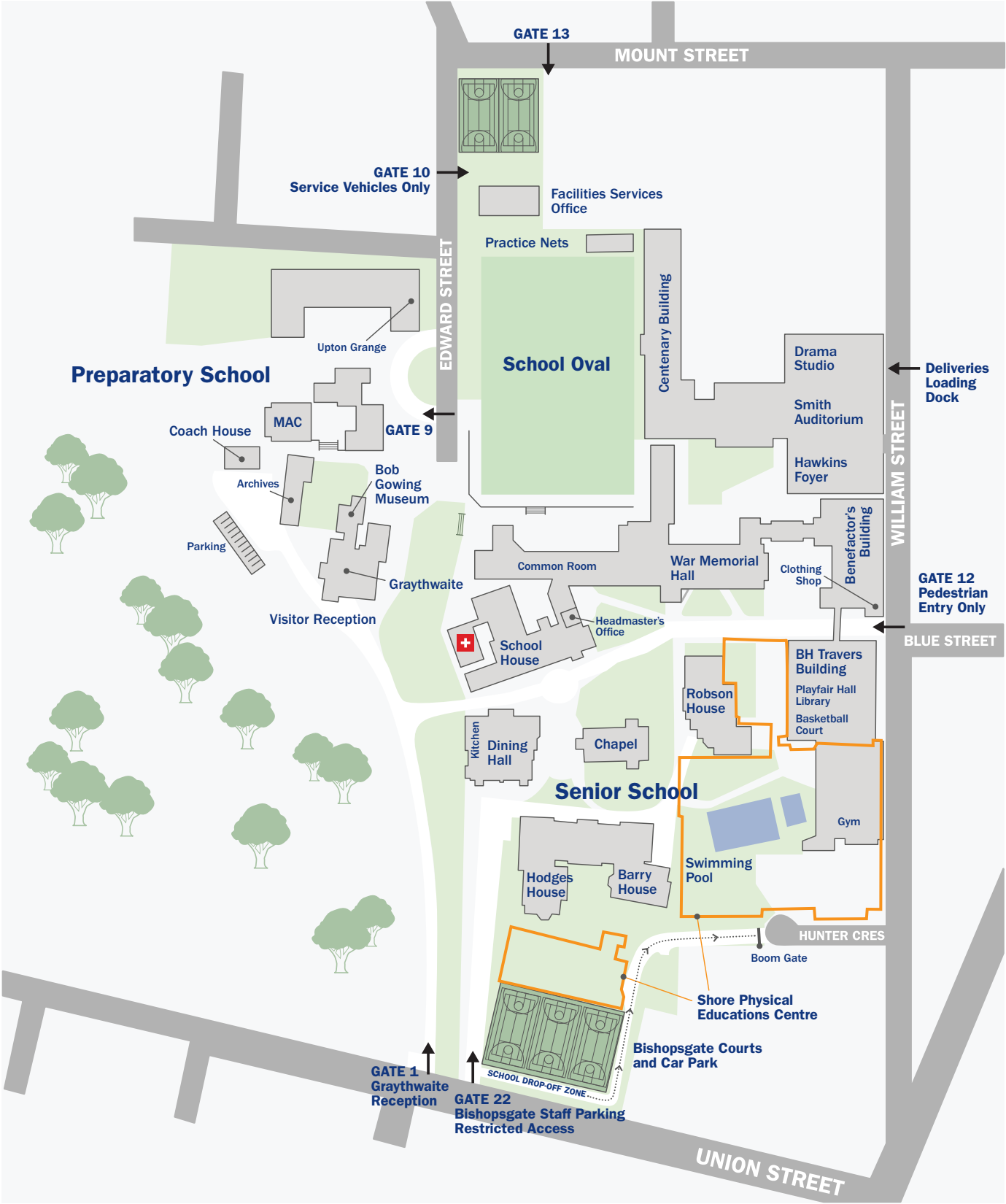


Figure 3



Appendix C

Preliminary Construction Traffic Management Plan

Preliminary Construction Traffic Management Plan

Shore Physical Education Centre

Prepared for Shore School / 17th February, 2017

141522 UT

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Revision Register

Rev	Date	Prepared By	Approved By	Remarks
1	20/04/16	AK	PY	For issue
2	17/02/17	GC	PY	Following adjustment of drop off design

1.0 Existing Site Conditions

1.1 The Site

The objective of this report is to provide a preliminary construction traffic assessment of the Shore Physical Education Centre project, a part of Shore's North Sydney Campus.

