Upgrade to North Sydney Public School

Transport and Accessibility Impact Assessment

182 Pacific Highway, North Sydney
26/08/2021
Ref: P1723r01 Issue VI

Info@asongroup.com.au
+61 2 9083 6601
Suite 17.02, Level 17,
1 Castlereagh Street,
Sydney, NSW 2000

Document Control

Project No	P1723
Project	Upgrade to North Sydney Public School
Client	School Infrastructure NSW
File Reference	P1723r01 TA SSDA North Sydney Public School; Issue VI

Revision History

Revision No.	Date	Details	Author	Approved by
Rep01	6/08/2021	Draft	T. Chen & M. Tangonan	D. Choi
Rep01	10/08/2021	Issue I	T. Chen & M. Tangonan	D. Choi
Rep01	12/08/2021	Issue II	T. Chen & M. Tangonan	D. Choi
Rep01	13/08/2021	Issue III	T. Chen	D. Choi
Rep01	19/08/2021	Issue IV	T. Chen	D. Choi
Rep01	20/08/2021	Issue V	T. Chen	D. Choi
Rep01	26/08/2021	Issue VI	T. Chen	D. Choi

contents

contents continued

Figures

Tables

APPENDICES

1 Introduction

1.1 Overview

This Ason Group Transport and Accessibility Impact Assessment Report (TAIA) accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD-11869481).

The development is for upgrades to North Sydney Public School, located on land at 182 Pacific Highway, North Sydney.

This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs) as detailed in Section 1.5 of this report. The TAIA provides a comprehensive assessment of the traffic and transport elements of the project, specifically SEAR 5, on the existing and future road network within proximity of the project and wider North Sydney area in line with Transport for NSW (TfNSW) guidelines.

In addition, SINSW have outlined assessments of multi-modal transport, travel patterns and demand. These are accordingly undertaken within this TAIA, in conjunction with the Preliminary School Transport Plan (PSTP) document, which forms a separate report accompanying the submission.

1.2 The School

This SSDA seeks consent for alterations and additions to the existing North Sydney Public School. The proposal entails:

- Demolition of the existing hall (building B), haven building (building C) and 6 temporary buildings;
- Construction of a three storey building comprising:
  - staff administration rooms;
  - 16 homebases
  - a new library;
  - hall;
  - out of school hours care facilities;
  - covered outdoor learning area;
  - 63 bicycle parking spaces;
  - End of trip facilities for staff; and
  - services, amenities and access.
- New entry gate and forecourt from Bay Road;
- Internal refurbishment of building G ground floor from the existing library to 3 homebases;
- Capacity for an increase in student numbers from 869 to 1,012;
- Increase of 7 staff members for a total of 87 staff members; and
- Associated tree removal, landscaping and excavation.

The proposal maintains:

- The gates and fence of former Crows Nest House including the entrance from the Pacific Highway and Bay Road;
- Existing gate along McHatton Street;
- The outdoor play area to the east of Building A;
- Existing covered outdoor learning area adjacent to Building A;
- The basketball courts and staff carpark in the western portion of the site;
- The significant tree planting on all school boundaries;
- Buildings A, D and F noting minor internal refurbishments are being undertaken outside of the SSDA scope of work (exempt development) to improve student amenities and canteen; and
- Building G noting ground floor internal refurbishment is proposed in the SSDA.

Notably, the upgrades do not propose changes to following traffic and transport elements:

- On-site at-grade car parking providing 50 car parking spaces, including two accessible car spaces, accessed via McHatton Street
- Existing pedestrian access locations, as follows:
  - Three (3) pedestrian access points from McHatton Street (and associated school signage at two of the entrances);
  - One (1) pedestrian access point from the Pacific Highway; and
  - One (1) pedestrian access point from Bay Road.

Reference should be made to the reduced plans provided in the **Figure 1.**

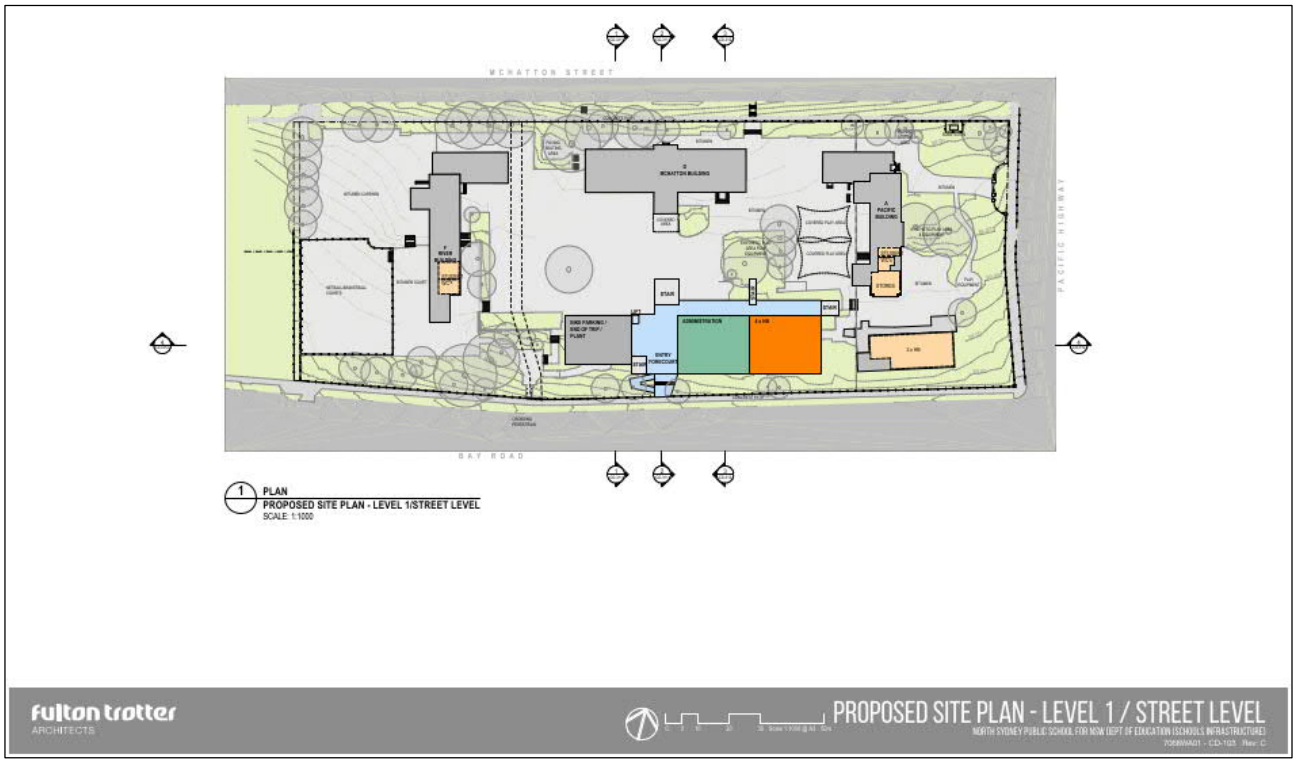

Figure 1: Site Plan (received 28 July 2021)

1.3 Key References

The TAIA makes reference to a series of key strategic, design and planning documents in assessment of the traffic and transport related elements of the project. These documents include:

- North Sydney Development Control Plan 2013, Amended 17 November 2020;
- North Sydney Local Environmental Plan (2013)
- Education Precinct Public Domain Masterplan, prepared by Oculus for North Sydney Council
- North Sydney Transport Strategy;
- North Sydney Council Walking Map; 2009
- North Sydney Integrated Cycling Strategy, Final (Post Exhibition) 18 June 2014;
- North Sydney Council Cycling Guide and Map;
- NSW Department of Education, Master planning guidelines for schools, October 2020
- NSW Department of Education, SINSW Community of Practice Architects + Transport Planners, 29th October 2020
- NSW Department of Education, Educational Facilities Standards and Guidelines (EFSG Guide)
- NSW Government, Planning Guidelines for Walking and Cycling, November 2019;
- Transport for NSW, NSW Movement and Place Framework
- NSW Government, Practitioner's Guide to Movement and Place, March 2020
- NSW Planning Guidelines for Walking and Cycling (December 2004);
- Architectural Plans prepared by Fulton Trotter, Revision A dated 02 August 2021.

This TAIA also references general access, traffic and parking guidelines, including:

- Roads and Maritime Services, Guide to Traffic Generating Developments, v2.02, 2002 (RMS Guide)
- Roads and Maritime Services, Trip Generation Surveys Schools Analysis Report (Prepared by GTA for RMS, Issue A dated 25/08/2014);
- Australian Standard 2890.1:2004 Parking Facilities – Off-Street Car Parking (AS 2890.1: 2004)
- Australian Standard 2890.2:2018 Parking Facilities – Off Street Commercial Vehicle Facilities (AS 2890.2:2018)
- Australian Standard 2890.3:2015 Parking Facilities – Bicycle Parking (AS 2890.3:2015)
- Australian Standard 2890.5:2018 Parking Facilities – On-Street Parking (AS 2890.5:2018)
- Australian Standard 2890.6:2009 Parking Facilities – Off-Street Parking for People with Disabilities (AS 2890.6:2009)
- Transport for NSW, Supplement to Australian Standard AS 1742.10-2009, Manual of Uniform Traffic Control Devices – Part 10: Pedestrian Control and Protection Version 3.1 March 2021
- EIS Guidelines – Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996)
- Cycling Aspects of Austroads Guides
- Guide to Traffic Management Part 12: Integrated Transport Assessments for Development (Austroads, 2020)

1.4 SEARs

As mentioned above, the project team have submitted formal request for the SEARs for the preparation of an environmental impact statement and development application for the SSDA.

This was formally lodged in November 2020, with the response documentation subsequently issued by the NSW Department of Planning, Industry & Environment (DPIE) on the 24 December 2020.

A summary of the requirements relating to Transport & Accessibility are highlighted in the below table.

Table 1: SEARS

NO.	SEARS REQUIREMENT	ASON GROUP RESPONSE
1	Analysis of the existing transport network to at least the existing or proposed enrolment boundary, including: • road hierarchy. • pedestrian, cycle and public transport infrastructure. • details of current daily and peak hour vehicle movements based on traffic surveys and / or existing traffic studies relevant to the locality. • existing transport operation for 1hr before and after (existing or proposed) bell times such as span of service, frequency for public transport and school buses, pedestrian phasing for signals. • existing performance levels of nearby intersections utilising appropriate traffic modelling methods (such as SIDRA network modelling)	Analysis of the existing transport networks has been undertaken as part of this document – the TA – in Section 4 as well as the Preliminary School Transport Plan. It is noted that due to the current Covid-19 restrictions, recent traffic surveys were unable to be commissioned and hence, we had to rely on older traffic surveys to from the base scenarios. Details relating to Road Hierarchy and existing intersection assessment are provided in Section 4.1. Details relating to public and active transport are provided in Section 5.
2	Details of the proposed development, including: • a map of the proposed access which identifies public roads, bus routes, footpaths and cycleways. • pedestrian site access and vehicular access arrangements, including for service and emergency vehicles and loading/unloading, including swept path analysis demonstrating the largest design vehicle entering and leaving the site and moving in each direction through intersections along the proposed transport routes. • car and motorcycle parking, bicycle parking and end-of-trip facilities. • drop-off / pick-zone(s) and arrival/departure bus bay(s). • pedestrian, public transport or road infrastructure improvements or safety measures.	Details of the development are outlined in Section 1.2 and Section 7. The road hierarchy, public transport infrastructure and services, cycle network are been detailed in Section 4.1 and 5 respectively. No changes are proposed to the existing on-site car park, which currently also accommodates the site's loading. As such, no swept path analysis has been conducted. Parking requirements (car, bicycle and motorcycle) have been assessed against the relevant requirements including DCP, Austroads and EFSG. Refer to Section 9.
3	Analysis of the impacts due to the operation of the proposed development, including: • proposed modal split for all users of the development including vehicle, pedestrian, bicycle riders, public transport, school buses and other sustainable travel modes. • estimated total daily and peak hour vehicular trip generation. • a clear explanation and justification of the: – assumed growth rate applied. – volume and distribution of proposed trips to be generated. – type and frequency of design vehicles accessing the site.	The existing travel modal split has been determined based on the commissioned travel modes surveys. Proposed travel mode targets have been set to achieve a lower reliance on the private vehicle. Growth rate of 1% has been applied to the surveyed traffic volumes to determine the future base case (based on School opening in Term 1, 2023) and horizon year (10 years post school opening) volumes.

	• details of performance of nearby intersections with the additional traffic generated by the development both at the commencement of operation and in a 10-year time period (using SIDRA network modelling). • cumulative traffic impacts from any surrounding approved development(s). • adequacy of pedestrian, bicycle and public transport infrastructure and operations to accommodate the development. • adequacy of car and motorcycle parking and bicycle parking provisions when assessed against the relevant car / bicycle parking codes and standards. • adequacy of the drop-off / pick-up zone(s) and bus bay(s), including assessment of any related queuing during peak-hour access. • adequacy of the existing / proposed pedestrian infrastructure to enable convenient and safe access to and from the site for all users.	Traffic distribution has been determined based on the student catchment and existing intersection operations. See Section 8.2. The intersections have been analysed using SIDRA Intersection 9 with the additional traffic generated by the development both at the commencement of operation and in a 10-year time period. Results show that the road network will perform within he acceptable limits post the proposed upgrades. The cumulative traffic impacts are considered as part of the background traffic growth. Results of the modelling are detailed in Section 8. The adequacy of pedestrian, bicycle and public transport infrastructure and operations to accommodate the development is examined in detail in Section 5. Reference has been made to the relevant standards and guidelines to determine the parking provisions.
4	Measures to ameliorate any adverse traffic and transport impacts due to the development based on the above analysis, including: • travel demand management programs to increase sustainable transport (such as a School Transport Plan). • arrangements for the Travel Coordinator roles. • governance arrangements or relationships with state and local government transport providers to update roads safety. • infrastructure improvements, including details of timing and method of delivery.	The accompanying Preliminary School Travel Plan outlines these items.
5	A preliminary school transport plan detailing an operational traffic and access management plan for the site, pedestrian entries, the drop-off / pick-up zone(s) and bus bay(s).	The accompanying Preliminary School Travel Plan outlines these items.
6	Analysis of the impacts of the traffic generated during construction of the proposed development, including: • construction vehicle routes, types and volumes. • construction program (duration and milestones). • on-site car parking and access arrangements for construction, emergency and construction worker vehicles. • cumulative impacts associated with other construction activities in the locality (if any). • road safety at identified intersections near the site due to conflicts between construction vehicles and existing traffic in the locality. • measures to mitigate impacts, including to ensure the safety of pedestrian and cyclists during construction.	A preliminary Construction Traffic Management Plan (CTMP) has been provided in Section 11.
7	A preliminary Construction Traffic and Pedestrian Management Plan.	A preliminary Construction Traffic Management Plan (CTMP) has been provided in Section 11.

1.5 Detailed Stakeholder Engagement

Over the course of the development of this Plan, Ason Group has consulted with key stakeholders including Transport for NSW (TfNSW), North Sydney Council, Sydney Buses, the Deputy School Principal and the SINSW. This report provides details of consultation undertaken by the Project Team in its preparation of this TA.

1.5.1 Council & TfNSW Joint Project Working Group

Table 2: Engagement 1

TRANSPORT WORKING GROUP MEETING 01	
Date	22/07/2021
Time	14:00 to 14:45
Location	MS Teams
Purpose	To form the Transport Working Group and to discuss the transport related elements relating to the proposed upgrades to the North Sydney Public School.
Attendance	• North Sydney Council – Iman Mohammadi (IM) • TfNSW – Pahee Rathan (PR) – Joanna Lau (JL) – Steven Finnan (SF) – Zhaleh Najari Alamouti (ZNA) – Emma Burke (EB) • SINSW – Alfred Jury (AJ) – Rebecca Lehman (RL) • Sydney Buses – Egwin Herbert (EH) • Turner & Townsend – Tarini Pathak (TP) • Ason Group – Dora Choi (DC) – Tanya Chen (TC) Apologies • North Sydney Council – Michaela Kemp (MK) • TfNSW – Sarah McKay (SM)
ACTIONS	
01	MK/ IM to review Council's Survey Data and if available, issue tube counts data for McHatton Street and Bay Road to Ason
02	IM/MK to review the decal installations and provide feedback if they were a Council funded program
03	DC/TC to send existing decal photo's to IM/MK
04	DC/TC to issue email to PR to confirm the SIDRA growth rate to be adopted
05	SF to confirm if bus route figures can be provided in GIS and to provide if possible.
06	TR to circulate power point slides and contacts details to the TWG
NOTES	
1) RL explained the purpose of the Terms and Reference document, highlighting the confidential nature and that it is yet to be signed but we are assuming that it will be. 2) DC provided a project overview and the relevant traffic and transport elements 3) DC explained that due to the current Covid -19 restrictions Ason is unable to commission survey data. As such, we have purchased SCATS data for the Pacific Highway/ McLaren Street and the Pacific Highway/ Bay Road intersections as well as previous TMC counts at those intersections from April 2018 and September 2017, respectively. 4) DC noted that in our discussion with MK on 21/07/2021, MK would check if Council had any previous tube counts for McHatton Street and Bay Road, and if so they would be issued to Ason.	

5) IM queried the accessibility from the existing Kiss and Ride along McHatton Street to the school. TP acknowledged the existing situation and whilst the project team is not in a position to rectify this situation along McHatton Street, proposes to relocate the main access to Bay Road and create an accessible entrance to/from Bay Road. This will also result in the kiss and ride being partially relocated from McHatton Street to Bay Road, subject to further discussions.
6) DC queried EH/SF on the need to increase the length of the existing bus bay to service the existing school bus and if they knew of any current operational issues. EH/SF both indicated that during the school pick-up/drop-off periods access to the bus zone was not an issue. Issues arise outside of these periods when the bus bay is not available and buses arrive for school excursions/ sports etc. IM indicated that if the bus zone length were to increase, there would need to be no net loss to the surrounding car parking, ie loss of pick-up/ drop off spaces (No Parking, 5m P or ¼ P) and not 1P or 2P spaces.
7) RL noted that North Sydney Oval could be used as a remote pick-up/drop off zone for buses, with supervised travel between the school and the oval for students.
8) DC queried IM on the previous installation of directional pavement decals surrounding the school and if they were a Council funded program. If so, would it be possible to refurbish these decals?
9) DC queried PR on the background growth rate to be adopted for the SIDRA modelling. Indicatively a 1% increase should be adopted.
10) RL asked SF if the existing bus route figures could be issued to Ason in GIS for analysis. SF to confirm
11) RL queried if there were any planned bus routes upgrades for the area. JL indicated that the bus network is not expected to change until the Metro is constructed, which is expected to be in 2024. SF confirmed that there would be limited to no changes to the existing school bus routes.
12) DC queried if there was a way to validate the bus usage by students, as Ason had been informed that the bus usage was relatively low. SF indicated that school children rarely tap on and off and hence it is difficult to capture who is using the bus. EH/SF stated a more accurate indication would be to count of the number of students when the bus arrives at the school.
13) DC noted that approximately 60 students are transferred by Bus to an off-site Out of School Hours Care (OSHC) facility.
14) RL noted that the Preliminary School Travel Plan (STP) should include a campaign to encourage students to tap on and off.
15) DC noted that discussions with the deputy school principal indicated very limited active travel focus. RL queried IM if there is a Sustainable Transport Contact within Council who could assist. IM to send over the Sustainable Transport Contact who will be invited to the next Transport Working Group (TWG) meeting.
16) DC noted that the school is currently working collaboratively with Council with respect to an off-site OSHC program. Currently the Leisure Centre operates an off-site OSHC facility, with leisure centre staff walking the students between the school and the OSHC facility.
17) The next TWG Meeting (02) is to be held on 9 August 2021.

Table 3: Engagement 2

TRANSPORT WORKING GROUP MEETING 02	
Date	09/08/2021
Time	16:00 to 16:45
Location	MS Teams
Purpose	To discuss the transport related elements relating to the proposed upgrades to the North Sydney Public School.
Attendance	• North Sydney Council – Michaela Kemp (MK) • TfNSW – Steven Finnan (SF) – Zhaleh Najari Alamouti (ZNA) • SINSW – Alfred Jury (AJ) – Rebecca Lehman (RL) • Turner & Townsend – Tarini Pathak (TP) – • Ason Group – Dora Choi (DC) – Tanya Chen (TC) Apologies • TfNSW – Pahee Rathan (PR) – Joanna Lau (JL) – Sarah McKay (SM) • Sydney Buses – Egwin Herbert (EH)
ACTIONS	
01	MK to review Council pedestrian data for McHatton Street. Send over counts as soon as possible.

02	DC/TC to circulate Draft TA for comment on the SIDRA assumptions. Comments required to be received prior to 12/08/2021.
03	SF to provide future bus contact details once known
04	ZNA to provide TWG with TfNSW Ops contact
05	RL to circulate Parramatta Council Pedestrian Warrants Assessment Document
06	DC/TC circulate power point slides and meeting minutes.

NOTES

1. DC provided a project update to the traffic and transport elements, including that Ason had issued Draft TA and PSTP's to the internal project team.
2. DC mentioned that the student surveys currently indicate a high proportion of walking as the primary mode of travel, with approximately 25% of students arriving/departing via private vehicle. There was also a very low reliance on bus travel.
3. DC noted that the proposal will include a new pedestrian entry and forecourt along Bay Road.
4. DC noted that the proposal seeks to modify some of the car parking restrictions along the Bay Road and McHatton Street frontages, to provide a Kiss and Ride (No Parking) area along Bay Road and reduce the length of the Kiss and Ride (No Parking) along McHatton Street. Overall, the provision of Kiss and Ride spaces remains consistent with the current provision. It was noted that any parking signage changes requires approval from Council.
5. DC noted that there is currently one on-street accessible space along McHatton Street. As part of the proposal, Ason was looking at what would be required to provide an on-street space along Bay Road. Again, it was acknowledged that any parking restriction changes would require Council approval.
6. DC explained that due to the current Covid -19 restrictions Ason is unable to commission survey data. As such, we have purchased SCATS data for the Pacific Highway/ McLaren Street and Pacific Highway/ Bay Road intersections as well as previous TMC counts at those intersections from April 2018 and September 2017, respectively.
7. DC noted that we have received email confirmation for PR to adopt a 1% growth rate.
8. DC explained that due to the high pedestrian volumes expected in the area, Ason have assumed the following with respect to the pedestrian inputs and therefore seek clarification from Council and TfNSW regarding these assumptions and figures:
   - SCATS does not provide pedestrian volumes and therefore we have adopted 300 pedestrian movements for the 'base case'.
   - A 1% growth factor has been added to analysed scenarios
   - A minimum pedestrian green time of 10 seconds has been adopted (increased from the default 5 second allowance).
   - SIDRA provides an option to optimise the timing. However, the Ason analysis has been reviewed to ensure that the optimisations do not reduce the current pedestrian timings.

     NOTE: Any changes to the signal phasing/timing to improve the level of service will require approval from TfNSW.
9. RL noted that to assist in providing Ason with the above clarifications, the Draft TA would be shared with Council and TfNSW for comment.
10. ZNA noted that any changes to the signal phasing would require consent from the TfNSW Operations Team. ZNA to find out who is the best contact for the Signal Phasing discussion and provide this to the team. This has been provided.
11. ZNA noted that any changes due to the re-allocation of Kiss and Ride to Bay Street will need to be incorporated into the SIDRA Analysis. DC noted that the main driver for the new pedestrian access is to provide accessible access. The parking restrictions around the school (Bay Road and McHatton Street frontages) during school pick-up/drop-off times are typically high turnover (Kiss and Ride, 5m P and 1/4P) with pick-up/drop-off already utilising these areas.
12. RL queried SF on the bus usage and any feedback. SF mentioned no negative feedback, also noting that within the next 12 to 24 months the entire bus network will be reviewed and therefore any feedback can be reviewed as part of that.
13. SF also indicated that the bus network will soon be 'franchised' with private operators to manage the bus network on behalf of TfNSW.
14. RL noted that the STP, as a live document, will need to be updated with the new bus contact once received.
15. MK noted that the previously installed pavement markings were installed as part of a one off Council run program. There might be future opportunities for Council to refresh these markings, however it will be dependent on future Council funding and opportunities.
16. DC queried MK if she is aware of any Council pedestrian upgrades or crossing for McHatton Street. MK mentioned that Council have previously reviewed the pedestrian warrants (prior to 2020) and at that time, the pedestrian numbers did not meet the warrants. DC and RL mentioned that revised pedestrian warrants were introduced in March 2021, and thus the warrants may be met. 2015 pedestrian counts received from Council.
17. RL mentioned that Parramatta Council have prepared a pedestrian warrants assessment document. RL to circulate to the team.
18. RL noted that the TWG initiative is a new concept and thus any feedback on the process is welcome. Please forward any feedback to improve the process.

Table 4: Engagement 3

TRANSPORT WORKING GROUP MEETING 02	
Date	25/08/2021
Time	15:00 to 15:30
Location	MS Teams
Purpose	To discuss the transport related elements relating to the proposed upgrades to the North Sydney Public School.
Attendance	• North Sydney Council – Michaela Kemp (MK) • SINSW – Alfred Jury (AJ) – Jeremy Farrington (JF) – Rebecca Lehman (RL) • Turner & Townsend – Tarini Pathak (TP) – Stephanie Leaper (SL) • Ason Group – Dora Choi (DC) – Tanya Chen (TC)
ACTIONS	
01	DC/TC circulate meeting minutes.
02	North Sydney Public School SSDA to be submitted

NOTES

1. TP provided an introduction to the meeting and presented the agenda, being:
   - Comments relating to the draft SSDA TA and PSTP, red flags.
   - CTMP requirements.
2. DC and RL reiterated that the purpose of the TWG's was to try and work collaboratively with Council regarding the traffic elements of the proposal.
3. MK was asked if she had any comments regarding the draft TA and STP received. MK noted that she predominately focused on the previous queries posed, ie any issues with the assumptions for the pedestrian modelling. A high level review of the reports have not raised any 'red flags'.
4. TP indicated that some minor changes had been made to both the TA and STP, as a result of client feedback. These modifications will be included in the TA and STP submitted as part of the SSDA Submission.
5. TP queried MK on the general process for Construction Management Plans and Timing.
6. MK mentioned that CTMP's are required to be submitted to the Local Traffic Committee (LTC) for review. It was also noted that CTMP's and work zone signage restriction plans and approvals did not have to wait for the LTC meetings, they could be sent to the committee, as soon as submitted.

   Note: Signage restriction changes require approval from the LTC.
7. MK outlined the basic CTMP requirements, as per the DCP requirements.
8. DC noted that the project team is aware of this, and that the Preliminary CTMP with the SSDA TA gives high level consideration to these elements.
9. TP provided a brief overview of the proposed Construction Plan, highlighting the following:
   - The School is to remain open during the construction period.
   - Truck movements to be outside of the peak school periods.
   - Proposed work zone along the Bay Road frontage.
   - Potential to provide a gantry and site accommodation above the footpath.
   - Truck routes as follows:
     – Entry – Pacific Highway, Berry Street, Edward Street and then onto Bay Road.
     – Exit Bay Road onto Pacific Highway.

     This route was chosen as it is the shortest and is expected to impact on the least amount of residents,
10. MK noted that residents will have the opportunity to review the truck routes and provide comment, in particular those residing in Edward Street.
11. MK noted that different permits and costs are associated with the different CTMP approaches.
12. DC queried if the preparation of the CTMP can be prepared concurrently with the SSDA Application, due to the timing pressures, and if Council/ LTC would be able to provide comment/ review if the SSDA Application has not been decided.
13. MK stated that any CTMP prepared would not be referred to the LTC or internally within Council until a decision had been granted for the application. This was to also ensure that any CTMP meets the relevant requirements of the decision.

14. RL asked if it would help if the team sent across the most recent CTMP conditions, as they appear to remain quite consistent across the different Council areas.
15. MK stated that at this stage, Council would stick to the standard procedures, being that the CTMP would only be referred once a decision and any relevant conditions were approved.

2 Strategic Context

2.1 North Sydney Development Control Plan

The North Sydney Planning Area includes an education precinct located on the western edge of the North Sydney CBD. With respect to the education precinct, the DCP provides the following:

- New development within the Planning area should result in:
  - a vibrant and engaging Education Precinct with safe pedestrian networks and a range of formal and informal public spaces for students to study, socialise and engage with the local community.
  - a high level of public transport patronage which is easily accessible to residents, workers, students and visitors.
  - the area being linked to the Sydney CBD, other suburban centres and many parts of the Sydney Region by rail and bus as well as by road and is a place of interchange between the various modes.
- The Education Precinct focuses around the following key educational establishments:
  - Australian Catholic University (ACU);
  - The Sydney Church of England Grammar School (Shore); and
  - North Sydney Demonstration School (The Site).
- Public Transport, including walking and cycling, is the main form of access to the North Sydney CBD and the Education Precinct
- Traffic is managed in a way that maintains pedestrian safety and the quality of the public realm and minimises traffic generation
- Rear lanes allow for the primary vehicular access to properties
- Limited increase to the capacity of private parking
- Pedestrians are assisted to safely cross barriers such as the Pacific Highway
- Educational establishments are oriented to the public realm to provide increased surveillance and activation

Figure 2: Educational Precinct[1]:

[1] NSDCP (2013) Amended November 2020

2.2 Movement and Place Framework

The Movement and Place is a cross-government framework for planning and managing roads and streets across NSW. The framework delivers on NSW policy and strategy directions to create successful streets and roads by balancing the movement of people and goods with the amenity and quality of places.

The below provides a brief summary of how Movement and Place is relevant for the school development.

2.2.1 Place Analysis

The place analysis makes reference to the importance of the location in its physical form, the activity and generates and how its meaning is characterised for the community.

With reference to the movement impacts on place, the framework recognises the need to provide safe, direct, and comfortable walking and cycling routes as the backbone of active travel, including to schools and linking local activities to local recreation, giving priority to car-free arrival points and providing minimal parking. Of relevance to the Proposal, built environment indicators for Primary Schools extracted from the Practitioner's Guide to Movement and Place is presented in **Figure 3.**

USER OUTCOME	INDICATOR	MEASURE	DESIRED OUTCOME	DATA SOURCE
Amenity and Uses				
Convenient facilities	Primary schools	Walkable access to primary schools	Positive indicates increase in catchment	GIS network analysis

Figure 3: Built Environment Indicators

2.2.2 Movement Analysis

The concept of movement as characterized by the Framework describes the demand to, from and through the activity centres, and describes the series of modal networks interlinking them. With reference to the schools location – forming part of the education precinct of the North Sydney DCP – it is interlinked by the road network, which is of adequate width to provide for bus services, as well as pedestrian footpaths and a dedicated cycling routes.

2.3 North Sydney Transport Strategy

The *North Sydney Transport Strategy (NSTS)* prepared by NS Council has been prepared as a guiding document for Council to its transport planning and management functions, which includes strategic transport planning, transport advocacy and the delivery of local transport projects. The NSTS builds on the directions, outcomes and strategies detailed in North Sydney's Community Strategic Plan 2013-23 (CSP) and Ecologically Sustainable Development Best Practice Project 2014 (ESD) to create an over-arching transport planning and management framework for the whole Council.

Feedback reported within the document highlighted that, in general, North Sydney Communities aspired for the transport networks to prioritise walking, cycling and public transport over car based travel, noting that an increase in parking supply and traffic capacity results in increased traffic demands, increased congestion at upstream and downstream pinch points, reduced walking, cycling and public transport uptake and inherent negative impacts upon local amenity and safety.

The NSTS provides the following Modal Hierarchy for North Sydney, as shown in Figure 4

Figure 4: A modal hierarchy for North Sydney[2]

2.4 North Sydney Integrated Cycling Strategy

The North Sydney Integrated Cycling Strategy (NSICS) was prepared in June 2014 by GTA for Council to assist in a justified and consistent approach to cycle planning and management, to ultimate increase the uptake in cycling in North Sydney.

The document provide the following goals for North Sydney:

- Deliver an accessible, safe and connected cycle network by 2020
- Make cycling an attractive choice for short trips within the LGA
- Increase and diversify participation in cycling (people of all ages and abilities will view cycling as safe, everyday transport option)

As part of the plan, the existing provision for bicycle paths are documented as well as identification of proposed connections looking to improve connectivity for the region. The purpose being to provide active connections to the wider cycling corridors that provide improved connectivity between areas of demand.

2.5 Education Precinct Public Domain Masterplan

The *Education Precinct Public Domain Masterplan (EPPDM)* was prepared by Oculus for North Sydney Council in response to one of the key actions identified in the Education Precinct Planning Study (2013).

The Education Precinct is 26 hectares of commercial, mixed use and residential land located to the western edge of the North Sydney Centre and contains the following education facilities:

- North Sydney Demonstration School (The Site);
- The North Sydney Campus of the Australian Catholic University; and
- Shore's preparatory and senior schools.

[2] *North Sydney Transport Strategy*

The precinct also accommodates approximately one third of the LGA's student population and is currently experiencing significant growth.

The key action of the study was to transform the Education Precinct into a popular and easy to reach destination in North Sydney through place making strategies that:

- Enhance the precinct's function as an urban campus;
- Better connect people, schools and places; and
- Transform street into valuable civic places.

The study identified the following improvements for the Education Precinct, with respect to access (vehicular, cycling and pedestrian), as shown **Figure 5** and **Figure 6.**

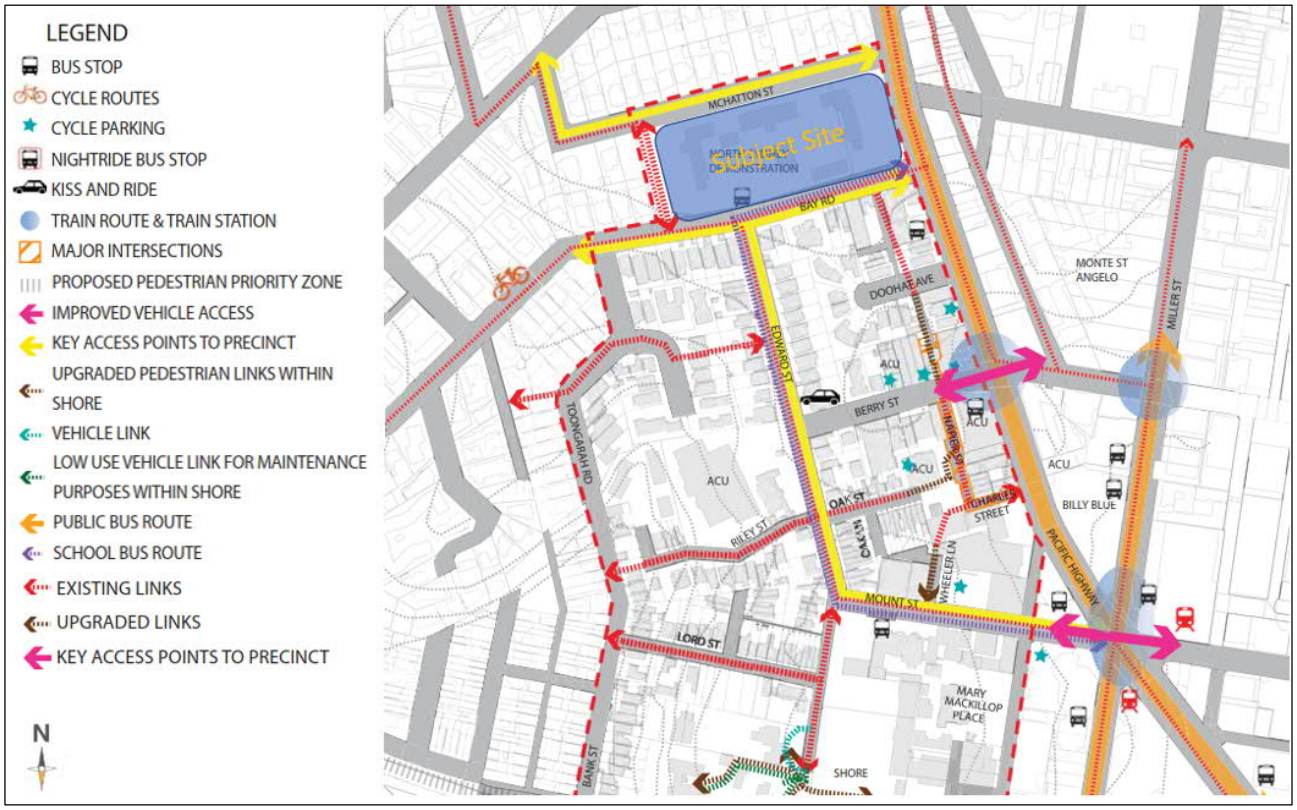

Figure 5: Detailed Analysis – Traffic[3]

[3] *Education Precinct Public Domain Masterplan (prepared by Oculus)*

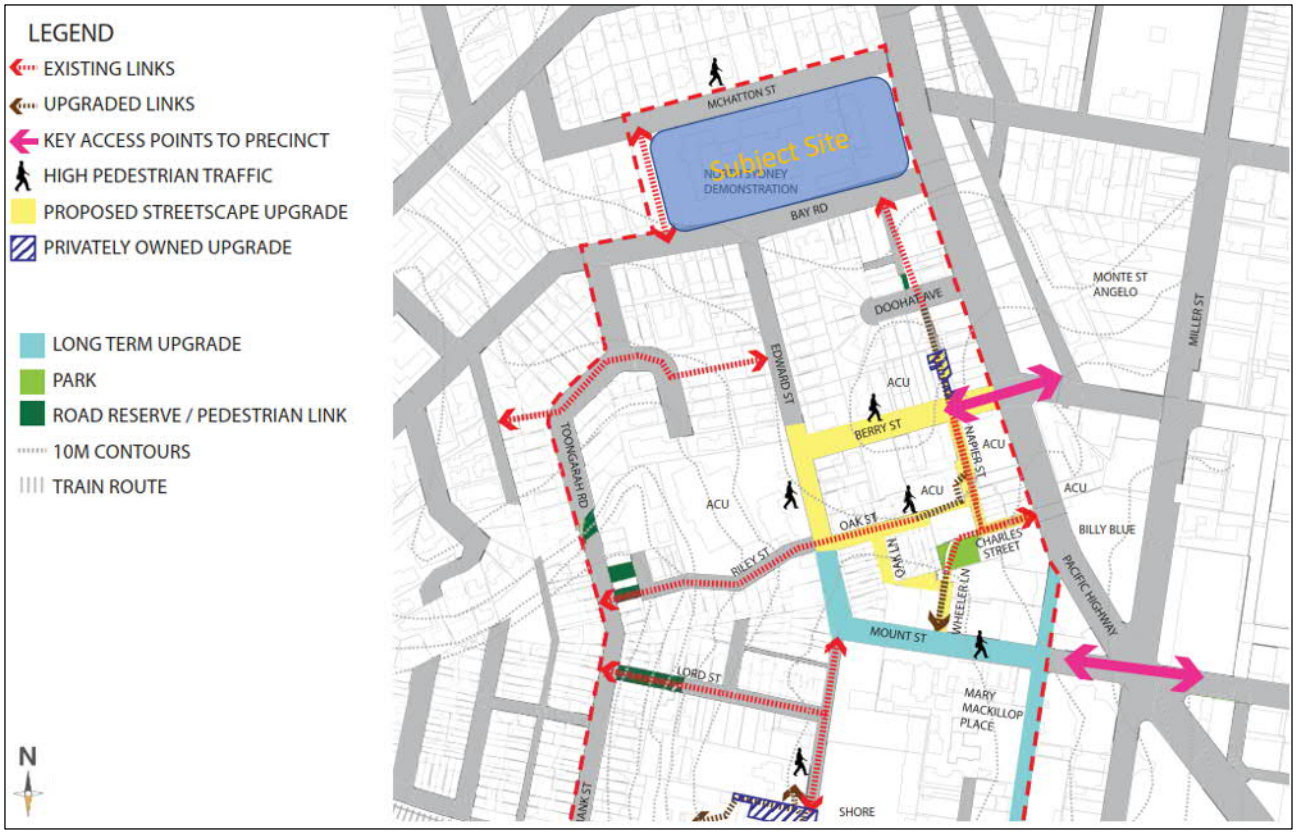

Figure 6: Detailed Analysis - Pedestrian Access Improvements[4]

2.6 Road Safety Education Program

The Road Safety Education Program is a long-term integrated education initiative funded by the Centre for Road Safety in government and non-government schools. The aim of the program is to increase road safety knowledge, understanding and skills.

