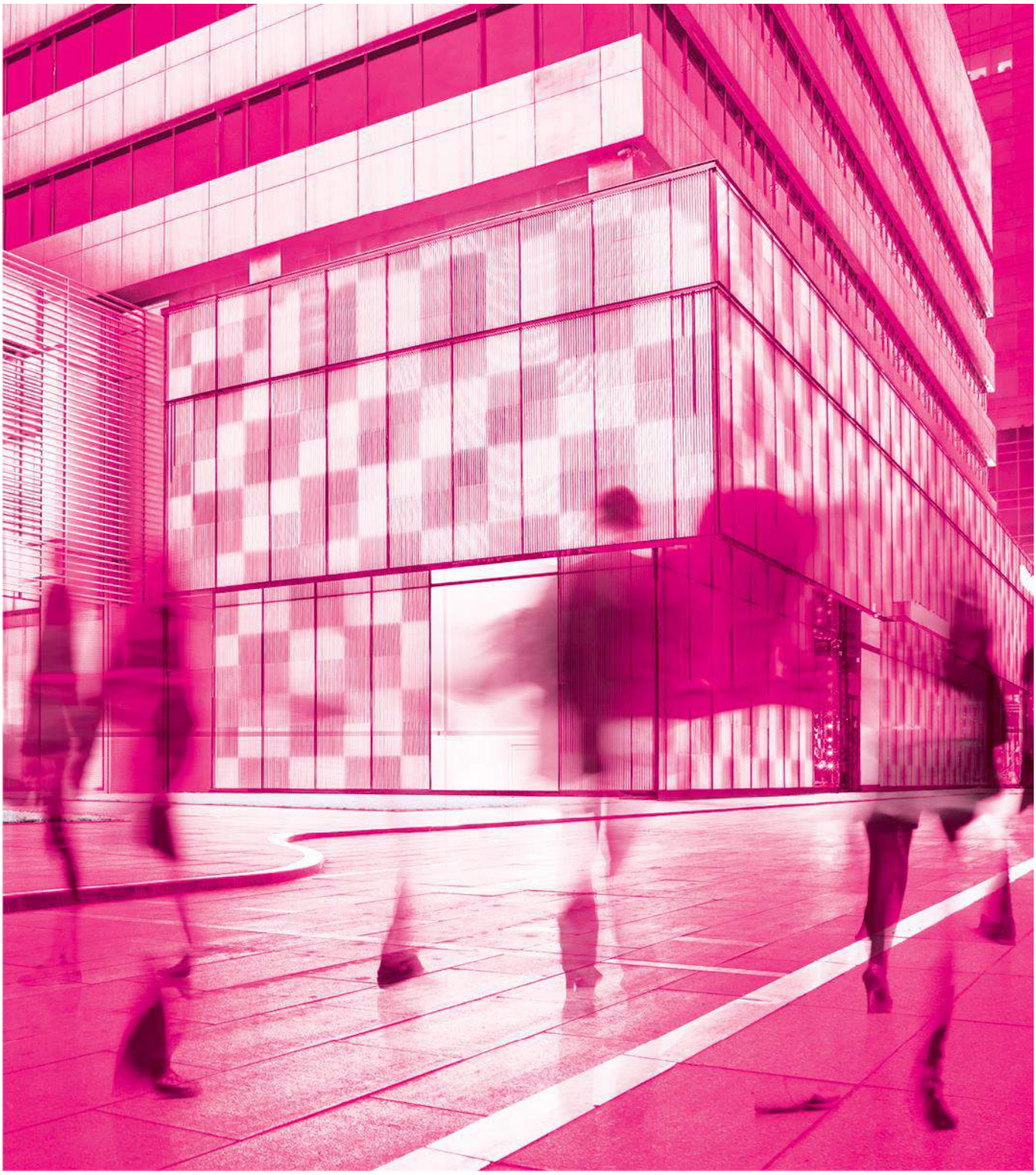


traffic impact assessment;

Pacific Brook Christian School, Muswellbrook

For Pacific Brook Christian School

30 September 2021

parking;
traffic;
civil design;
wayfinding;

ptc.

Document Control

Pacific Brook Christian School, Muswellbrook, Traffic impact assessment

Issue	Date	Issue Details	Author	Reviewed	For the attention of
1	12/07/2020	Draft	PS	KB / SW	Chris Baldry
2	23/09/2021	Final	PS	KB / SW	Chris Baldry
3	30/09/2021	Revision 1	PS	KB / SW	Chris Baldry

Contact

Kasia Balsam
+61 2 8920 0800
+61 0478 848 945
kasia.balsam@ptcconsultants.co

Pragya Sharma
+61 2 8920 0800
+61 406 601 284
pragya.sharma@ptcconsultants.co

COMMERCIAL IN CONFIDENCE

The information contained in this document, including any intellectual property rights arising from designs developed and documents created, is confidential and proprietary to **ptc.**

This document may only be used by the person/organisation to whom it is addressed for the stated purpose for which it is provided and must not be imparted to or reproduced, in whole or in part, by any third person without the prior written approval of a **ptc.** authorised representative. **ptc.** reserves all legal rights and remedies in relation to any infringement of its rights in respect of its intellectual property and/or confidential information.

© 2020

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
info@ptcconsultants.co
t + 61 2 8920 0800
ptcconsultants.co

Contents

© Copyright; **ptc.**

© Copyright; **ptc.**

© Copyright; **ptc.**

© Copyright; **ptc.**

© Copyright; **ptc.**

1. Executive Summary

ptc. has been engaged by the Pacific Group of Schools to prepare traffic, parking and accessibility documentation in relation to the proposed relocation of the Pacific Brook Christian School (the School) from 96-104 Hill Street, Muswellbrook to 72-74 Maitland Street, Muswellbrook.

- This State Significant Development Application is seeking approval for the staged construction of the school, with Stage 1 proposing to accommodate up to 140 students and the master plan 656 students.
- The traffic and parking strategy for this project has been developed with a strong focus to minimise potential queuing onto Maitland Street. The school has been actively involved in discussing options to reduce car usage of both students and staff and to reduce the impact of pick-up and drop-off on the frontage road. The following measures are being proposed:
    - Provision of a bus stop just outside of the school to enable school buses to drop-off and pick-up students safely and closely to the access point.
    - Provision of a pedestrian access at the Thompson Street / Maitland Street intersection and an internal footpath to provide the most direct pedestrian connectivity. The internal footpath enables students to not need to walk along Maitland Street.
    - Provision of bicycle spaces and an end of trip facility to encourage active transport.
    - Implementation of staggered bell times, when required.
    - Highly managed pick-up and drop-off process.
    - Provision of before and after school care, which will spread the traffic during the main pick-up and drop-off times.
    - Colocation of the entry and exit to one driveway to increase internal queuing at later stages.
- The signalisation of the Maitland Street / Thompson Street intersection has recently been approved by both Council and TfNSW, and construction works are expected to commence in approximately 6 months. This intersection is of great benefit to the proposed development, as it provides pedestrian crossings on all approaches, thus enabling direct access to the school from the south.
- The Muswellbrook bypass is currently in the planning process and the funding has already been approved. The construction is planned to commence in 2022 and finish in 2026.
  The bypass is likely to lead to a decrease of traffic along Maitland Street, which in turn will likely result in the school frontage becoming more localised and pedestrian friendly. Despite this, the traffic decrease has not been incorporated into the traffic modelling of the proposed school due to the uncertainty around timing of the bypass.