The proposed Physical Education Centre is located within the Shore Campus in North Sydney. The development will be located in the south-eastern corner of the Campus, near the corner of Hunter Crescent and William Street. The site also includes residential land at 4 and 5 Hunter Crescent and 16 William Street. Refer to Figure 1 for the location of the site.

The site is currently occupied by a 25 metre pool, gymnasium and three residential buildings. The works to be undertaken include:

- Demolition of the existing 25 metre pool and associated structures located in the south-eastern corner of Shore Senior School and the residential flat buildings at 4 and 5 Hunter Crescent and William Street.
- Construction of new buildings including an Aquatic Centre, Multipurpose Sporting Complex, additional classrooms, alterations to existing facilities, relocation of car parking spaces and loading facilities.
- Additional landscaping including tree removal and replacement.
- Modifications to the drop off facility, including revised circulation within the existing Bishopsgate car park drop off.

Vehicular access to the site is currently via Hunter Crescent and Union Street.

The Hunter Crescent access point has a two way entry and exit arrangement with a single lane entry and single lane exit. The posted speed limit along this point is 5 kilometres per hour. Access and egress is controlled by boom gates.

Hunter Crescent is a local no through road with 1 hour parking restrictions along the northern kerb side and a no parking restriction along the southern kerb side and at the end of the cul-de-sac, this is where the entrance to the site is located.

The Union Street access point has a two way entry and exit arrangement with no formal lane markings. Entry is via a left turn only movement.

Union Street is a local road with two way traffic flow and typical kerb side parking along the southern side with a 1 hour parking restriction. There is a no parking restriction directly opposite the entrance to the site.