Road safety education specialists in the government, Catholic and independent school sectors provide professional learning and advice to teachers and schools about teaching road safety and how to address road safety issues through the curriculum.

The teaching and learning focus is on pedestrian, passenger and wheels safety, as well as on future drivers. The Centre for Road Safety leads the development of quality teaching and learning resources for teachers to use in schools.

The education sectors provide professional learning to teachers to equip them with the knowledge and skills to teach quality road safety education. Teachers are also shown how to use the resources in the classroom to create effective teaching and learning programs.

[4] *Education Precinct Public Domain Masterplan (prepared by Oculus)*

2.7 Safety Around Schools Program

TfNSW continues to have a strong focus on improving the visibility of school zones to increase driver awareness and compliance. Schools aim to address road safety issues around their school to create a safer environment for the whole school community by:

- Teaching students about the local road safety conditions contributes significantly to improving their own safety.
- Reminding parents and carers about safe road user behaviours outside the school also contributes significantly to the safety of our students
- Working with agencies to improve local safety issues in the school zone through planning, enforcement, engineering or environmental changes.

2.8 Community Profile

2.8.1 Population

A review of Profile ID was undertaken to establish population contexts for the North Sydney Local Government Area. Profile ID sources data from Australian Bureau of Statistics (ABS) Census - accordingly, it should be noted that this data includes the wider extents of the LGA. Interpretation should account for minor variance in available statistical information.

Estimated Resident Population (ERP) demonstrates minor to moderate growth over the 15-year data period, with notable decreasing growth from 2017 from 1.81% per annum to only 0.18% growth between 2019 and 2020.

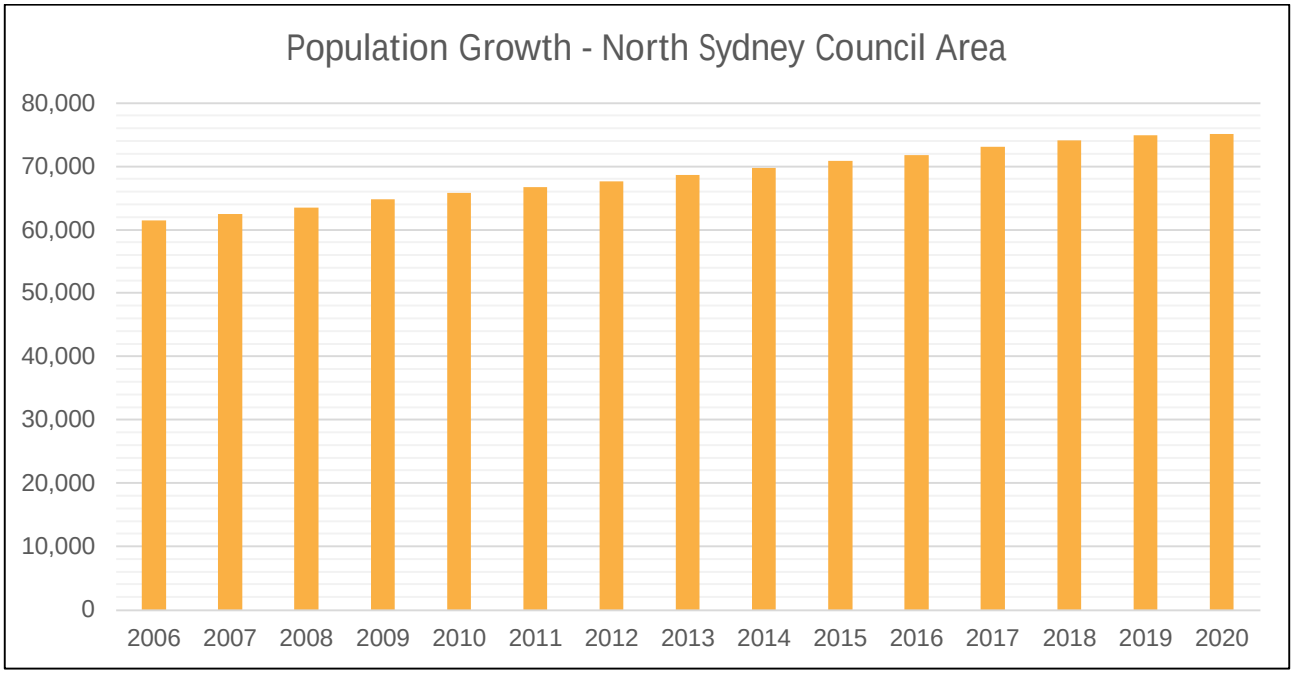

Figure 7: Estimated Resident Population[5]

[5] Australian Bureau of Statistics, Regional Population Growth, Australia (3218.0). Compiled and presented by .id (informed decisions)

2.8.2 Travel Mode Share

In the context of travel behaviour, the table below provides a breakdown for modal dependency exhibited by the North Sydney LGA during the 2018/19 collection year as captured in TfNSW's Household Travel Survey.

TABLE 5: EXISTING MODE SHARE

Travel Mode Share	% of total trips
Vehicle Driver	24%
Vehicle Passenger	9%
Train	8%
Bus	5%
Walk Only	27%
Walk Linked	25%
Other	3%

With reference to the above table, modal travel for the locality characteristically demonstrates a lower overall dependency on private vehicle usage (33%), and a higher proportion of walking and walk-linked trips (52%) – more-so than pure public transport usage (13%).

Walk-linked trips are defined as multi-segment trips that involve an ancillary travel mode. Typically, this constitutes a form of public transport (I.e., train, bus or ferry) and to a lesser extent, private vehicles.

Accordingly, the above exhibits a well-established pedestrian network with sufficient provisions to public transport connections supplemented by wide coverage of routes and services.

3 Existing Conditions

3.1 Site & Location

The site, Lot 1 in DP 183591 and Lot 1 in DP 184559, is located at 182 Pacific Highway, North Sydney NSW 2060. The site is bounded by the Pacific Highway to the east, McHatton Street to the north, low density residential land to the west and Bay Road to the south, is essentially rectangular in shape and has an approximate area of 1.93 hectares.

The site is currently occupied by North Sydney Public School, located adjacent to the North Sydney CBD and within proximity to a number of educational establishments including the North Sydney campus of the Australian Catholic University, Shore's preparatory and senior schools, Monte Sant'Anngelo Mercy College and Cammeraygal High School.

The North Sydney Public School is currently a primary school and includes the following building and facilities:

- Five (5) existing buildings;
- Six (6) demountable single-storey buildings;
- A number of outdoor spaces;
- At-grade car parking accommodating 50 car parking spaces, inclusive of 2 accessible car spaces, accessed via McHatton Street;
- Five (5) pedestrian accesses, including three (3) along the McHatton Street frontage and one (1) along each of the frontages to Bay Road and the Pacific Highway; and
- 20 on-site bicycle/ scooter parking spaces.

The Site and surrounding context is demonstrated in **Figure 8** below.

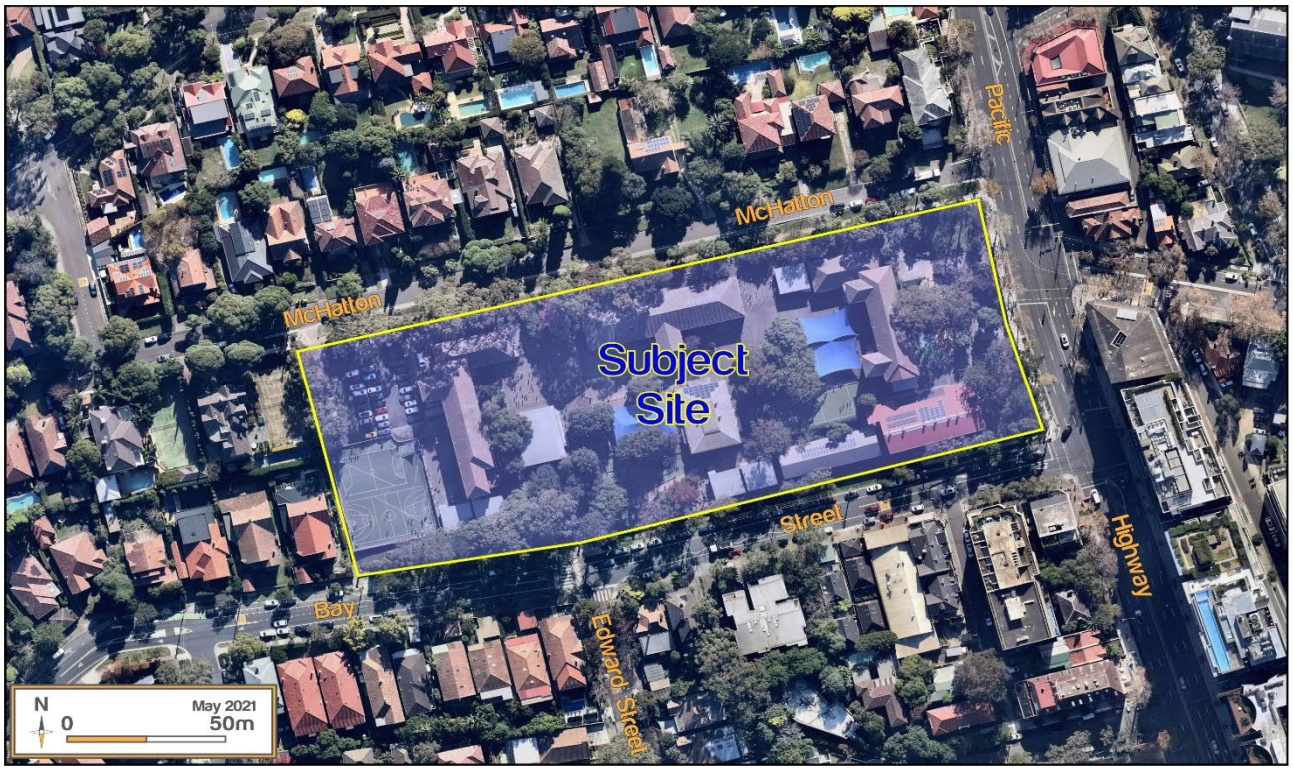

Figure 8: Site Location

The McHatton Street frontage has been used as the main access associated with car based trips to / from the school. There is significant level difference between the kerbside parking that consists of a mix of short stay parking restrictions, and Kiss and Ride restriction (i.e., No Parking restriction). Connectivity between the kerbside parking area and the footpath / School Gates along McHatton Street are provided by three staircases.

Of the five existing pedestrian access gates, only one gate located along the McHatton Street frontage does not consist of steps / stairs between the footpath and the school site. This gate is located on McHatton Street, to the east of the main pedestrian access to the existing Administration Building.

All other accesses, especially the existing gate along Bay Road consists of steps / stairs.

3.1.1 Existing Site Transport Facilities

As it relates to travel planning, the School and immediate surroundings of the School Site provide the following transport facilities:

- 20 on-site bicycle parking rails;
- 50 on-site car parking spaces for staff;
- A time restricted on-street Kiss and Ride area along McHatton Street which can accommodate approximately 10 vehicles.
- A single bus bay on Bay Road along the School frontage (northern side) between the school crossing and the Pacific Highway.
- Constructed concrete footpaths surrounding the school along McHatton Street, Princess Highway and Bay Road;
- Constructed shared path along the western boundary of the site, linking McHatton Street and Bay Road;
- Existing school crossing on Bay Road.

The existing arrangements are presented in **Figure 9, Figure 10** and **Figure 11.**

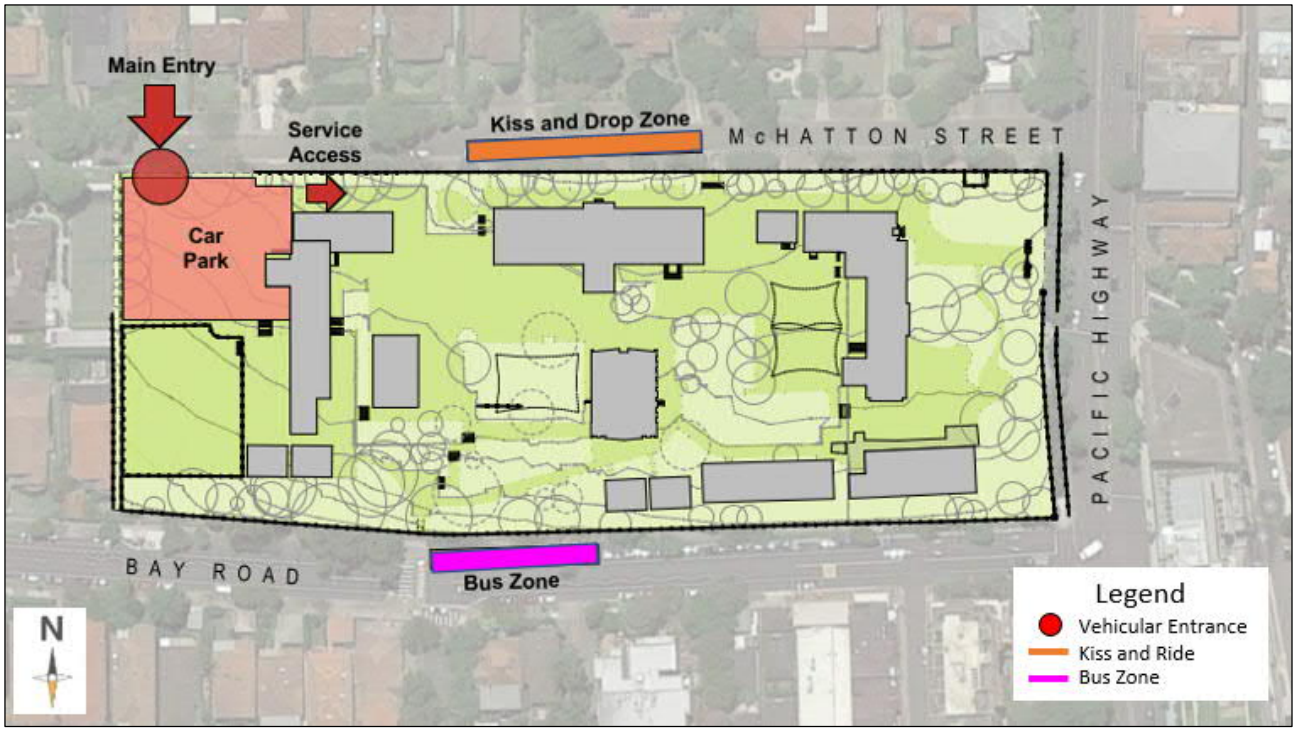

Figure 9: Existing Transport Facilities[6]

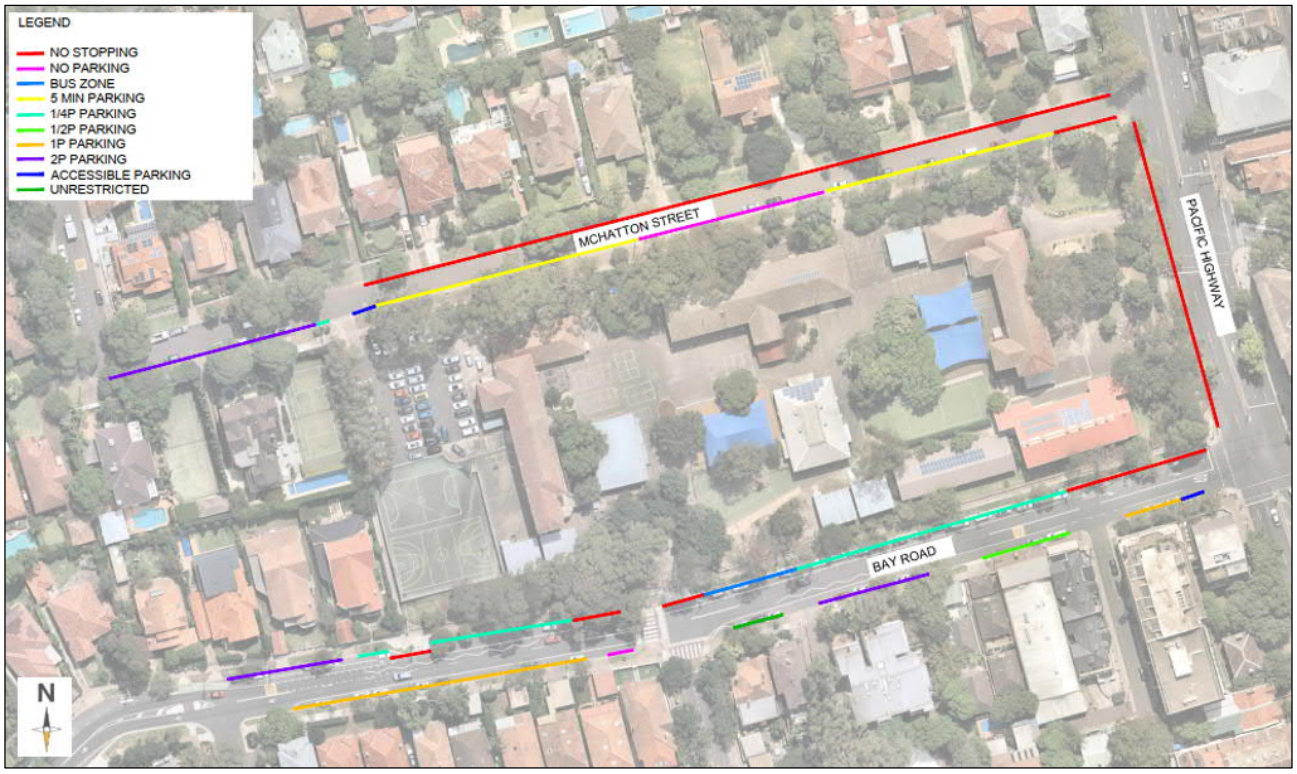

Figure 10: Existing Parking Restrictions

[6] *Fulton Trotter Architects*

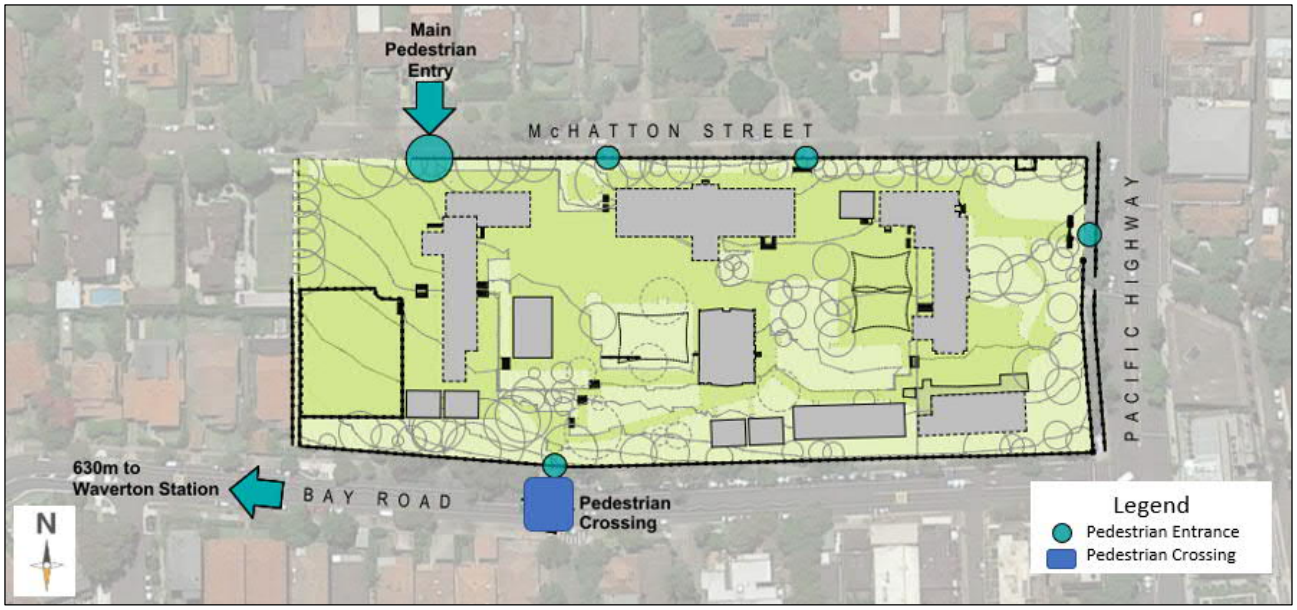

Figure 11: Existing Pedestrian Facilities[7]

[7] *Fulton Trotter Architects*

4 Road Network

4.1 Road Hierarchy

The key roads in proximity of the site are summarised in **Figure 12** with reference to the site plan and road hierarchy in **Table 6.**

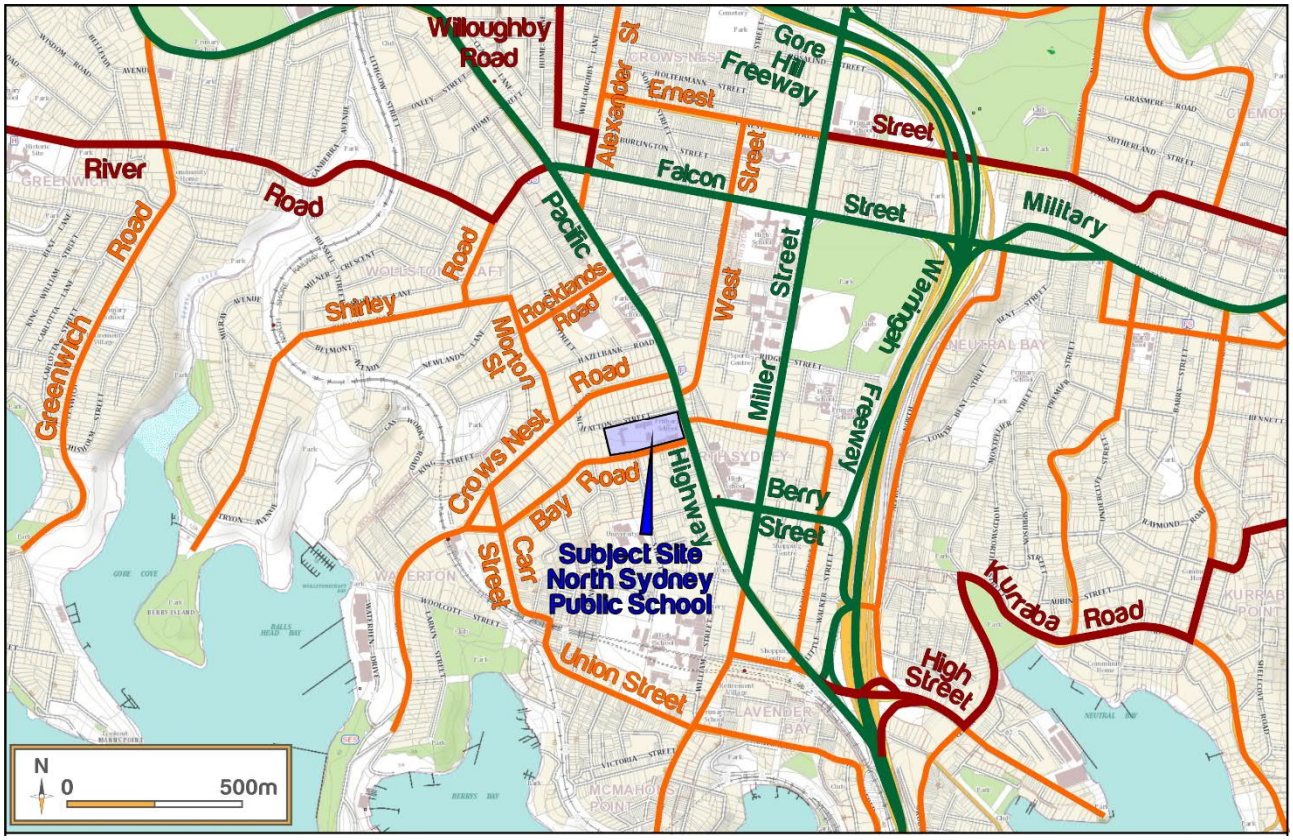

Figure 12: Site Context and Road Hierarchy

TABLE 6: KEY ROADS

Road Name	Road Classification	AADT[1] (vpd)[2]	Speed Limit[3]
Pacific Highway	Arterial	~60,000	80 km/h
Bay Road	Local Road	~10,000	50 km/h
McHatton Street	Local Road	< 5,000	50 km/h
Edward Street	Local Road	< 5,000	50 km/h

4.1.1 Traffic Volumes

At time of writing, the greater metropolitan area is undergoing a Covid 19 pandemic-induced lockdown, which in turn impact the results, consistency and integrity of traffic surveys undertaken during this period. As such, existing baseline traffic volumes have been obtained via historical SCATS detector counts provided by TfNSW. Reference should be made to the assumptions and considerations made in section 8.1.1.

The traffic count data has been assessed to define natural peak periods associated with the schools' bell times, specifically during the AM and PM Peaks. Accordingly, background peaks formed during the following hours and thus form the basis of assessment:

- AM School Peak: 8:00am to 9:00am
- PM School Peak: 3:00pm to 4:00pm

The figure below captures background movements for the two intersections in proximity of the Site.

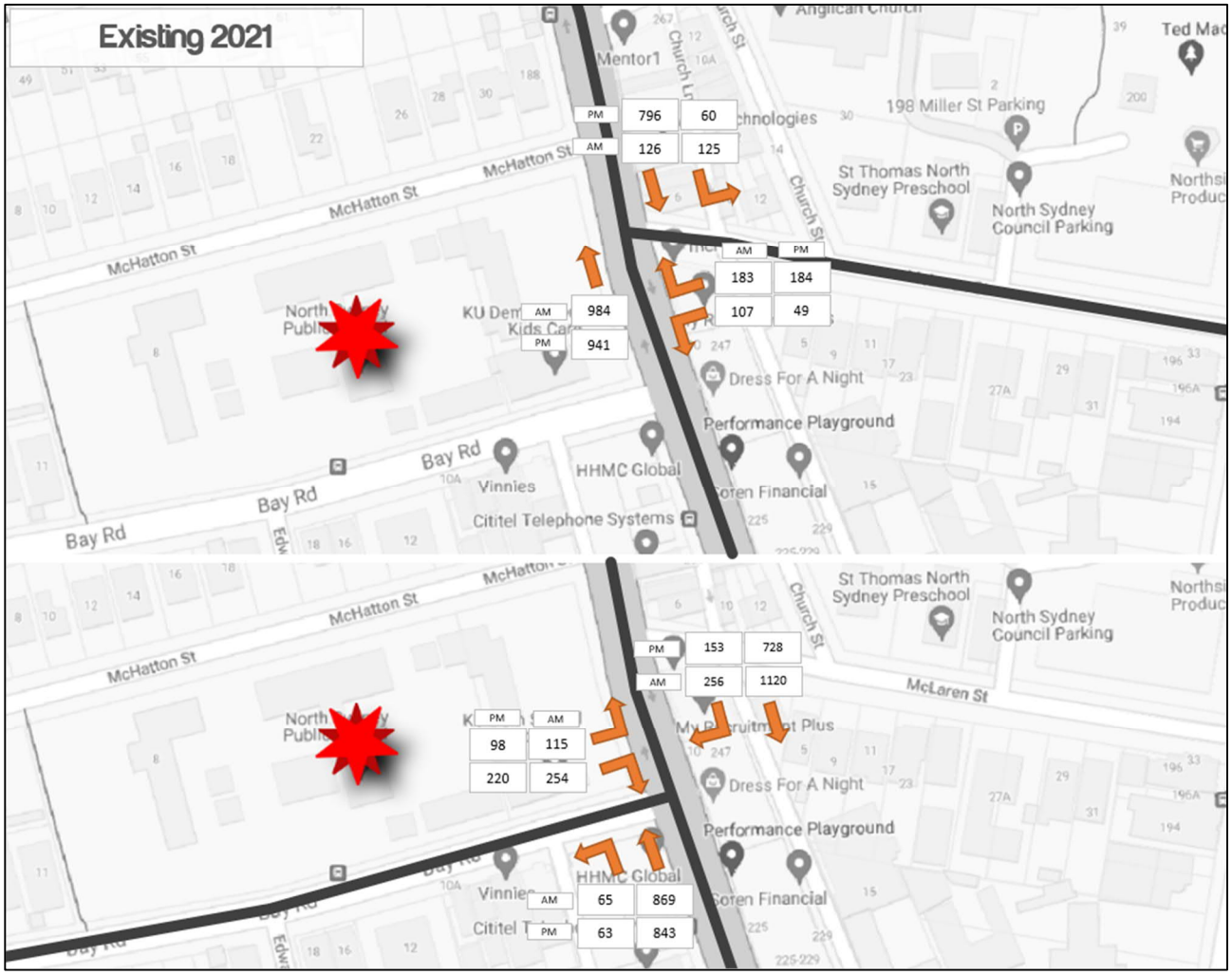

Figure 13: Existing (Background) Traffic Volumes

4.2 Baseline SIDRA Performance Testing

The performance of the existing road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA Intersection 9 modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network at key intersections within proximity of the site.

In accordance with RMS (now Transport for NSW) *Guide to Traffic Generating Developments V2.2* (2002) (RMS Guide), the Levels of Service (LOS) relevant to local roads is used to evaluate the operational performance of intersections.

According to the RMS guidelines, roads operating at LOS D or better are generally considered to have acceptable flow conditions because they are below capacity. Roads operating at LOS E or worse are generally considered to have unacceptable flow conditions because they are at or above capacity.

In this regard, the operating performance of the key intersections has been analysed using the SIDRA Intersection 9 software. SIDRA modelling outputs a range of performance measures, in particular:

- **Level of Service (LOS)** – The LOS is a qualitative measure used to relate the quality of motor vehicle traffic service. LOS is used to analyse roadways and intersections by categorizing traffic flow and assigning quality levels of traffic based on performance measure like vehicle speed, density, congestion.
- **Average Vehicle Delay (AVD)** – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- **Degree of Saturation (DOS)** – The DOS of an intersection (typically under traffic signal control) or a link measures the demand relative to the total capacity. A DoS value of 100% means that demand and capacity are equal and no further traffic is able to progress through the junction.

The SIDRA recommended criteria for the assessment of intersections as references by the RMS Guide is outlined in **Table 7**.

Table 7: RMS Level of Service Guidelines

LEVEL OF SERVICE	AVERAGE DELAY PER VEHICLE (SEC/VEH)	TRAFFIC SIGNALS, ROUNDABOUT	GIVE WAY AND STOP SIGNS
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment

4.2.1 SIDRA Layout

The below figure captures the layout geometry of the existing intersection configurations as interpreted in the SIDRA modelling software.

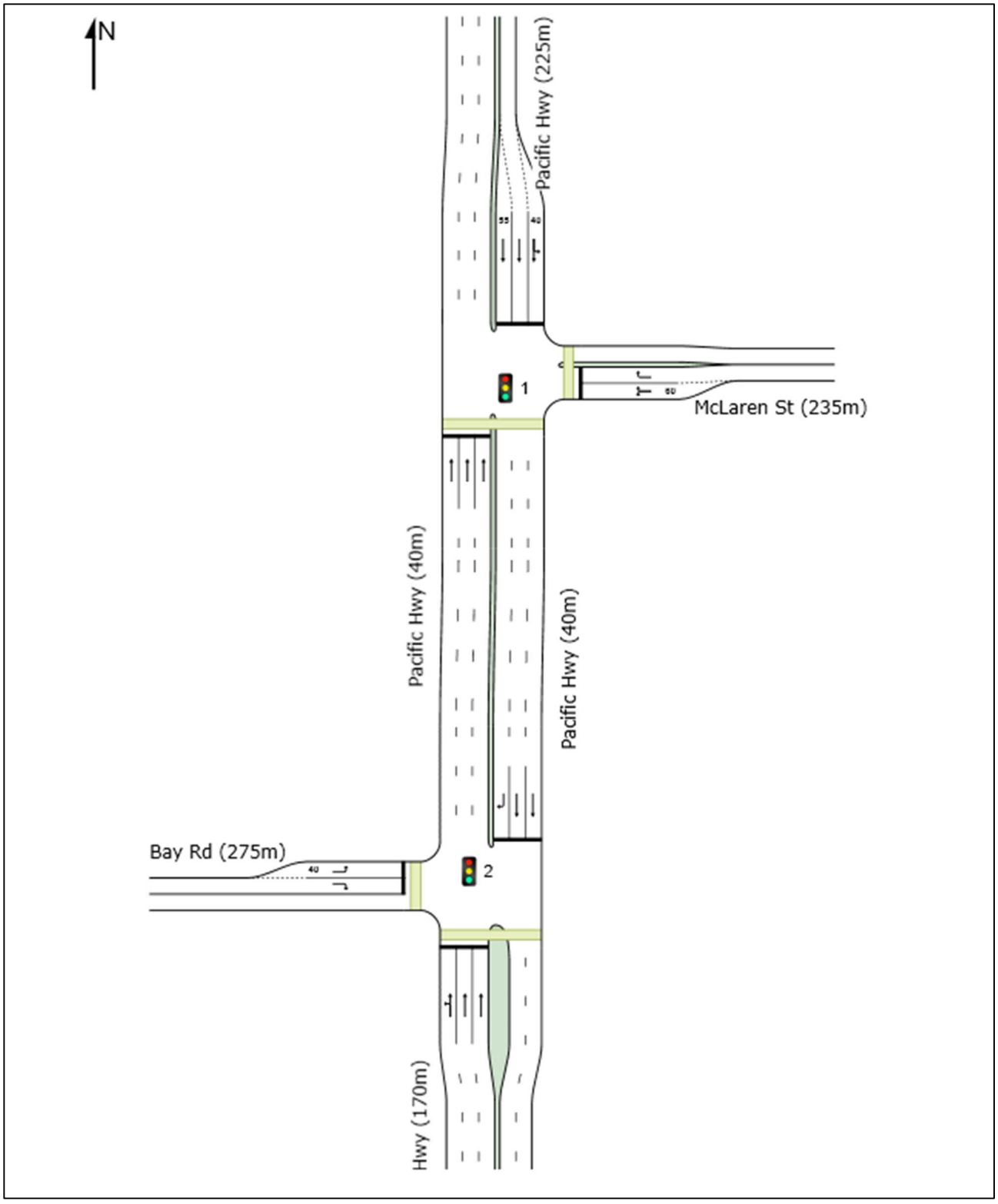

Figure 14: Existing intersection layout as modelled in SIDRA Intersection 9

4.2.2 Existing Intersection Performance

Whilst pedestrian counts were unable to be commissioned, the Site is located in an area where it is expected that higher than average pedestrian movements would be typical.

As such, the existing baseline SIDRA model incorporates the following values, greater than the SIDRA defaults:

- 300 pedestrians per hour (SIDRA default is 50)
- A minimum pedestrian green time of 10 seconds (which is greater than the SIDRA default of 5 seconds).

The results of the baseline SIDRA Intersection assessment are provided below in **Table 8.**

Table 8: Existing Baseline Performance for School Peak Periods

INTERSECTION	CONTROL TYPE	PERIOD	INTERSECTION DELAY (S)	DEGREE OF SATURATION	LEVEL OF SERVICE
Pacific Hwy / McLaren St	Signalised	AM	33	0.93	LOS C
		PM	8	0.32	LOS A
Pacific Hwy / Bay Rd	Signalised	AM	24	0.86	LOS B
		PM	31	1.23	LOS C

A copy of the existing detailed SIDRA results in presented in **Appendix B.**

4.3 Road Safety

A review of the TfNSW *Centre for Road Safety* database has been undertaken to establish the crash history within the immediate vicinity of the Site. The results are based on crashes over a five-year period between 2014 and 2019. Locations of recorded crashes are shown in **Figure 15** and details summarised in **Table 9**.

A review of the crashes indicate that the majority of crashes occurred along the Pacific Highway, with four crashes occurring at the Pacific Highway/ Bay Road signalised intersection and two crashes occurring at the Pacific Highway/ McLaren Street signalised intersection.

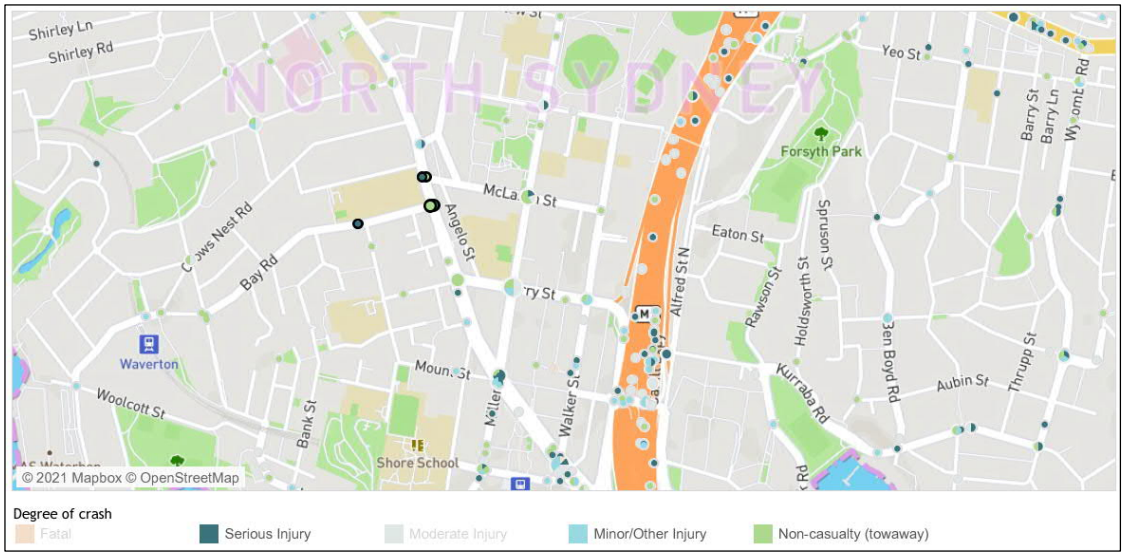

Figure 15: Crash Locations[8]

Table 9: Crash Typology

REPORTING YEAR	LIGHTING	RUM DESCRIPTION	LOCATION	INJURY
2015	Daylight	10 – Cross-traffic	Pacific Highway/ McLaren Street	Non-casualty
	Daylight	71 – Off Road Left - object	Pacific Highway/ McLaren Street	1 serious injury
2016	Darkness	10 – Cross Traffic	Pacific Highway/ Bay Road	Non-casualty
2017	Daylight	74 – On-road out of control	Bay Road, west of Edward Street	1 serious injury
	Daylight	0 – Ped nearside	Pacific Highway/ Bay Road	1 serious injury
2018	Daylight	21 – Right through	Pacific Highway/ Bay Road	Non-casualty
	Daylight	0 – Ped nearside	Pacific Highway/ Bay Road	1 serious injury

[8] *https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4*

5 Public and Active Transport

5.1 Public Transport

5.1.1 Train Connectivity

The Public School is situated in proximity of two existing train stations, being Waverton Station (approximately 650m) and North Sydney Station (~950m), with Waverton Station being the preferred option relating to walking distance.