© Copyright; **ptc.**

2. Introduction

2.1 Project Summary

ptc. has been engaged by the Pacific Group of Schools to prepare traffic, parking and accessibility documentation in relation to the proposed relocation of the Pacific Brook Christian School (the School) from 96-104 Hill Street, Muswellbrook to 72-74 Maitland Street, Muswellbrook.

As part of the process, a planning proposal has been submitted to apply for the change of land use of the lot parcel for the purpose of an educational establishment. With the proposed being a new school, the approval process is required to occur via a State Significant Development Application (SSDA).

With the view on the above, a transport, traffic, parking and accessibility assessment has been undertaken to determine the potential impact of the proposal on the surroundings of the site. Given the proposed staged construction of the school, this report discusses the overall masterplan, but also distinctly separates and reviews the impacts associated with the first stage - Stage 1 - of the development.

As the proposed site lies within the Muswellbrook Shire Council Local Government Area (LGA), the project has also considered local controls.

The masterplan involves a school accommodating up to 656 students from Kindergarten to Year 12 and 65 staff. Stage 1 is proposed to cater for 140 students and 16 staff.

The layout incorporates a car park for staff, an internal pick-up and drop-off lane, as well as pedestrian & cycling infrastructure, and a provision for a bus bay in the future.

The location of the subject site is outlined in Figure 1.

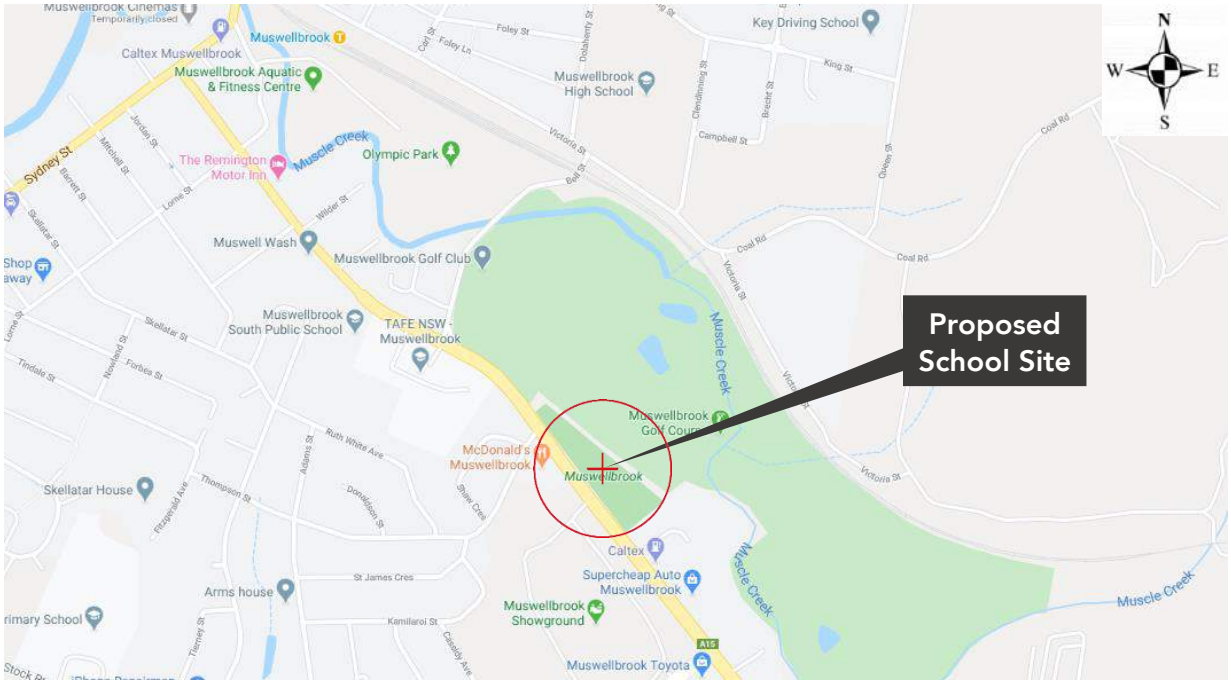


Figure 1 – Site Location (Source: Google Maps)

© Copyright; **ptc.**

2.2 Response to SEARs and TfNSW Comments

2.2.1 SEARs Requirements

SEARs Requirement – Item 6	ptc. Response
analysis of the existing transport network to at least the existing or proposed enrolment boundary, including:	
• road hierarchy.	Refer to Section 4.4
• pedestrian, cycle and public transport infrastructure.	Refer to Section 4.2 and Section 4.3
• details of current daily and peak hour vehicle movements based on traffic surveys and / or existing traffic studies relevant to the locality.	Refer to Section 7
• existing transport operation for 1 hour before and after (existing or proposed) bell times such as span of service, frequency for public transport and school buses, pedestrian phasing for signals.	Refer to Section 4.3.3.2 and Attachment 3
• existing performance levels of nearby intersections utilising appropriate traffic modelling methods (such as SIDRA network modelling).	Refer to Section 7.6 and Attachment 6
details of the first stage of the proposed development, including:	
• a map of the proposed access which identifies public roads, bus routes, footpaths and cycleways.	Refer to Section 6.2
• safe 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.	Refer to Section 6 and Attachment 4 and Attachment 5
• car and motorcycle parking, bicycle parking and end-of-trip facilities.	Refer to Section 6.8, Section 6.8.1.2, Section 6.8.2 and Section 6.3
• drop-off / pick-zone(s) and arrival/departure bus bay(s).	Refer to Section 6.5 and Section 6.3
• any future strategies pedestrian, public transport or road infrastructure improvements or safety measures.	Refer to Section 4.2, Section 4.3, Section 7.3 and Section 8