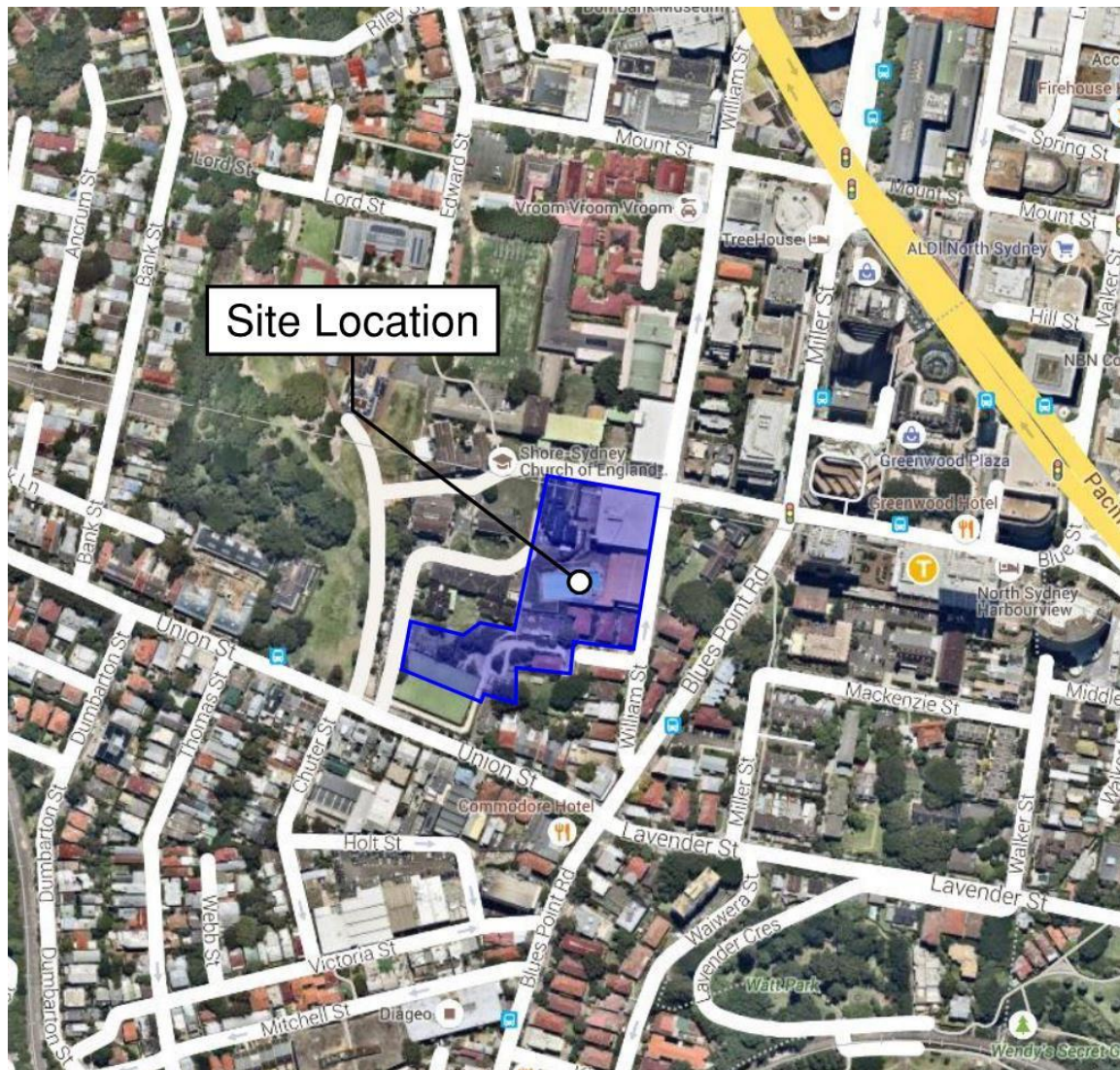


Figure 1: Site Location (Source: Nearmap)

1.2 Existing Parking

There are three main parking areas located within the Campus. There is a staff car park accessed via William Street in the north eastern corner of the Campus. Visitor and accessible parking is located near the Graythwaite Building and is accessed by Gate 1 on Union Street. Bishopsgate Car Park is located adjacent to Union Street, accessed by Gate 22 and restricted. Refer to Figure 2.