Key serviceability details are provided in **Table 10**, with reference to **Figure 16** below.

Table 10: Existing Train Services

LINE	NAME	FREQUENCY
T1	North Shore & Western Line	Moderate Frequency (5-10 services per hour)
T9	Northern Line	Low Frequency (2-4 services per hour)
CCN	Central Coast & Newcastle Line	Low Frequency (1-2 services per hour)

Figure 16: Train Stations

5.1.2 Public Bus Connectivity

With reference to existing public bus service connectivity for the area, immediate to the Site is a bus stop along Bay Road which services the school and provides access for a single route during the AM Peak. Route details for the 265 are provided below in **Table 11** and **Figure 17.**

It is considered that broadly, the route largely operates as a public route, with only a single AM service modified for the AM School Peak (arriving at the school 8:24am).

Table 11: Existing Public Bus Connectivity

ROUTE	DESCRIPTION	SERVICE
265	Lane Cove to North Sydney via Greenwich	1 modified bus route for school service during AM Peak

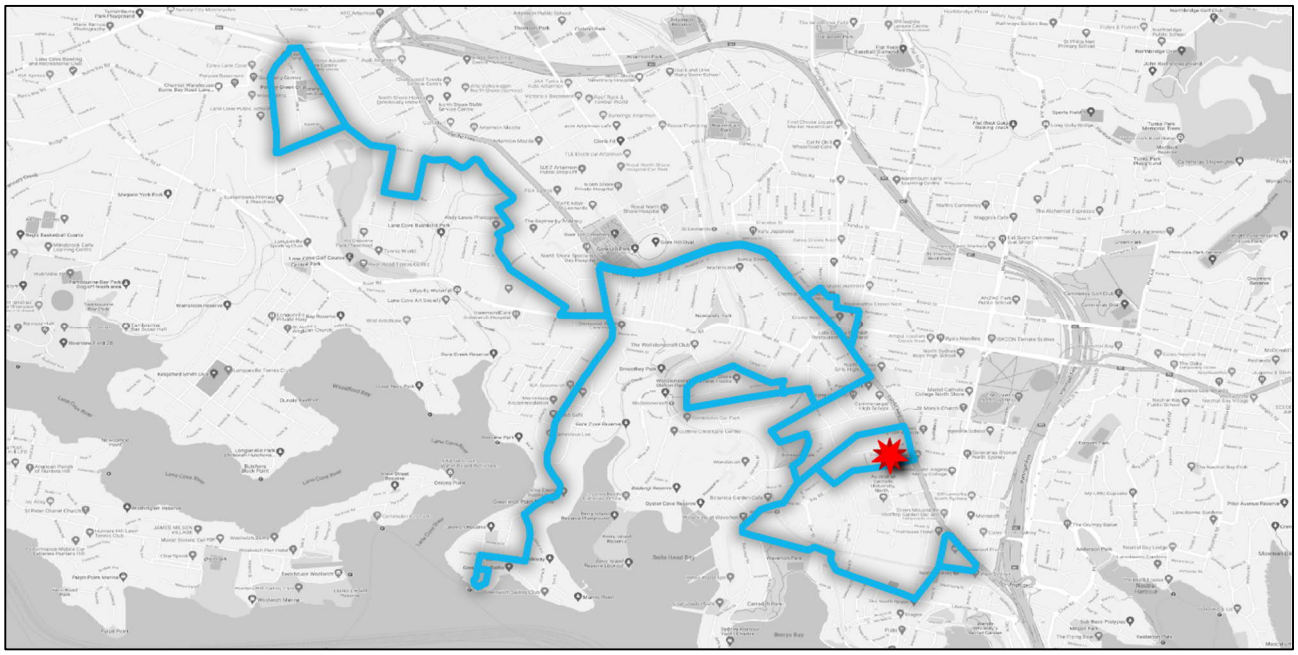

Figure 17: Route 265 (School Service)

In addition to the above, a bus stop location situated 100m north of the school along Pacific Highway provides for a number of key routes throughout greater North Sydney and the Sydney CBD area. A summary of these routes are captured in **Table 12**, with mapping extents broadly demonstrated in **Figure 18**.

Table 12: Existing Bus Routes

ROUTE	DESCRIPTION	ROUTE	DESCRIPTION
115	Chatswood to City Bridge St via North Sydney	**287**	Ryde to Milsons Point via St Leonards & North Sydney
200	Gore Hill to Bondi Junction	**290**	Epping to City Erskine St via Macquarie University & North Sydney

252	Gladesville to City King Street Wharf via North Sydney	**291**	Epping to McMahons Pt
254	Riverview to McMahons Point	**320**	Gore Hill to Mascot
261	Lane Cove to City King Street Wharf via Longueville	**N90**	Hornsby to City Town Hall via Chatswood (Night Service)
286	Denistone East to Milsons Point via St Leonards & North Sydney	**N91**	Macquarie Park to Bondi Junction via City Town Hall (Night Service)

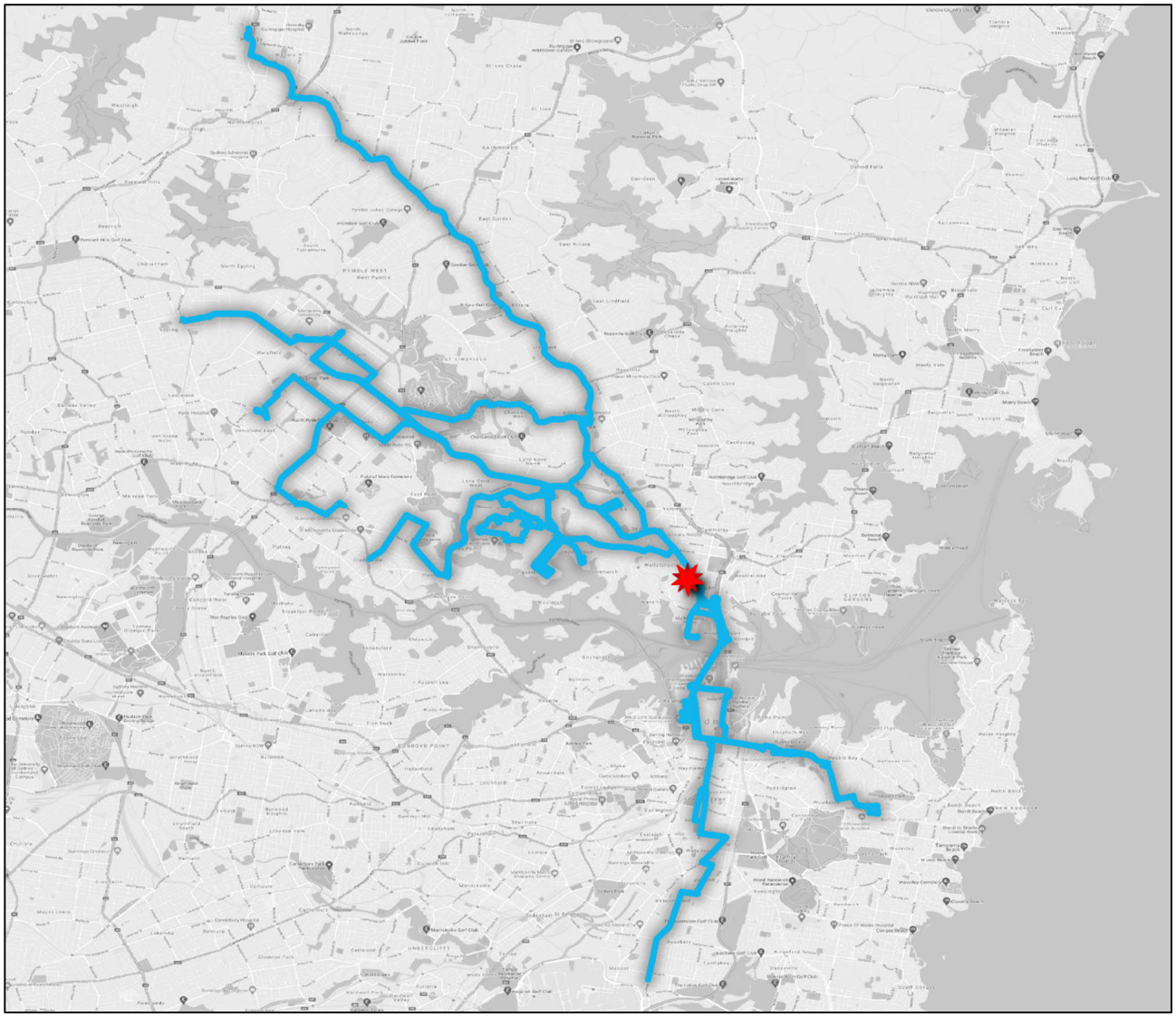

Figure 18: Public Bus Service Extents

5.1.3 Existing School Bus Connectivity

In addition to the modified 265 route during the AM Peak, the school is additionally serviced by a further 3 dedicated school routes, as captured in **Figure 19** and **Table 13**.

Table 13: Existing School Bus Connectivity

ROUTE	DESCRIPTION	SERVICE
265	Lane Cove to North Sydney via Greenwich	1 modified bus route for school service during AM Peak
664W	North Sydney Demonstration School to Milsons Point	AM and School PM services
665W	Milsons Point to Crows Nest	AM and School PM services
667W	North Sydney Demonstration School to McMahons Point	AM and School PM services

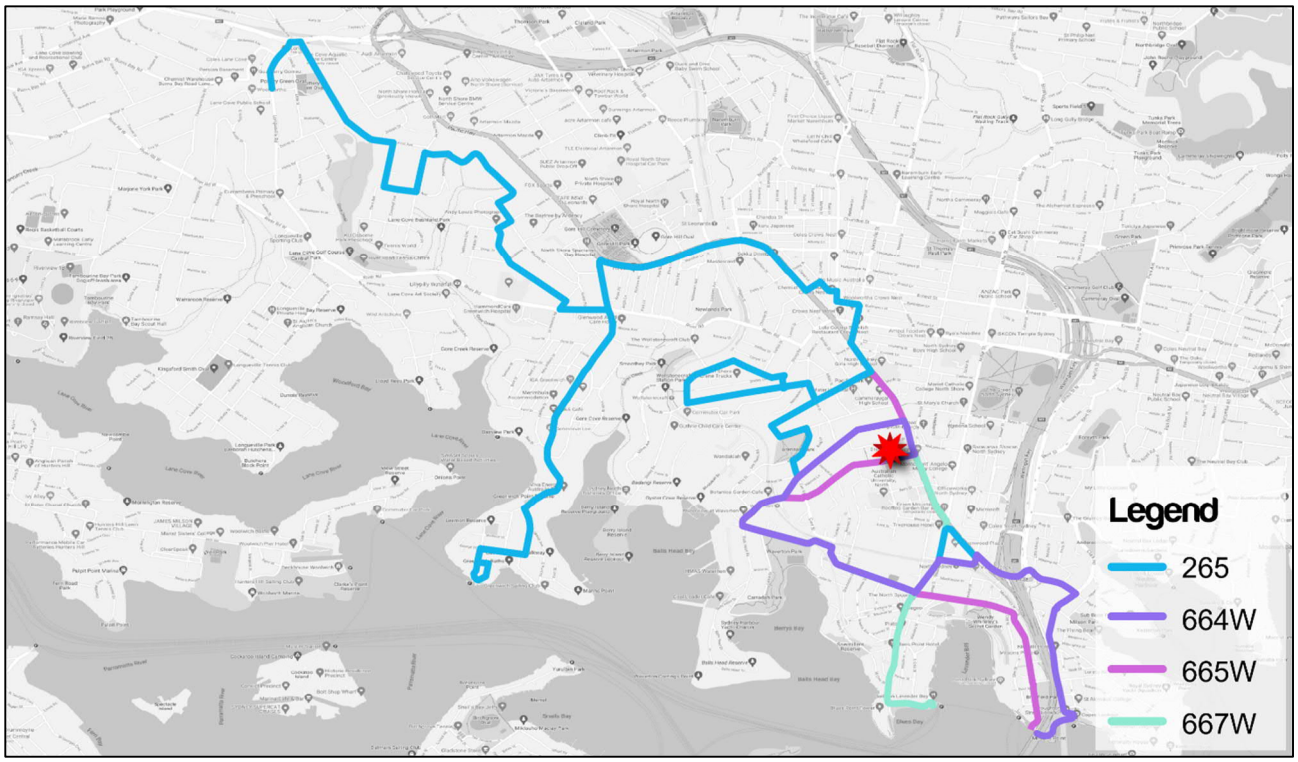

Figure 19: Existing School Bus Routes

The 664W, 665W and 667W routes demonstrate predominant serviceability towards the School south and south-east and operates within the schools' catchment zone.

5.1.4 Future Opportunities for Services

As demonstrated above, the Site demonstrates adequate and broad serviceability by public transport and accordingly, is not anticipated to require the identification of additional bus services.

It is noted that TfNSW has advised that the entire bus network will be reviewed within the next 12 to 24 months, with any changes to the existing bus routes and timetabling communicated to the public via appropriate channels.

5.2 Active Transport

5.2.1 Pedestrian Network & Connectivity

The Site is situated within an established suburb adjacent to a developed business centre in the North Sydney CBD. With reference to the pedestrian network, desktop studies as well and on-site observations confirm that the broader road network is accompanied by pedestrian footpaths, either on one or both sides of all streets.

Immediate to the Schools' frontage on Bay Road, a raised zebra crossing provides a safe location for students to access the school. To the frontage along the Pacific Highway, full movements for pedestrian crossings at the traffic signals are provided. A throughfare also exists to the west between Bay Road and McHatton Street. These locations provide broader catchment to the wider pedestrian network.

Figure 20 below shows Council's Walking Map within the context of the Public School, having regard for defined "walking routes" separate to the provision of pedestrian pathways/ footpaths.

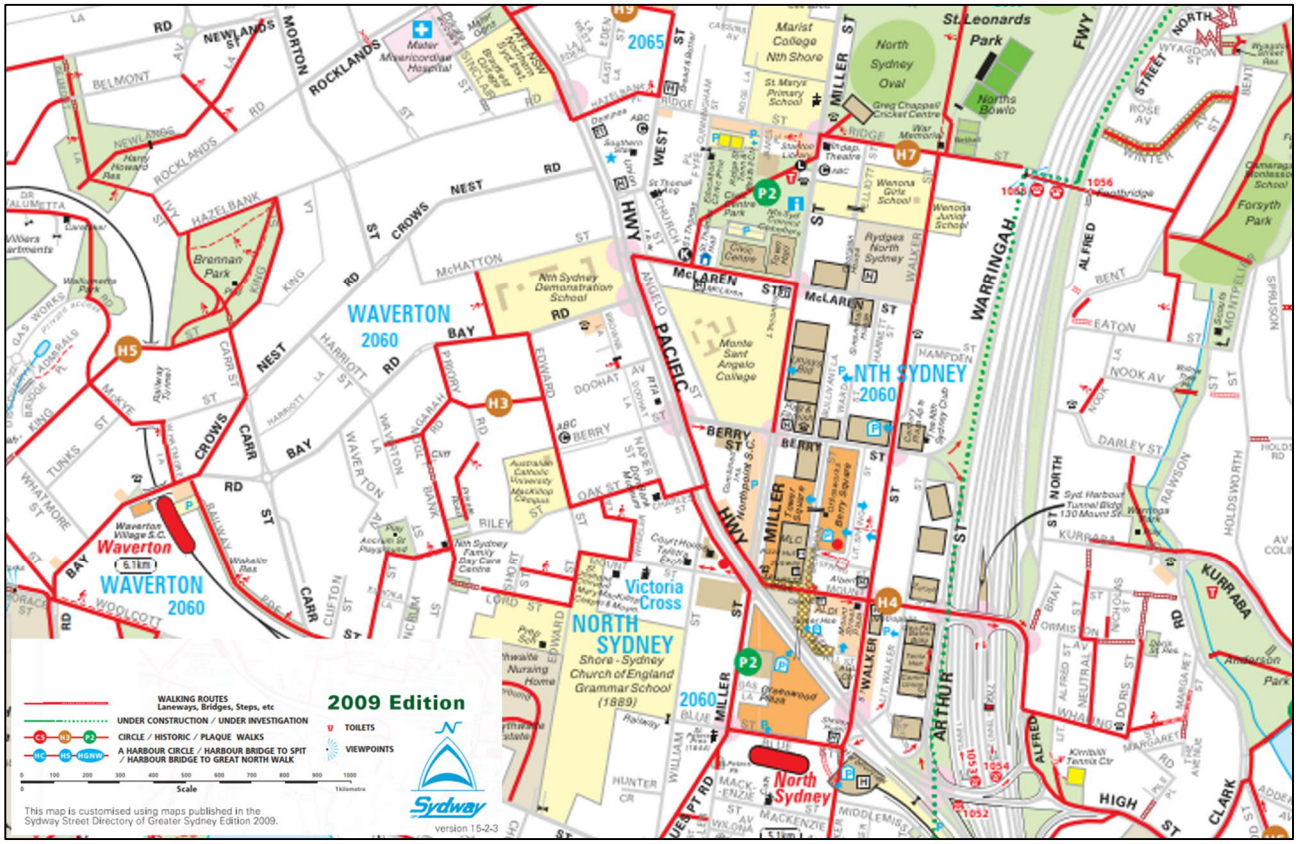

Figure 20: North Sydney Walking Map[9]

In addition, the Education Precinct Public Domain Masterplan (EPPDM) has identified the following pedestrian access improvements surrounding the Site, as shown in **Figure 21**.

These pedestrian access improvements are predominately focussed to the south of the Site, along Berry Street, Oak Street and Mount Street.

[9] North Sydney Council. *North Sydney Walking Map 2009*

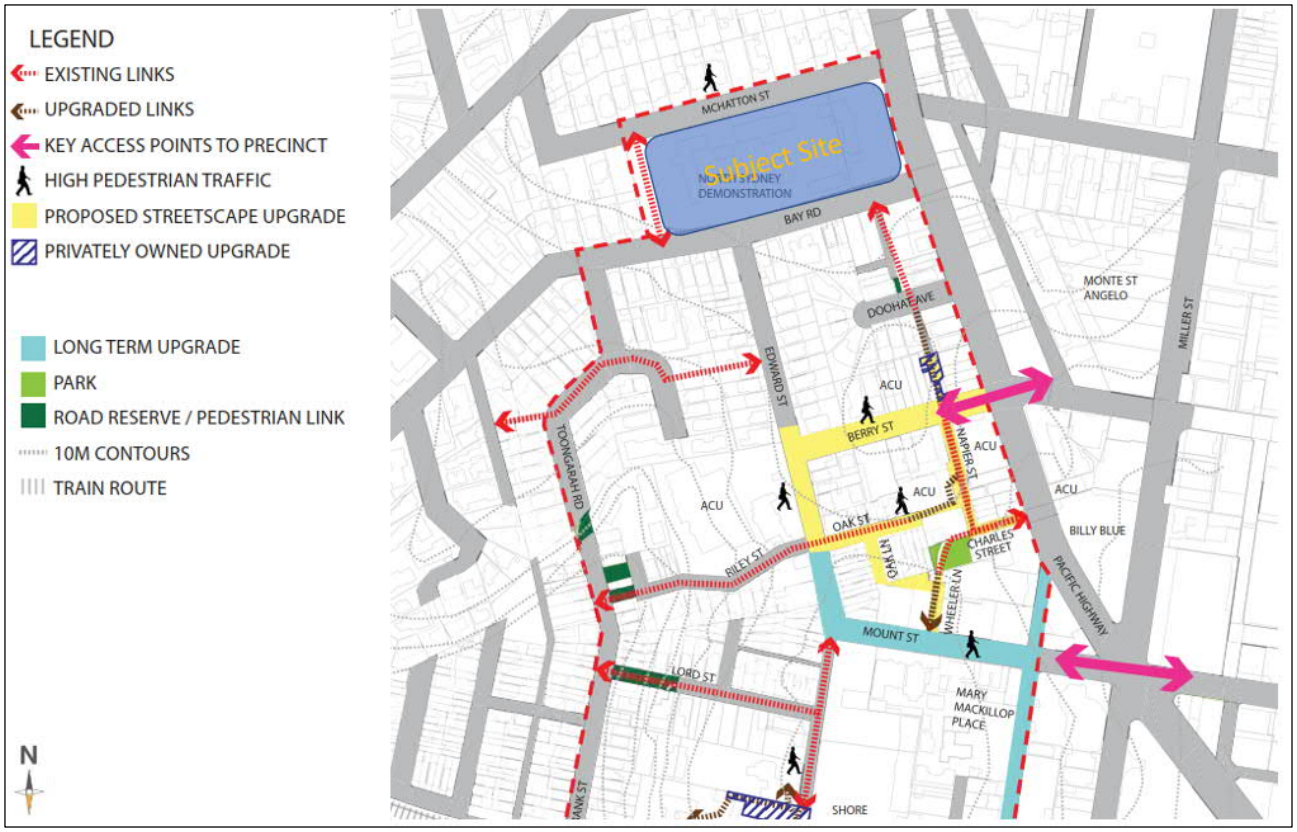

Figure 21: Pedestrian Access Improvements[10]

5.2.2 Cycling Network

With reference to existing cycling infrastructure within the Council area, **Figure 22** below captures the extents of the North Sydney Bike Map in proximity of the School. Surrounding the school includes a mix of shared user paths, and on-road bicycle routes.

Specifically, the Council map identifies the Pacific Highway as a "High Current Bicycle Use" corridor. It is considered that this is defined by usage of both on and off-road cyclists accessing the corridor.

[10] Education Precinct Public Domain Masterplan - Location Precinct Public Domain Masterplan

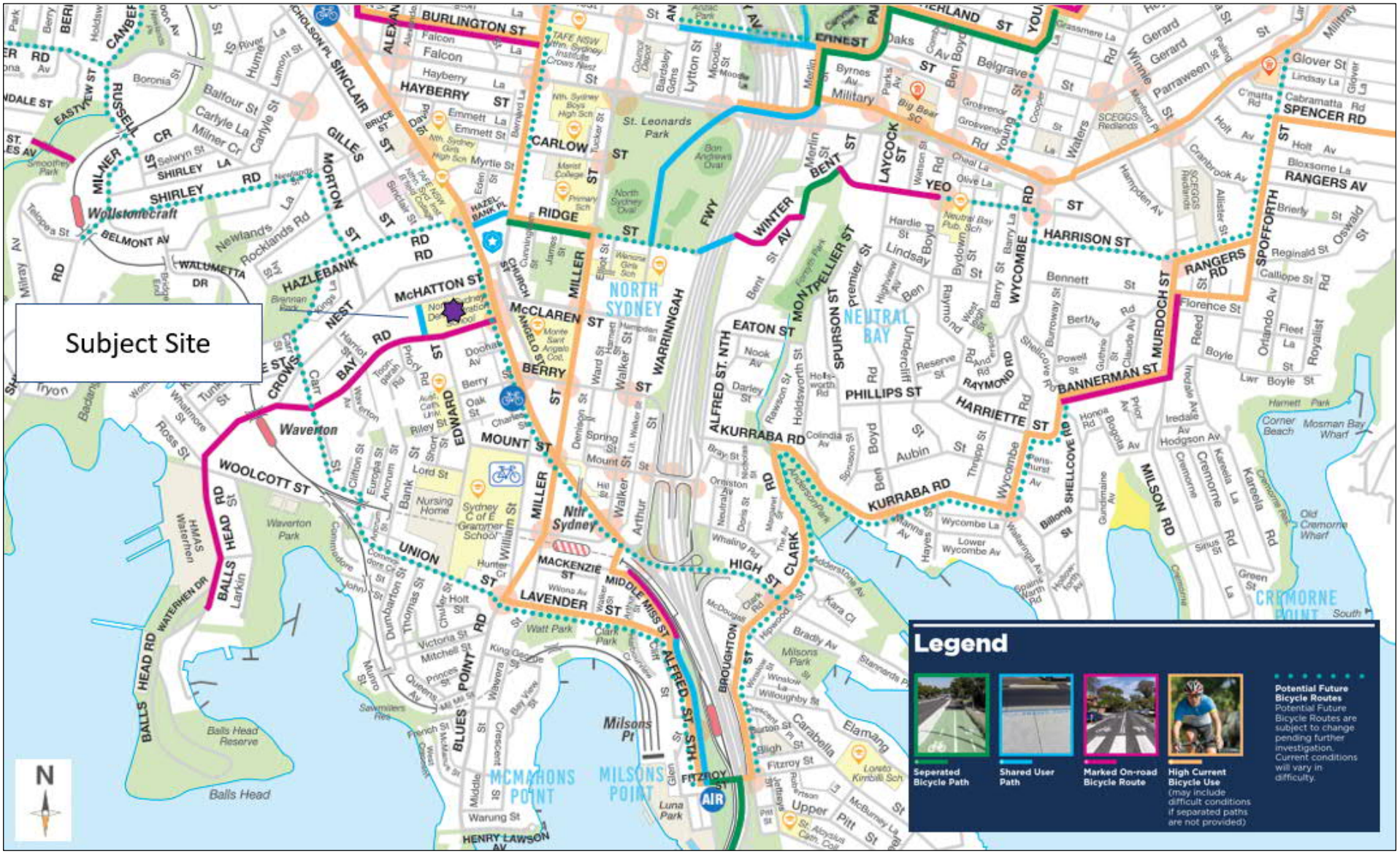

Figure 22: North Sydney Bicycle Path Network[11]

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In addition to Council's cycling map, Service NSW provides a Cycleway Finder map for the locality and characterises specific bicycle routes and infrastructure by the degree of difficulty to which the route can be traversed. Based on the figure below, the school is generally surrounded by 'moderate difficulty' routes, which effectively captures on-road cycling provisions.

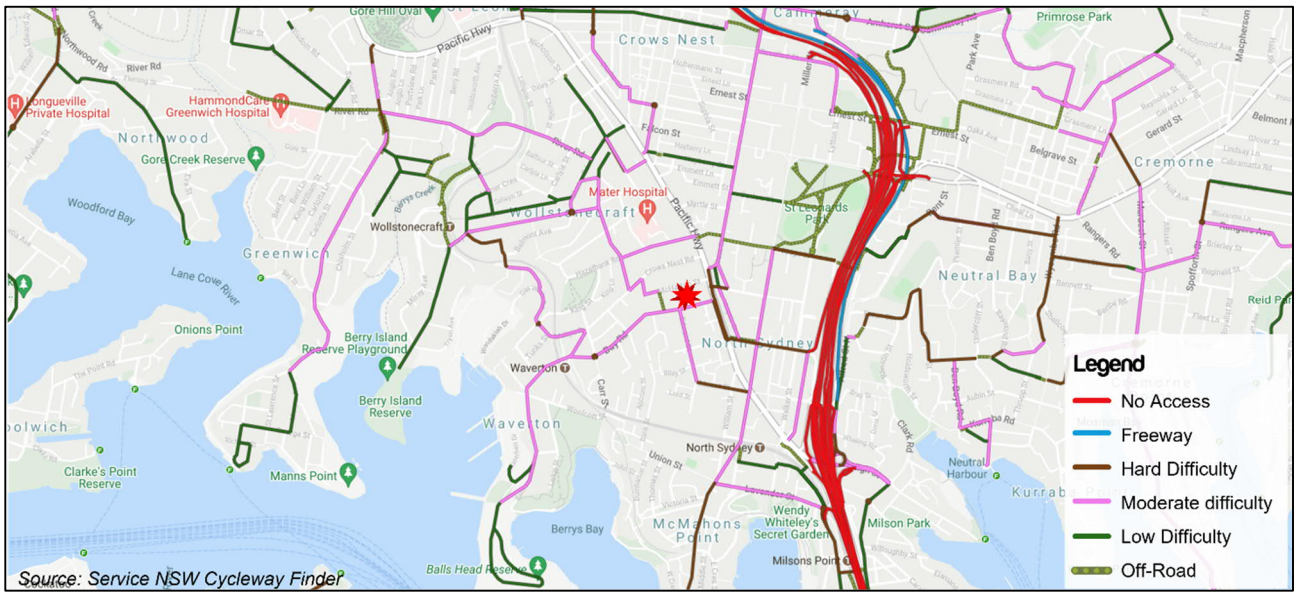


Figure 23: North Sydney Cycleway Finder Map

6 Existing School Travel Characteristics

6.1 Catchment Analysis

The school itself is situated within a metropolitan area in close proximity to the North Sydney and Sydney CBD's. In this regard, the high population density of this area is underpinned by several primary schools in proximity servicing the wider locality. The map below demonstrates the existing North Sydney Public School Catchment, and defines its catchment borders with Greenwich Public School, Anzac Park Public School, and Neutral Bay Public School, amongst more distant catchment zones.

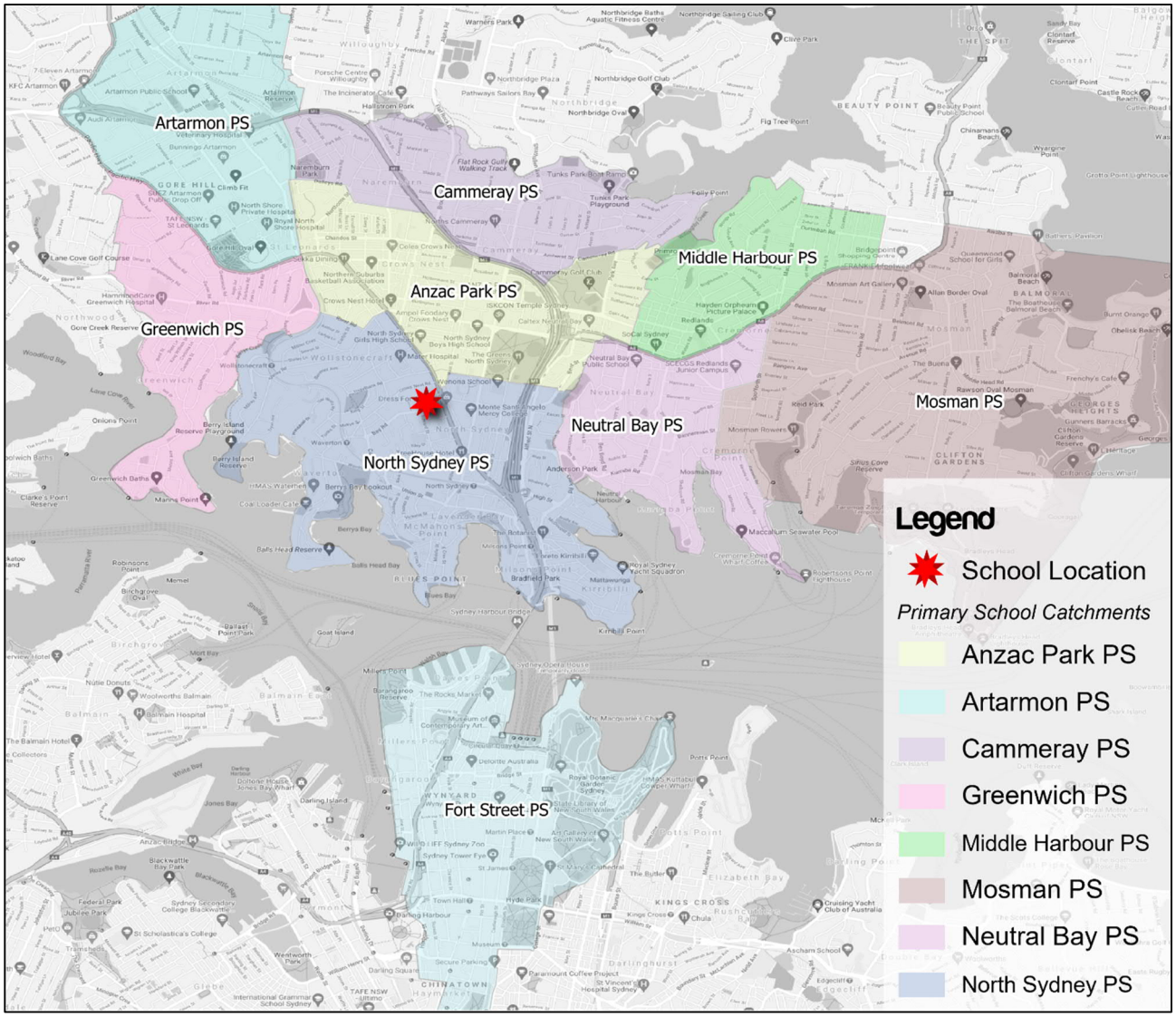


Figure 24: Public School Catchment Areas

With consideration for the school as an existing development, it is anticipated that the increased student capacity for North Sydney Public School will likely come from a combination of factors, including increasing density to the region in future years, as well as from adjacent catchment zones.

Accordingly, SINSW have provided student location data based on the above catchment areas, which in turn provide spatial indication for where additional growth to the public school may be originating from.

6.2 Student Enrolment Map

The following figure demonstrates an anonymized distribution for the existing student population of the School in its current form. While additional students are anticipated to come from adjacent catchments, it is anticipated that the school still will consolidate the locality of its existing population, predominantly within the areas south-west of the school as demonstrated below.

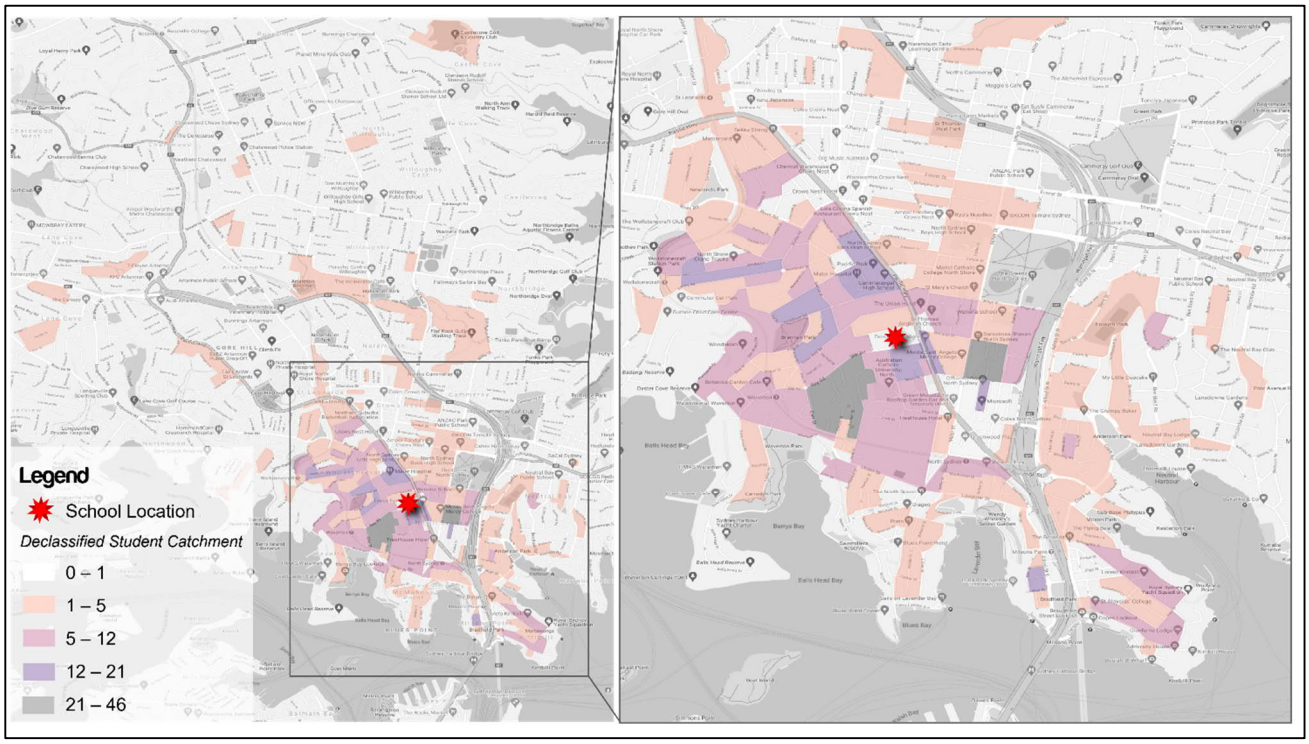


*Figure **25**: North Sydney Public School (Grade K – 6)*

The abovementioned figure demonstrates that there is a lower degree of student density residing north-east of the Pacific Highway and east of the M1. This broadly indicates a degree of geographic separation resultant from main roads, as well as isolation from adjacent public school catchment zones.

Further northwards, there are fewer students in attendance residing in the Castle Cove, Willoughby and lane Cove areas, with an even smaller degree of students residing south of the Harbour Bridge.

When considered in conjunction with the catchment map in Figure 24 above, it can be deduced that potential growth centres for the North Sydney Public School are more like to originate in proximity of the location, maintaining local connectivity and geographical separation. Specifically, these areas are more likely to be from the Gore Hill, Greenwich and Northwood areas, with Cammeray and Neutral Bay to a lesser degree.

6.3 Public Transport Catchment

In line with guidelines outlines by the NSW Government and TfNSW, the School Student Transport Scheme (SSTS) provides catchment guidelines to provide eligibility for school public transport.

For grades K-2, the following eligibility criteria applies:

- They are a resident of NSW, or an overseas student eligible for free government education.

- Aged 4 years 6 months, or older.
- No minimum walking distance criteria applies to these students.

For grades 3 – 6, the following eligibility criteria applies:

- They are a resident of NSW, or an overseas student eligible for free government education.
- The straight line distance from their home address to school is more than 1.6 km.
- The walking distance from home to school is 2.3 km or further.

As defined above, **Figure 26** below demonstrates the catchment exclusion zones for Grades 3-6 with reference to the Public Schools' location.