© Copyright; **ptc.**

SEARs Requirement – Item 6	ptc. Response
analysis of the impacts due to the operation of the first stage of the proposed development, including:	
• proposed modal split for all users of the development including vehicle, pedestrian, cyclist, public transport and other sustainable travel modes.	Refer to Section 5.5
• estimated total daily and peak hour vehicular trip generation.	Refer to Section 7
• a clear explanation and justification of the:	
◦ assumed growth rate applied.	Refer to Section 7.5
◦ volume and distribution of proposed trips to be generated.	Refer to Section 7.4.1
◦ type and frequency of design vehicles accessing the site.	Refer to Section 7.4
• 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).	Refer to Section 7.6
• cumulative traffic impacts from any surrounding approved development(s).	Refer to Section 7.3 and Section 7.4
• adequacy of pedestrian, bicycle and public transport infrastructure to accommodate the development.	Refer to Section 4
• adequacy of car parking and bicycle parking provisions when assessed against the relevant car / bicycle parking codes and standards.	Refer to Section 6.8 and Section 6.3
• adequacy of the drop-off / pick-up zone(s) and bus bay(s), including assessment of any related queuing during peak-hour access.	Refer to Section 6.5 and Section 6.3
• adequacy of the existing / proposed pedestrian infrastructure to enable convenient and safe access to and from the site for all users.	Refer to Section 4, Section 6.3 and School Transport Plan
impacts of the proposed access to the development from Maitland Street including adequate traffic assessment and evidence of consultation with TfNSW.	Refer to Section 4.2.1.2, Section 4.3.2.2 and Section 7.3

© Copyright; **ptc.**

SEARs Requirement – Item 6	ptc. Response
measures to ameliorate any adverse traffic and transport impacts due to the development based on the above analysis, including:	
• travel demand management strategies to increase sustainable transport (such as a Green Travel Plan / School Transport Plan).	Refer to Section 5.5 and School Transport Plan
• infrastructure improvements or protection measures, including details of timing and method of delivery.	Refer to Section 3.4, Section 4.2, Section 6 and School Transport Plan
a preliminary operational traffic and access management plan for the site, the drop-off / pick-up zone(s) and bus bay(s).	Refer to the School Transport Plan
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.	Refer to the Preliminary Construction Traffic and Pedestrian Management Plan
a preliminary Construction Traffic and Pedestrian Management Plan.	Refer to the Preliminary Construction Traffic and Pedestrian Management Plan
Relevant Policies and Guidelines: • Guide to Traffic Generating Developments (Roads and Maritime Services, 2002). • EIS Guidelines - Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996).	Traffic studies have been undertaken based on first principles assessment

© Copyright; **ptc.**

SEARs Requirement – Item 6	ptc. Response
• Cycling Aspects of Austroads Guides.	Refer to Section 6.3
• NSW Planning Guidelines for Walking and Cycling (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2004).	Refer to Section 6.3
• Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020).	Refer to Section 6.3
• Australian Standard 2890.3 Parking facilities, Part 3: Bicycle parking (AS 2890.3).	Refer to Section 6

SEARs Requirement – Item 14	ptc. Response
Assess impacts of staging (construction and operation) and where it is proposed and detail how construction works and operations would be managed to ensure public safety and amenity on and surrounding the site.	Refer to the Preliminary Construction Traffic and Pedestrian Management Plan

SEARs Requirement – Item 19	ptc. Response
Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.	Refer to Section 6.10 and Section 6.11

2.2.2 TfNSW Comments

TfNSW Requirement – Letter dated 23 April 2021	ptc. Response
TfNSW recommends that the Environmental Impact Statement (EIS) should refer to the following guidelines with regard to the traffic and transport impacts of the proposed development:	
• Road and Related Facilities within the Department of Planning EIS Guidelines, and,	
• Section 2 Traffic Impact Studies of Roads and Maritime's NSW's Guide to Traffic Generating Developments 2002.	Traffic studies have been undertaken based on first principles assessment.

© Copyright; **ptc.**

TfNSW Requirement – Letter dated 23 April 2021	ptc. Response
Furthermore, a traffic and transport study shall be prepared in accordance with the Roads and Maritime Services NSW's Guide to Traffic Generating Developments 2002 and is to include (but not be limited to) the following:	
• Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject properties.	Refer to Section 7.1.
• Current traffic counts for all of the traffic routes and intersections.	Refer to Section 7.2
• The anticipated additional vehicular traffic generated from both the construction and operational stages of the project.	Refer to Section 7.4
• The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.	Refer to Section 7.4
• Consideration of the traffic impacts on existing and proposed intersections, including the access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during both the construction and operational stages. The traffic impact shall also include the cumulative traffic impact of other proposed developments in the area.	Refer to Section 7.2, Section 7.4 and Preliminary Construction Traffic and Pedestrian Management Plan
• Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development. In this regard, preliminary concept drawings shall be submitted with the EIS for any identified road infrastructure upgrades. However, it should be noted that any identified road infrastructure upgrades will need to be to the satisfaction of Transport for NSW and Council.	Refer to Section 7.3 and Section 8
• Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:	
◦ Current traffic counts and 10 year traffic growth projections	Refer to Section 7.5
◦ With and without development scenarios	Refer to Section 7.2 and 7.4
◦ 95th percentile back of queue lengths	Refer to Section 7.6.2
◦ Delays and level of service on all legs for the relevant intersections	Refer to Section 7.6.2

© Copyright; **ptc.**

TfNSW Requirement – Letter dated 23 April 2021	ptc. Response
• Electronic data for Transport for NSW review.	Can be provided upon request
• Any other impacts on the regional and state road network including consideration of pedestrian, cyclist and public transport facilities and provision for service vehicles.	Refer to Section 6 and Preliminary Construction Traffic and Pedestrian Management Plan
• As the prospective development will generate pedestrian traffic including vulnerable pedestrians (i.e. children), the safety of children around the school and classified (State) road network must be a primary consideration in the preparation of a traffic impact assessment. This includes the need to identify anticipated pedestrian desire-lines / paths of travel and address potential safety impacts with practical solutions.	Refer to Section 6.3

© Copyright; **ptc.**

2.3 Purpose of this Report

The purpose of this report is to present the considerations relating to the SSDA of the proposed Pacific Brook Christian School relocation. This report will form part of the Schematic Design for the Pacific Brook Christian School for Stage 1 and Masterplan and will address the following:

Section 2	Introduction and comments received as part of the SEARs application and references to responses to each individual point.
Section 3	Site context, changes planned in the surrounding areas and a brief description of the proposal.
Section 4	Review of the existing transport networks (pedestrian, cycling, bus and road) and an analysis of their adequacy in the context of the proposed development. A gap analysis has been undertaken to determine what changes within the proposed enrolment catchment would benefit the prospective students.
Section 5	Review of the existing travel patterns to and from school to determine the behavioural baseline. Analysis of the potential travel demand based on walkability and cyclability.
Section 6	Assessment of the required and proposed parking provisions for all user groups, including waste and emergency vehicles and queuing for the pick-up and drop-off. Assessment of the proposed car park layout, vehicular access and internal circulation arrangements
Section 7	Determination of the traffic activity associated with the new school location, including an assessment of the adequacy of the surrounding road network
Section 8	Proposed driveway assessment based on Austroads Guidelines
Section 9	Conclusion.