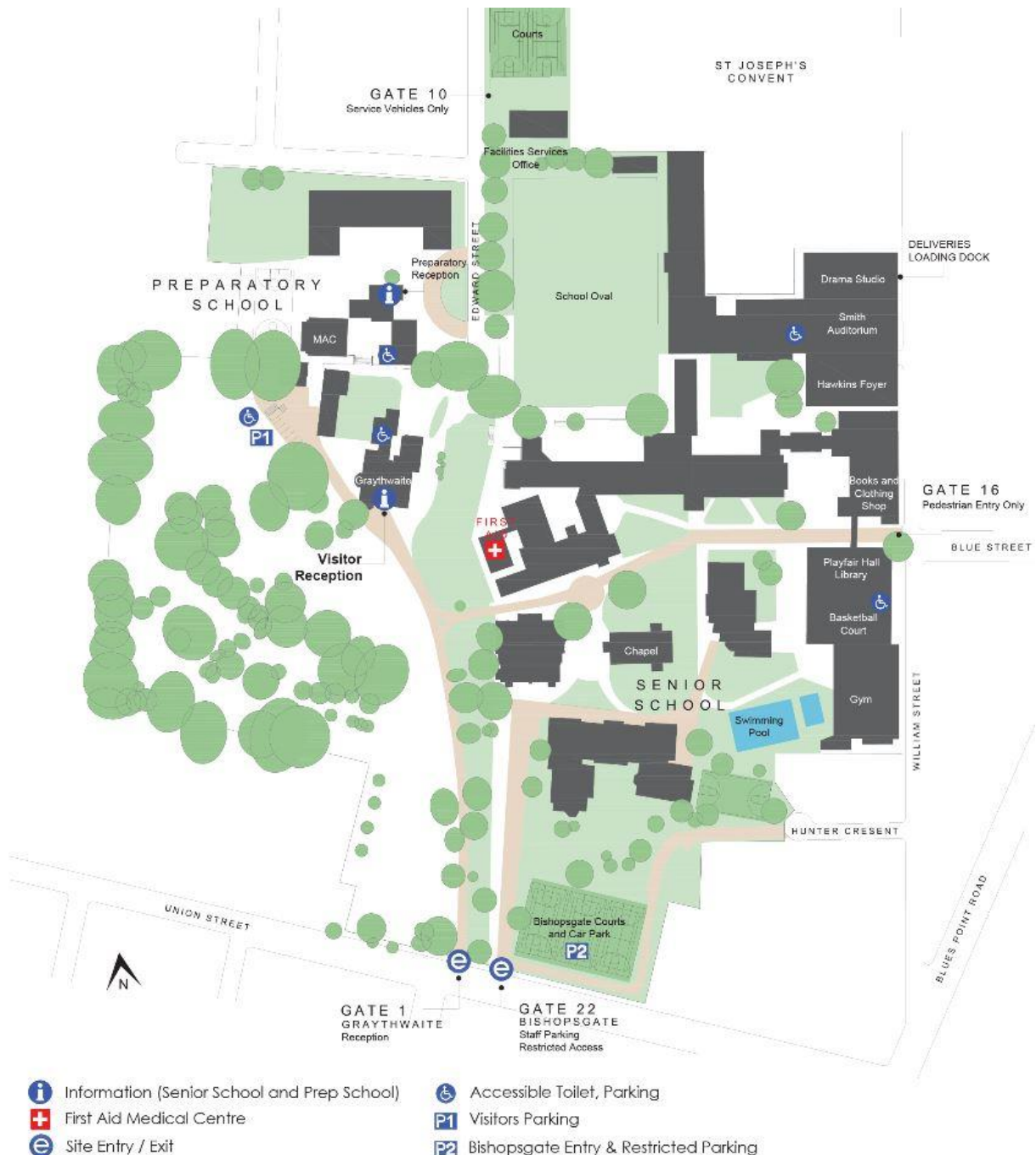


Figure 2: Off Street Parking Locations (Source: www.Shore.nsw.edu.au)

Limited short term parking spaces are available on surrounding streets to the school, generally with 1 hour restrictions between 8:30am to 6pm, Monday to Friday with exceptions for permit holders.

1.3 Access to the Site

A pedestrian and vehicle access diagram has been prepared by Cox Richardson on the 21st of January, 2016. Refer to Figure 3.

Currently the primary pedestrian access to the site is via the school entrance on Blue Street adjacent to the site.

There is a car park pick up and drop off zone along the southern boundary of the site near Hunter Crescent.

Primary vehicle access to the site is from Union Street at the southern boundary of the school.