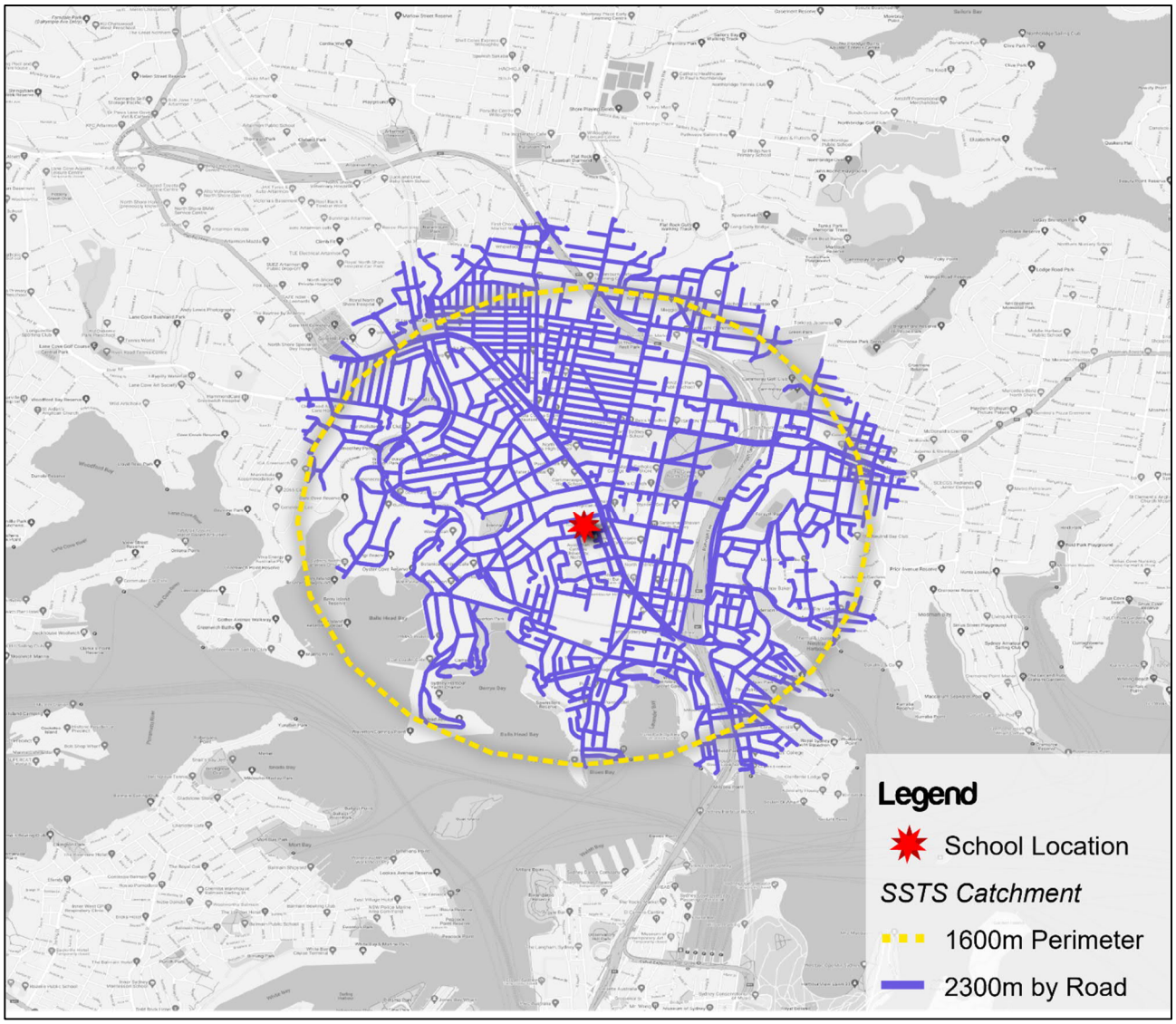


Figure 26: SSTS Exclusion Zones

The exclusion zones above demonstrate that both the 1.6km radius and 2.3km distance capture the wider proportion of the local area to which the majority of the student population are currently residing.

6.4 Active Transport Catchment

6.4.1 Pedestrian Catchment

SINSW have characterised the walking catchment of a school within 5, 10 and 15-minute walking distance increments (approximately 400m increments) of the school, representing desirability for the catchment area. **Figure 27** demonstrates the walking distances relative to the Site.

In its existing form, the pedestrian network for the North Sydney area exhibits a high degree of pedestrian connectivity, with adequate provision of footpaths on either one or both sides of all roads. The span of the Pacific Highway additionally provides adequate and safe crossing opportunities for pedestrians, approximately every hundred metres.

It is noted that there are substantially less crossing opportunities between the east and west sides of the M1 Highway, indicating a lower degree of pedestrian permeability from the Neutral Bay side.

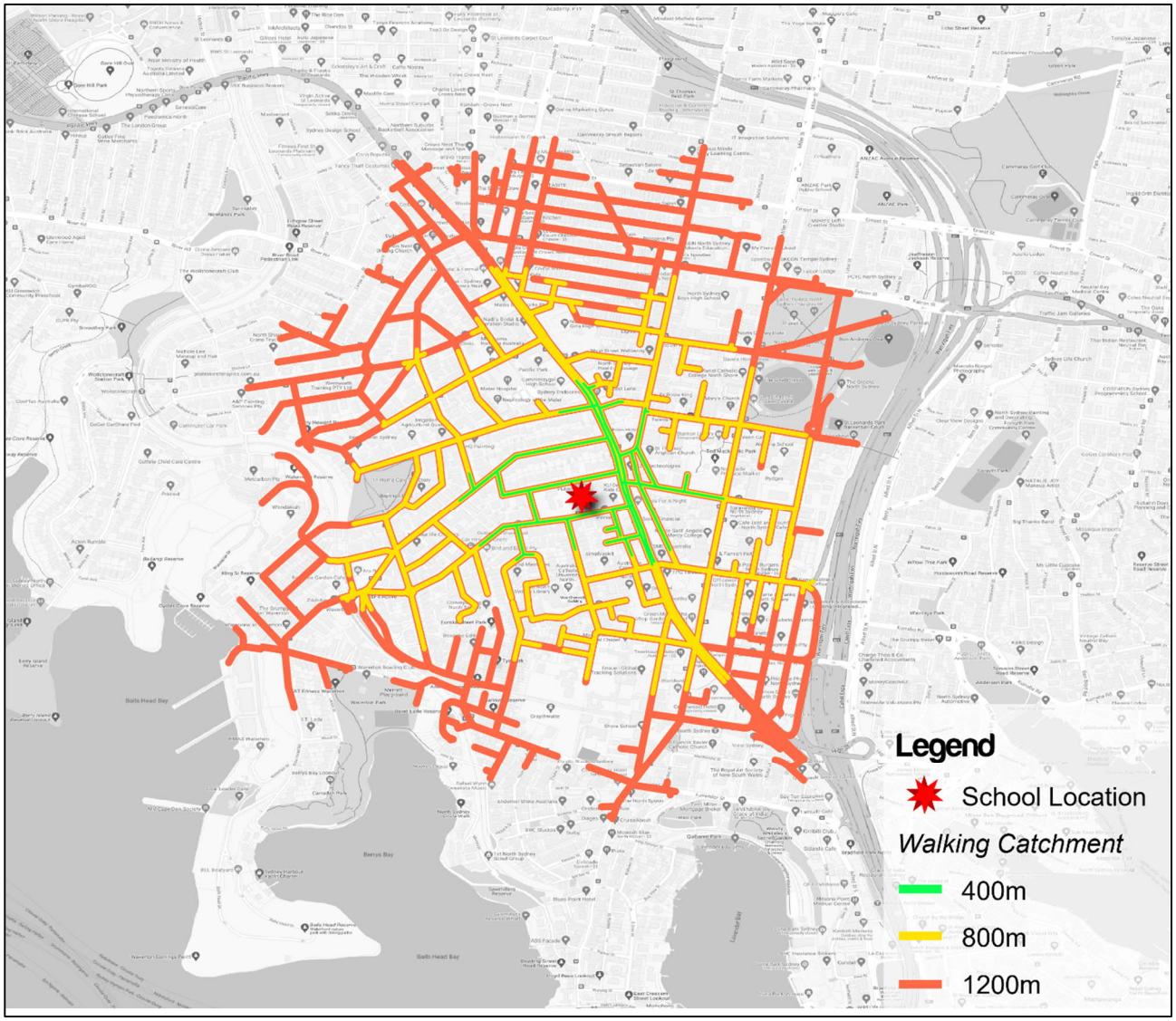


Figure 27: Pedestrian Catchment Zone

6.4.2 Cycling Catchment

In addition to the pedestrian catchment guidelines described by SINSW, the catchment areas for cycling are defined in a similar format based from 5-minute increments (approximately 1.2km increments). **Figure 28** illustrates the maximum extents of the cycling catchment zone.

With reference to the figure, the M1 forms a geographic barrier and is particularly prevalent in the cycling map with limited crossing opportunities across the road.

While the catchment map exhibits further reaching extents particularly towards the north and east, it should be broadly noted that certain elements of cycling infrastructure – specifically relating to on-road cycling lanes - may not be applicable particularly for younger students as safe provisioning.

Accordingly, the extents of the catchment captures cycling movements as applicable to usage of pedestrian and shared pathways.

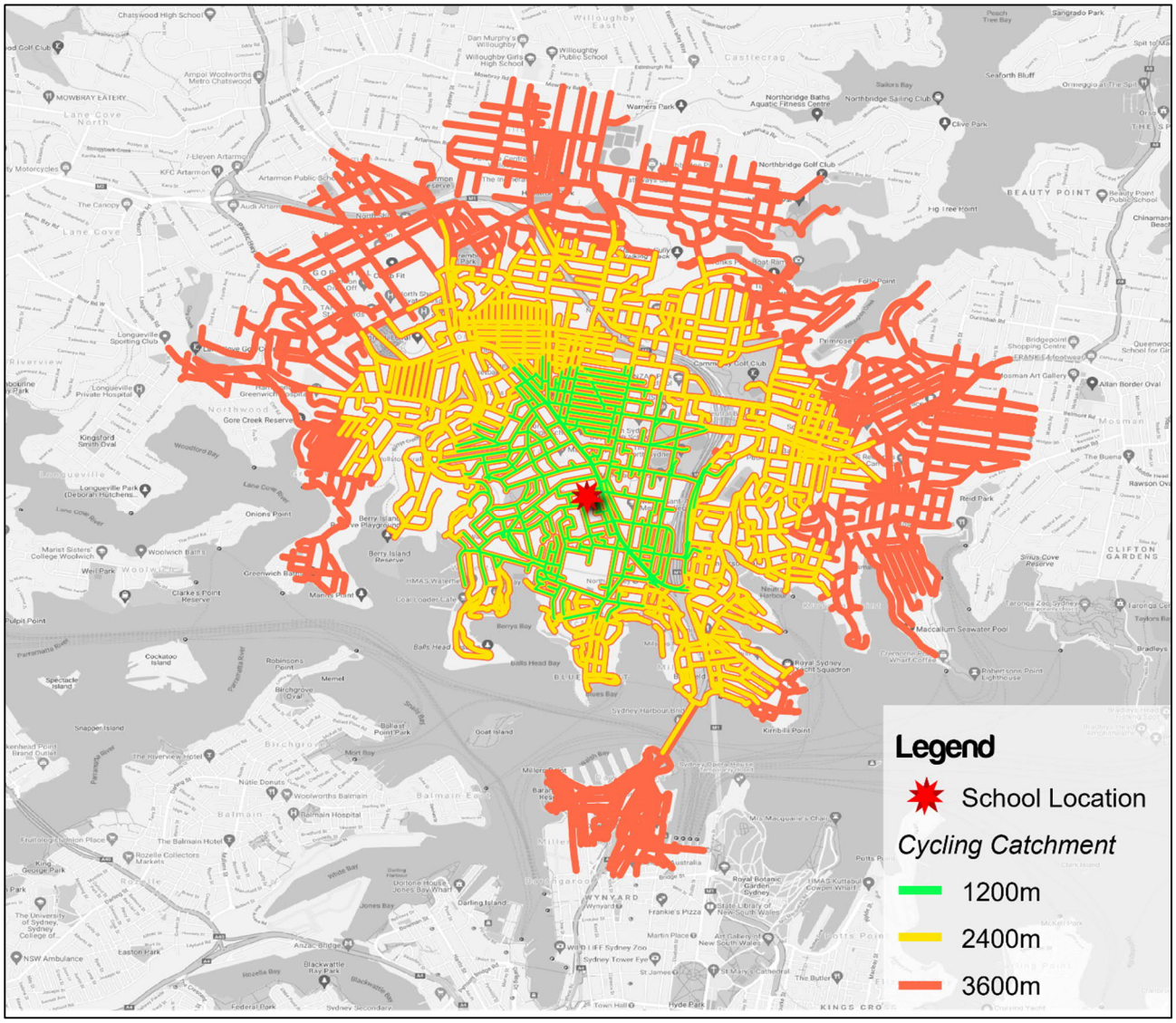


Figure 28: Cycling Catchment Zones

6.4.3 Active Travel Catchment Summary

In the context of public and active transport catchment areas relating to the school, the table below captures the extents of students within the respective zones and summarised as follows:

- Approximately 91% of students reside within the SSTS exclusion zones, with only 9% of students living outside of the zones and hence eligible for free public transport. While the majority of students are located within the exclusion zone, they may be eligible for School Term Bus Passes, which provides discounted travel during the school term.
- Approximately 96% of students reside within the 15-minute cycling distance to the school, and 62% live within the 15-minutes walking distance.

A more detailed breakdown for the 5-minute, 10-minute, and 15-minute walking and cycling distances is presented in **Table 14.**

Table 14: Cycling and Walking Catchment Summary - Cumulative

CATCHMENT	TRAVEL MODE	
	Walking	**Cycling**
5-Minute	9%	64%
10-Minute	41%	93%
15-Minute	62%	96%

6.5 Travel Mode Surveys

In consultation with the school, Ason Group has undertaken a travel mode survey for current staff and students of the School. The purpose of the survey is to determine key traffic and parking characteristics of existing school population, including:

- Travel mode for both the arrival and departure trips;
- Vehicle occupancy;
- Out of Hours School Care;
- Car Pooling, and
- Interest in different green travel strategies and initiatives.

In an operating capacity, the school period and bell times occurs between 08:55 and 14:55 during weekdays, with student arrival typically occurring between 08:30 and 08:45.

At this current time, a total 104 responses have been received for the issued student surveys, representing approximately 12% of the 869 enrolled students. It is envisioned as part of the maintenance of the future School Transport Plan as live document, this student survey information will be appropriately updated as responses to the surveys increase.

6.5.1 Student Travel Mode

As part of the undertaken student surveys, an appreciation for modal travel has been obtained to provide indicators for travel behaviour and interactions with the School. Accordingly, the figure below demonstrates the modal breakdown of student trips to the Primary School.

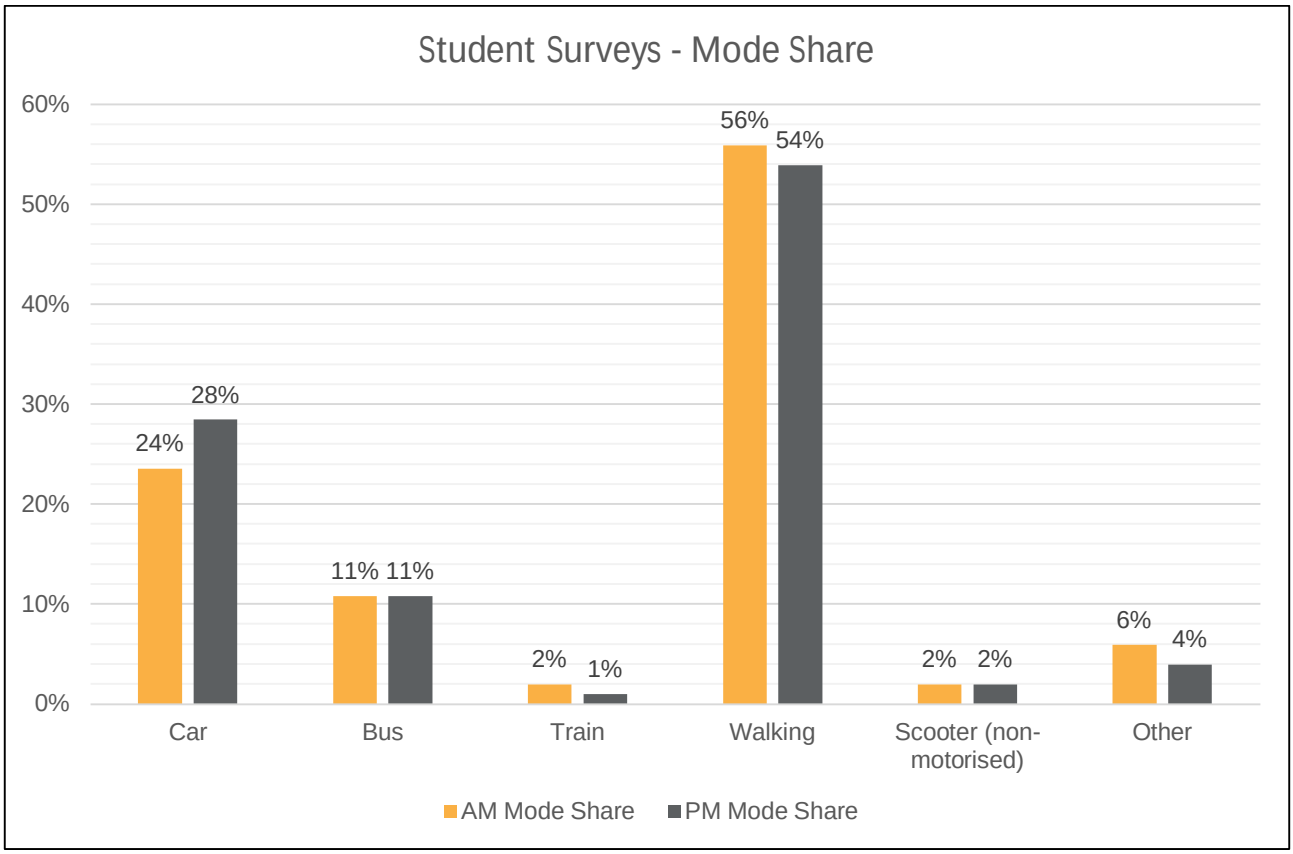


Figure 29: Student Survey Mode Share

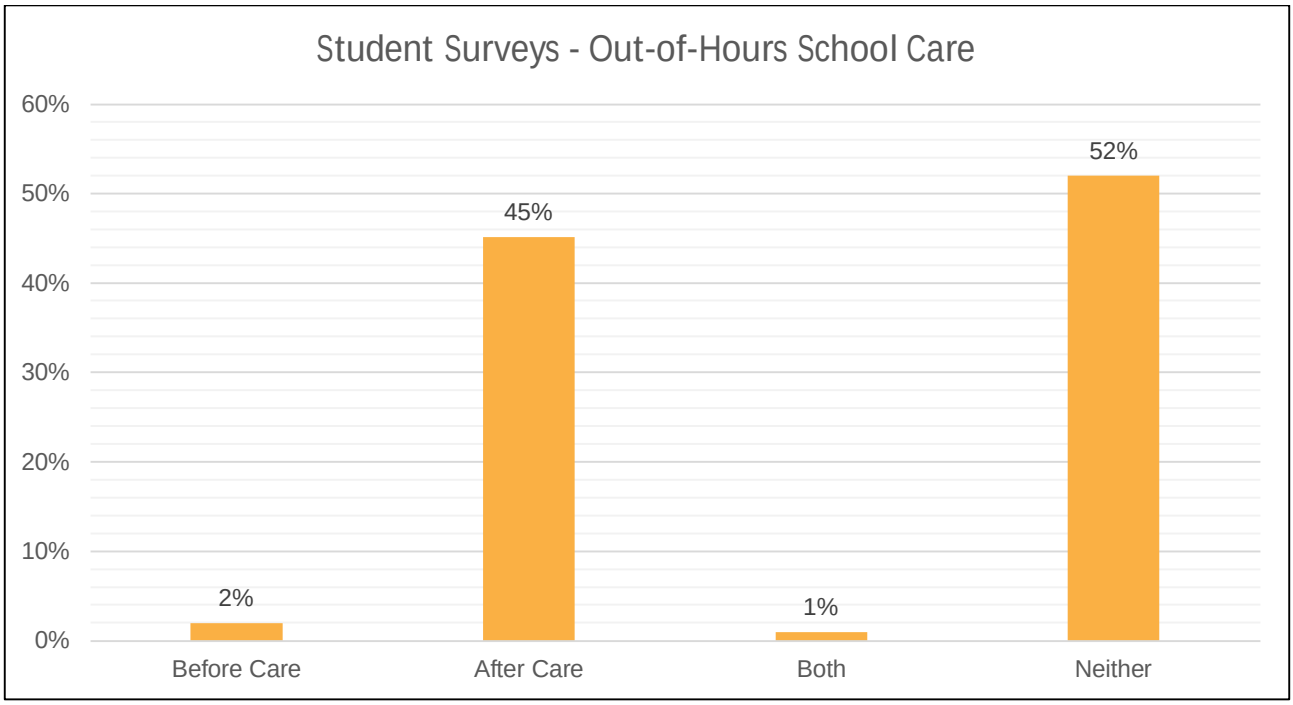
It is noted that the 'other' category effectively captures the effects of multi-modal trips, such as being driven to a bus stop before continuing by bus to the School. Accordingly, it is considered that "other" trips would generally not include private vehicle trips directly to the school itself.

Summarising the results, the following key points are deduced:

- The school demonstrates a high dependency on walking to and from the School both before and after school, capturing between 54% and 56%. Active Travel Modes constitute approximately 56% - 58% of total trips to and from the School.
- Alternatively, public transport modes (accounting for Bus, Train, as well as 'Other') account for 16% - 19%, with bus usage forming the highest proportion of public transit trips to/from the school.
- Vehicle ridership accounts for approximately a quarter (24% - 28%) of total trips to the School.

Out of School Hours Care

As part of the student surveys, the proportion of students utilising Out-of-Hours School Care was assessed to gain an appreciation for potential impacts to traffic generation. Based on the results, the following table defines the proportion of students in attendance of OHSC.



The figure demonstrates that approximately 47% of students attend OSHC programs during the AM or the PM session, with a further 1% indicating attendance of both. Of the 47%, the vast majority (45%) of students indicated attendance of after hours care only.

Further to the survey responses, Ason has engaged in discussion with the school, who have indicated that the OSHC programs are highly utilised during the PM (typically above 90% capacity) with a slightly lower usage during the AM period.

Car Pooling

With reference to multi-passenger vehicle trips, the initial results demonstrate that degree of vehicle trips with more than one student is an uncommon occurrence, constituting only 1% of total private vehicle trips. Thus, early results indicate that car pooling is not prevalent in this instance.

6.5.2 Staff Travel Surveys

At this current time, a total 35 responses have been received from staff, representing approximately 44% of the 80 staff members. As the STP is intended to be a live document, this staff survey information will be appropriately updated as responses to the surveys increase.

Having regard for modal travel, the staff survey captures both the primary and secondary travel mode preferences for the Site, with the secondary mode preference indicating situations when the primary mode is currently unavailable.

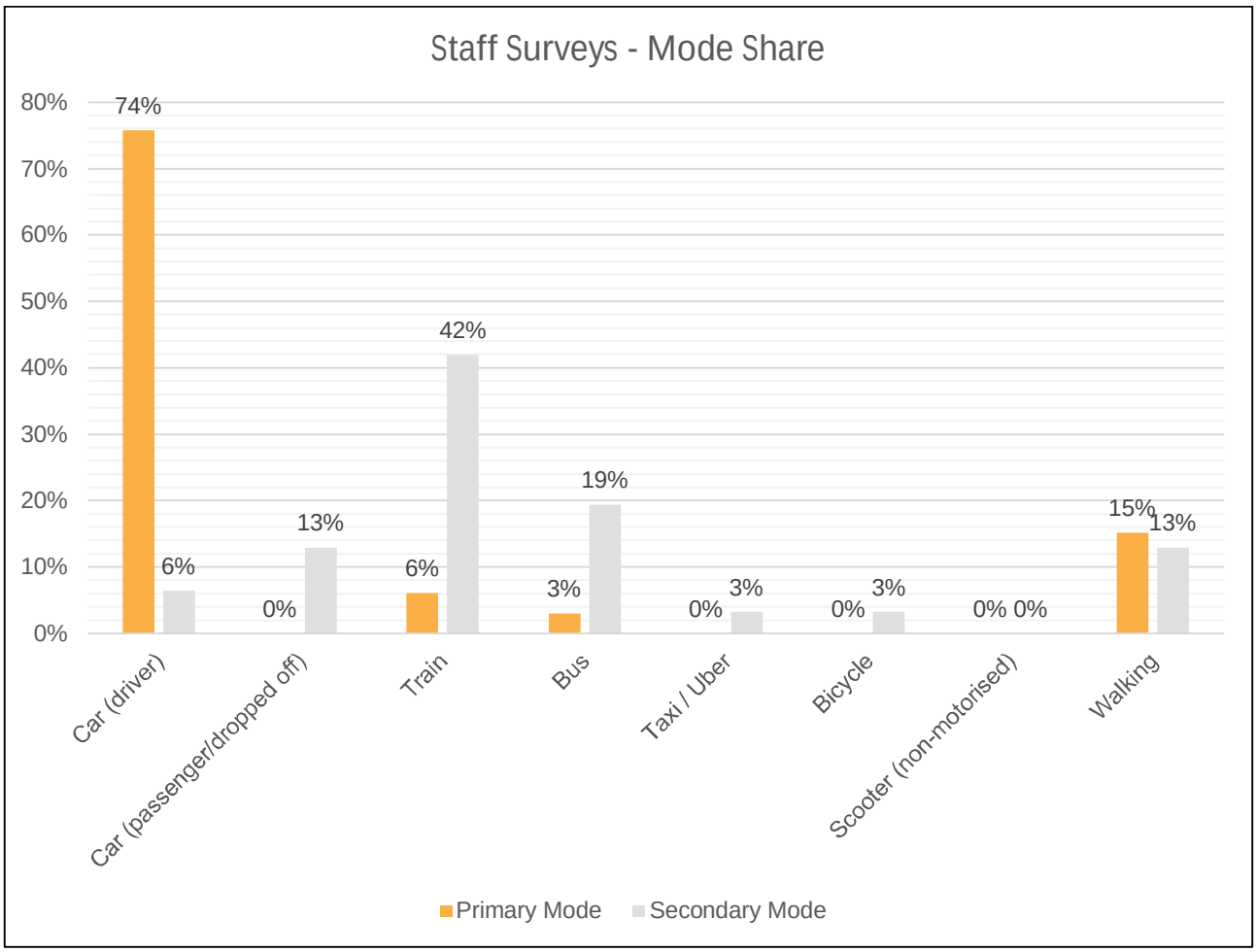


Figure 30: Staff Surveys Mode Share

The above figure demonstrates a typically higher dependency on car ridership (predominantly as driver), with a secondary dependency on walking. In our experience, teachers within NSW exhibit lower dependency on public transport modes and private vehicle (as passenger) as they are generally required to bring equipment and materials to and from the workplace. This is further supported by the majority (62.5%) of staff having access to dedicated on-site parking spaces. As such, these factors are likely to impact the viability of modal shift towards public and active travel modes, which do not necessarily accommodate staff requirements.

The predominant secondary mode of travel is demonstrated to be train or bus to the School.

6.6 School Traffic Generation

It should be noted that as the school is an existing development, traffic associated with the school has been captured as underlying volumes forming part of background traffic movements surveyed for the local area.

Notwithstanding, an indicator for traffic generation associated with the school can be inferenced based on traffic generation surveys undertaken for the similar developments to the Site. Accordingly, the RMS Guide to Traffic Generation captures detailed surveys undertaken by GTA Consultants as part of a survey report.

On this basis, the following trip rates have been adopted for the traffic assessment and are based on school sites demonstrating relative similarity to the school in terms of public transport accessibility, geography and urban density:

- 0.43 vehicle trips per student during the AM Peak; and
- 0.14 vehicle trips per student during the PM Peak.

Application of the trip rates to the existing student populous (869 students) approximates the following current traffic generation of the School:

- 374 total vehicle trips during the AM Peak; and
- 122 total vehicle trips during the PM Peak.

It should be considered that the outbound trips during the AM accounted for vehicles leaving the Site after attending the Kiss & Ride facilities or similar drop-off arrangement, and the inbound trips during the PM account for vehicles arriving for pick-up. In addition, while the survey demonstrates staggered staff movements, the above assessment conservatively captures 100% of the staff movements during the peak periods.

7 The Proposal

7.1 The School

7.1.1 Features

The upgraded school will seek to improve and provide DDA compliant access along the Bay Road frontage, and continue to provide high-quality educational outcomes to meet the needs of students within the local community and deliver innovative learning and teaching spaces, by providing the following:

- Construction of a three storey building comprising:
  - staff administration rooms;
  - 16 homebases
  - a new library;
  - hall;
  - out of school hours care facilities;
  - covered outdoor learning area;
  - 63 new bicycle parking spaces (with the existing 20 spaces to be removed);
  - End of trip facilities for staff; and
  - services, amenities and access.
- New DDA compliant main entry, with associated ramps, gate and forecourt from Bay Road;
- Internal refurbishment of building G ground floor from the existing library to 3 homebases;
- Capacity for an increase in student numbers from 869 to 1,012;
- Increase of 7 staff members, for a total of 87 staff members; and
- Associated tree removal, landscaping and excavation.

The proposal maintains:

- The gates and fence of former Crows Nest House including the entrance from the Pacific Highway and Bay Road;
- Existing gate along McHatton Street;
- The outdoor play area to the east of Building A;
- Existing covered outdoor learning area adjacent to Building A;
- The basketball courts and staff carpark in the western portion of the site;
- The significant tree planting on all school boundaries;
- Buildings A, D and F noting minor internal refurbishments are being undertaken outside of the SSDA scope of work (exempt development) to improve student amenities and canteen; and
- Building G noting ground floor internal refurbishment is proposed in the SSDA.

Notably, the upgrades do not propose changes to following traffic and transport elements:

- On-site at-grade car parking providing 50 car parking spaces, including two accessible car spaces, accessed via McHatton Street

- Existing pedestrian access locations, as follows:
  - Three (3) pedestrian access points from McHatton Street (and associated school signage at two of the entrances);
  - One (1) pedestrian access point from the Pacific Highway; and
  - One (1) pedestrian access point from Bay Road.

7.1.2 School Operations

The School is accessible from 6:30 AM – 6:30 PM on weekdays with restricted access outside of these hours. The bell times are as follows:

- Start Time: 8:55 AM
- Finish Time: 2:55 PM

7.1.3 OSHC Operations

The school offers on and off-site Out of School Hours Care (OSHC) services between the following times:

- Before School: 7:00 AM to 8:55 AM
- After School: 3:00 PM to 6:00 PM

The current OSHC facilities operate as follows:

- 60 place Kindergarten at North Sydney Oval (off-site). Students are transported by bus to the off-site facility, with the bus departing the school at 3:45 PM
- 60 place Year 1 to 2 (on-site);
- 60 place Years 3-6 operated by KU (on-site).
- 60 places at the North Sydney Leisure Centre, typically Years 3-6 (off-site). Staff from the centre walk to the school and collect the students, walking the group of students across the road to the North Sydney Leisure Centre site.

7.2 Vehicle Access

7.2.1 Staff Car Park

Access to the staff carpark remains unchanged, with access via a double width crossover to/from McHatton Street at the western end of the site. The car park accommodates 50 parking spaces including 2 accessible spaces. Parking allocation is to be determined by the School administration.

The location of the Car Park and access is shown in **Figure 31.**

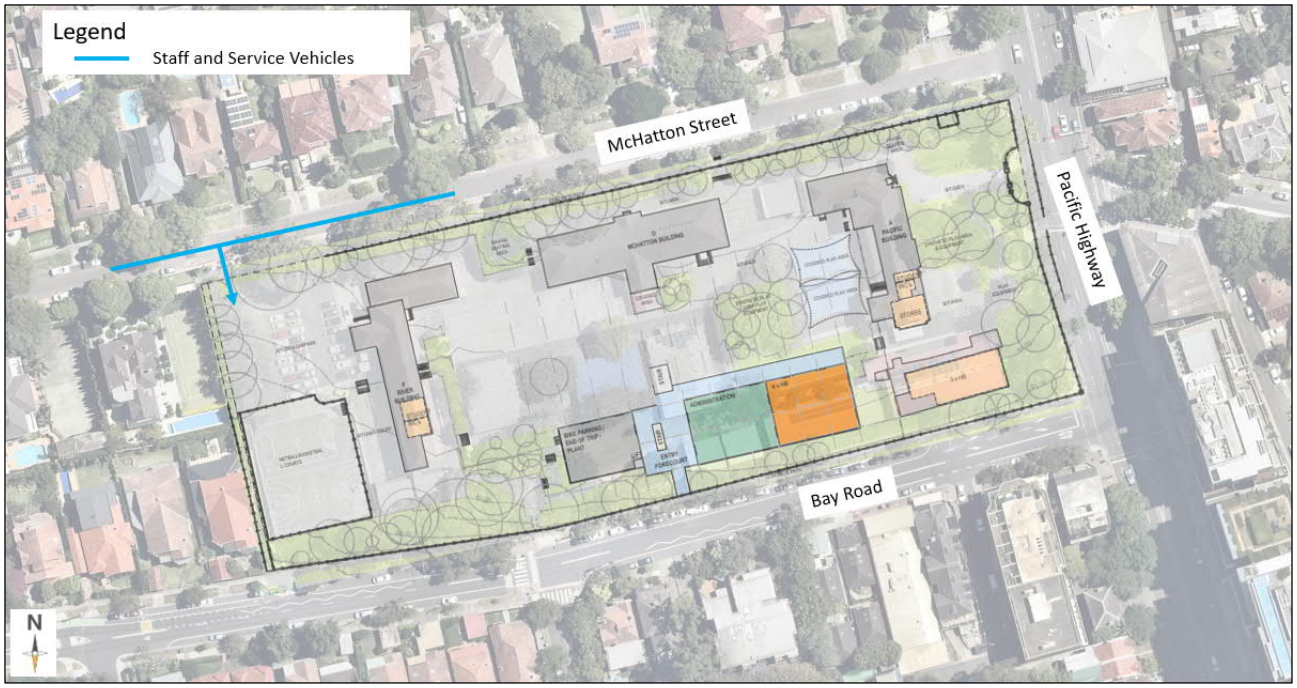


Figure 31: Staff Car Park Location

7.2.2 Kiss & Ride

Two Drop-Off / Pick-Up (DOPU) otherwise known as Kiss & Ride facilities will be provided along McHatton Street and Bay Road, as shown in **Figure 32.**

The overall provision of kiss and ride spaces for the site remains similar to the existing, however has been split between Bay Road and McHatton Street due to the new accessible main pedestrian entrance along Bay Road. The proposed Bay Road kiss and ride locations, including in front of No. 11 Bay Road effectively replaces the existing 1/4P parking restrictions during school pick-up and drop-off periods. The proposed change is required to support the new DDA compliant access to the school via a new entry at Bay Road.

In addition, the majority of parking restrictions surrounding the school at the peak pick-up and drop-off times are subject to short terms restrictions, i.e. 15 minutes or less, as shown on **Figure 33.**

As part of the Indicative Parking Restrictions Plan prepared by Ason Group, the kiss and ride locations shown in **Figure 33** will be signposted as “No Parking” between specific operational hours during the day. As per the typical ‘No Parking’ restrictions, parents must remain within 3 metres of their vehicle and are unable to stay for longer than 2 minutes.

Figure 32: Kiss & Ride Location

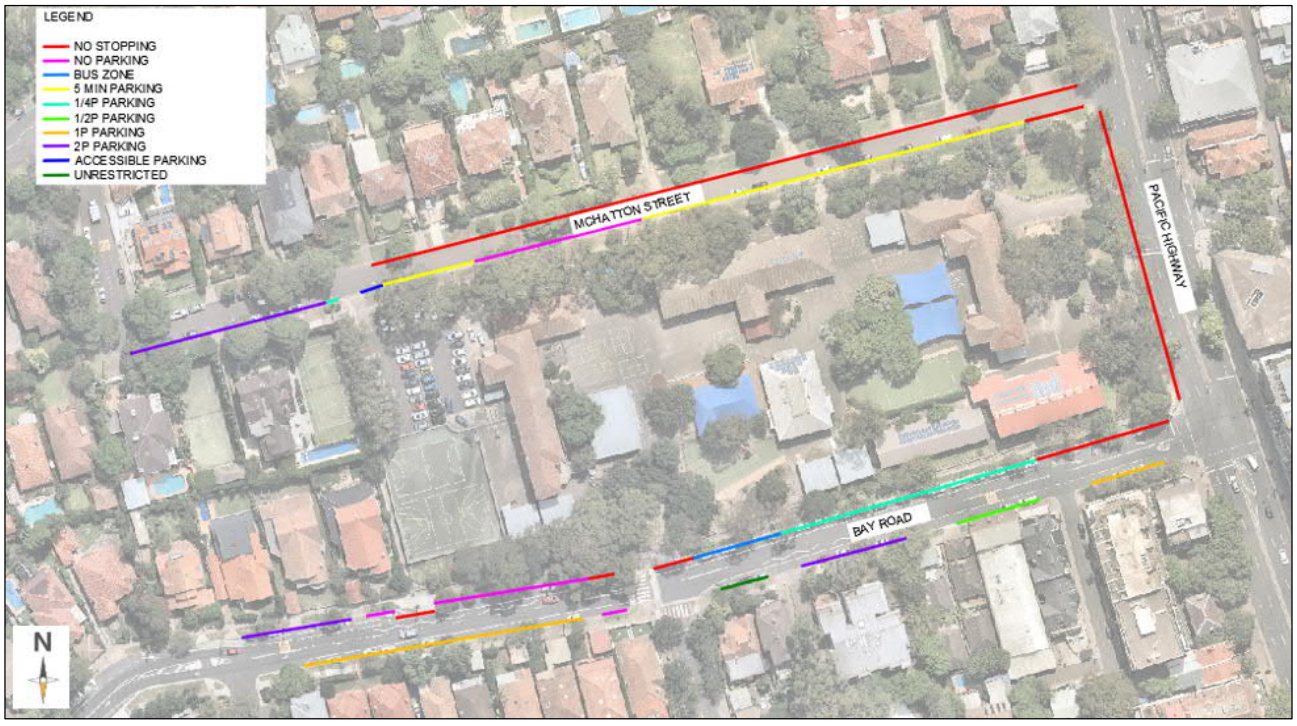


Figure 33: Proposed Car Parking Restrictions

It is noted that any changes to the surrounding parking restrictions requires Council consent and approval. Based on initial discussion, Council is not opposed to the changes, subject to the overall changes not resulting in a net loss to the number of on-street car parking spaces.