© Copyright; **ptc.**

3. Site Context

3.1 Site Location and Current Use

The proposed School site is located at 72-74 Maitland Street, Muswellbrook and is identified as Lot 100 in Deposited Plan 1261496.

The School site is located approximately 250 kilometres north of Sydney CBD. More specifically, it is located south of Muswellbrook Golf Course and north of Muswellbrook Showground. The site has a frontage to Maitland Street on the southwestern boundary.

The site is a former nursery which consists of clad buildings, metal sheds and a greenhouse shed. It is proposed to demolish most of the existing structures under a separate DA in order to make place for the construction of the new school.

An aerial view of the site is provided in Figure 2.

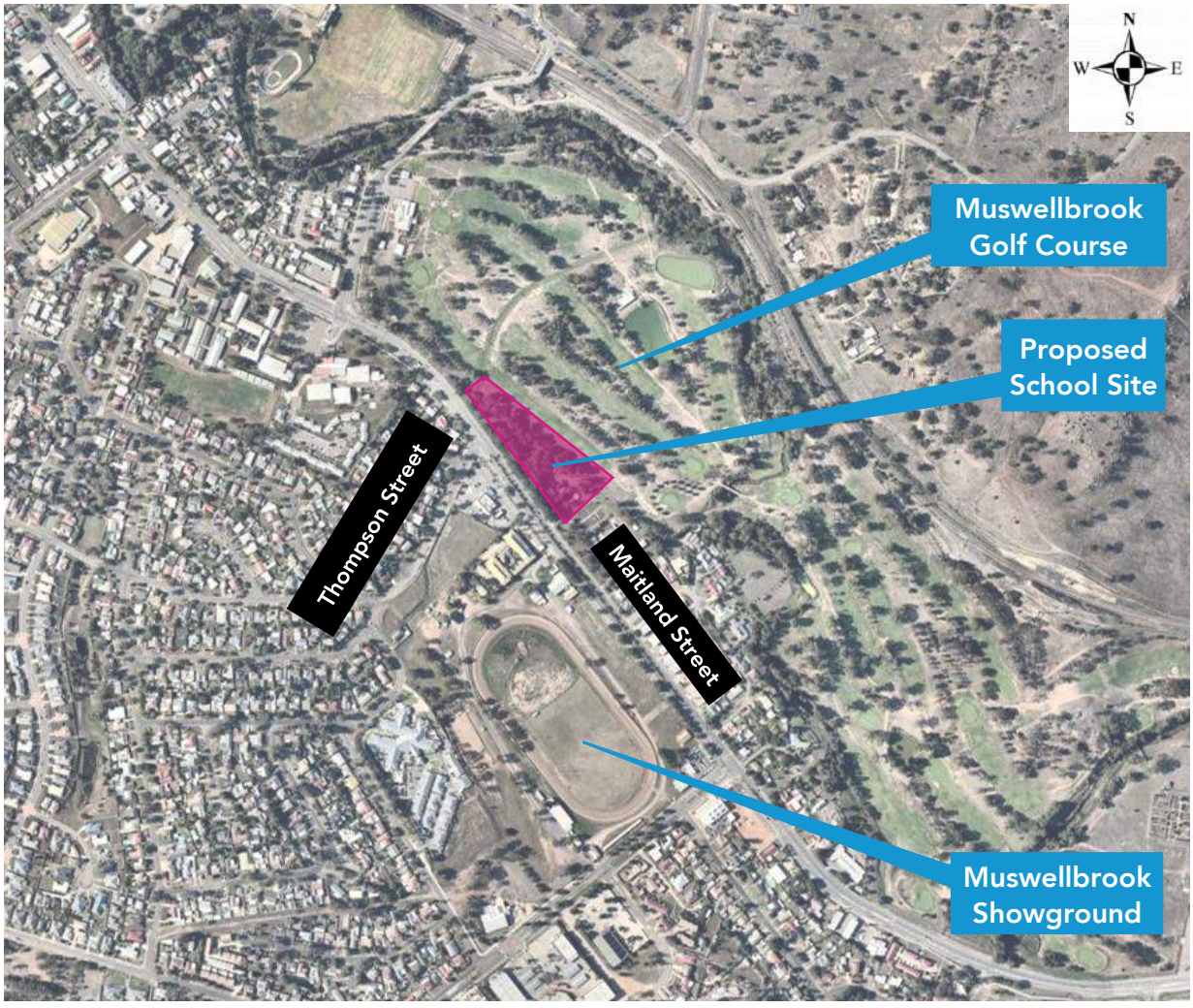


Figure 2 – Aerial View of the Subject Site (Source: Near Map)

© Copyright; **ptc.**

3.2 Surrounding Land Use

The proposed site is currently zoned as a RU3 Forestry Infrastructure Zone, but it is proposed to rezone the land to R1 General Residential.

The following uses are surrounding the proposed development:

- To the south, the surrounds are predominantly R1 (General Residential)
- There is a large B2 (Local Centre) to the south of the site, which include a McDonald's, a hotel and a shopping centre
- Directly opposite the site is the Muswellbrook Showground, zoned as a B5 Business Development
- Surrounding the northern side of the site is the Muswellbrook Golf Course zoned as RE2 Private Recreation
- There are also some RE1 (Public Recreation), and E3 (Environment Management) zones within the vicinity of the site
- A railway corridor to the north of the Golf Course leads to the Muswellbrook Railway Station and provides a barrier to the north of Muswellbrook.

The surrounding land uses are presented in Figure 3.