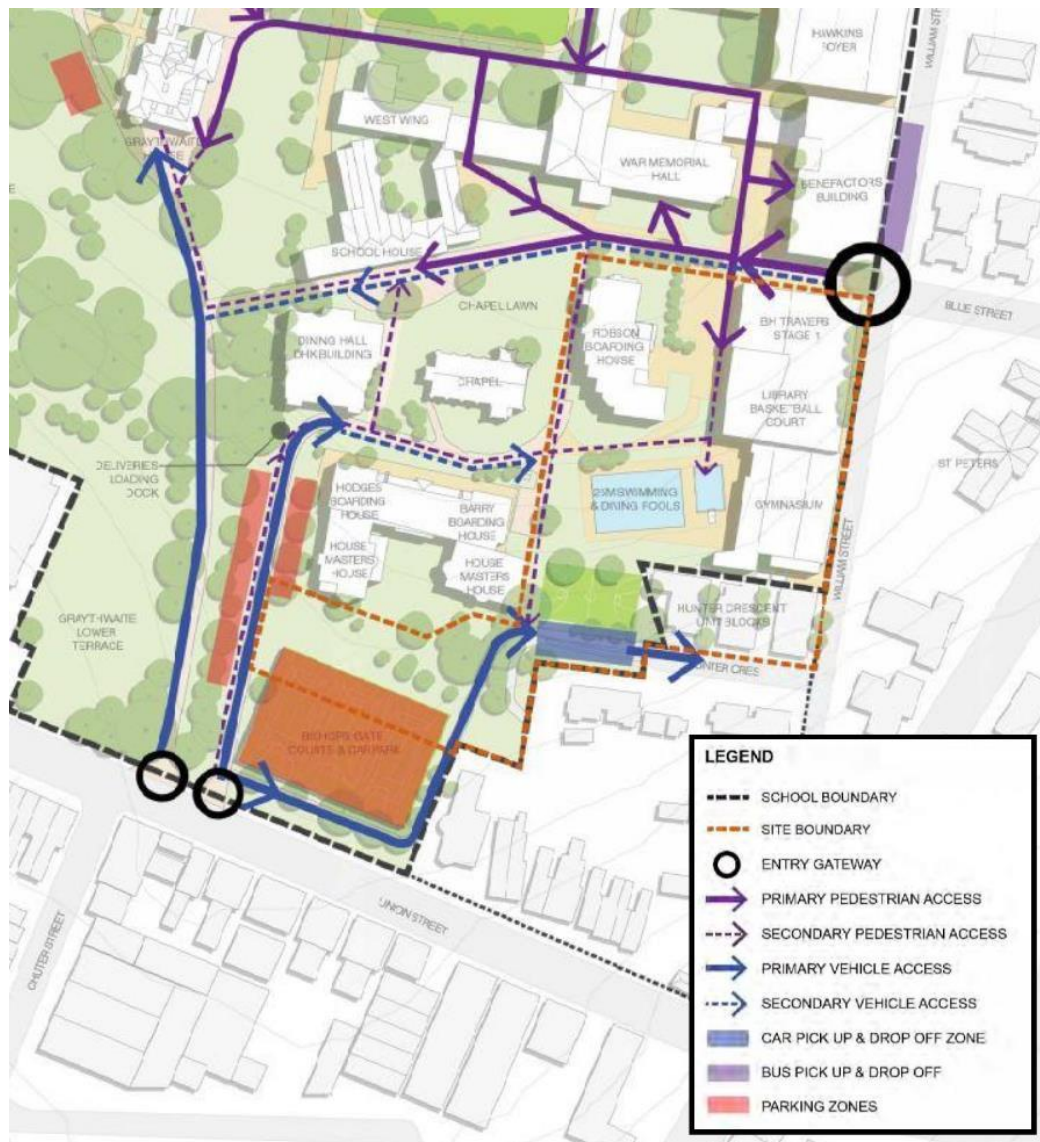


Figure 3: Pedestrian and Vehicle Access (Source: Cox Richardson, January 2016)

1.4 Cyclist Facilities

The Campus is located near on-road cycling routes along Union Street, Blues Point Road, Lavender Street, Miller Street, Pacific Highway and Bay Road. Refer to Figure 4. There are shower and change facilities currently on the Campus for use by cyclists.



Figure 4: Public Transport and Active Travel Network (Source: Shore Transport Access Guide)

1.5 Other Facilities

There are several public transport facilities located within close proximity to the work site. These are discussed in the Shore Transport Access Guide which can be found in Appendix A of the Transport and Accessibility Report prepared by Taylor Thomson Whitting.

1.5.1 Bus Services

There are five main bus stops serviced by Sydney Buses located near the site as shown in Figure 4. The route numbers servicing these bus stops are detailed in Table 1.

Table 1: Bus Routes (Source: Shore Transport Access Guide)