7.2.3 Bus Stops

Consistent with the current arrangements, the school shall utilise the existing bus stop along the Bay Road frontage, as shown in **Figure 34**.

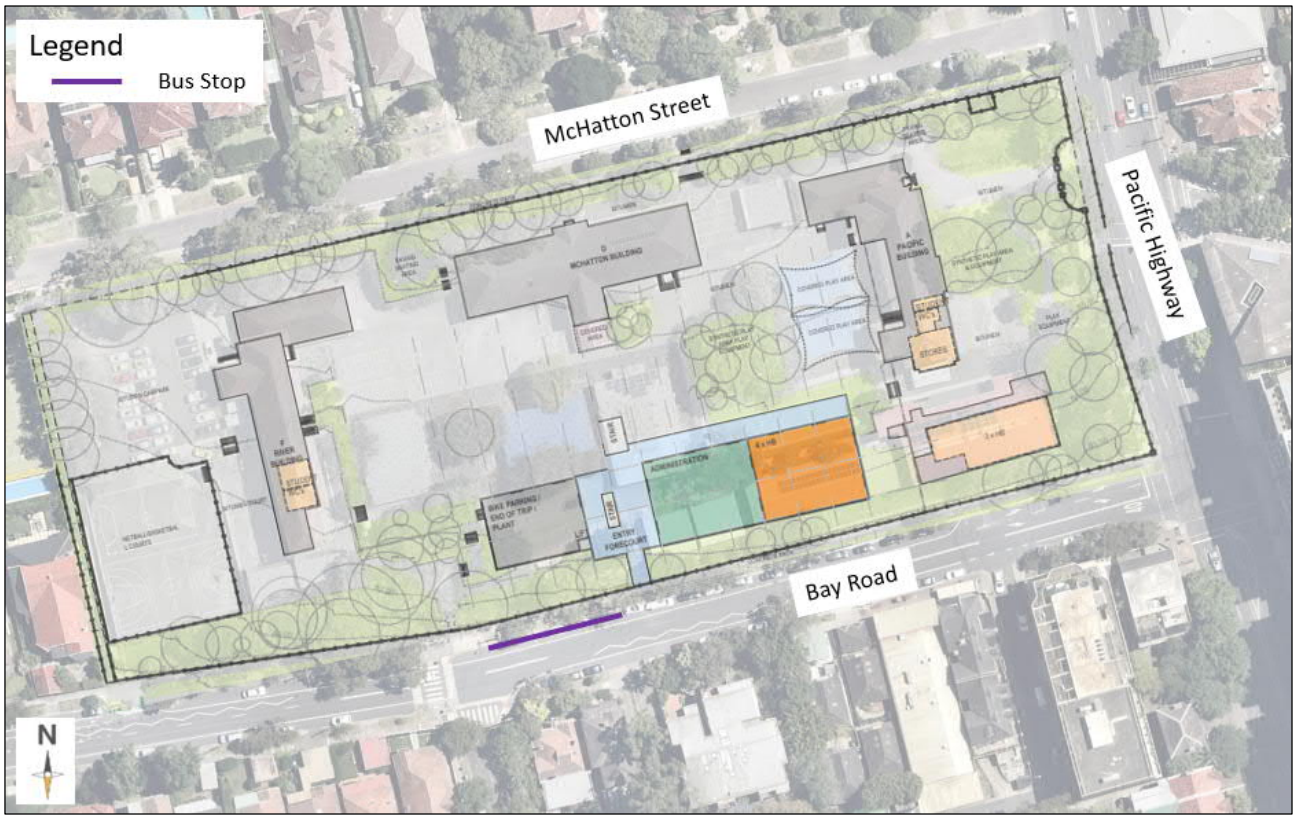


Figure 34: Bus Stop Location

Based on current discussion between the school and bus operators, the current bus stop design is sufficient to cater for the current and future bus requirements during peak pick-up and drop-off periods.

The existing school bus stop is located immediately west of the new main entry to the school along Bay Road, which provides for DDA compliant access to / from the School.

7.2.4 Servicing Vehicles

All major deliveries and waste collection will occur within the staff car park, as per the current arrangements. It is noted that the proposed upgrades (including additional students and staff population) are not anticipated to significantly alter the servicing requirements for the school.

It is understood that that waste is currently collected as follows:

- General Waste – Twice weekly on Wednesday (before 7:00am) and Saturdays; and
- Recycling – Weekly between Friday evening and Sunday evening.

It is noted that delivery times would be strictly managed, whereby regular services are subject to strict timelines that to ensure the minimum movements possible and these occur outside of the school peak periods.

Deliveries will be managed by the School's administration and management staff and will ensure that drivers are familiar with the details of the Plan, as well as the Code of Conduct (refer to the School Travel Plan).

7.3 Pedestrian Facilities

A new forecourt and main entrance to the school is to be provided along Bay Road, which shall be designed to accommodate accessible access.

Due to the current Covid-19 restrictions, at the time of the preparation of this report, no pedestrian surveys were able to be commissioned.

A review of previous Council pedestrian and vehicular movements, conducted in 2015, at two locations along McHatton Street has been conducted against the latest pedestrian warrants assessment as provided in *Supplement to Australian Standard AS 1742.10-2009, Manual of Uniform Traffic Control Devices – Part 10: Pedestrian control and protection Version 3.1.* Based on the 2015 volumes, the volumes do not meet the current warrants to provide a pedestrian crossing.

If deemed appropriate, traffic counts can be commissioned approximately 6 months following Day 1 operations of the upgraded school to review and validate whether the level of pedestrian / traffic activities are sufficient, to meet the latest pedestrian crossing warrants.

8 Traffic Assessment

8.1 Trip Generation

8.1.1 Background Traffic Surveys

It should be noted that the Traffic Assessment associated with this report has been conducted through the use of historical SCATS intersection data provided by TfNSW, in lieu of recorded on-road survey data undertaken by traffic surveyors. At time of writing, the greater metropolitan area is undergoing a Covid 19 pandemic-induced lockdown, which in turn impact the results, consistency and integrity of traffic surveys undertaken during this period. As such, given the circumstances, the following approach is considered appropriate.

In accordance with the above, the following assumptions and considerations have been accounted for:

- Historical SCATS detector counts have been assessed during a school semester period prior to the impacts of lockdown.
- For the split turning lane on the Pacific Highway southern approach, a left-turn percentage has been obtained based on first principles assessment. The number of vehicles turning left to Bay Road as part of background traffic is assumed to be 10%.
- For the split turning lane on Mclaren Street, historical survey data of the Site provided by TTM has been utilised to gain an appreciation for turning volumes.
- Traffic growth rates for future year assessment have been assumed at 1%. This has been confirmed in consultation with TfNSW relating to modelling specific to the School project.
- It has been considered that in lieu of pedestrian count information, 300 pedestrians per hour has been adopted to form a conservative baseline assessment.
- A minimum pedestrian green time of 10 seconds has been adopted (which is greater than the SIDRA default of 5 seconds).

8.1.2 Trip Rates

Ason Group has undertaken a detailed review of the Roads and Maritime Services (now TfNSW) Trip Generation Surveys, Schools (Schools Trip Generation Report) prepared by GTA Consultants on behalf of TfNSW in 2014. The Schools Trip Generation Report determined contemporary trip generation rates for the land use “School” within Metropolitan Sydney and Regional NSW, with the rates determined on the back of surveys conducted in March 2014.

It is noted that as part of the GTA report, the following ley characteristics were considered and influenced the overall trip generations:

- Bus services,
- Immediately adjacent residential area of such as to utilise all of the school’s capacity,
- Number of pedestrian access points,
- Number of vehicle access points,
- School type / status (i.e. primary or secondary); and
- On-site car parking provision

Following a review of the above key characteristics against the schools surveyed within the GTA report, the, the following trip generation for the AM and PM school peak periods have been adopted noting that the trip

rates also include staff and visitor trip generation. Given the upgraded schools location, access to sustainable travel modes and existing travel mode patterns, the minimum vehicle trip generation per student from Table 6.2 of the GTA report have been adopted, as follows:

- AM School Peak 0.43 Trips / Student
- PM School Peak: 0.14 Trips / Student

8.1.3 Out of School Hours Care

The school currently provides on and off-site Out of School Hours Care (OSHC) Facilities. The maximum capacity of these OSHC Facilities is 240 students.

Acknowledging the current usage of the OSHC facility, and adopting a conservative approach, the OSHC facility has been assessed as operating at 80% capacity, which implies 192 students participate in the OSHC Program. Noting the start and finish hours of the OSHC Program, 192 students would be arriving outside of the school peak hour periods.

8.1.4 Net Traffic Generation

With reference to the development, as the SSDA is seeking to increase the student capacity of the school from 869 to 1,012 (an increase of 143 students), the net traffic generation assessment anticipates to capture the extents of this increase in students only. In consultation with the School, a minor increase to staffing numbers is required, in the order of 7 staff members.

In addition, OSHC services offered at the Site form a key discount factor the PM Peak. In consideration of the 80% operational capacity of OSHC services, it can be determined that approximately 19% of the student population would attend OSHC service, therefore would not leave the school during the PM Peak period.

Accordingly, application of the abovementioned trip generation rates to the net increase in students results in the following additional vehicle trip estimations:

- School AM Peak: 61 Trips
- School PM Peak: 16 Trips

Furthermore, the abovementioned additional trips would capture both inbound and outbound movements for drop-off and pick-up journeys, hence will be distributed as 50% inbound movements and 50% outbound movements during the peak periods.

It is noted that as the school is an existing development, traffic associated with the school has been captured as underlying volumes forming part of background traffic movements surveyed for the local area.

8.2 Trip Assignment

8.2.1 Student Trip Distribution

Based on student catchment information provided by SINSW, the distribution associated with net traffic generation with the school is based on existing catchment data for North Sydney Public School, as well as

adjacent neighbouring school catchments, which are more likely to contain origin locations for an increase in student capacity for the public school.

The following diagram captures the distribution of movements based on the above inferences during AM and PM periods.

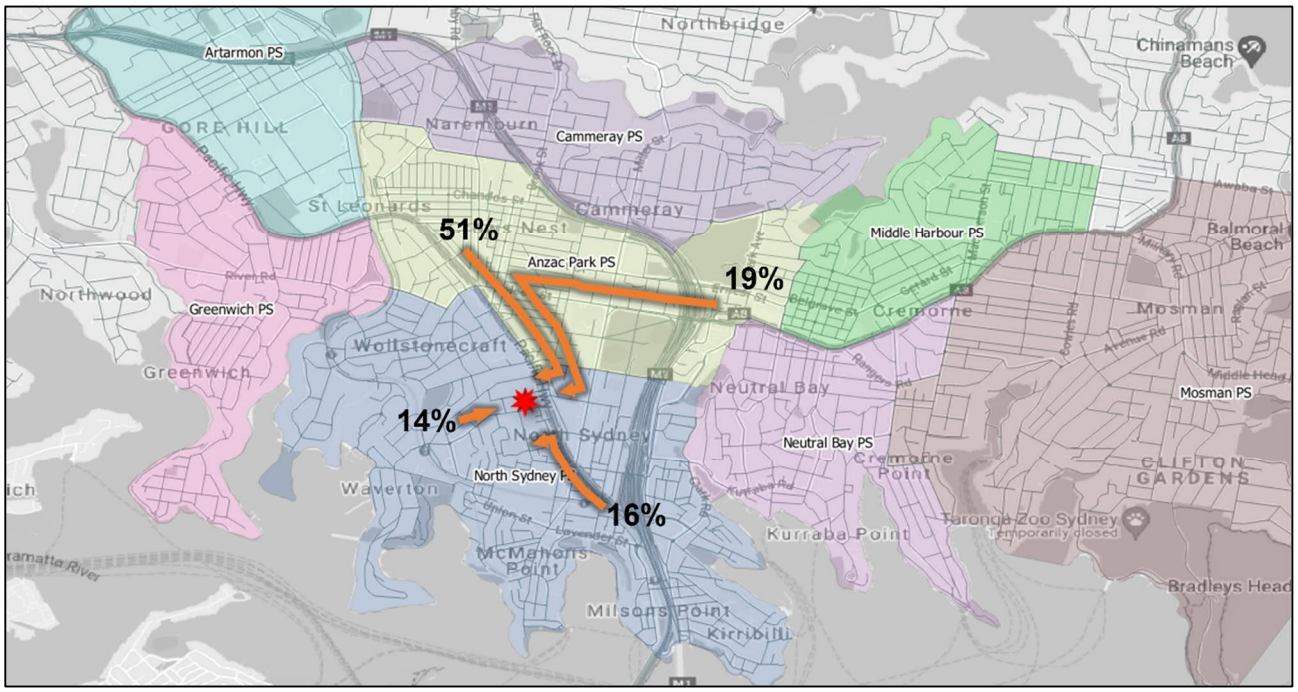


Figure 35: Student Distribution

8.3 Intersection Performance

8.3.1 Scenarios

Baseline performance of existing intersection network located in proximity of the School are assessed in section 4.2.2.

With reference to the modification, the increase in student capacity triggers a warrant for future year modelling assessment. Accordingly, the following modelling scenarios have been tested in addition to the existing modelling case provided above. The table below provides a summary of the scenarios.

SCENARIO	YEAR	SCENARIO NAME	PHASING	BASELINE	DEVELOPMENT TRAFFIC
1	2021	Existing Case	SCATS phase timing	SCATS counts	No

SCENARIO	YEAR	SCENARIO NAME	PHASING	BASELINE	DEVELOPMENT TRAFFIC
2	2023	2023 Baseline	SCATS phase timing	SCATS counts + growth	No
3	2023	2023 Project	SCATS phase timing	SCATS counts + growth	Yes
4	2033	10-Year Post Development Case	SCATS phasing arrangement, Optimised phase times	SCATS counts + growth	No
5	2033	10-Year Post Development Case	SCATS phasing arrangement, Optimised phase times	SCATS counts + growth	Yes

It should be noted that Scenarios 2 and 3 adopt identical phase timing to the historical SCATS data, while the 10-year post development scenarios (6 and 7) are based on SIDRA optimised phase and cycle times only to account for the larger amount of uncertainty that accompanies future year modelling horizons.

8.3.2 Intersection Impacts

Having regard for the above, the table below provides an assessment between the 2023 future baseline and project modelling cases whilst retaining the signal phase timing from the SCATS historical data.

Table 15: 2023 Modelling Results

INTERSECTION	CONTROL TYPE	PERIOD	SCENARIO 2			SCENARIO 3		
			Average Delay (s)	**Degree of Saturation**	**Level of Service**	**Average Delay (s)**	**Degree of Saturation**	**Level of Service**
Pacific Hwy / McLaren St	Signalised	AM	21	0.85	B	22	0.86	B
		PM	9	0.33	A	9	0.34	A
Pacific Hwy / Bay Rd	Signalised	AM	26	0.88	B	28	0.95	B
		PM	33	1.25	C	37	1.30	C

The 2023 modelling demonstrates the following points:

- Comparing 2021 existing with 2023 baseline performance (Scenarios 1 and 2), the future year growth only causes minor increases to average delay whilst retaining LoS performance levels.
- Comparing the 2023 baseline with 2023 project results (Scenarios 2 and 3), the net traffic generation associated with the Site is demonstrated to only cause further minor increases to average delay, whilst still retaining LoS performance levels to the 2023 Baseline and 2021 existing cases. The largest increase to delay occurs at the Pacific Highway / Bay Road intersection during the PM Peak, with an increase of 4 seconds.
- This generally indicates that the traffic associated with the modification is anticipated to have minor impacts to existing and future baseline performance.

To form a robust transport assessment, the 10-year post development modelling scenarios have been undertaken to demonstrate longer-term impacts to the intersection predominantly associated with background growth. The results of the 2033 Baseline and 2033 project cases (Scenarios 4 and 5) are provided below.

Table 16: 2033 Modelling Results (10-year Post Development)

INTERSECTION	CONTROL TYPE	PERIOD	SCENARIO 4			SCENARIO 5		
			Average Delay (s)	Degree of Saturation	Level of Service	Average Delay (s)	Degree of Saturation	Level of Service
Pacific Hwy / McLaren St	Signalised	AM	46	0.98	D	0.98	45	D
		PM	9	0.41	A	0.42	9	A
Pacific Hwy / Bay Rd	Signalised	AM	27	0.93	B	1.00	30	C
		PM	21	0.69	B	0.70	21	B

The 2033 modelling results demonstrate the following:

- From the 2021 and 2023 baseline modelling, the 2033 horizon modelling demonstrates worsening impacts to the intersection, particularly for the Pacific Highway / McLaren Street intersection during the AM Peak period, performing at LoS D. Notwithstanding, the other assessed periods and the Pacific Highway / Bay Road intersection perform in a similar capacity to existing.
- With the introduction of net traffic associated with the development, the results demonstrate minor increases to average delay, particularly during the AM Peak at the Pacific Highway / Bay Road intersection. The increase of 3 seconds reduces the LOS of the period from B to C.
- Notwithstanding, the results generally indicate that the intersections still perform at a satisfactory level.

Summarising the traffic impact assessment associated with the modification, it should be considered that the increase in vehicle trips associated with the increase to school capacity will generally not have any wider or extenuating impacts to the intersections in proximity of the Site.

It is considered that the future year baseline demonstrates worsening performance attributed to background growth in the locale; notwithstanding the intersections demonstrate capacity to improve performance with adjustments to phase timing during the AM Peak.

8.4 Drop-Off and Pick-Up

Student Drop-off and Pick-up (DOPU) trips are expected to be concentrated over 30 – 45 minutes rather than a full hour in the school morning and afternoon peak.

With reference to previous assessments of primary schools, it is understood that schools are required to use DOPU areas under the same conditions as No Parking zones. That is, no stopping for more than 2 minutes provided that occupants stay within 3 metres of the vehicle such that they are dropping off or pick up passengers and loading or unloading items. On this basis, an individual DOPU space could effectively serve approximately 15 - 25 vehicles across a 30 – 45-minute period.

It is also important to consider the different characteristics of the drop-off trip against the pick-up trip. In the AM school peak, the drop-off trip generally takes less time, as the students are in the car and simply need to be dropped-off.

Conversely, in the PM school peak parents / carers typically arrives early and wait for the students, which can increase the average stopping time; in addition, many parents / carers will arrive prior to the end of school, and as such queues can form behind the vehicles waiting in the pick-up area. To ensure queuing is kept to a minimum, management measures will be required to ensure parents / carers do not arrive at the school early, with potential time-slots based on a numbering system in place to allow for families to be assigned an appropriate time for pick-up. This system has been adopted at the recently opened Barramurra Public School, and will be adopted by the Denham Court Public School, which will be operational in Day 1, Term 3, 2021.

The arrival and departure times of students (through the broader AM and PM school peaks) utilising the DOPU facilities has been surveyed and observed by Ason Group over a number of years, with almost all primary schools having a similar build-up of trips prior to school finishing.

These observed profiles have been assigned to the School demand for the afternoon (PM) peak pick-up period and are presented in **Figure 36.**

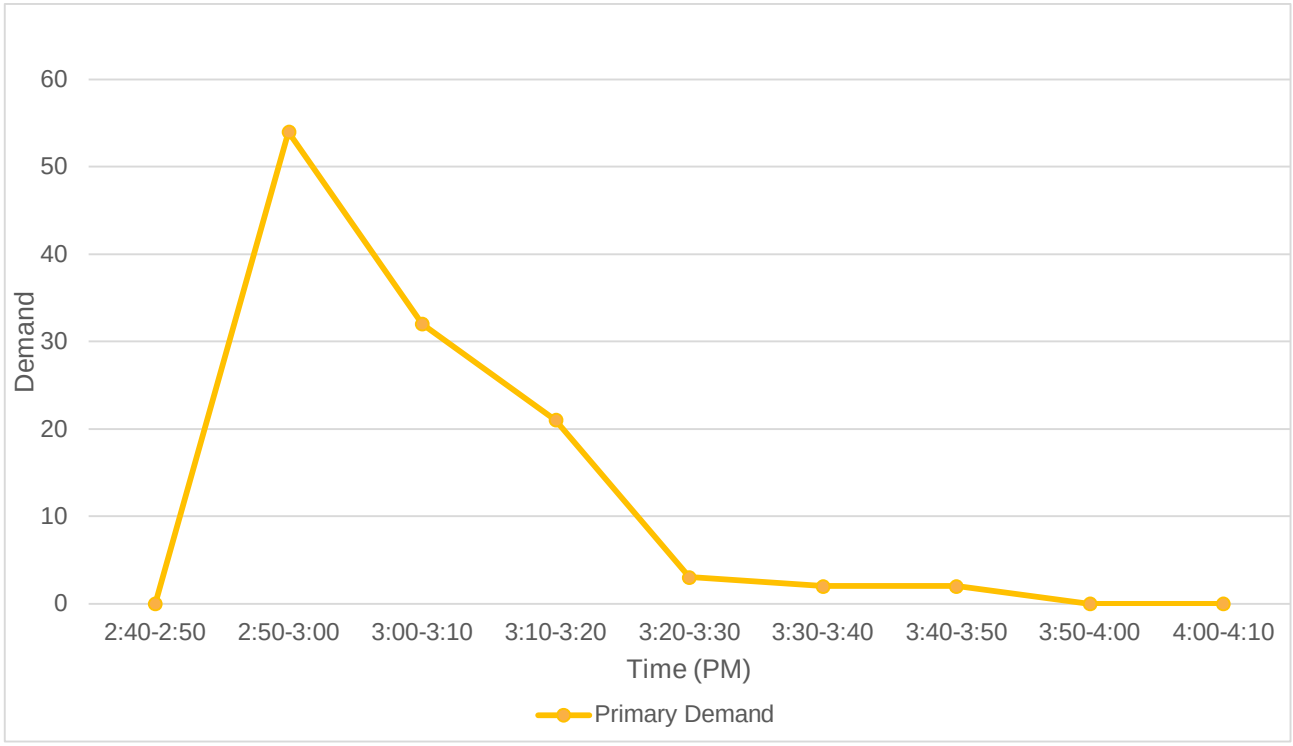


Figure 36: Afternoon PM School Peak Profile

It is assumed that the managed, time restricted (maximum 1.5 minutes) Drop-Off / Pick-Up (DOPU) zone could potentially cater for parent drop-off/pick-up movements over a 45 minute period during the school's morning and afternoon peak periods. In this regard, the maximum number of movements the DOPU zone could accommodate would be as follows:

- 13 spaces (4 spaces along McHatton Street and 9 spaces along Bay Road)
- 45-minute period
- 2 minute Drop-Off & Pick-Up
- 13 spaces x 45 minutes / 1.5 minutes DOPU = 390 vehicle movements (Trips)

It is noted that estimated overall traffic generation potential of the Site, excluding the OSHC, is:

- School AM Peak: 353 Trips
- School PM Peak: 115 Trips

On the basis of the above, it is considered that there is sufficient capacity within the DOPU Zones to accommodate the generated traffic without any adverse impacts on the adjoining road network.

9 Parking Assessment

9.1 Car Parking Assessment

The North Sydney DCP, within Table B-10.3 – Parking rates for specific non-residential uses specifies maximum car parking rates for a range of uses. With respect to Educational establishments, Table 10.3 provides a maximum rate of 1 car parking space to every 6 staff members.

The SSDA seeks to provide an additional 7 staff members, which results in a maximum requirement of one space.

No additional car parking spaces are proposed as part of the upgrades, which satisfies the North Sydney DCP requirements.

It is noted that the North Sydney Public School currently provides 50 on-site car parking spaces, inclusive of 2 accessible car parking spaces for the existing 80 staff members. Thus, the current provision of 50 spaces exceeds the DCP requirement for educational establishments.

9.1.1 Accessible Car Parking

The North Sydney DCP within Clause 10.3.1 – Provisions requires 1-2% of all non-residential parking spaces to be designed for use by the disabled. Application of this percentage to the existing 50 car parking spaces results in a requirement of one space. The existing car park provides two accessible car parking spaces, thus satisfying this requirement.

9.1.2 Motorcycle Parking

The North Sydney DCP requires motorcycle parking to be provided at a minimum rate of one space to every 10 cars or part thereof.

Given that the proposed upgrades do not propose to provide any additional on-site car parking, there is no strict requirement to provide any motorcycle parking as part of the upgraded school development.

9.1.3 Car Parking Summary

The upgrades to the North Sydney Public School do not include any changes to the existing on-site car park, which currently accommodated 50 on-site spaces, inclusive of two accessible car spaces.

The overall provision of car parking for the site exceeds the maximum car parking requirements to Table B - 10.3 of the North Sydney DCP.

9.2 Bicycle Parking

9.2.1 North Sydney DCP

The North Sydney DCP does not provide a specific rate for bicycle parking for educational establishments (primary schools), instead referring to a merit assessment, making reference to the Planning Guidelines for Walking and Cycling 2004 (PGFW&C). The PGFW&C, provides the following bicycle parking rates for primary schools:

- Long Term Spaces – 3% to 5% of staff members

- Short Term Spaces – 5% to 10% of staff members

Application of the above rates to the overall staffing numbers (87) results in a bicycle parking requirement of four long term spaces and nine short term spaces.

9.2.2 Austroads

Reference is made to the Austroads *Guide to Traffic Management Part 11: Parking Management Techniques* (2020) to establish bicycle parking requirements. In this regard, Clause 2.3, Table 2 6 provides the following rate for School Land Uses:

– 1 per 5 pupils over Year 4

According to the depersonalised data for the schools provided by Department of Education, student numbers over year 4 in 2023 is approximately 145. Application of the above rate would result in a requirement of 58 bicycle spaces.

9.2.3 EFSG Guide

The EFSG provides bicycle parking requirements based on school core size. The upgraded North Sydney Public School is categorised as a CORE 35 school, which has a requirement for at least 60 bicycle parking spaces.

9.2.4 Bicycle Parking Summary

Based on the bicycle parking requirements above and to actively encourage cycling as a primary mode of transport for students and staff travelling to and from the school, it is considered that the EFSG bicycle parking rates would provide the most appropriate bicycle parking requirements. In this regard, in accordance with the EFSG, the development is required to provide a minimum of 60 bicycle parking spaces.

As part of the upgrades, the proposal seeks to provide 63 new bicycle parking spaces (removing the existing 20 spaces on-site).

10 Design

10.1 Design Commentary

The upgrades to the North Sydney Public School do not proposes any changes to the on-site car parking arrangements, and as such, no assessment has been conducted of the existing access arrangements and car parking layouts.

It is understood that the existing car parking arrangements generally comply with AS 2890.1:2004 Parking Facilities – Off Street Car Parking (AS 2890.1: 2004) and/or the previous version AS 2890.1:1993.

Consistent with the existing arrangements, servicing (deliveries, waste collection) shall occur within the staff car park. All major deliveries and waste collection will occur within the staff carpark. Delivery times would be strictly managed, whereby regular services are subject to strict timelines that to ensure the minimum movements possible and these occur outside of the school peak periods.

10.2 Bicycle Parking Arrangements

A total of 63 bicycle parking spaces are to be provided within the school grounds, as shown graphically in **Figure 37.** The existing 20 spaces will be removed.

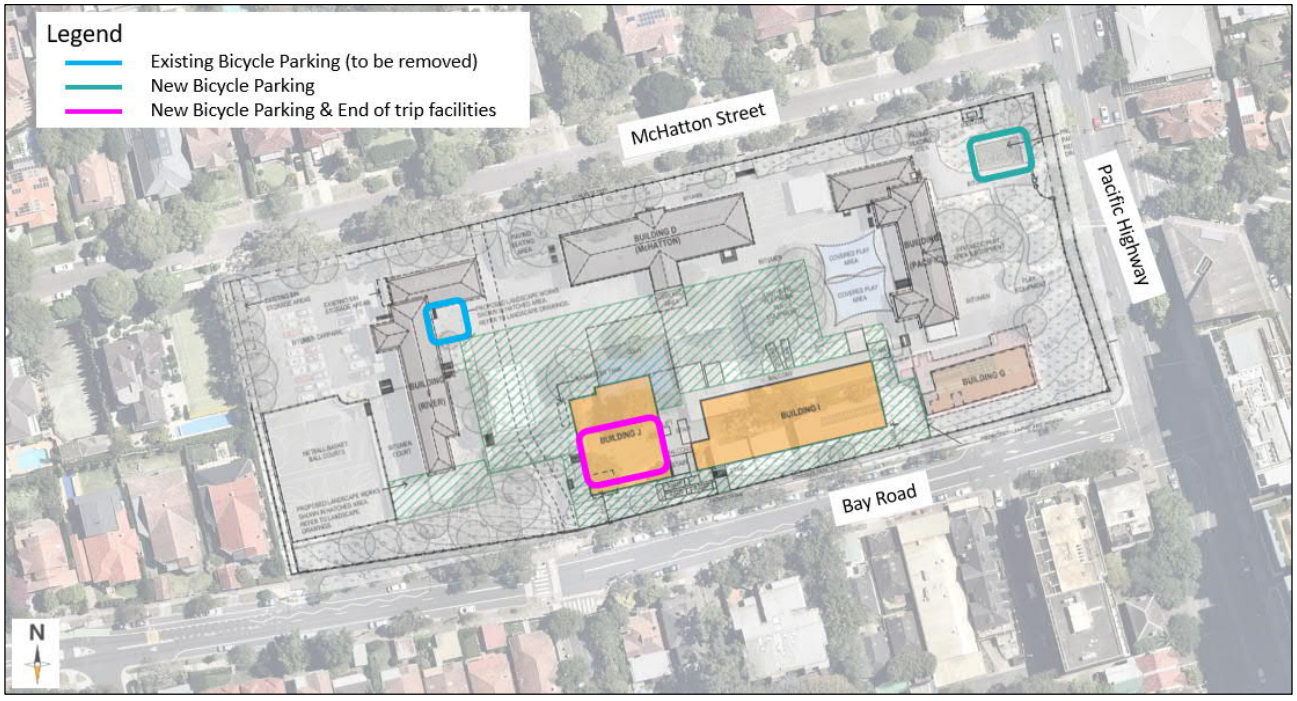


Figure 37: Bicycle Parking Locations

Access to the bicycle spaces in close proximity to Pacific Highway is via the Pacific Highway entrance, which shall be accessible to students and teachers before and after school. Access to the bicycle spaces and end of trip facilities near Bay Road shall be via Bay Road.

The design and layout of the bicycle parking spaces shall comply with AS 2890.3:2015.

10.2.1 Kiss and Ride Facilities

The proposed upgrades to the North Sydney Public School include the provision of a new main pedestrian entry and forecourt to Bay Road. As part of this, the intention is to relocate approximately half of the existing on-street Kiss and Drop spaces from McHatton Street to the Bay Road frontage.

Ason Group has prepared a Parking Restrictions Plan to detail the proposed conditions of the Site as per the Ason TA. This is detailed in **Figure 38** and has also been attached in **Appendix A** for further information.

This Parking Restrictions Plan details the proposed parking restrictions for the school, which seeks to provide a kiss and ride facility along Bay Road.

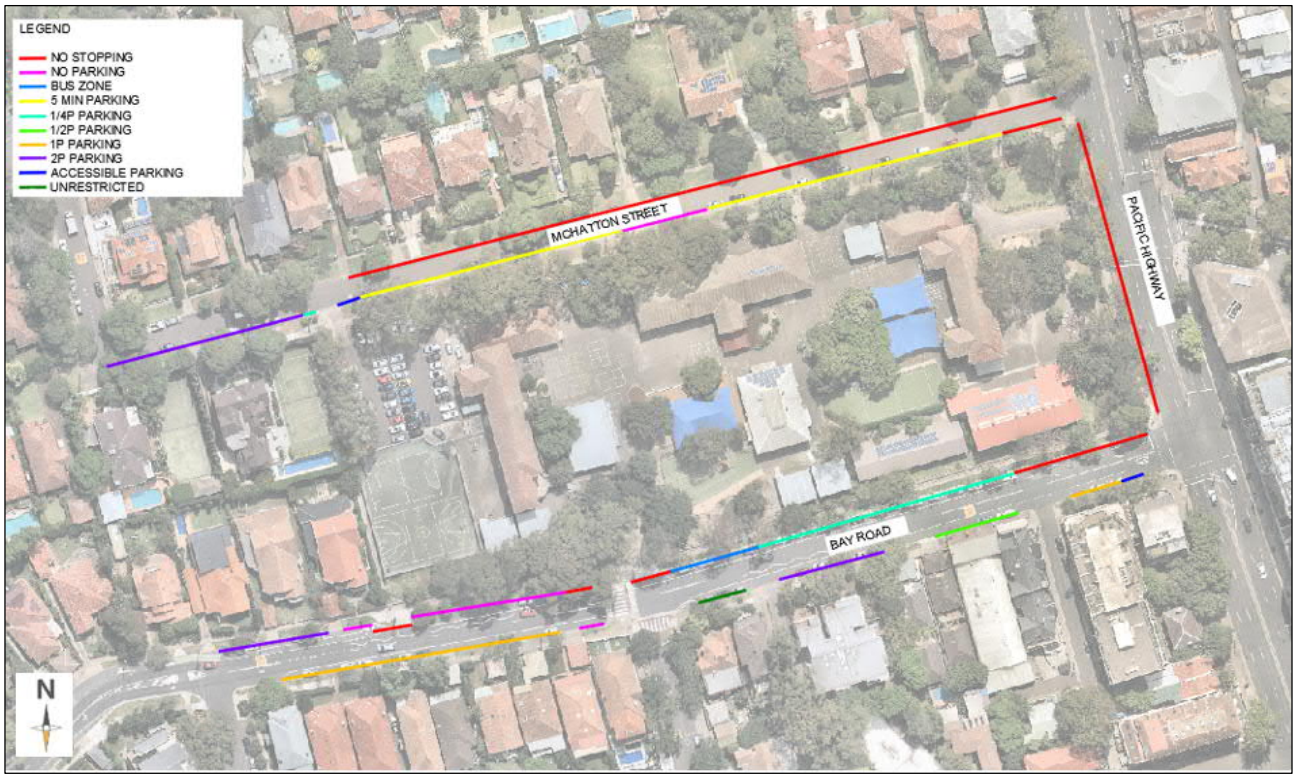


Figure 38: Proposed Parking Restrictions

11 Preliminary Construction Traffic Management Plan

11.1 Overview

The proposed works forming part of this SSDA include the following:

- Demolition works to accommodate new works;
- Construction of new buildings;
- Construction of pedestrian infrastructure;
- Covered outdoor learning area (COLA) and covered walkways;
- Associated earthworks, landscaping, stormwater works, service upgrades; and
- Tree removal/ tree safety works.

This Preliminary Construction Traffic Management Plan (Preliminary CTMP) outlines principles that shall be adopted by the appointed contractors for the project and is subject to a detailed Construction Traffic Management Plan (CTMP) that forms part of a Construction Management Plan (CMP) to be prepared and commissioned by the incumbent contractor.

11.2 Overall Principles of Construction Traffic Management

The overall principals of traffic management during construction activities include:

- Minimising the impact on pedestrian and cyclist safety and movements
- Maintaining appropriate public transport and school bus access
- Minimising the impact to existing traffic on adjacent roads and intersections
- Minimising the loss of on-street parking
- Maintaining access to / from adjacent properties
- Restricting construction vehicle movements to designated routes to / from the site
- Managing and controlling construction vehicle activity near the site
- Ensuring construction activity is carried out in accordance with Council's approved hours of work.

11.3 Contractor Parking

On-site parking will not be available to construction contractors on site.

The incumbent contractor will be required to ensure contractors working on the project are aware that there is no on-site parking and encouraged to carpool for drop off / pick up, or travel to / from the site using public transport.

11.4 Proposed Work Hours

The construction work will vary depending on the phase of construction and associated activities. Construction works however will be undertaken during standard construction-working hours, with no deliveries allowed prior to the AM and PM school bell time as follows:

- Monday to Friday: 7.00AM to 5:00PM.
- No construction deliveries between 7:30am to 9:00am, and between 1:30pm to 3:00pm on school days.
- Saturday: 8.00AM to 1.00PM
- Sunday and Public holidays: No planned work.

It may (on occasions) be necessary to undertake night works to minimise disruption to traffic however any works undertaken outside of these times will only occur with prior approval from Council.

11.5 Staging and Duration

The construction program would generally consist of the following construction stages with duration to be determined once a contractor has been appointed:

- Stage 1: Site Preparation,
- Stage 2: Demolition
- Stage 3: Bulk Excavation
- Stage 4: Main Works (Construction)

Note that duration for each stage would be confirmed by the contractor once appointed.

It is noted during all stages, all vehicle entry and exit movements are to be in a forward direction only, with spoil to be loaded within the site and under the careful supervision of an authorised traffic controller. Accordingly, supervision by an authorised traffic controller would also be required for the movements of vehicles that would cross the footpath during deliveries.

11.6 Worker Induction

All workers and subcontractors engaged on-site would be required to complete a site induction. The induction should include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, work, health and safety (WHS), driver protocols and emergency procedures.

Any workers required to undertake works or traffic control within the public domain would be suitably trained and covered by adequate and appropriate insurances.

11.7 Authorised Traffic Controller

If there is a requirement for authorised traffic controllers to be present throughout the demolition, and construction stages of the project, their responsibilities include:

- Pedestrian and cyclist management, to ensure that adverse conflicts between vehicle movements and pedestrians do not occur.
- Supervision of all vehicle movements across pedestrian footpaths at all times, and
- Supervision of all loading and unloading of construction materials during the deliveries in the construction phase of the project.

11.8 Construction Traffic Volumes

Construction traffic will generally incorporate:

- Rigid trucks up to 8.8m
- Up to 12.5m rigid trucks for removal of spoil and transportation of material operating under traffic control in the local road network.

Any oversize vehicles using local roads to access the site for would require additional Council and/or Transport for NSW approval.

The maximum number of trucks accessing the site is estimated to be between 6 to 12 trucks per hour, depending on the works undertaken and type of material required on-site.

It is anticipated that there will be an average of 20 – 40 workers on-site during peak construction activities. Workers will be advised that there is no on-site parking and encouraged to carpool, or travel to / from the site using public transport where practicable.

11.9 Site Access

Construction vehicles accessing the site are expected to travel in a forward-in and forward-out direction to / from the work zone on Bay Road. The proposed work zone is to temporarily replace the 1/4P parking area on Bay Road per **Figure 39**: Bay Road Work Zone**.**

Figure 39: Bay Road Work Zone

All construction vehicle loading / unloading is proposed to take place within the work zone with some construction vehicles permitted to park within the work zone when deliveries are not scheduled.

Access to the work zone will be managed via construction scheduling set by the incumbent contractor to ensure no queuing or parking on local streets occur. Work zone access is stopped during school drop off / pick up hours (7:30am to 9:00am, and between 1:30pm to 3:00pm on school days) and work zone cleared by 1/4P parking for student pick up / drop off.

The bus stop on Bay Road accommodates one regular route and three school routes shown in **Table 13**: Existing School Bus Connectivity. As work zone will be cleared for pick up / drop off, the school bus routes will not be affected by construction traffic. The work zone proposed is situated clear of the existing bus zone so access to the bus stop will not be affected and construction vehicle drivers will be briefed to prioritise bus egress.