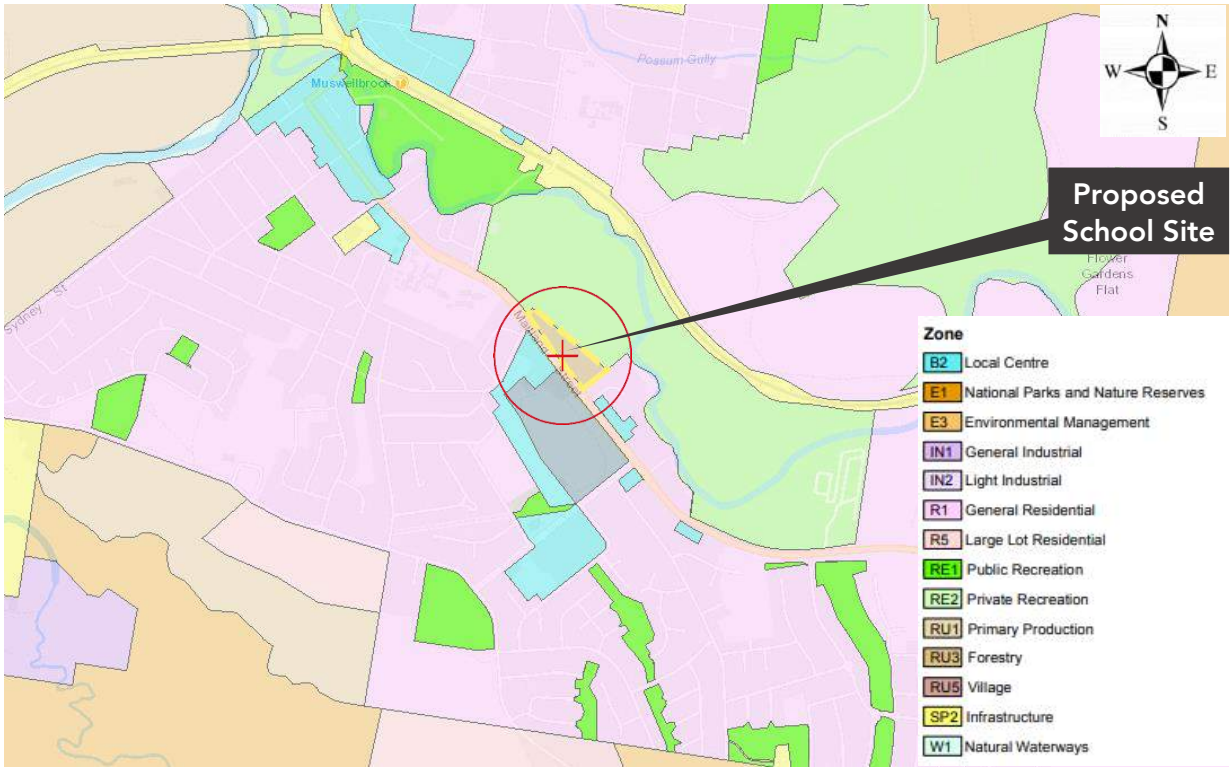


Figure 3 – Local Land Use map (Source: NSW Planning Viewer)

© Copyright; **ptc.**

3.3 New England Highway – Muswellbrook Bypass

The NSW Government is planning to deliver a New England Highway bypass in Muswellbrook. According to the Transport for NSW (TfNSW) 2020 project updates, the preferred alignment of the bypass is as shown in Figure 4.

The bypass is proposed to run east of Muswellbrook area, connecting the New England Highway southeast and north of the town, thus diverting through traffic away from the Muswellbrook Town Centre and the proposed school development.

The preferred bypass includes:

- *about 9.1 kilometres of new highway with a single lane in each direction*
- *a refined alignment south of Coal Road, with the bypass shifted further to the east to reduce environmental impacts and improve the road alignment*
- *full southern and northern connections with the existing New England Highway which provide for all traffic movements.*

The key benefits of the proposed bypass are to:

- *improve network efficiency on the New England Highway, particularly travel times for long haul freight movements*
- *improve safety for all road users in the town centre, particularly relating to heavy and light vehicle interactions*
- *improve amenity of Muswellbrook township.*

According to the *New England Highway Muswellbrook Bypass - Options Report* published by RMS in July 2018, the 2016 origin-destination (OD) surveys in Muswellbrook indicate that for all traffic (heavy and light vehicles) the following distribution was recorded:

- *About 35 per cent northbound (56 per cent of heavy vehicles) were travelling through*
- *About 29 per cent southbound (59 per cent of heavy vehicles) were travelling through*
- *Between 65 per cent and 71 per cent local.*

Of the total 1966 daily heavy vehicles recorded on the day of the OD survey on the New England Highway, the majority would use the bypass if it were provided (see Figure 5).

Considering that the bypass will lead to through traffic being diverted away from Muswellbrook, it is expected that traffic along Maitland Street and its intersection with Thompson Street within the vicinity of the School site will be reduced.

Further, following the construction of the bypass, Maitland Street is expected to change its character to a more localised street.

© Copyright; **ptc.**

Figure 4 – Muswellbrook bypass preferred option (Source: TfNSW *New England Highway Muswellbrook bypass, Project update – Preferred Option*, November 2020)