Bus Stop	Bus Routes	Areas of Service	Frequency
A	265	McMahon's Point, Greenwich Wharf and Lane Cove	Every half hour during peak hours Every hour during off peak hours
B	265, 269	McMahon's Point, Kirribilli, Greenwich Wharf and Lane Cove	Every 15 minutes during peak hours Every half hour during off peak hours
C	168, 173, 183, 209, 227, 228, 230, 265, 287, 612X, 622, 653, E50, L78, L84	Balgowlah, Narrabeena, Narrabeen, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Ryde, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Dee Why and Mona Vale	Every 2 minutes during peak hours Every half hour during off peak hours
D	173, 209, 227, 228, 230, 265, 612X, 622, 653, E50, L87	Narrabeena, East Lindfield, Mosman, McMahon's Point, Greenwich Wharf, Lane Cove, Rouse Hill, Kellyville, Dural, West Pennant Hills, Manly, Newport	Every 5 minutes during peak hours Every half hour during off peak hours
E	252, 254, 261, 343, 286, 287, 290, 622, 653, M20	Lane Cove West, Riverview, City, Northwood, Kingsford, Rosebery, Denistone East, Ryde, Epping, Dural, West Pennant Hills, Gore Hill, Redfern	Every 2 minutes during peak hours Every half hour during off peak hours

1.5.2 Train Services

North Sydney Train Station is located approximately 160 metres walking distance to the east of the Campus. The station is serviced by the T1 North Shore and Northern Line. Train frequency is every 3 to 5 minutes during peak hours.

Waverton Train Station is located 800 metres to the north-west of the campus. It is also serviced by the T1 North Shore and Northern Line.

2.0 Proposed Traffic and Associated Works

The proposed works are anticipated to be undertaken in up to 2 stages, but may be completed in one stage.

Construction phases will be finalised by the contractor.

2.1 Access To/From the Worksite

The primary construction point is anticipated to be within the school boundary. There will be limitations on vehicle access in this area during student hours. There may be need for crane access which would be controlled out of school hours. Further details of these requirements will be finalised by the contractor.

Access to the site will be via the following designated route (Refer Figure 5 and Figure 6):

- Lavender Street
- Continue onto Union Street
- Right into the site
- Reverse within the site
- Left onto Union Street
- Left onto Blues Point Road
- Right onto Blue Street

This proposed route minimises impact on surrounding residential streets, minimises uncontrolled right turn movements and utilises existing signalised intersections. Access and egress could also be via Blue Street and Blues Point Road.

Additional site access may be via William Street. It is recommended that, to the maximum extent possible, materials delivered to or extracted from the site with larger vehicles be undertaken via Union Street as William Street only permits movement in a northerly direction. William Street also contains a pedestrian crossing that would be affected if it was used as a construction vehicle route.

There is no proposal to alter the phasing of signals or posted speed limits as a result of the works.