The existing kiss and drop zone on McHatton Street will not be affected by construction traffic per the route proposed in **Figure 40**: Construction Vehicle Haulage Routes**.**

11.10 Construction Mitigation Measures

Construction of the above development is expected to be in the order of 6-12 vehicles per hour (equivalent to one vehicle very 5 to 10 minutes) on the surrounding road network. In this regard, the following measures should be undertaken to minimise the impacts of the construction activities of the development:

- A construction fence will be provided along Bay Road and internally within the school to provide safe pedestrian access. The fence will consist of chain wire fencing along the remaining site boundaries, that will be maintained for the duration of the construction program.
- Traffic control may be required to manage and regulate traffic movements into and out of the site during construction, with pedestrian priority provided during peak hour periods to maintain accessibility to public transport facilities.

- Disruption to road users would be kept to a minimum by scheduling intensive delivery activities outside of peak network hours.
- Supervised traffic control will be required where two-way flow is restricted over any length of the roadway, depending on the number of truck movements required and would be managed outside of peak hour vehicle and pedestrian activity.

11.11 Pedestrian and Cyclist Management

During construction, pedestrian movements will be maintained along all frontages of the site when possible. This includes maintaining access needs and requirements for school operations and community traffic.

It is expected that the construction fencing is to be located as close as possible to the property boundary, maintaining maximum footpath width to minimise impact on pedestrian amenity.

Construction fencing will be provided around the perimeter of the site and shall be documented in the Project's Construction Management Plan.

Construction materials and equipment is expected to be unloaded / loaded from vehicles in the work zone on Bay Road, when required Class A hoarding will be provided for the length of the work zone to ensure pedestrian safety.

Traffic controller(s) will be present at the site accesses to manage pedestrian and vehicular traffic to ensure public safety while construction materials and equipment enter and exit the site. Pedestrians will not be directed to use the other footpath by use of signage alone. Also, traffic controls would need to be in accordance with AS1742.3 and RMS 'Traffic Control at Worksites' manual at all times.

Should any unforeseen activities require the temporary closure of any existing pedestrian access, a TGS should be developed and implemented by the contractor to ensure a safe alternative for pedestrians traversing these routes in the vicinity of the site.

11.12 Truck Routes

It is proposed that construction vehicles enter and exit the Site via the routes shown in **Figure** 40. A copy of the truck route maps shall be provided to all drivers prior to attending the Site.

The access and egress routes are to be utilised by all construction vehicles associated with the Site and represents the shortest route between the local and regional road network – hence minimising the impacts of the construction process. No trucks are to be queued on local roads. Mobile phones and two-way radios will be used to coordinate truck arrivals.

Figure 40: Construction Vehicle Haulage Routes

12 Summary and Conclusions

12.1 Summary

Ason Group has been commissioned by SINSW to prepare a TAIA to accompany the SSDA to the NSW DPIE for a proposed upgrades to the North Sydney Public School, to meet the educational needs of the area.

12.2 Key Findings

Further to a detailed assessment of the proposed development of the upgrades to North Sydney Public School, we provide the following conclusions:

- The Development relates to a series of upgrade and refurbishment works in the North Sydney Public School, aimed to support high-quality educational outcomes to meet the needs of students within the local community and deliver innovative learning and teaching spaces. The site is located within the North Sydney Council area and is subject to that Council's controls.
- The proposed main access gate along Bay Road will provide a DDA compliant access to / from the School along Bay Road ad provide for improved pedestrian and cyclist access to the school.
- A formal SEARs have been issued by DPIE relating to the SSDA for the Site. The Transport Assessment, inclusive of the Preliminary Construction Plan and Preliminary School Travel Plan are documents intended to address the Requirements relating to traffic and transport elements of the proposed works.
- The School is situated within the Education Precinct of the North Sydney Council area, with connectivity to the surrounding public transport network via footpaths and/or shared paths within the walking catchment area. An assessment of the school bus network generally indicates adequate servicing availability to the student population.
- The proposal comprises the conversion of existing 15-minute parking area along the Bay Road frontage of the site as a kiss and ride zone with No Parking restrictions to better service the new DDA compliant main access along the Bay Road frontage of the site.
- The retention of the existing school bus stop along the Bay Road frontage of the School is located immediately to the west of the new DDA compliant Access Gate and will continue to service the school well into the future with improved access to / from the school.
- A School Travel Survey undertaken by Ason Group indicates that there is additional opportunity to cultivate a higher proportion of active travel modes (walking and cycling) for students within appropriate distance.
- An assessment of the surveys indicates a high dependency on walking as the primary mode of transport to/from the school. Throughout both periods, walking varies between 54% and 56%.
- The student surveys demonstrate that a high proportion of students travel to and from school via alternative modes to private vehicle travel, with approximately a quarter of students arriving/ departing via private vehicles.
- The staff surveys demonstrate a higher dependency on private vehicle (as driver) usage, which is generally in line with observed education staff patterns throughout NSW. This is underpinned by the provision of on-site parking, as well as the requirements of bringing heavy material and equipment to and from the workplace, thus benefitting from private vehicle usage.
- Due to the current Covid-19 restrictions, Ason Group have relied on previous traffic survey data for the locale at the Bay Road and the Pacific Highway intersection to establish existing baseline performance of the surrounding road network. An assessment of the school peak periods (AM between 08:00 and 09:00, and PM between 15:00 and 16:00) demonstrate that generally, traffic performance is satisfactory, demonstrating LoS C's at worst for each assessed period.

- The traffic assessment indicates an increased traffic generation (net traffic generation) of 61 vehicle trips during the AM Peak, and 16 vehicle trips during the PM Peak.
- Accordingly, the network modelling demonstrates that the Pacific Highway / Bay Road and the Pacific Highway / McLaren Street intersections will continue to operate satisfactorily for the 2023 future year assessment, demonstrating that both intersections have sufficient capacity for the increase to traffic of the locale.
- As part of the traffic assessment, 10-year post development modelling has additionally been undertaken. Based on the scenarios for 2033 and with the application of a conservative 1% growth rate, it is considered that the assessed intersections notably decrease in performance as a result of background growth, performing at LoS D (worst intersection) during the AM Peak.
- Therefore, it can be determined that the increase of traffic associated with works included as part of the SSDA are not anticipated to cause any extenuating impacts to the road network, with the intersections exhibiting adequate capacity to provide for existing and future demands of the Site.

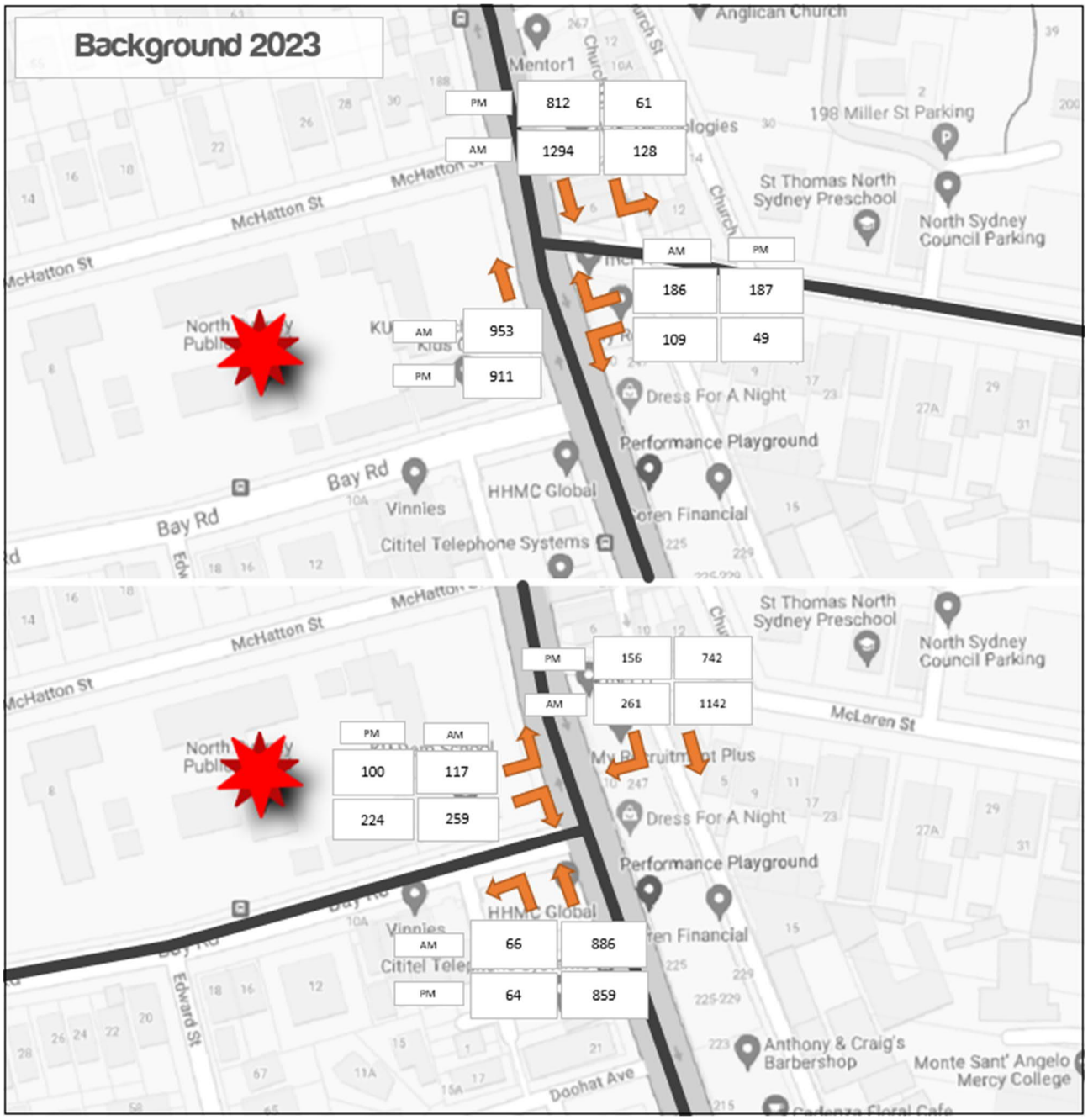
In summary, the Proposal is supportable on traffic planning grounds and is not anticipated to result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A. Network Diagrams

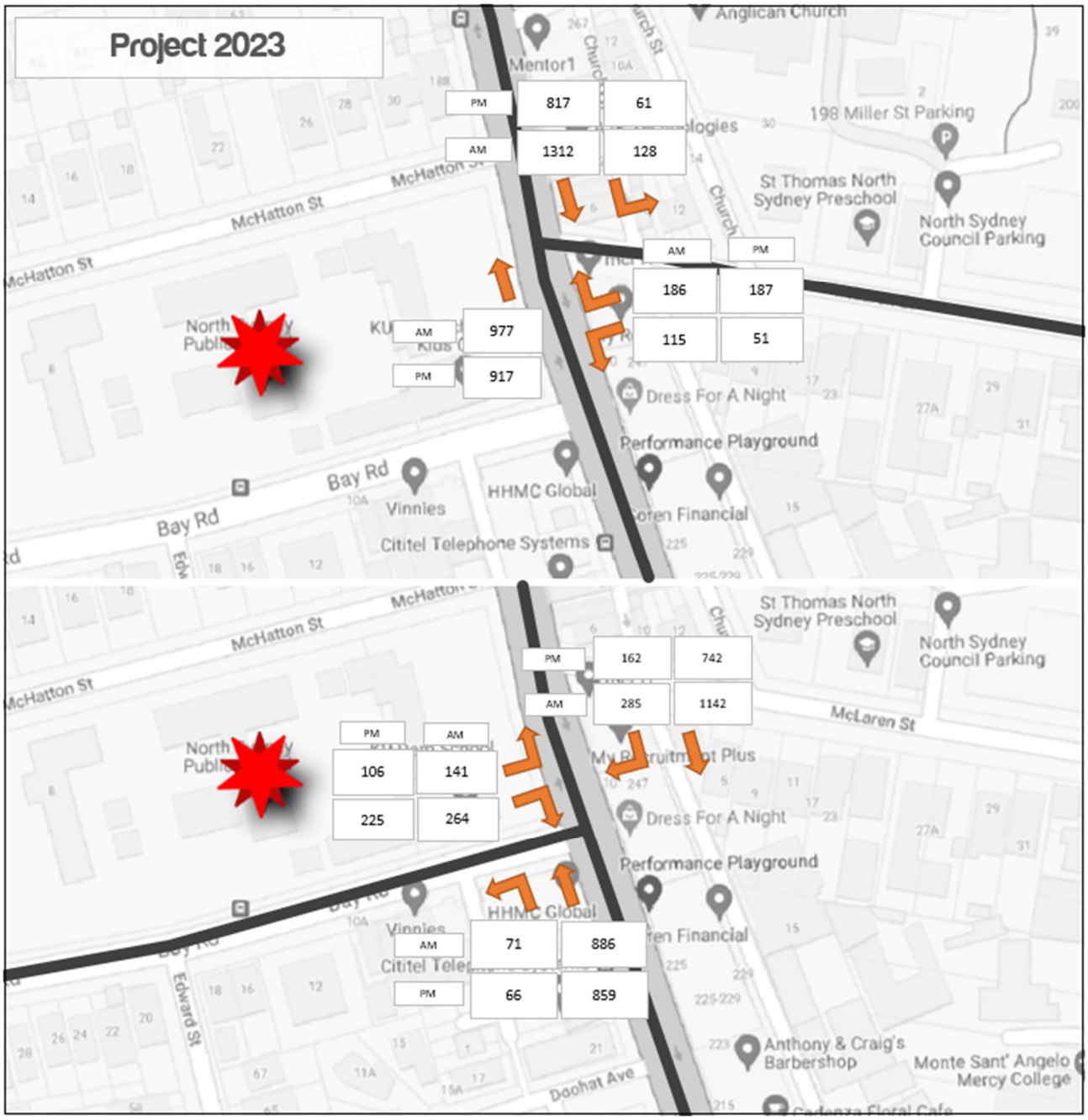
2021 Existing Volumes

Project Volumes

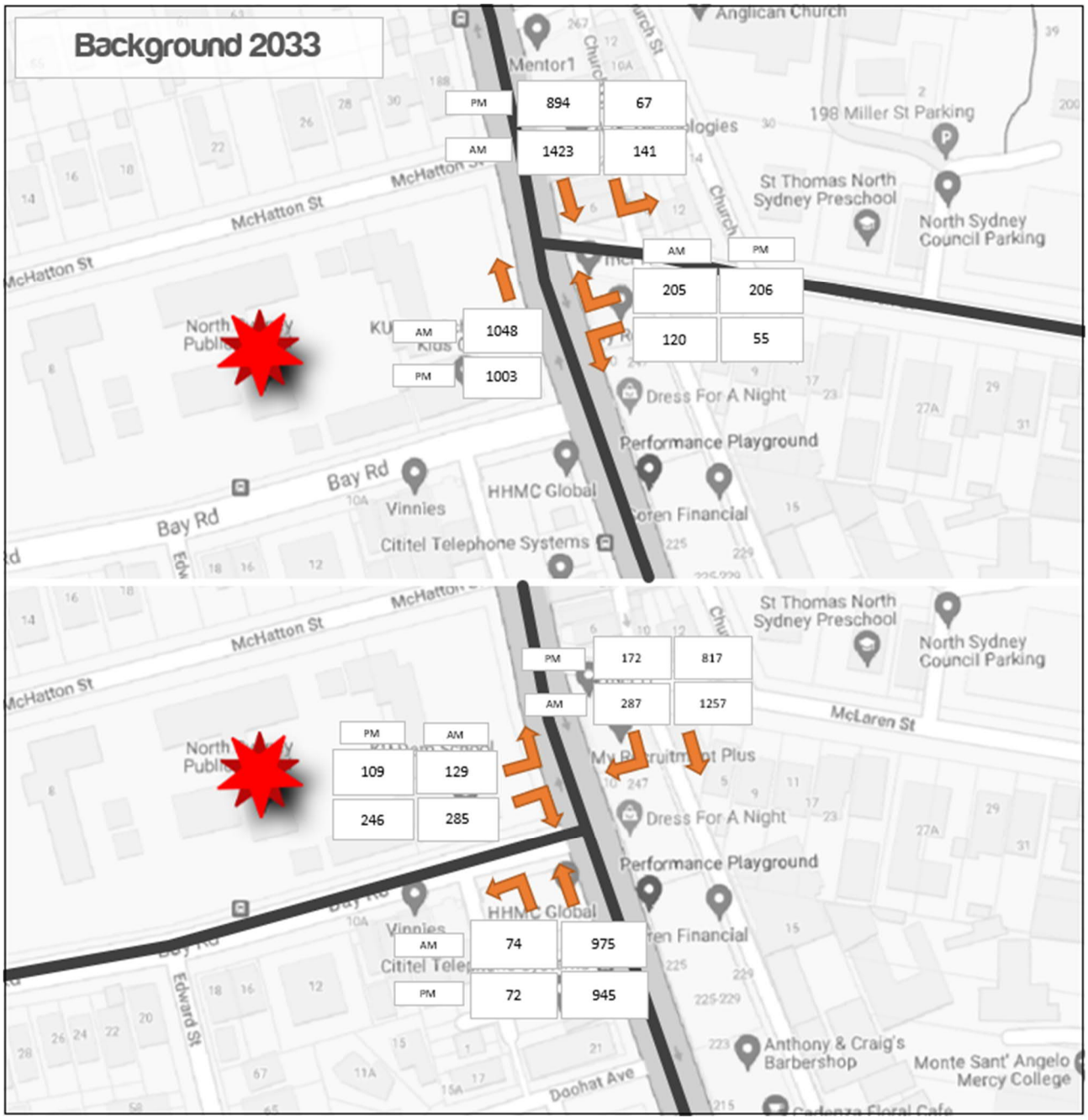
2023 Background Volumes



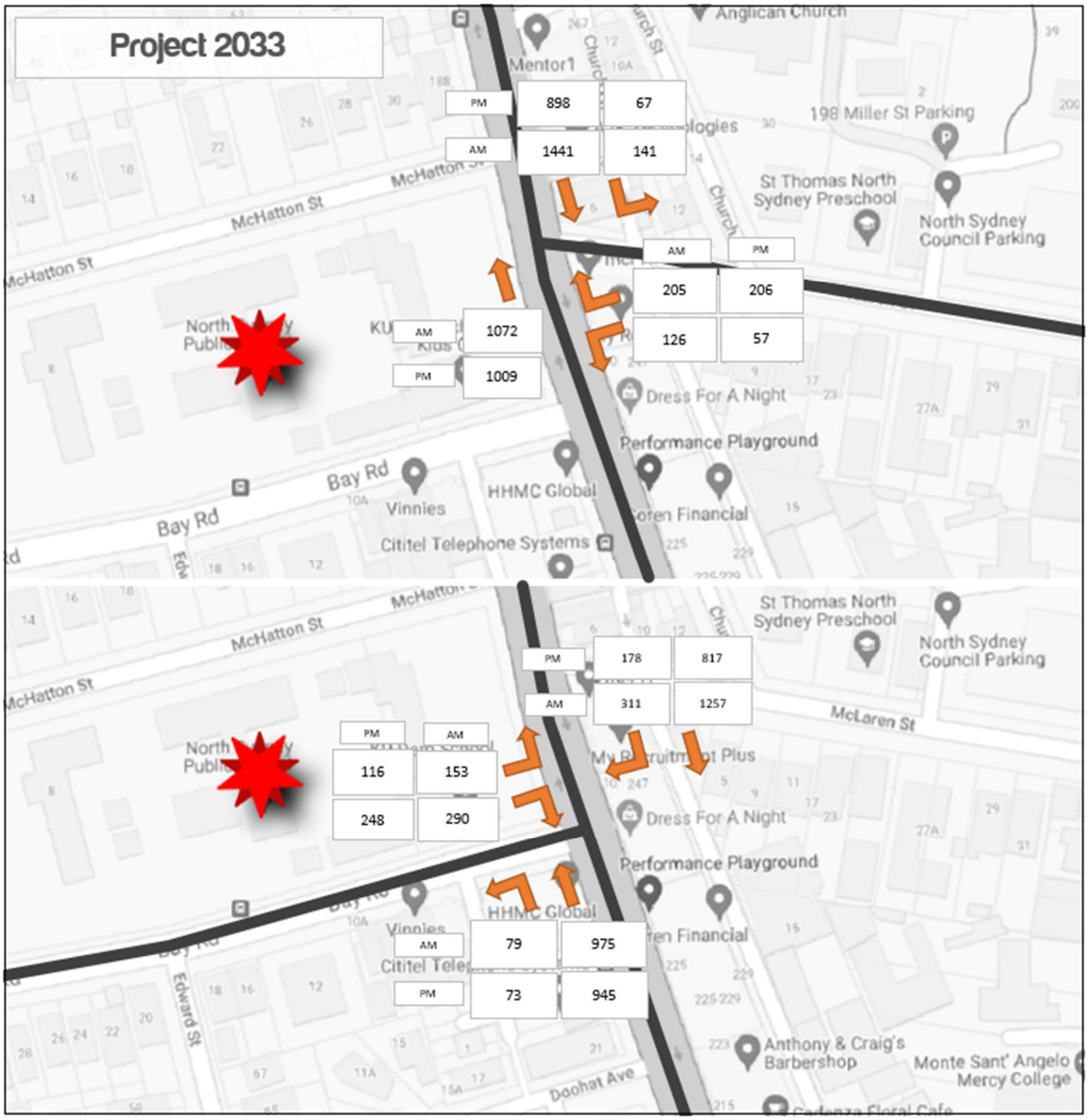
2023 Project Volumes



2033 background Volumes



2033 Project Volumes



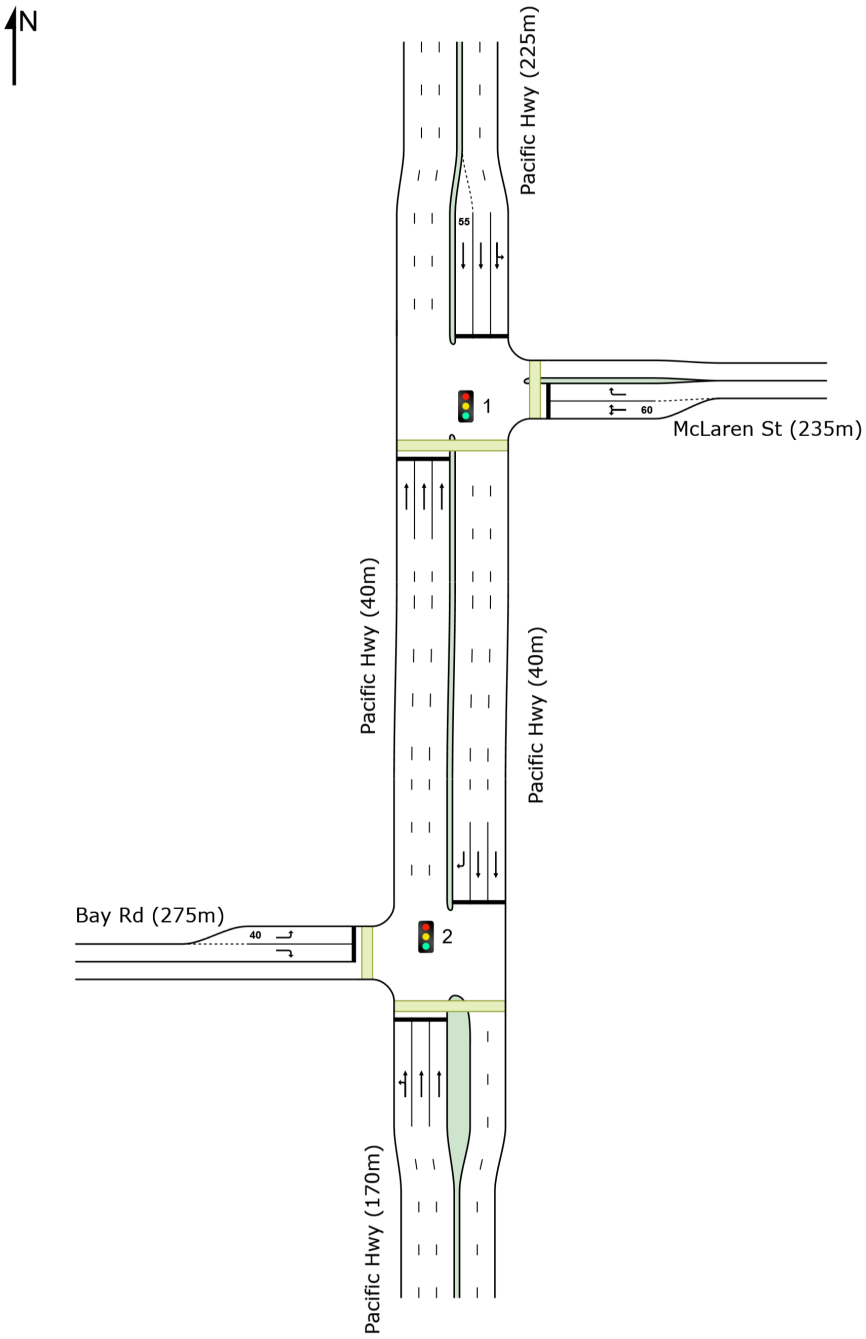
Appendix B. Existing SIDRA Results

NETWORK LAYOUT

Network: N101 [AM (Network Folder: Scenario 1 - Base 2021)]

New Network
Network Category: (None)
EQUISAT (Fixed-Time/SCATS) Isolated
Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
1	349	Pacific Hwy x McLaren St_AM
2	349	Pacific Hwy x Bay Rd_AM

CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 1 - Base 2021)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_AM]														
South: Pacific Hwy (40m)														
2	T1	1035	5.0	1035	5.0	0.296	1.9	LOS A	3.4	25.0	0.08	0.07	0.08	37.2
Approach		1035	5.0	1035	5.0	0.296	1.9	LOS A	3.4	25.0	0.08	0.07	0.08	37.2
East: McLaren St (235m)														
4	L2	113	4.7	113	4.7	0.578	50.9	LOS D	6.2	45.0	0.95	0.80	0.95	12.3
6	R2	193	4.9	193	4.9	0.379	40.6	LOS C	9.1	66.1	0.85	0.78	0.85	20.6
Approach		305	4.8	305	4.8	0.578	44.4	LOS D	9.1	66.1	0.89	0.79	0.89	17.8
North: Pacific Hwy (225m)														
7	L2	132	4.8	132	4.8	* 0.824	31.5	LOS C	27.3	198.9	0.86	0.88	0.95	24.0
8	T1	1335	5.0	1335	5.0	0.824	24.5	LOS B	27.3	198.9	0.70	0.72	0.80	18.6
Approach		1466	5.0	1466	5.0	0.824	25.1	LOS B	27.3	198.9	0.72	0.73	0.81	19.3
All Vehicles		2806	5.0	2806	5.0	0.824	18.6	LOS B	27.3	198.9	0.50	0.49	0.55	23.1
Site: 2 [Pacific Hwy x Bay Rd_AM]														
South: Pacific Hwy (170m)														
1	L2	68	4.6	68	4.6	0.456	34.4	LOS C	13.6	99.4	0.81	0.72	0.81	22.7
2	T1	914	5.0	914	5.0	0.456	29.4	LOS C	14.5	105.8	0.80	0.69	0.80	14.3
Approach		982	4.9	982	4.9	0.456	29.7	LOS C	14.5	105.8	0.80	0.69	0.80	15.2
North: Pacific Hwy (40m)														
8	T1	1179	5.0	1179	5.0	0.506	5.8	LOS A	8.9	65.3	0.26	0.24	0.26	31.0
9	R2	269	5.1	269	5.1	0.859	64.2	LOS E	8.9	65.3	1.00	0.99	1.24	12.8
Approach		1448	5.0	1448	5.0	0.859	16.7	LOS B	8.9	65.3	0.40	0.38	0.45	22.8
West: Bay Rd (275m)														
10	L2	121	5.2	121	5.2	0.133	19.9	LOS B	3.7	26.8	0.56	0.66	0.56	22.8
12	R2	267	5.1	267	5.1	0.812	56.2	LOS D	15.8	115.3	0.98	0.93	1.14	17.1
Approach		388	5.1	388	5.1	0.812	44.9	LOS D	15.8	115.3	0.85	0.84	0.96	18.1
All Vehicles		2819	5.0	2819	5.0	0.859	25.1	LOS B	15.8	115.3	0.60	0.55	0.64	19.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_AM]											

South: Pacific Hwy (40m)										
P1 Full	316	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
East: McLaren St (235m)										
P2 Full	316	50.2	LOS E	1.0	1.0	0.92	0.92	227.6	212.9	0.94
All Pedestrians	632	50.2	LOS E	1.0	1.0	0.92	0.92	231.7	217.9	0.94
Site: 2 [Pacific Hwy x Bay Rd_AM]										
South: Pacific Hwy (170m)										
P1 Full	316	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
West: Bay Rd (275m)										
P4 Full	316	50.2	LOS E	1.0	1.0	0.92	0.92	226.7	211.9	0.93
All Pedestrians	632	50.2	LOS E	1.0	1.0	0.92	0.92	231.3	217.4	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 1 - Base 2021)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

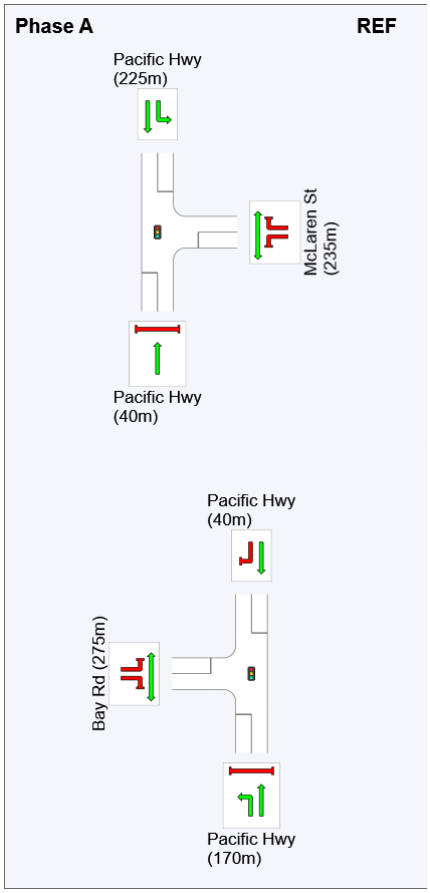
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

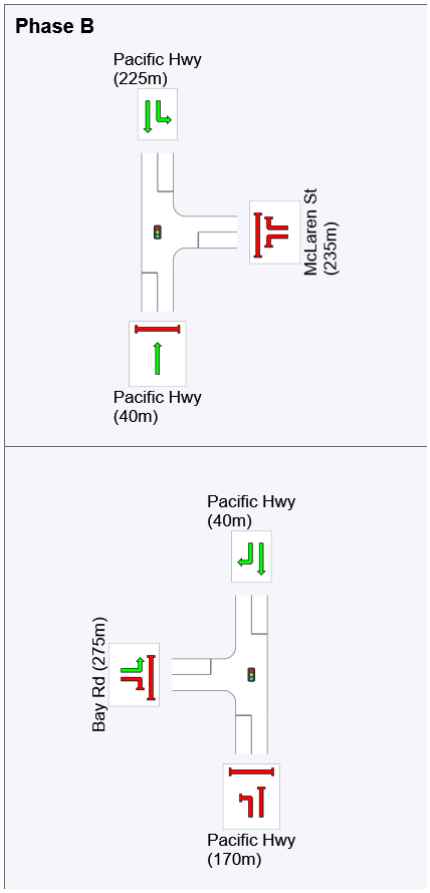
Phase Timing Summary (CCG)

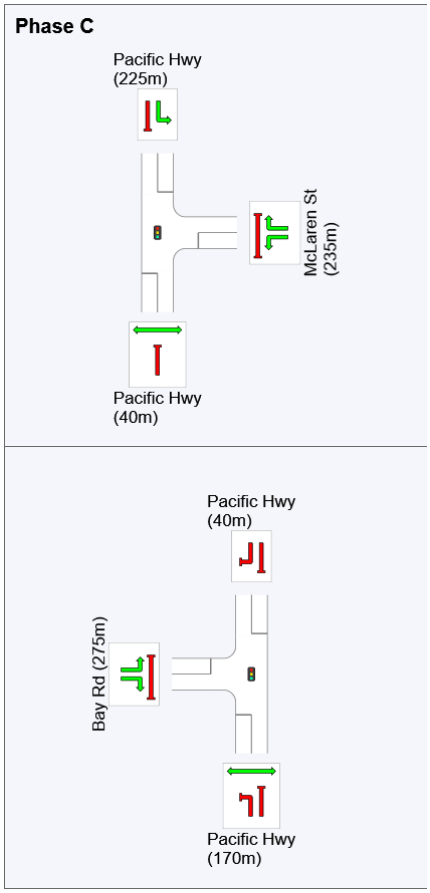
Phase	A	B	C
Phase Change Time (sec)	0	53	80
Green Time (sec)	47	21	34
Phase Time (sec)	53	27	40
Phase Split	44%	23%	33%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

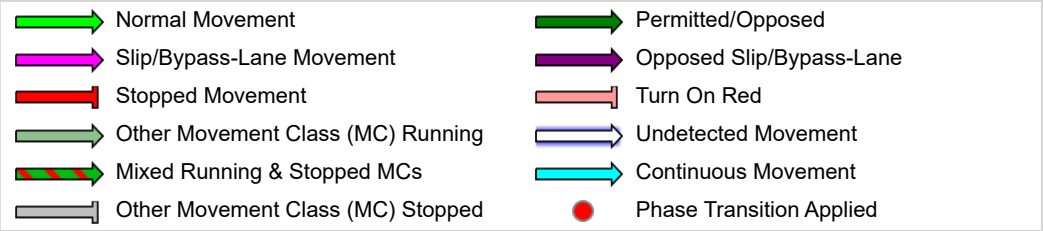
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 1 - Base 2021)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_PM]														
South: Pacific Hwy (40m)														
2	T1	991	5.0	991	5.0	0.293	2.8	LOS A	5.0	36.9	0.16	0.14	0.16	36.0
Approach		991	5.0	991	5.0	0.293	2.8	LOS A	5.0	36.9	0.16	0.14	0.16	36.0
East: McLaren St (235m)														
4	L2	51	4.2	51	4.2	0.259	30.9	LOS C	3.6	25.9	0.85	0.74	0.85	16.9
6	R2	194	4.9	194	4.9	0.259	28.6	LOS C	4.2	30.8	0.82	0.74	0.82	24.1
Approach		244	4.7	244	4.7	0.259	29.1	LOS C	4.2	30.8	0.82	0.74	0.82	23.0
North: Pacific Hwy (225m)														
7	L2	63	5.0	63	5.0	* 0.326	12.2	LOS A	6.8	49.8	0.55	0.52	0.55	33.0
8	T1	838	5.0	838	5.0	0.326	8.8	LOS A	11.0	80.6	0.54	0.48	0.54	28.1
Approach		901	5.0	901	5.0	0.326	9.1	LOS A	11.0	80.6	0.54	0.49	0.54	28.7
All Vehicles		2136	5.0	2136	5.0	0.326	8.4	LOS A	11.0	80.6	0.40	0.35	0.40	30.2
Site: 2 [Pacific Hwy x Bay Rd_PM]														
South: Pacific Hwy (170m)														
1	L2	66	4.8	66	4.8	* 0.384	20.8	LOS B	8.2	59.8	0.73	0.65	0.73	27.9
2	T1	886	5.0	886	5.0	0.384	16.4	LOS B	8.7	63.5	0.71	0.62	0.71	19.9
Approach		953	5.0	953	5.0	0.384	16.7	LOS B	8.7	63.5	0.71	0.62	0.71	20.9
North: Pacific Hwy (40m)														
8	T1	766	4.9	766	4.9	0.339	3.9	LOS A	4.7	34.6	0.23	0.20	0.23	33.5
9	R2	161	5.2	161	5.2	* 1.229	255.4	LOS F	8.9	65.3	1.00	2.11	3.55	4.1
Approach		927	5.0	927	5.0	1.229	47.6	LOS D	8.9	65.3	0.37	0.54	0.81	12.3
West: Bay Rd (275m)														
10	L2	103	5.1	103	5.1	0.143	20.1	LOS B	2.6	19.1	0.67	0.69	0.67	22.6
12	R2	232	5.0	232	5.0	0.623	36.4	LOS C	8.7	63.8	0.96	0.82	0.97	21.4
Approach		335	5.0	335	5.0	0.623	31.4	LOS C	8.7	63.8	0.87	0.78	0.88	21.7
All Vehicles		2215	5.0	2215	5.0	1.229	31.9	LOS C	8.9	65.3	0.59	0.61	0.78	16.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_PM]											

South: Pacific Hwy (40m)										
P1 Full	316	31.1	LOS D	0.6	0.6	0.88	0.88	216.8	222.8	1.03
East: McLaren St (235m)										
P2 Full	316	31.1	LOS D	0.6	0.6	0.88	0.88	208.6	212.9	1.02
All Pedestrians	632	31.1	LOS D	0.6	0.6	0.88	0.88	212.7	217.9	1.02
Site: 2 [Pacific Hwy x Bay Rd_PM]										
South: Pacific Hwy (170m)										
P1 Full	316	31.1	LOS D	0.6	0.6	0.88	0.88	216.8	222.8	1.03
West: Bay Rd (275m)										
P4 Full	316	31.1	LOS D	0.6	0.6	0.88	0.88	207.7	211.9	1.02
All Pedestrians	632	31.1	LOS D	0.6	0.6	0.88	0.88	212.3	217.4	1.02

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 1 - Base 2021)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

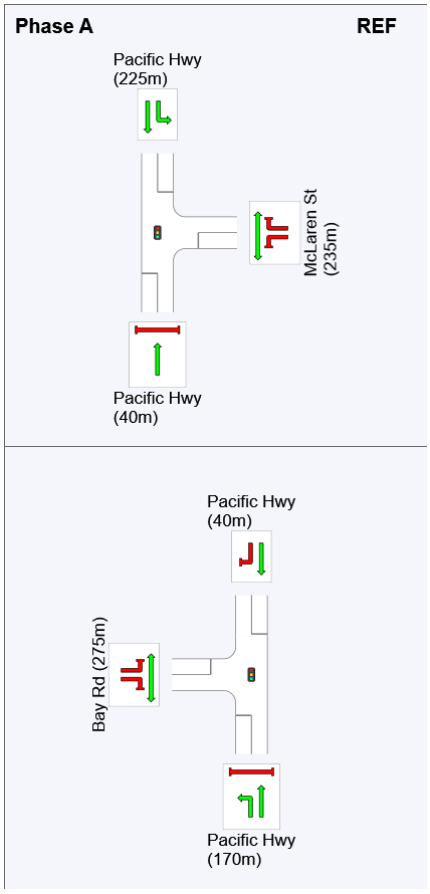
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