© Copyright; **ptc.**

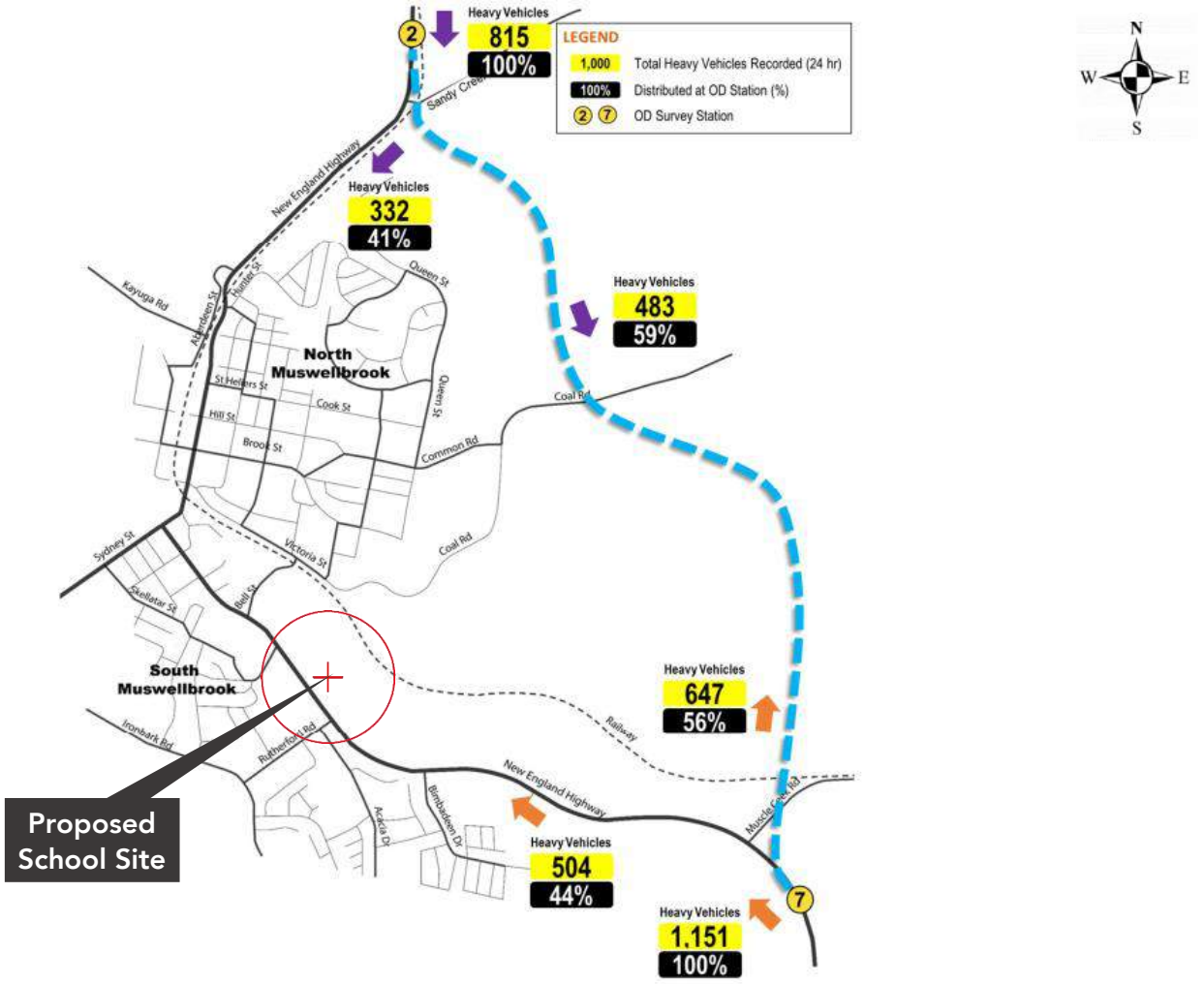


Figure 5 – 2016 Heavy vehicle through volumes (Source: RMS *New England Highway Muswellbrook Bypass - Options Report*, July 2018)

© Copyright; **ptc.**

3.4 Maitland Street / Thompson Street Intersection

The Maitland Street / Thompson Street intersection is currently unsignalised and does not provide any pedestrian crossing opportunities in any of the approaches. An upgrade to a signalised intersection has been approved by Council, and as per advice received from Council on 9th July 2021, these works have received a Works Authorisation Deed from TfNSW. Refer to Figure 6 for the current and future intersection treatment.

It is understood that this project is seen as a matter of urgency by all stakeholders; Although the timing of construction in unclear, it is currently being speculated that the work may commence in approximately 6 months.

The endorsed layout of this intersection incorporates pedestrian crossings on all approaches, which will provide connection for students living south of Maitland Street.

Considering all the above, this intersection will likely be signalised prior co commencement of the proposed school, thus the pedestrian infrastructure will be available for staff and students.

Figure 6 – Current (l.) and future (r.) intersection tretment

© Copyright; **ptc.**

3.5 Proposed Development

Pacific Brook Christian School proposes the staged construction of a new school at 72-74 Maitland Street, Muswellbrook. This will involve site preparation work (including remediation), the removal of 96 trees (7 within Stage 1), civil works, infrastructure works, landscaping, signage and construction works in stages over the next 10 years.

3.5.1 Stage 1

3.5.1.1. General Description

Stage 1 of the masterplan consists of:

- Site remediation;
- Removal of 7 trees;
- Facilities for a maximum of 140 students and 16 staff, including:
    - One (1) administration and staff area;
    - One (1) staff and student amenities block (including one (1) end of trip facility);
    - Five (5) General Learning Areas (GLAs);
    - One (1) Science classroom; and
    - Covered Outdoor Learning Area (COLA)
- Internal pathways;
- On-site Parking (15 spaces, inclusive of 1 accessible);
- Bike parking x 12 (6 x bike racks);
- Kiss and drop off areas;
- Bus stop;
- Bin storage and collection area;
- Signage;
- Infrastructure works; and
- Widening of existing vehicular access from Maitland Street.

© Copyright; **ptc.**

3.5.1.2. Traffic and Transport Relevant Description

Stage 1 school characteristics relevant from a traffic and parking perspective is as follows:

- 140 students from Kindergarten to Year 12
- 16 staff
- Car parking area consisting of 15 parking spaces, including 1 accessible car space
- Approximately 14 pick-up and drop-off spaces + additional queuing within the site
- The following bell times are proposed:
    - Start – 8:50am
    - Finish – 3:10pm
- The following timetables are proposed for before and after school activities:
    - Before School Care: 7:30am – 8:50am
    - After School Care: 2:50 – 6:30pm
- Extra-Curricular activities will be offered during the following times:
    - Monday – Friday: 3:10pm – 6:30pm

The proposed Stage 1 layout is shown in Figure 7 and in **Attachment 1.**

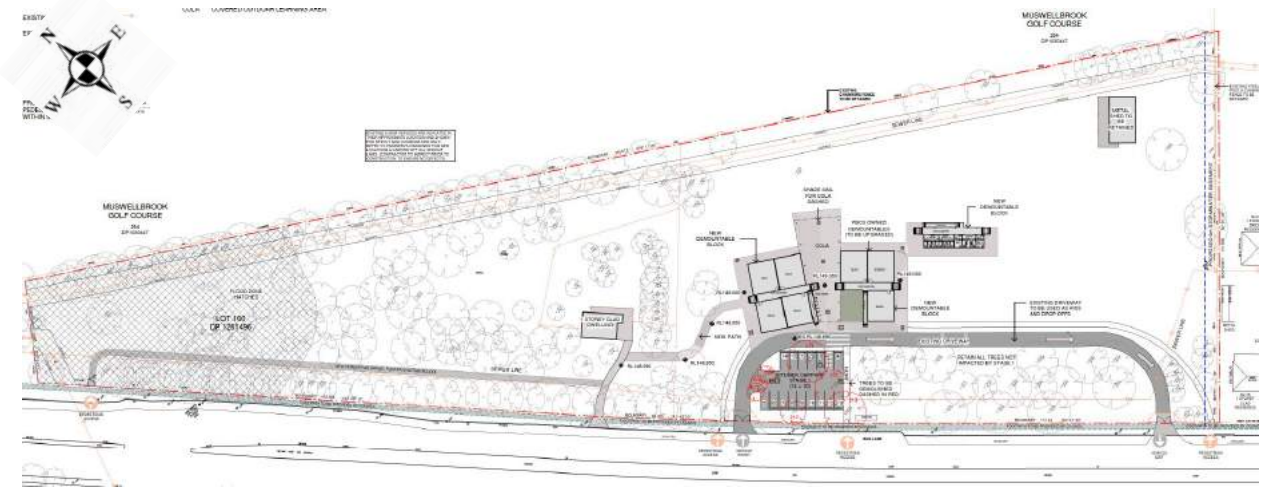


Figure 7 – Stage 1 - Site Layout (Source: NBRS Architects)