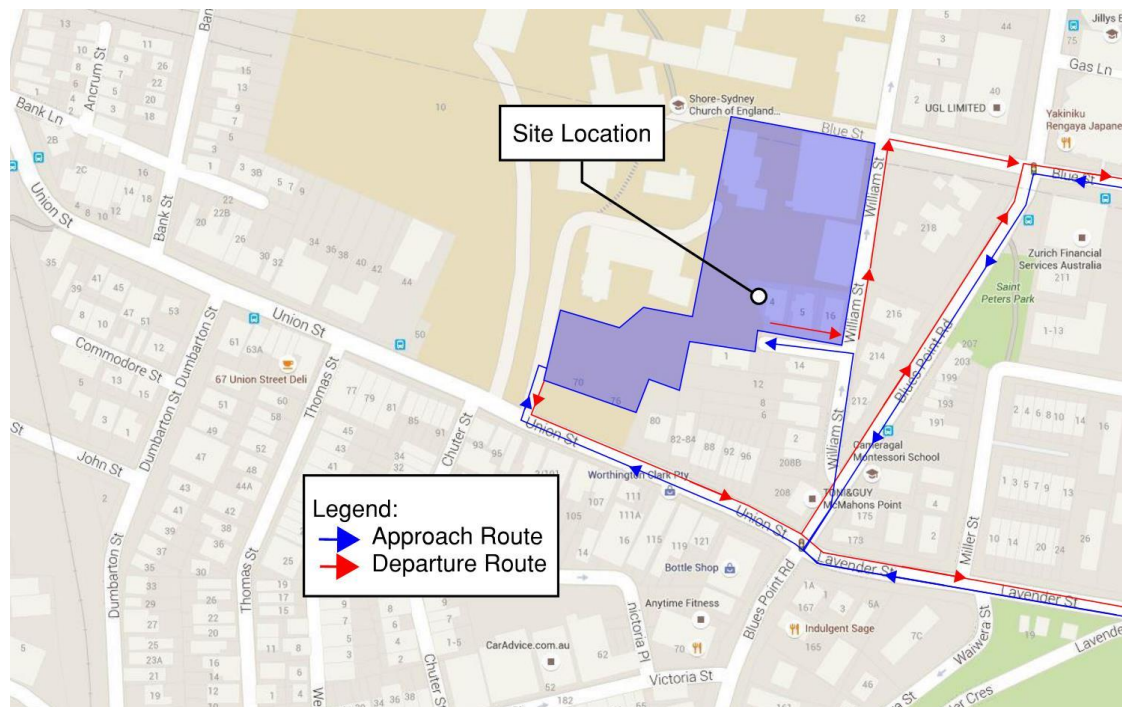


Figure 5: Construction Vehicle Routes

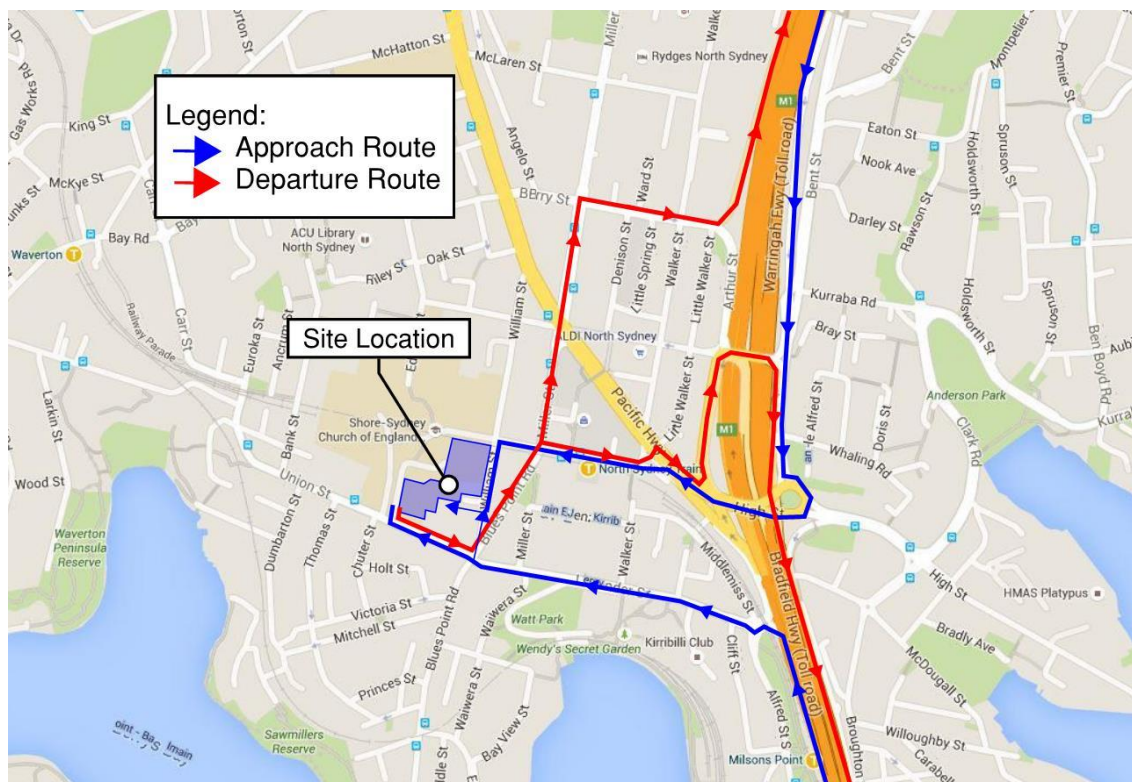


Figure 6: Broad Construction Vehicle Routes

2.2 Traffic Movements Within and Around the Worksite

Trucks will access the site via the designated route outlined in Section 2.1.

2.3 Truck and Vehicle Volumes and Queuing Arrangements

Construction Vehicle queuing external to the proposed site will be minimised. Vehicles are not to queue in residential streets. Anticipated truck types to be used during the works include trucks, trailers, concrete pumps, concrete trucks and various delivery trucks.