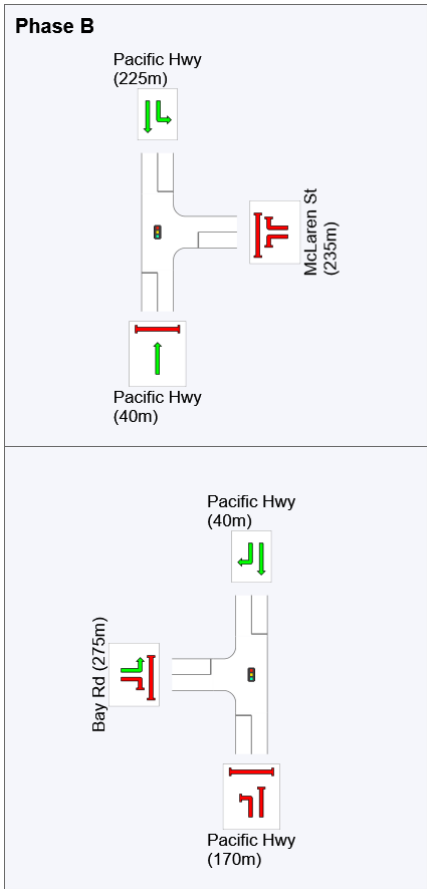
Phase Timing Summary (CCG)

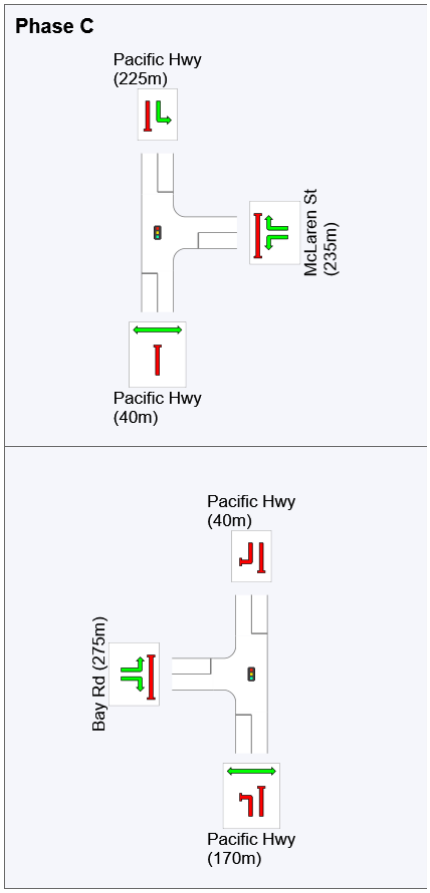
Phase	A	B	C
Phase Change Time (sec)	0	43	55
Green Time (sec)	37	6	24
Phase Time (sec)	43	9	30
Phase Split	52%	11%	37%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

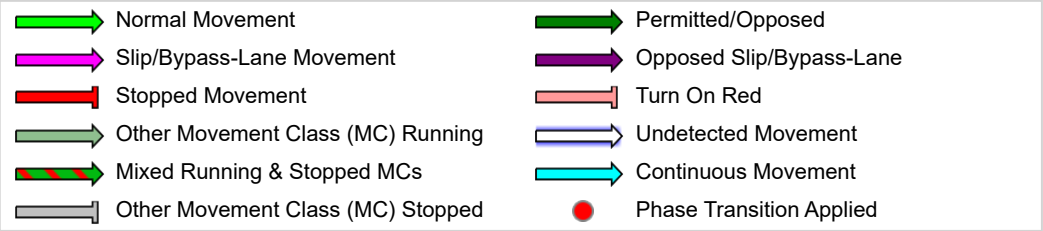
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



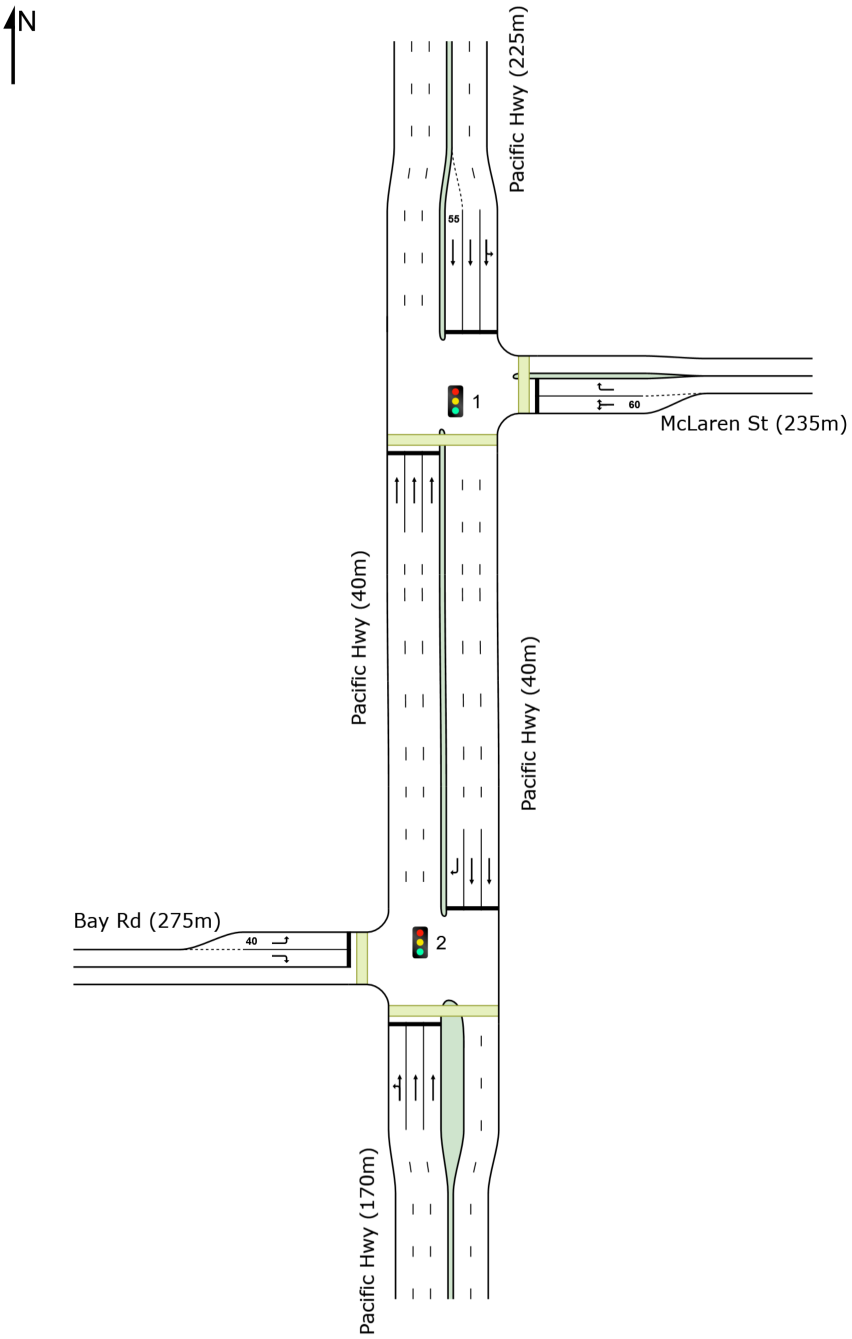
Appendix C. Future SIDRA Results

NETWORK LAYOUT

Network: N101 [AM (Network Folder: Scenario 2 - Base 2023)]

New Network
Network Category: (None)
EQUISAT (Fixed-Time/SCATS) Isolated
Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
1	349	Pacific Hwy x McLaren St_AM
2	349	Pacific Hwy x Bay Rd_AM

CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 2 - Base 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_AM]														
South: Pacific Hwy (40m)														
2	T1	1056	5.0	1056	5.0	0.302	1.9	LOS A	3.5	25.6	0.08	0.07	0.08	37.2
Approach		1056	5.0	1056	5.0	0.302	1.9	LOS A	3.5	25.6	0.08	0.07	0.08	37.2
East: McLaren St (235m)														
4	L2	115	4.6	115	4.6	0.589	51.1	LOS D	6.3	46.1	0.95	0.81	0.95	12.3
6	R2	196	4.8	196	4.8	0.385	40.7	LOS C	9.2	67.3	0.85	0.78	0.85	20.6
Approach		311	4.7	311	4.7	0.589	44.5	LOS D	9.2	67.3	0.89	0.79	0.89	17.8
North: Pacific Hwy (225m)														
7	L2	135	4.7	135	4.7	* 0.847	35.5	LOS C	30.1	219.3	0.89	0.92	1.01	22.7
8	T1	1362	5.0	1362	5.0	0.847	28.5	LOS B	30.1	219.3	0.71	0.76	0.85	17.1
Approach		1497	5.0	1497	5.0	0.847	29.1	LOS C	30.1	219.3	0.73	0.77	0.86	17.8
All Vehicles		2863	5.0	2863	5.0	0.847	20.7	LOS B	30.1	219.3	0.51	0.52	0.58	22.0
Site: 2 [Pacific Hwy x Bay Rd_AM]														
South: Pacific Hwy (170m)														
1	L2	69	4.5	69	4.5	0.465	34.5	LOS C	14.0	101.9	0.81	0.72	0.81	22.7
2	T1	933	5.0	933	5.0	0.465	29.5	LOS C	14.9	108.5	0.80	0.70	0.80	14.3
Approach		1002	4.9	1002	4.9	0.465	29.9	LOS C	14.9	108.5	0.80	0.70	0.80	15.2
North: Pacific Hwy (40m)														
8	T1	1202	5.0	1202	5.0	0.516	5.8	LOS A	8.9	65.3	0.27	0.24	0.27	31.0
9	R2	275	5.0	275	5.0	0.875	66.0	LOS E	8.9	65.3	1.00	1.01	1.28	12.6
Approach		1477	5.0	1477	5.0	0.875	17.0	LOS B	8.9	65.3	0.40	0.38	0.45	22.6
West: Bay Rd (275m)														
10	L2	123	5.1	123	5.1	0.135	19.9	LOS B	3.7	27.3	0.56	0.66	0.56	22.7
12	R2	273	5.0	273	5.0	0.832	57.8	LOS E	16.4	119.9	0.98	0.95	1.18	16.8
Approach		396	5.1	396	5.1	0.832	46.0	LOS D	16.4	119.9	0.85	0.86	0.98	17.8
All Vehicles		2875	5.0	2875	5.0	0.875	25.5	LOS B	16.4	119.9	0.60	0.56	0.65	18.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_AM]											

South: Pacific Hwy (40m)										
P1 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
East: McLaren St (235m)										
P2 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	227.6	212.9	0.94
All Pedestrians	644	50.2	LOS E	1.0	1.0	0.92	0.92	231.7	217.9	0.94
Site: 2 [Pacific Hwy x Bay Rd_AM]										
South: Pacific Hwy (170m)										
P1 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
West: Bay Rd (275m)										
P4 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	226.8	211.9	0.93
All Pedestrians	644	50.2	LOS E	1.0	1.0	0.92	0.92	231.3	217.4	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 2 - Base 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

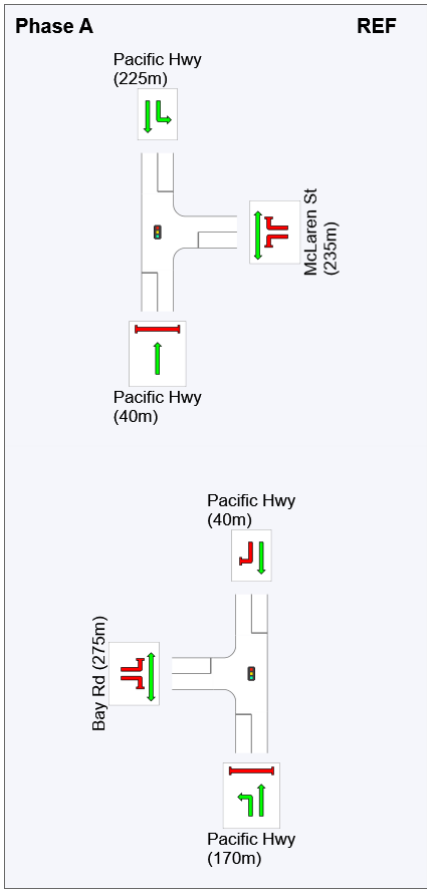
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

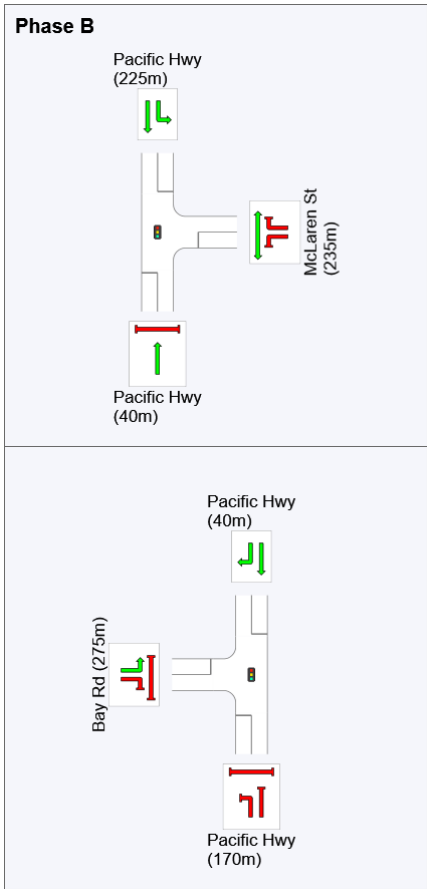
Phase Timing Summary (CCG)

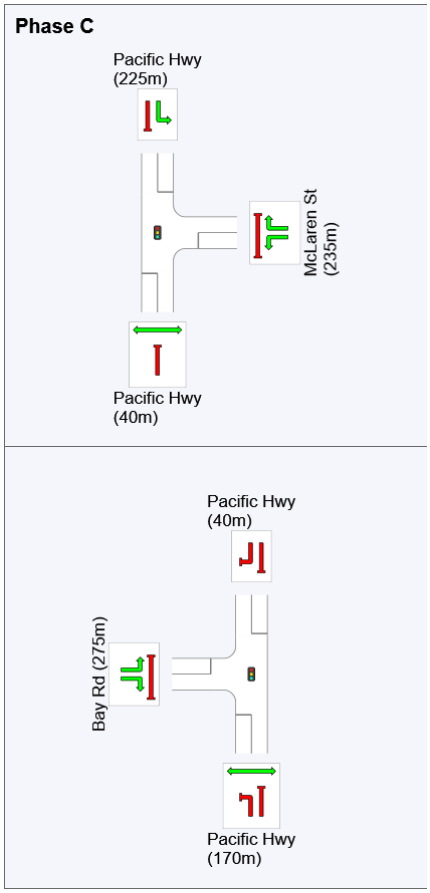
Phase	A	B	C
Phase Change Time (sec)	0	53	80
Green Time (sec)	47	21	34
Phase Time (sec)	53	27	40
Phase Split	44%	23%	33%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

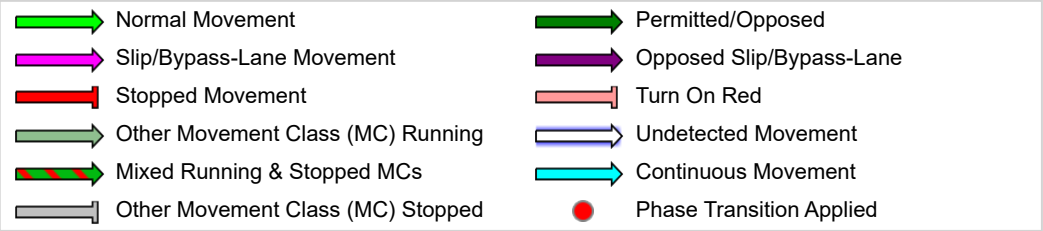
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 2 - Base 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_PM]														
South: Pacific Hwy (40m)														
2	T1	1009	5.0	1009	5.0	0.298	2.8	LOS A	5.2	37.7	0.16	0.14	0.16	36.0
Approach		1009	5.0	1009	5.0	0.298	2.8	LOS A	5.2	37.7	0.16	0.14	0.16	36.0
East: McLaren St (235m)														
4	L2	52	4.1	52	4.1	0.263	30.9	LOS C	3.6	26.4	0.85	0.75	0.85	16.9
6	R2	197	4.8	197	4.8	0.263	28.6	LOS C	4.3	31.3	0.82	0.74	0.82	24.1
Approach		248	4.7	248	4.7	0.263	29.1	LOS C	4.3	31.3	0.83	0.74	0.83	22.9
North: Pacific Hwy (225m)														
7	L2	64	4.9	64	4.9	* 0.333	12.2	LOS A	7.0	51.1	0.56	0.52	0.56	33.0
8	T1	855	5.0	855	5.0	0.333	8.9	LOS A	12.4	90.5	0.54	0.49	0.54	28.1
Approach		919	5.0	919	5.0	0.333	9.1	LOS A	12.4	90.5	0.54	0.49	0.54	28.6
All Vehicles		2177	5.0	2177	5.0	0.333	8.5	LOS A	12.4	90.5	0.40	0.35	0.40	30.1
Site: 2 [Pacific Hwy x Bay Rd_PM]														
South: Pacific Hwy (170m)														
1	L2	67	4.7	67	4.7	* 0.392	20.9	LOS B	8.4	61.3	0.73	0.66	0.73	27.9
2	T1	904	5.0	904	5.0	0.392	16.5	LOS B	8.9	65.0	0.72	0.62	0.72	19.9
Approach		972	5.0	972	5.0	0.392	16.8	LOS B	8.9	65.0	0.72	0.63	0.72	20.8
North: Pacific Hwy (40m)														
8	T1	781	5.0	781	5.0	0.346	3.9	LOS A	4.9	35.5	0.24	0.21	0.24	33.5
9	R2	164	5.1	164	5.1	* 1.253	275.2	LOS F	8.9	65.3	1.00	2.18	3.69	3.8
Approach		945	5.0	945	5.0	1.253	51.0	LOS D	8.9	65.3	0.37	0.55	0.83	11.7
West: Bay Rd (275m)														
10	L2	105	5.0	105	5.0	0.146	20.1	LOS B	2.7	19.5	0.67	0.69	0.67	22.6
12	R2	236	4.9	236	4.9	0.634	36.6	LOS C	8.9	65.2	0.97	0.83	0.98	21.4
Approach		341	4.9	341	4.9	0.634	31.5	LOS C	8.9	65.2	0.87	0.78	0.88	21.6
All Vehicles		2258	5.0	2258	5.0	1.253	33.4	LOS C	8.9	65.3	0.60	0.62	0.79	16.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_PM]											

South: Pacific Hwy (40m)										
P1 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	216.8	222.8	1.03
East: McLaren St (235m)										
P2 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	208.6	212.9	1.02
All Pedestrians	644	31.2	LOS D	0.7	0.7	0.88	0.88	212.7	217.9	1.02
Site: 2 [Pacific Hwy x Bay Rd_PM]										
South: Pacific Hwy (170m)										
P1 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	216.8	222.8	1.03
West: Bay Rd (275m)										
P4 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	207.7	211.9	1.02
All Pedestrians	644	31.2	LOS D	0.7	0.7	0.88	0.88	212.3	217.4	1.02

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 2 - Base 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

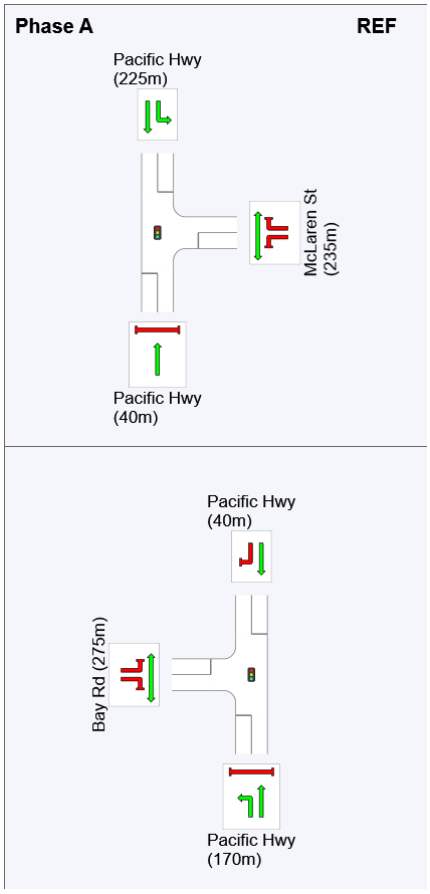
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

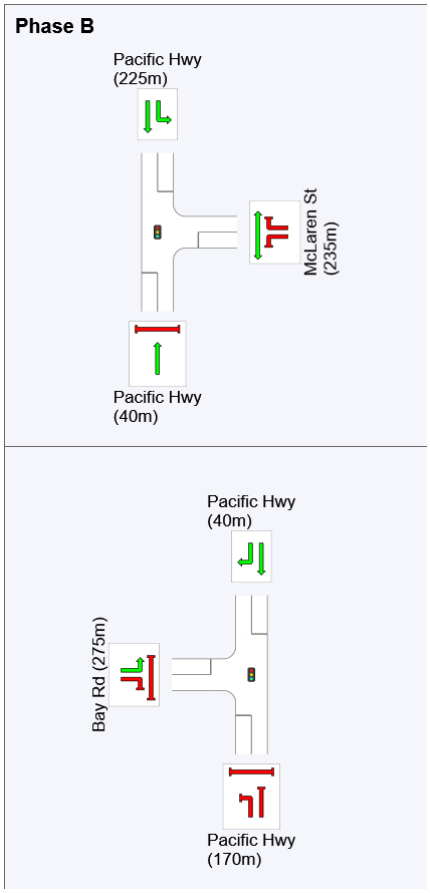
Phase Timing Summary (CCG)

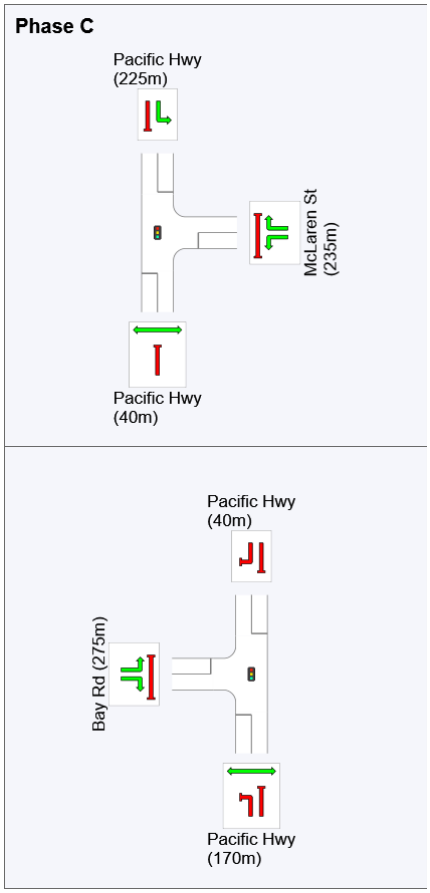
Phase	A	B	C
Phase Change Time (sec)	0	43	55
Green Time (sec)	37	6	24
Phase Time (sec)	43	9	30
Phase Split	52%	11%	37%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

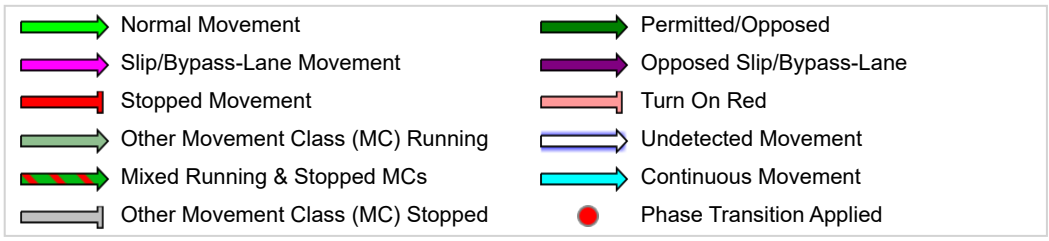
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 3 - Project Case 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_AM]														
South: Pacific Hwy (40m)														
2	T1	1081	4.9	1081	4.9	0.309	2.1	LOS A	4.1	29.9	0.09	0.08	0.09	36.9
Approach		1081	4.9	1081	4.9	0.309	2.1	LOS A	4.1	29.9	0.09	0.08	0.09	36.9
East: McLaren St (235m)														
4	L2	121	4.3	121	4.3	0.620	52.0	LOS D	6.8	49.3	0.96	0.83	0.99	12.1
6	R2	196	4.8	196	4.8	0.385	40.7	LOS C	9.2	67.3	0.85	0.78	0.85	20.6
Approach		317	4.7	317	4.7	0.620	45.0	LOS D	9.2	67.3	0.89	0.80	0.90	17.6
North: Pacific Hwy (225m)														
7	L2	135	4.7	135	4.7	* 0.861	37.6	LOS C	31.4	228.8	0.88	0.94	1.03	22.1
8	T1	1381	5.0	1381	5.0	* 0.861	31.1	LOS C	31.4	228.8	0.72	0.78	0.88	16.3
Approach		1516	4.9	1516	4.9	0.861	31.6	LOS C	31.4	228.8	0.73	0.79	0.89	17.0
All Vehicles		2914	4.9	2914	4.9	0.861	22.1	LOS B	31.4	228.8	0.51	0.53	0.60	21.3
Site: 2 [Pacific Hwy x Bay Rd_AM]														
South: Pacific Hwy (170m)														
1	L2	75	4.2	75	4.2	0.468	34.5	LOS C	14.0	102.2	0.82	0.72	0.82	22.7
2	T1	933	5.0	933	5.0	0.468	29.6	LOS C	15.0	109.4	0.80	0.70	0.80	14.3
Approach		1007	4.9	1007	4.9	0.468	29.9	LOS C	15.0	109.4	0.80	0.70	0.80	15.2
North: Pacific Hwy (40m)														
8	T1	1202	5.0	1202	5.0	0.516	6.0	LOS A	8.9	65.3	0.27	0.25	0.27	30.8
9	R2	300	4.6	300	4.6	0.953	82.6	LOS F	9.0	65.3	1.00	1.14	1.49	10.7
Approach		1502	4.9	1502	4.9	0.953	21.3	LOS B	9.0	65.3	0.42	0.43	0.52	20.4
West: Bay Rd (275m)														
10	L2	148	4.3	148	4.3	0.162	20.1	LOS B	4.6	33.2	0.57	0.67	0.57	22.6
12	R2	278	4.9	278	4.9	0.882	63.7	LOS E	17.8	129.8	0.98	1.01	1.28	15.8
Approach		426	4.7	426	4.7	0.882	48.6	LOS D	17.8	129.8	0.84	0.89	1.03	17.1
All Vehicles		2936	4.9	2936	4.9	0.953	28.2	LOS B	17.8	129.8	0.61	0.59	0.69	17.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_AM]											

South: Pacific Hwy (40m)										
P1 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
East: McLaren St (235m)										
P2 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	227.6	212.9	0.94
All Pedestrians	644	50.2	LOS E	1.0	1.0	0.92	0.92	231.7	217.9	0.94
Site: 2 [Pacific Hwy x Bay Rd_AM]										
South: Pacific Hwy (170m)										
P1 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	235.8	222.8	0.94
West: Bay Rd (275m)										
P4 Full	322	50.2	LOS E	1.0	1.0	0.92	0.92	226.8	211.9	0.93
All Pedestrians	644	50.2	LOS E	1.0	1.0	0.92	0.92	231.3	217.4	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 3 - Project Case 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (CCG User-Given Phase Times)

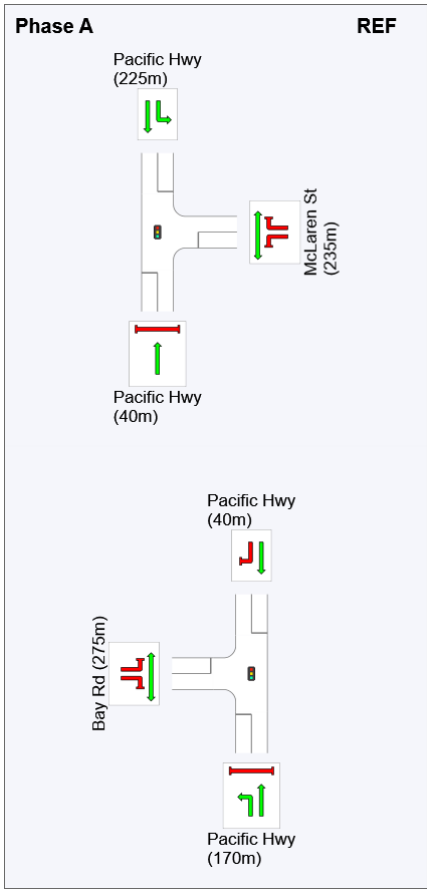
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

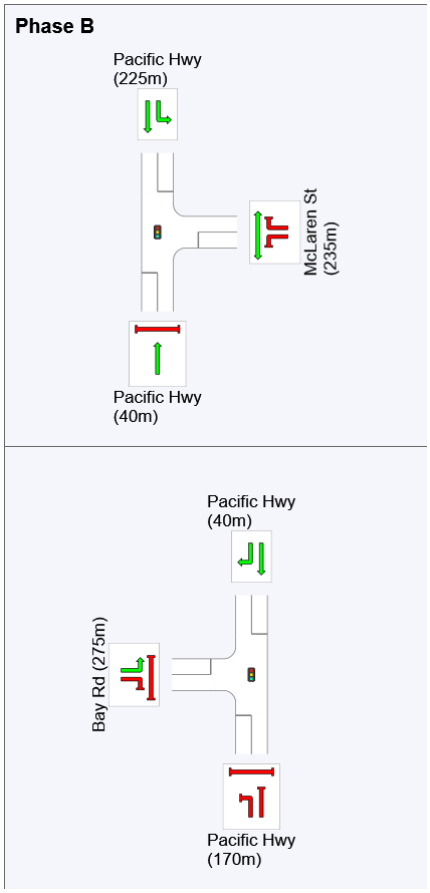
Phase Timing Summary (CCG)

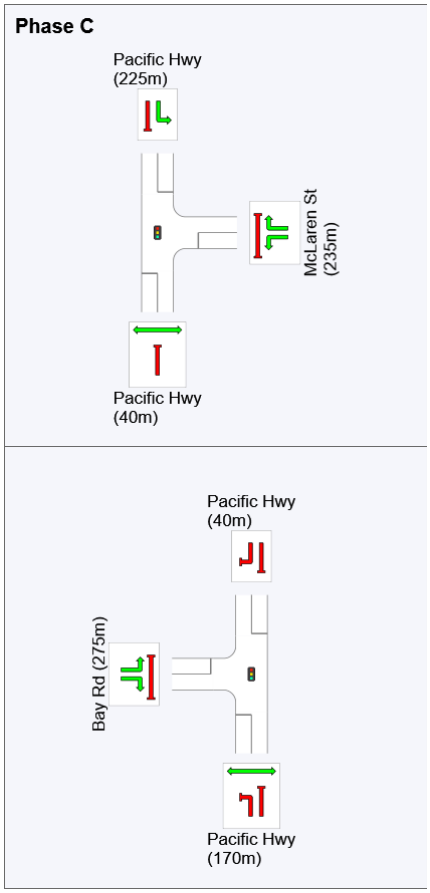
Phase	A	B	C
Phase Change Time (sec)	0	53	80
Green Time (sec)	47	21	34
Phase Time (sec)	53	27	40
Phase Split	44%	23%	33%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

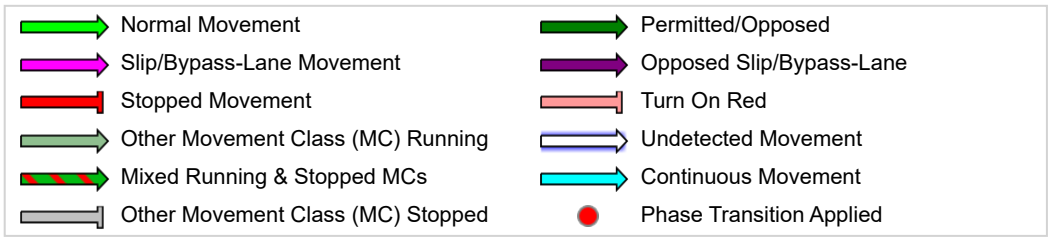
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 3 - Project Case 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_PM]														
South: Pacific Hwy (40m)														
2	T1	1016	5.0	1016	5.0	0.300	3.0	LOS A	5.5	39.9	0.17	0.14	0.17	35.8
Approach		1016	5.0	1016	5.0	0.300	3.0	LOS A	5.5	39.9	0.17	0.14	0.17	35.8
East: McLaren St (235m)														
4	L2	54	3.9	54	3.9	0.266	31.8	LOS C	3.7	26.9	0.86	0.75	0.86	16.6
6	R2	197	4.8	197	4.8	0.266	28.8	LOS C	4.3	31.7	0.82	0.74	0.82	24.1
Approach		251	4.6	251	4.6	0.266	29.5	LOS C	4.3	31.7	0.83	0.74	0.83	22.8
North: Pacific Hwy (225m)														
7	L2	64	4.9	64	4.9	* 0.335	12.3	LOS A	7.1	51.7	0.56	0.52	0.56	32.9
8	T1	862	5.0	862	5.0	0.335	8.9	LOS A	15.1	110.4	0.54	0.49	0.54	28.1
Approach		926	5.0	926	5.0	0.335	9.1	LOS A	15.1	110.4	0.55	0.49	0.55	28.6
All Vehicles		2193	4.9	2193	4.9	0.335	8.6	LOS A	15.1	110.4	0.40	0.36	0.40	30.0
Site: 2 [Pacific Hwy x Bay Rd_PM]														
South: Pacific Hwy (170m)														
1	L2	69	4.5	69	4.5	* 0.398	21.6	LOS B	8.3	60.8	0.75	0.67	0.75	27.5
2	T1	904	5.0	904	5.0	0.398	16.7	LOS B	9.1	66.2	0.72	0.63	0.72	19.8
Approach		974	5.0	974	5.0	0.398	17.0	LOS B	9.1	66.2	0.72	0.63	0.72	20.7
North: Pacific Hwy (40m)														
8	T1	781	5.0	781	5.0	0.346	3.9	LOS A	4.9	36.0	0.24	0.21	0.24	33.5
9	R2	171	4.9	171	4.9	* 1.299	315.2	LOS F	8.9	65.3	1.00	2.32	3.95	3.4
Approach		952	5.0	952	5.0	1.299	59.7	LOS E	8.9	65.3	0.37	0.59	0.90	10.5
West: Bay Rd (275m)														
10	L2	112	4.7	112	4.7	0.162	20.3	LOS B	2.9	20.8	0.67	0.69	0.67	22.5
12	R2	237	4.9	237	4.9	0.637	36.6	LOS C	9.0	65.6	0.97	0.83	0.98	21.4
Approach		348	4.8	348	4.8	0.637	31.4	LOS C	9.0	65.6	0.87	0.78	0.88	21.6
All Vehicles		2274	5.0	2274	5.0	1.299	37.1	LOS C	9.1	66.2	0.60	0.64	0.82	15.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_PM]											

South: Pacific Hwy (40m)										
P1 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	216.8	222.8	1.03
East: McLaren St (235m)										
P2 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	208.6	212.9	1.02
All Pedestrians	644	31.2	LOS D	0.7	0.7	0.88	0.88	212.7	217.9	1.02
Site: 2 [Pacific Hwy x Bay Rd_PM]										
South: Pacific Hwy (170m)										
P1 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	216.8	222.8	1.03
West: Bay Rd (275m)										
P4 Full	322	31.2	LOS D	0.7	0.7	0.88	0.88	207.7	211.9	1.02
All Pedestrians	644	31.2	LOS D	0.7	0.7	0.88	0.88	212.3	217.4	1.02

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 3 - Project Case 2023)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 82 seconds (CCG User-Given Phase Times)

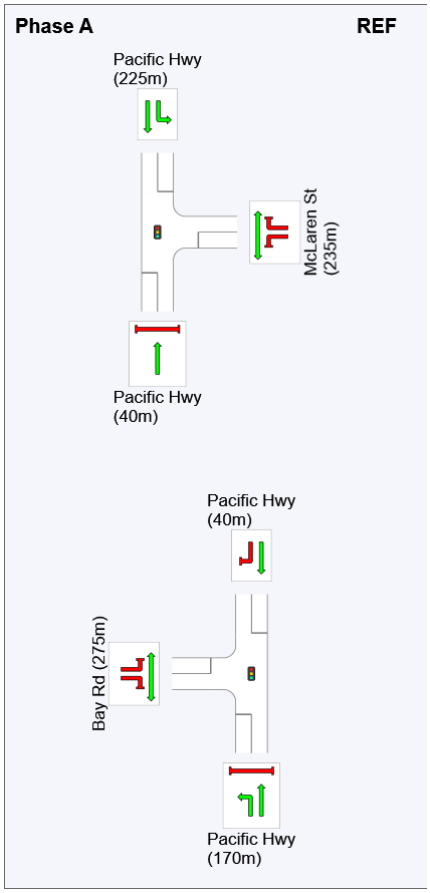
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

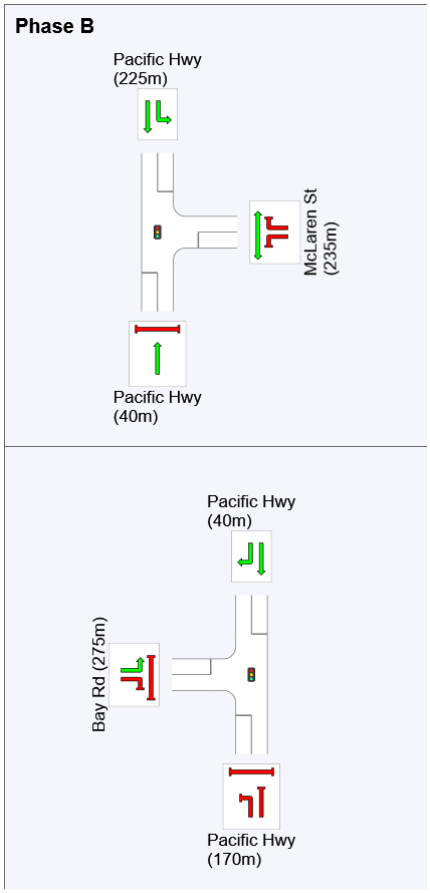
Phase Timing Summary (CCG)