© Copyright; **ptc.**

3.5.2 Masterplan

3.5.2.1. General Description

The masterplan will support high-quality educational outcomes to meet the needs of students within the local community as follows:

- Administration building and Library;
    - One (1) staff and student amenities block;
- Junior School facilities;
    - Ten (10) General Learning Areas (GLAs);
    - Two (2) Specialist classroom;
    - One (1) Store; and
    - Covered Outdoor Learning Area (COLA)
- Middle School facilities;
    - Seven (7) General Learning Areas (GLAs);
    - One (1) Science classroom; and
    - Covered Outdoor Learning Area (COLA)
- Senior School facilities;
    - Eight (8) General Learning Areas (GLAs);
    - One (1) Specialist classroom;
    - Three (3) TAS classrooms;
    - Two (2) Food Tech classrooms;
    - One (1) Art classroom;
    - One (1) Drama classroom;
    - Four (4) amenities block;
    - Three (3) Store; and
    - Covered Outdoor Learning Area (COLA)
- Hope School (special needs) facilities;
    - Four (4) General Learning Areas (GLAs);
    - One (1) Specialist classroom;
    - Four (4) Shared Withdrawal rooms;

© Copyright; **ptc.**

  - One (1) Office;
  - One (1) Staff room;
  - One (1) Interview + Therapy room;
  - Three (4) amenities block;
  - Three (3) Store; and
  - Covered Outdoor Learning Area (COLA)
- Multi-Purpose Hall;
- Maximum student capacity of 656;
- Maximum 65 staff;
- Agricultural teaching facility;
- Maintenance and bus area;
- On-site Parking (67 spaces, inclusive of 1 accessible);
- Bike parking x 72 (36 x bike racks);
- Internal pathways;
- Kiss and drop off areas;
- Bus stop;
- Waste Storage and collection area;
- Signage;
- Bush Chapel
- Removal of 96 trees (total);
- Landscaping (including Bush Chapel);
- Infrastructure works;
- Earthworks;
- Secondary emergency vehicle/ large vehicle access;
- Acoustic and safety fence; and
- Widening of existing vehicular access from Maitland Street

© Copyright; **ptc.**

3.5.2.2. Traffic and Transport Relevant Description

School characteristics at the masterplan stage relevant from a traffic and parking perspective is as follows:

- 656 students from Kindergarten to Year 12
- 65staff
- Car parking area consisting of 67 spaces, including 1 accessible
- Approximately 14 pick-up and drop-off spaces + additional queuing length through the car park
- At least 2 bell times will be implemented for the proposed Masterplan, which could be set out as follows (yet to be confirmed):
    - Start: 8:35am & 8:50am
    - Finish: 2:55pm & 3:10pm
- Following timetables are proposed for before and after school activities (yet to be confirmed):
    - Before School Care: 7:30am – 8:50am
    - After School Care: 2:50 – 6:30pm
- Extra-Curricular activities will be offered during the following times (yet to be confirmed):
    - Monday – Friday: 3:10pm – 6:30pm

The proposed masterplan layout is shown in Figure 8 and Attachment 2.

Figure 8 – Masterplan – Site Layout (Source: NBRS Architects)

© Copyright; **ptc.**

4. Transport Networks and Operations

4.1 Site Access

The site has a frontage to Maitland Street towards the southwest and has three vehicular access points off Maitland Street, as shown in Figure 9. The access towards the north allows a two-way traffic flow, whereas the gates further south provide entry or exit only, with a drive-through lane connecting these gates.

There are no footpaths in the eastern side of the carriageway along the site and no crossings, meaning that the site is currently inaccessible by foot.

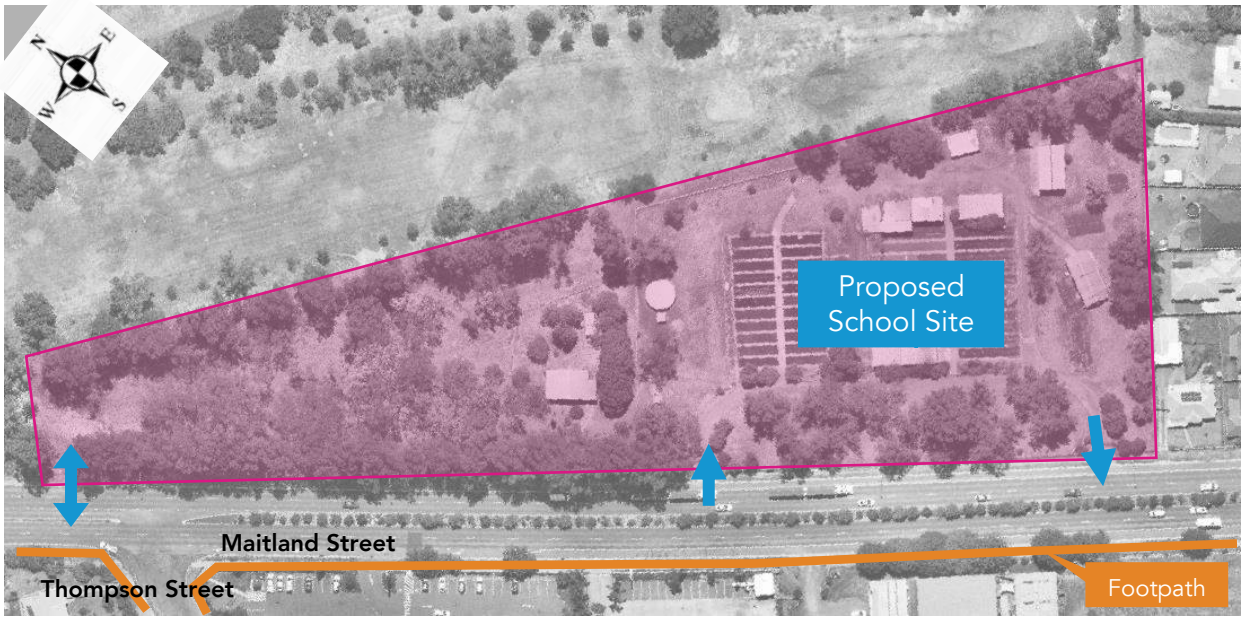


Figure 9 – Current access points

4.2 Active Transport

The locality was reviewed for features that would attract active transport trips (walking and cycling), with reference to the NSW Guidelines for Walking and Cycling (2004). The guideline suggests that 400-800m is a comfortable walking distance when considering accessibility to public transport, which equals a 5–10-minute walk. A 15-minute walk, or 1.2km distance is seen as acceptable if walking is the only mode of transport.