Deliveries of materials to the site will be staggered to minimise the queuing of vehicles to be within the worksite. Vehicles are not to queue in restricted parking areas and in locations that will impede traffic flow.

2.4 Work Zone

A work zone may be required as part of the works. If a work zone is required approval will need to be obtained from North Sydney Council.

2.5 Pedestrian/Cycle Movements

It is recommended that truck movements within the school be supervised by traffic marshals into and out of the site to maintain pedestrian and cyclist safety.

2.6 Road Closures

The proposed works will not require any full road closure.

2.7 Crane Usage

The site may require use of a crane as part of the works. These will be located within the site for material loading and unloading.

2.8 Construction Employee Traffic Generation

The school will not be providing construction vehicle parking. It is anticipated that at peak times 137 staff will be required to complete the works (according to the SEARs Application prepared by Robinson Urban Planning). It is unlikely that they will be provided car parking within the school for this construction staff.

To minimise the required parking for workers, contractors will be encouraged to assist in the transportation of workers to the site.

As part of the site induction, the employees will be advised of the public transport options as outlined in Section 1.5 and encouraged to use these facilities or carpooling arrangements to decrease the number of employee vehicles.

2.9 Signposting

Temporary construction traffic related signposting is to be developed in accordance with AS 1742.3 – Traffic Control Devices for Works on Roads.

2.10 Methods of Communicating Traffic Changes

During the works, signs are to be erected warning motorists of construction traffic exiting and entering the site.

Traffic Control advance warning signage in accordance with Roads and Maritime Services' (RMS) guidelines is to be in place to notify motorists of roadworks and when traffic controllers are present.

Sign size is to be size "A" and is to be monitored throughout the works to ensure they are clearly visible.

As part of the site induction procedures, all contractors will be made aware of the Construction Traffic Management Plan and their responsibility to adhere to the plan.

2.11 Environmental Control

Vehicles are not to transport dust, dirt, or gravel from the worksite onto the sealed road networks. Vehicle wash areas in accordance with industry standards will be applied. Loads are to be covered.

Materials and spoil storage areas will be within the site for collection.

2.12 Monitoring of Traffic Control Plans (TCP)

During construction the contractor shall each morning, prior to work commencing, ensure all signage is erected in accordance with the TCP and clearly visible. Each evening, upon completion of work, the contractor is to ensure signage is either covered or removed as required.

Any variation to the layout of the TCP on site is to be recorded and certified by authorised RMS accredited personnel.

A review of TCPs can be undertaken as required in order to determine any potential need for future amendments.

2.13 Certificates and Approvals

Approval is to be obtained from North Sydney Council and other relevant authorities.

Approval needs to be obtained for items such as, but not limited to:

- Road Occupancy Approvals
- Traffic Control Plan Approvals
- Hoarding Approvals

Coordination needs to be undertaken with neighbouring properties to maintain access.

Only certified personnel will be used on site to implement, monitor and carryout the Traffic Control Plan.

2.14 Hours of Work

The site works will be undertaken during the times as specified in the conditions of consent for the works. These will be finalised once development approvals have been obtained.

Work outside of these designated hours will need approval by the relevant authorities.

2.15 Contact of Emergency Services

In an emergency related to a construction traffic incident on the public road network it will be the responsibility of the Site Manager to ensure that Emergency Services are notified. The emergency services include but are not limited to:

- Fire
- Ambulance
- Police

Phone "000" in cases of emergency.

Furthermore, it is the responsibility of the Site Manager to advise the Emergency Services of any restriction of vehicular access to the public and private areas (1) one week prior to its implementation.

2.16 Responsibilities

The Site Manager is responsible for, but not limited to:

- Implementing the Traffic and Pedestrian Management Plan and TCP's
- Informing contractors of the requirements of the Traffic and Pedestrian Management Plan
- Undertaking site inspections to ensure all signage is clearly visible and not damaged
- Monitoring the Traffic and Pedestrian Management Plan
- Report on Incidents
- Obtaining permits

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