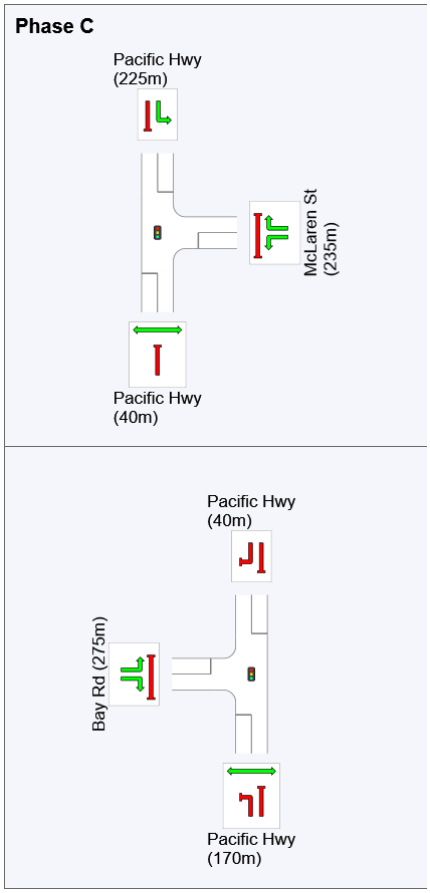
Phase	A	B	C
Phase Change Time (sec)	0	43	55
Green Time (sec)	37	6	24
Phase Time (sec)	43	9	30
Phase Split	52%	11%	37%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

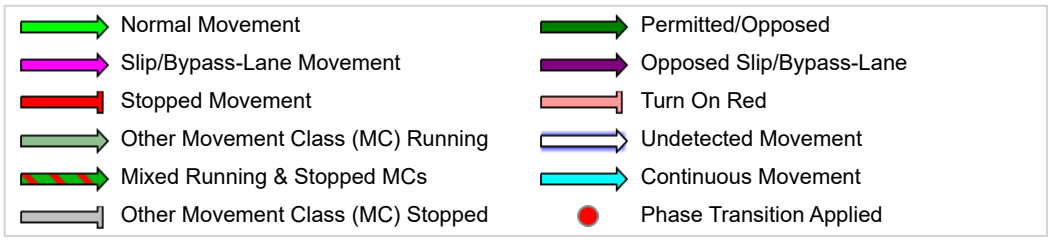
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase

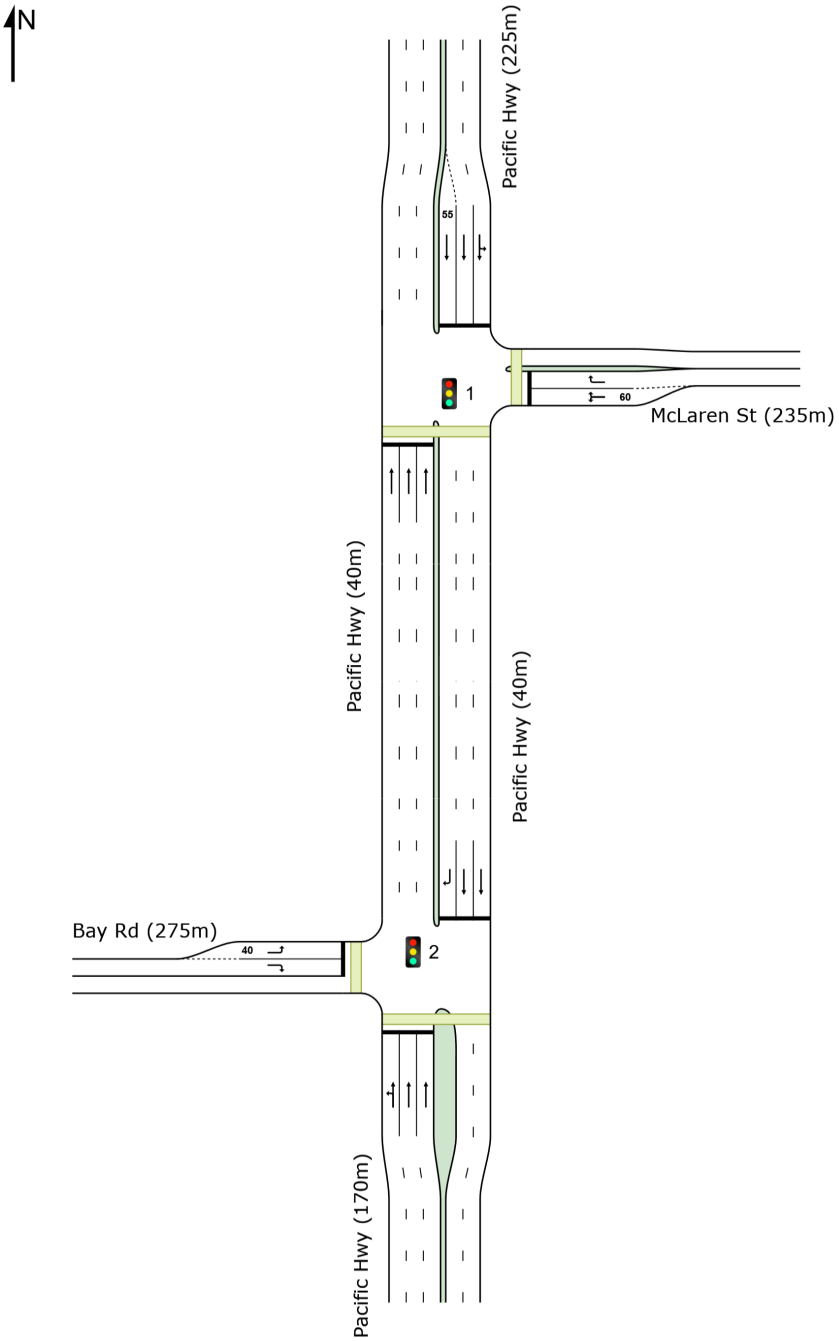


NETWORK LAYOUT

Network: N101 [AM (Network Folder: Scenario 6 - Base 2033)]

New Network
Network Category: (None)
EQUISAT (Fixed-Time/SCATS) Isolated
Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
1	349	Pacific Hwy x McLaren St_AM
2	349	Pacific Hwy x Bay Rd_AM

CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 6 - Base 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (CCG User-Given Cycle Time)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_AM]														
South: Pacific Hwy (40m)														
2	T1	1161	5.0	1161	5.0	0.337	2.0	LOS A	4.1	30.1	0.09	0.08	0.09	37.1
Approach		1161	5.0	1161	5.0	0.337	2.0	LOS A	4.1	30.1	0.09	0.08	0.09	37.1
East: McLaren St (235m)														
4	L2	126	5.0	126	5.0	0.648	51.0	LOS D	6.9	50.5	0.96	0.85	1.02	12.3
6	R2	216	4.9	216	4.9	0.419	39.3	LOS C	9.8	71.8	0.86	0.78	0.86	21.0
Approach		342	4.9	342	4.9	0.648	43.6	LOS D	9.8	71.8	0.90	0.81	0.92	18.0
North: Pacific Hwy (225m)														
7	L2	148	5.0	148	5.0	* 0.983	84.6	LOS F	53.4	389.4	1.00	1.31	1.52	13.7
8	T1	1498	5.0	1498	5.0	* 0.983	77.7	LOS F	53.4	389.4	0.78	1.14	1.33	8.6
Approach		1646	5.0	1646	5.0	0.983	78.3	LOS F	53.4	389.4	0.80	1.15	1.35	9.2
All Vehicles		3149	5.0	3149	5.0	0.983	46.4	LOS D	53.4	389.4	0.55	0.72	0.84	14.1
Site: 2 [Pacific Hwy x Bay Rd_AM]														
South: Pacific Hwy (170m)														
1	L2	78	5.4	78	5.4	0.687	44.3	LOS D	17.1	125.0	0.96	0.83	0.96	20.0
2	T1	1026	5.0	1026	5.0	0.687	39.2	LOS C	19.1	139.4	0.95	0.82	0.95	11.8
Approach		1104	5.1	1104	5.1	0.687	39.6	LOS C	19.1	139.4	0.95	0.82	0.95	12.6
North: Pacific Hwy (40m)														
8	T1	1323	5.0	1323	5.0	0.576	4.8	LOS A	8.9	65.3	0.23	0.21	0.23	32.2
9	R2	302	4.9	302	4.9	0.645	33.7	LOS C	9.0	65.3	0.83	0.78	0.83	19.0
Approach		1625	5.0	1625	5.0	0.645	10.2	LOS A	9.0	65.3	0.34	0.32	0.34	27.4
West: Bay Rd (275m)														
10	L2	136	4.7	136	4.7	0.126	13.9	LOS A	3.2	23.5	0.46	0.63	0.46	26.1
12	R2	300	4.9	300	4.9	0.931	72.2	LOS F	20.4	148.7	1.00	1.10	1.44	14.7
Approach		436	4.8	436	4.8	0.931	54.0	LOS D	20.4	148.7	0.83	0.95	1.14	16.2
All Vehicles		3165	5.0	3165	5.0	0.931	26.5	LOS B	20.4	148.7	0.62	0.58	0.66	18.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_AM]											

South: Pacific Hwy (40m)										
P1 Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	233.4	222.8	0.95
East: McLaren St (235m)										
P2 Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	225.1	212.9	0.95
All Pedestrians	709	47.7	LOS E	1.1	1.1	0.92	0.92	229.3	217.9	0.95
Site: 2 [Pacific Hwy x Bay Rd_AM]										
South: Pacific Hwy (170m)										
P1 Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	233.4	222.8	0.95
West: Bay Rd (275m)										
P4 Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	224.3	211.9	0.94
All Pedestrians	709	47.7	LOS E	1.1	1.1	0.92	0.92	228.9	217.4	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 6 - Base 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (CCG User-Given Cycle Time)

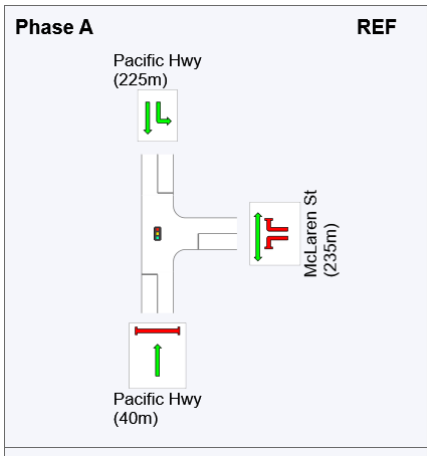
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

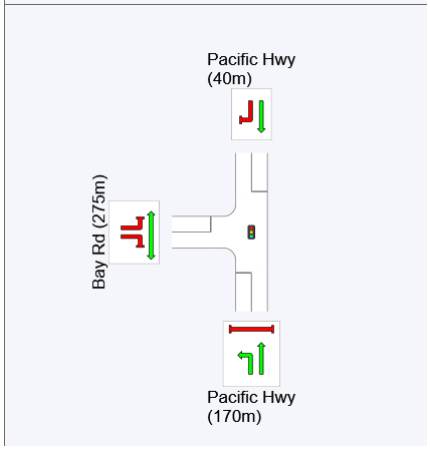
Phase Timing Summary (CCG)

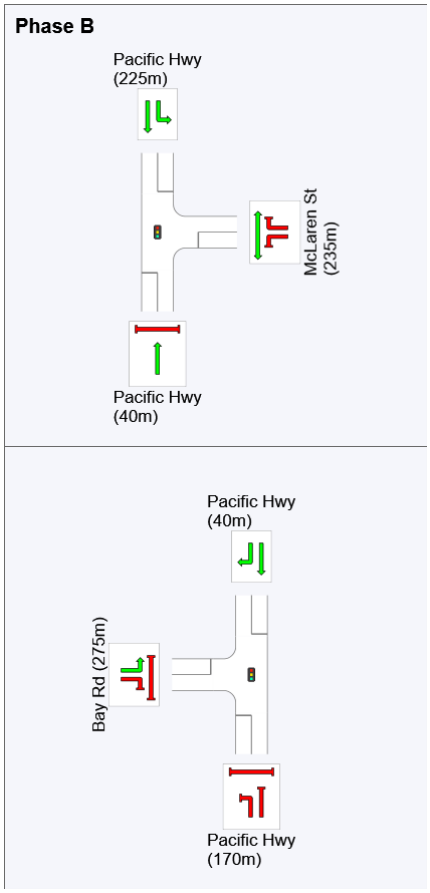
Phase	A	B	C
Phase Change Time (sec)	0	40	76
Green Time (sec)	34	30	33
Phase Time (sec)	40	36	39
Phase Split	35%	31%	34%

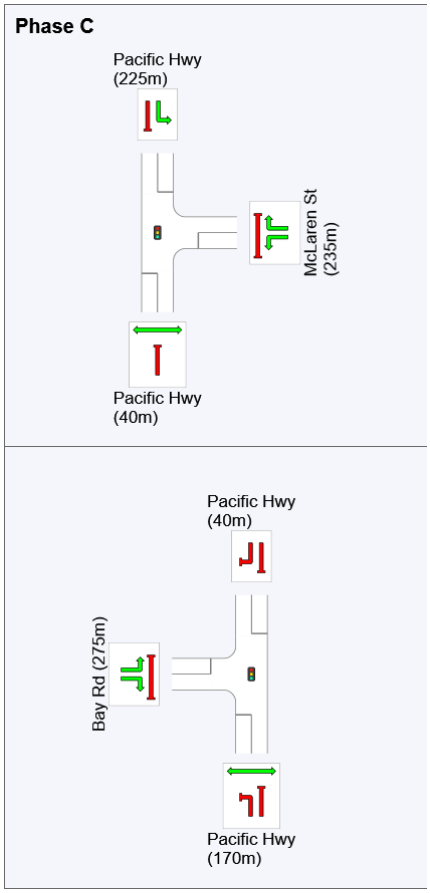
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence (CCG)

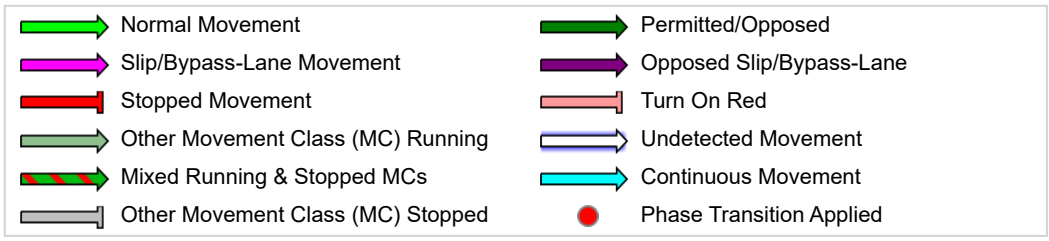








REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 6 - Base 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (CCG User-Given Cycle Time)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_PM]														
South: Pacific Hwy (40m)														
2	T1	1112	5.0	1112	5.0	0.383	1.7	LOS A	3.2	23.7	0.10	0.09	0.10	37.5
Approach		1112	5.0	1112	5.0	0.383	1.7	LOS A	3.2	23.7	0.10	0.09	0.10	37.5
East: McLaren St (235m)														
4	L2	58	5.5	58	5.5	0.259	28.3	LOS B	3.7	26.8	0.82	0.74	0.82	17.8
6	R2	217	4.9	217	4.9	0.259	25.4	LOS B	4.5	32.7	0.78	0.74	0.78	25.3
Approach		275	5.0	275	5.0	0.259	26.0	LOS B	4.5	32.7	0.79	0.74	0.79	24.0
North: Pacific Hwy (225m)														
7	L2	71	4.5	71	4.5	* 0.412	16.3	LOS B	7.8	57.2	0.68	0.63	0.68	30.5
8	T1	941	5.0	941	5.0	0.412	13.0	LOS A	9.6	70.1	0.67	0.59	0.67	24.8
Approach		1012	5.0	1012	5.0	0.412	13.2	LOS A	9.6	70.1	0.67	0.59	0.67	25.4
All Vehicles		2398	5.0	2398	5.0	0.412	9.3	LOS A	9.6	70.1	0.42	0.38	0.42	29.4
Site: 2 [Pacific Hwy x Bay Rd_PM]														
South: Pacific Hwy (170m)														
1	L2	76	5.6	76	5.6	* 0.691	34.2	LOS C	11.9	86.6	0.96	0.85	1.00	22.8
2	T1	995	5.0	995	5.0	0.691	28.9	LOS C	13.4	98.2	0.95	0.84	0.98	14.5
Approach		1071	5.0	1071	5.0	0.691	29.3	LOS C	13.4	98.2	0.95	0.84	0.98	15.4
North: Pacific Hwy (40m)														
8	T1	860	5.0	860	5.0	0.444	4.9	LOS A	6.0	43.9	0.27	0.24	0.27	32.1
9	R2	181	5.2	181	5.2	* 0.674	40.3	LOS C	7.2	52.4	1.00	0.86	1.08	17.2
Approach		1041	5.1	1041	5.1	0.674	11.1	LOS A	7.2	52.4	0.40	0.35	0.41	26.6
West: Bay Rd (275m)														
10	L2	115	4.6	115	4.6	0.113	12.1	LOS A	2.1	15.1	0.49	0.63	0.49	27.3
12	R2	259	4.9	259	4.9	0.577	32.5	LOS C	9.1	66.3	0.93	0.81	0.93	22.6
Approach		374	4.8	374	4.8	0.577	26.2	LOS B	9.1	66.3	0.80	0.76	0.80	23.5
All Vehicles		2485	5.0	2485	5.0	0.691	21.2	LOS B	13.4	98.2	0.70	0.62	0.72	20.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_PM]											

South: Pacific Hwy (40m)										
P1 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	215.9	222.8	1.03
East: McLaren St (235m)										
P2 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	207.6	212.9	1.03
All Pedestrians	709	30.2	LOS D	0.7	0.7	0.88	0.88	211.7	217.9	1.03
Site: 2 [Pacific Hwy x Bay Rd_PM]										
South: Pacific Hwy (170m)										
P1 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	215.9	222.8	1.03
West: Bay Rd (275m)										
P4 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	206.8	211.9	1.02
All Pedestrians	709	30.2	LOS D	0.7	0.7	0.88	0.88	211.3	217.4	1.03

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 6 - Base 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (CCG User-Given Cycle Time)

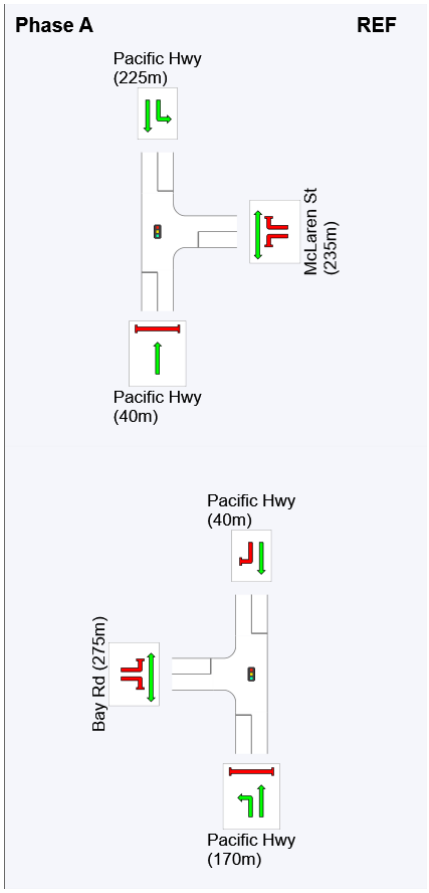
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

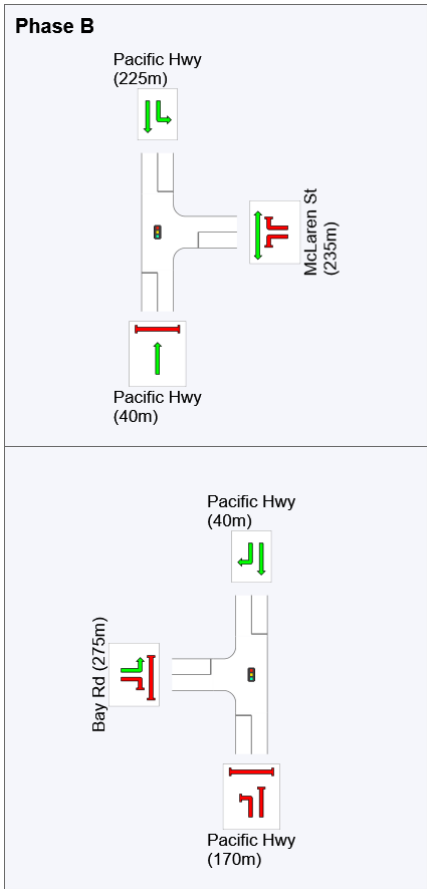
Phase Timing Summary (CCG)

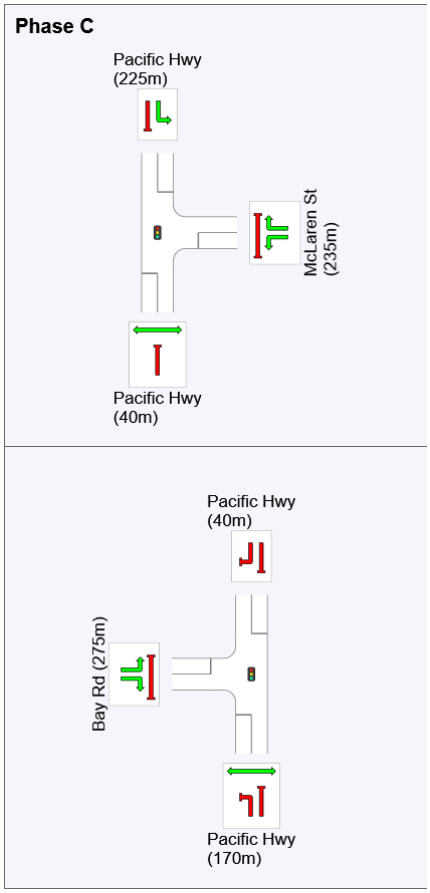
Phase	A	B	C
Phase Change Time (sec)	0	29	47
Green Time (sec)	23	12	27
Phase Time (sec)	29	18	33
Phase Split	36%	23%	41%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

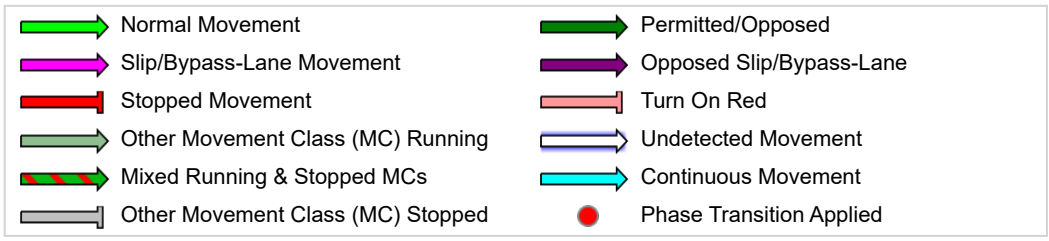
Output Phase Sequence (CCG)







REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 7 - Project Case 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (CCG Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_AM]														
South: Pacific Hwy (40m)														
2	T1	1186	4.9	1186	4.9	0.339	2.1	LOS A	4.7	34.6	0.10	0.09	0.10	36.8
Approach		1186	4.9	1186	4.9	0.339	2.1	LOS A	4.7	34.6	0.10	0.09	0.10	36.8
East: McLaren St (235m)														
4	L2	133	4.8	133	4.8	0.708	54.1	LOS D	7.6	55.3	0.98	0.90	1.11	11.8
6	R2	216	4.9	216	4.9	0.432	40.2	LOS C	10.0	72.8	0.87	0.79	0.87	20.7
Approach		348	4.8	348	4.8	0.708	45.5	LOS D	10.0	72.8	0.91	0.83	0.96	17.5
North: Pacific Hwy (225m)														
7	L2	148	5.0	148	5.0	0.980	82.4	LOS F	53.3	389.1	1.00	1.30	1.50	14.0
8	T1	1517	4.9	1517	4.9	* 0.980	75.5	LOS F	53.3	389.1	0.78	1.12	1.31	8.8
Approach		1665	4.9	1665	4.9	0.980	76.1	LOS F	53.3	389.1	0.80	1.13	1.33	9.4
All Vehicles		3200	4.9	3200	4.9	0.980	45.4	LOS D	53.3	389.1	0.55	0.71	0.83	14.3
Site: 2 [Pacific Hwy x Bay Rd_AM]														
South: Pacific Hwy (170m)														
1	L2	83	5.1	83	5.1	0.694	44.5	LOS D	17.0	124.4	0.96	0.83	0.96	19.9
2	T1	1026	5.0	1026	5.0	0.694	39.3	LOS C	19.3	141.3	0.95	0.82	0.95	11.8
Approach		1109	5.0	1109	5.0	0.694	39.7	LOS C	19.3	141.3	0.95	0.82	0.95	12.6
North: Pacific Hwy (40m)														
8	T1	1323	5.0	1323	5.0	0.567	4.9	LOS A	8.9	65.3	0.24	0.22	0.24	32.1
9	R2	327	4.5	327	4.5	0.675	33.5	LOS C	9.0	65.3	0.84	0.79	0.84	19.1
Approach		1651	4.9	1651	4.9	0.675	10.6	LOS A	9.0	65.3	0.36	0.33	0.36	27.1
West: Bay Rd (275m)														
10	L2	161	3.9	161	3.9	0.151	14.1	LOS A	3.9	28.2	0.47	0.63	0.47	26.0
12	R2	305	4.8	305	4.8	* 1.004	104.9	LOS F	25.9	188.7	1.00	1.26	1.73	11.4
Approach		466	4.5	466	4.5	1.004	73.6	LOS F	25.9	188.7	0.82	1.05	1.29	13.2
All Vehicles		3226	4.9	3226	4.9	1.004	29.7	LOS C	25.9	188.7	0.63	0.60	0.70	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_AM]											

South: Pacific Hwy (40m)											
P1	Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	233.4	222.8	0.95
East: McLaren St (235m)											
P2	Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	225.1	212.9	0.95
All Pedestrians		709	47.7	LOS E	1.1	1.1	0.92	0.92	229.3	217.9	0.95
Site: 2 [Pacific Hwy x Bay Rd_AM]											
South: Pacific Hwy (170m)											
P1	Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	233.4	222.8	0.95
West: Bay Rd (275m)											
P4	Full	355	47.7	LOS E	1.1	1.1	0.92	0.92	224.3	211.9	0.94
All Pedestrians		709	47.7	LOS E	1.1	1.1	0.92	0.92	228.9	217.4	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [AM (Network Folder: Scenario 7 - Project Case 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (CCG Optimum Cycle Time - Minimum Delay)

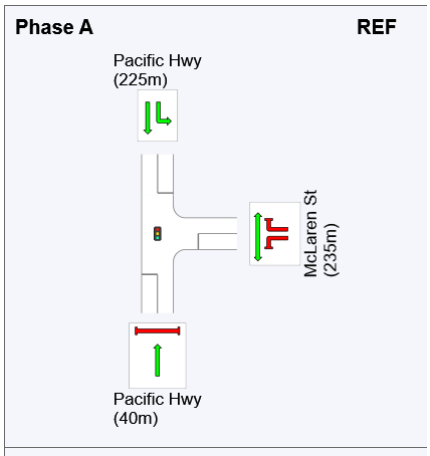
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

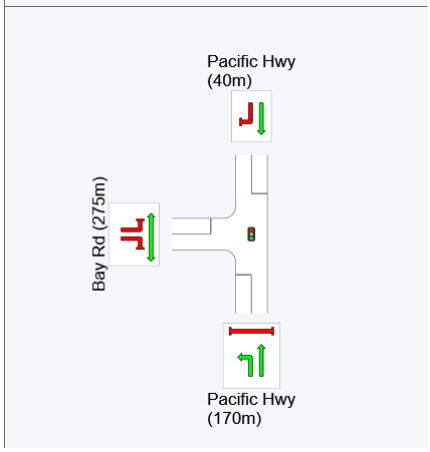
Phase Timing Summary (CCG)

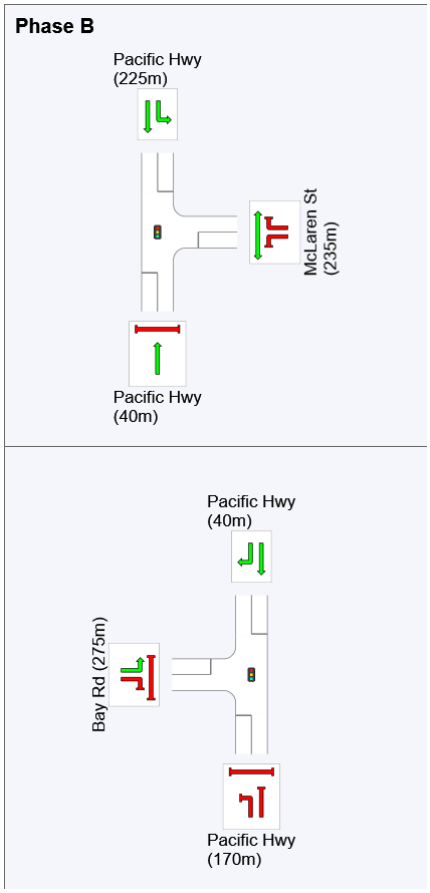
Phase	A	B	C
Phase Change Time (sec)	0	40	77
Green Time (sec)	34	31	32
Phase Time (sec)	40	37	38
Phase Split	35%	32%	33%

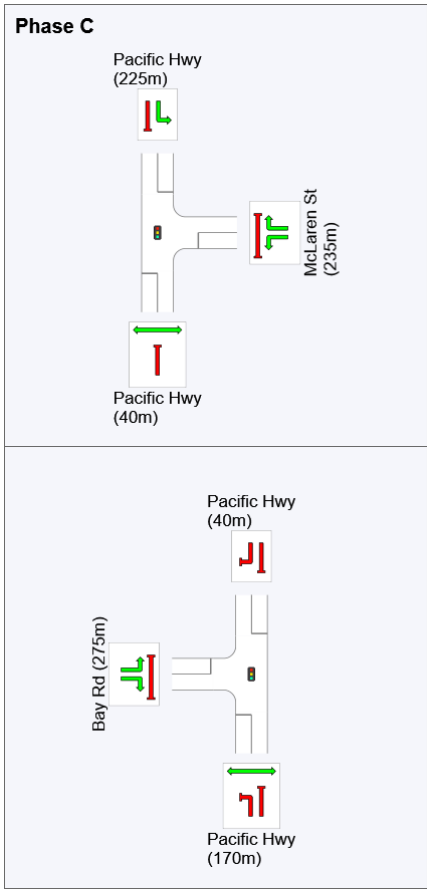
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence (CCG)

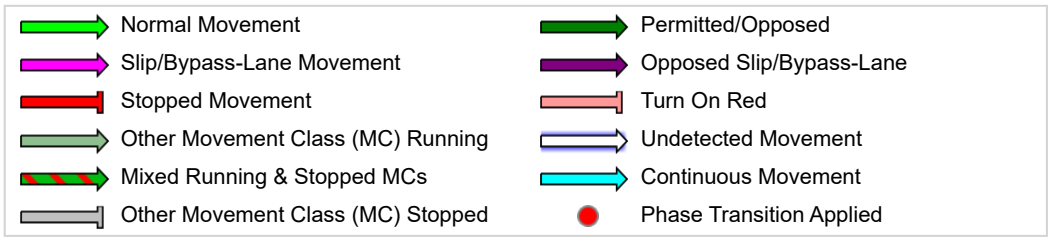








REF: Reference Phase
VAR: Variable Phase



CCG MOVEMENT SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 7 - Project Case 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (CCG User-Given Cycle Time)

Vehicle Movement Performance (CCG)

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
Site: 1 [Pacific Hwy x McLaren St_PM]														
South: Pacific Hwy (40m)														
2	T1	1118	5.0	1118	5.0	0.385	1.7	LOS A	3.4	25.1	0.11	0.09	0.11	37.4
Approach		1118	5.0	1118	5.0	0.385	1.7	LOS A	3.4	25.1	0.11	0.09	0.11	37.4
East: McLaren St (235m)														
4	L2	60	5.3	60	5.3	0.263	28.3	LOS B	3.7	26.7	0.82	0.74	0.82	17.8
6	R2	217	4.9	217	4.9	0.263	25.4	LOS B	4.6	33.2	0.78	0.74	0.78	25.3
Approach		277	4.9	277	4.9	0.263	26.0	LOS B	4.6	33.2	0.79	0.74	0.79	24.0
North: Pacific Hwy (225m)														
7	L2	71	4.5	71	4.5	* 0.422	16.5	LOS B	8.0	58.4	0.68	0.63	0.68	30.4
8	T1	945	5.0	945	5.0	0.422	13.1	LOS A	9.9	72.2	0.67	0.59	0.67	24.7
Approach		1016	5.0	1016	5.0	0.422	13.3	LOS A	9.9	72.2	0.67	0.60	0.67	25.3
All Vehicles		2411	5.0	2411	5.0	0.422	9.4	LOS A	9.9	72.2	0.42	0.38	0.42	29.3
Site: 2 [Pacific Hwy x Bay Rd_PM]														
South: Pacific Hwy (170m)														
1	L2	77	5.5	77	5.5	* 0.692	34.2	LOS C	11.9	86.6	0.96	0.85	1.00	22.8
2	T1	995	5.0	995	5.0	0.692	28.9	LOS C	13.5	98.4	0.95	0.84	0.98	14.5
Approach		1072	5.0	1072	5.0	0.692	29.3	LOS C	13.5	98.4	0.95	0.84	0.98	15.4
North: Pacific Hwy (40m)														
8	T1	860	5.0	860	5.0	0.444	5.0	LOS A	6.1	44.5	0.28	0.24	0.28	32.0
9	R2	187	5.1	187	5.1	* 0.697	40.8	LOS C	7.5	54.7	1.00	0.88	1.11	17.1
Approach		1047	5.0	1047	5.0	0.697	11.4	LOS A	7.5	54.7	0.41	0.36	0.43	26.4
West: Bay Rd (275m)														
10	L2	122	4.3	122	4.3	0.120	12.2	LOS A	2.2	16.1	0.50	0.63	0.50	27.3
12	R2	261	4.8	261	4.8	0.582	32.5	LOS C	9.2	66.9	0.93	0.81	0.93	22.6
Approach		383	4.7	383	4.7	0.582	26.0	LOS B	9.2	66.9	0.79	0.76	0.79	23.5
All Vehicles		2502	5.0	2502	5.0	0.697	21.3	LOS B	13.5	98.4	0.70	0.62	0.72	20.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance (CCG)

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
Site: 1 [Pacific Hwy x McLaren St_PM]											

South: Pacific Hwy (40m)										
P1 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	215.9	222.8	1.03
East: McLaren St (235m)										
P2 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	207.6	212.9	1.03
All Pedestrians	709	30.2	LOS D	0.7	0.7	0.88	0.88	211.7	217.9	1.03
Site: 2 [Pacific Hwy x Bay Rd_PM]										
South: Pacific Hwy (170m)										
P1 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	215.9	222.8	1.03
West: Bay Rd (275m)										
P4 Full	355	30.2	LOS D	0.7	0.7	0.88	0.88	206.8	211.9	1.02
All Pedestrians	709	30.2	LOS D	0.7	0.7	0.88	0.88	211.3	217.4	1.03

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

CCG PHASING SUMMARY

Common Control Group: 349 [Pacific Hwy Staggered T Intersection]

Network: N101 [PM (Network Folder: Scenario 7 - Project Case 2033)]

EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (CCG User-Given Cycle Time)

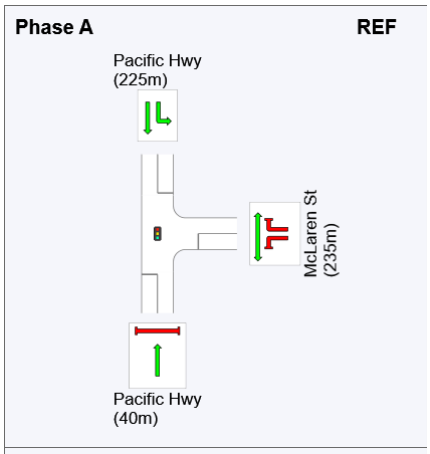
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

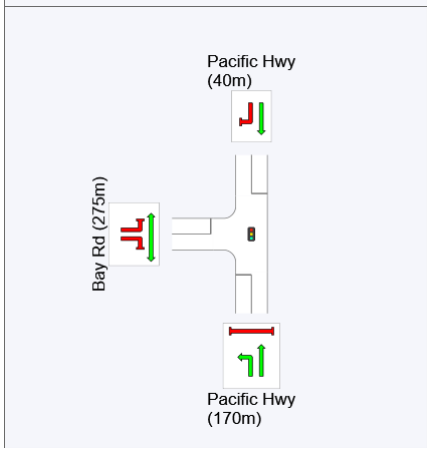
Phase Timing Summary (CCG)

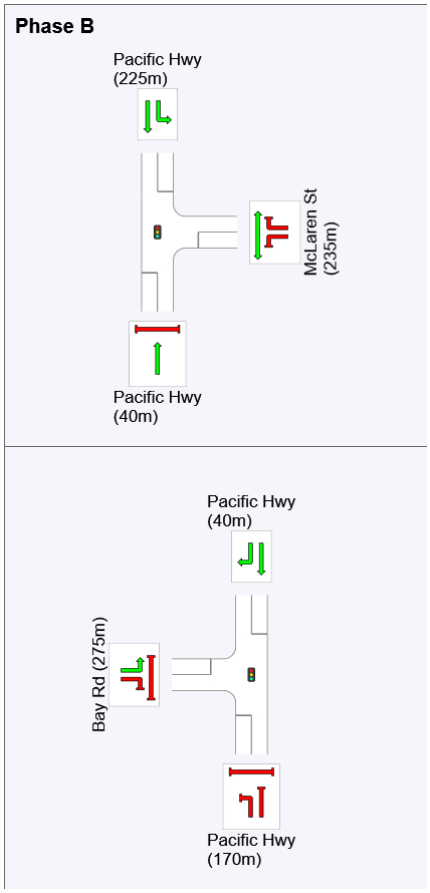
Phase	A	B	C
Phase Change Time (sec)	0	29	47
Green Time (sec)	23	12	27
Phase Time (sec)	29	18	33
Phase Split	36%	23%	41%

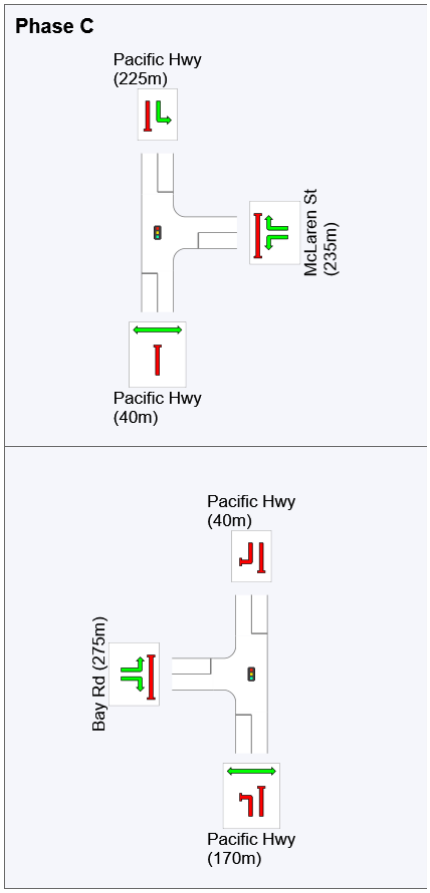
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence (CCG)









REF: Reference Phase
VAR: Variable Phase