The comfortable cycling distance is defined by the Guide to be between 800m-1.5km, which equals a 5–10-minute cycle. Distances of up to 2.4km and 3.6km are seen as acceptable if cycling is the only mode of transport for primary and secondary school students, respectively.

The following sections describe the existing pedestrian and cycling infrastructure within the proposed school enrolment area. A gap analysis has been undertaken based on the distance definitions described above, and following this, potential ways to improve walkability and cyclability have been identified.

© Copyright; **ptc.**

4.2.1 Walking

Walking is a viable transport option for short door to door trips. Walking is also the most space efficient mode of transport and presents the highest benefits. Co-benefits where walking replaces a motorised trip include improved health for the individual, reduced congestion on the road network and reduced noise and emission pollution. However, the likelihood of someone choosing walking as a mode of transport depends on the level of amenities between the origin and destination of the trip.

4.2.1.1. Catchments

Figure 10 shows the "as crow flies" and the actual 400m, 800m and 1200m walking catchments from the proposed school.

A portion of the area south of Maitland Street is covered by the walking catchment. Towards the north, the golf course and the railway line are the main reasons for little walking coverage.

Figure 10 – 400m, 800m and 1200m Walking Catchment

© Copyright; **ptc.**

4.2.1.2. Existing Infrastructure and Gap Analysis

Currently, the site is not accessible by foot, which is likely due to the former use of the land as a nursery. Figure 11 shows an overview of the existing pedestrian infrastructure in the vicinity of the site and potential improvements.

Within the immediate vicinity of the proposed School, footpaths are missing on the eastern side of Maitland Street as marked by blue circles in Figure 11.

As discussed in Section 3.4, a signalised intersection is proposed at the Maitland Street / Thompson Street intersection, which will provide pedestrian connectivity to students residing south of the state road.

Roads in the area south of Maitland Street (highlighted in blue) generally provide no footpaths or formalised crossings; However, residential streets in Muswellbrook appear rural with low traffic volumes, meaning that students may be able to use the verges of the roads to walk or cycle.

As marked by the yellow circle in Figure 11, a pedestrian crossing is missing at Bell Street near Clifford Street, which would provide connectivity for students coming from the north.

Ideally, the here discussed pedestrian improvements would be implemented in Council's annual maintenance schedule, particularly along main routes and across wider, more utilised roads.

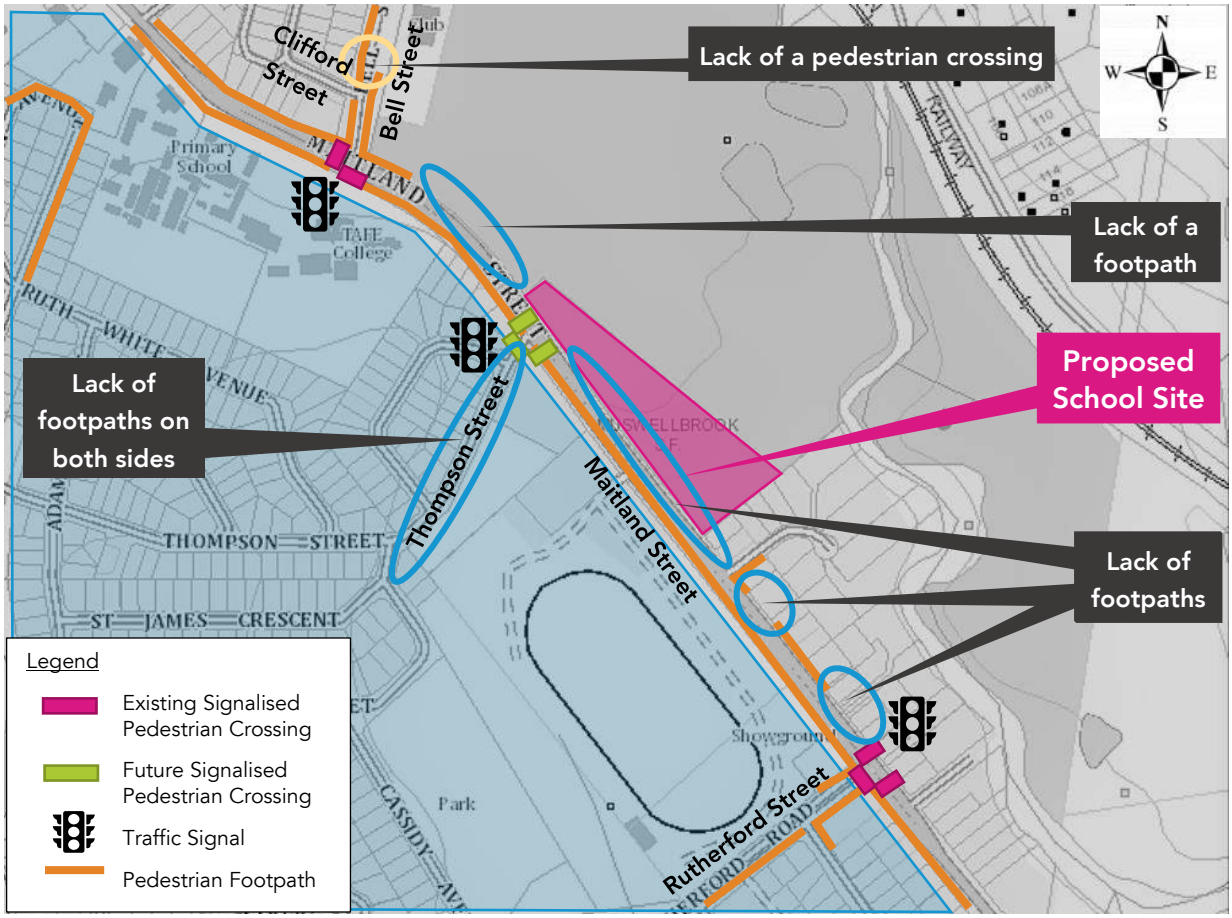


Figure 11 – Surrounding Pedestrian Infrastructure

© Copyright; **ptc.**

4.2.2 Cycling

4.2.2.1. Catchments

The "as crow flies" and actual 1200m, 2400m and 3600m cycling catchments are presented in Figure 12.

For cycling, an up to 2400m catchment is considered suitable for primary school students, and a 3600m catchment for secondary school students.

Almost the entire Muswellbrook area lies within the cycling catchment, meaning that distance wise cycling could be a viable option. Gaps in the existing cycling infrastructure are discussed in the following section.

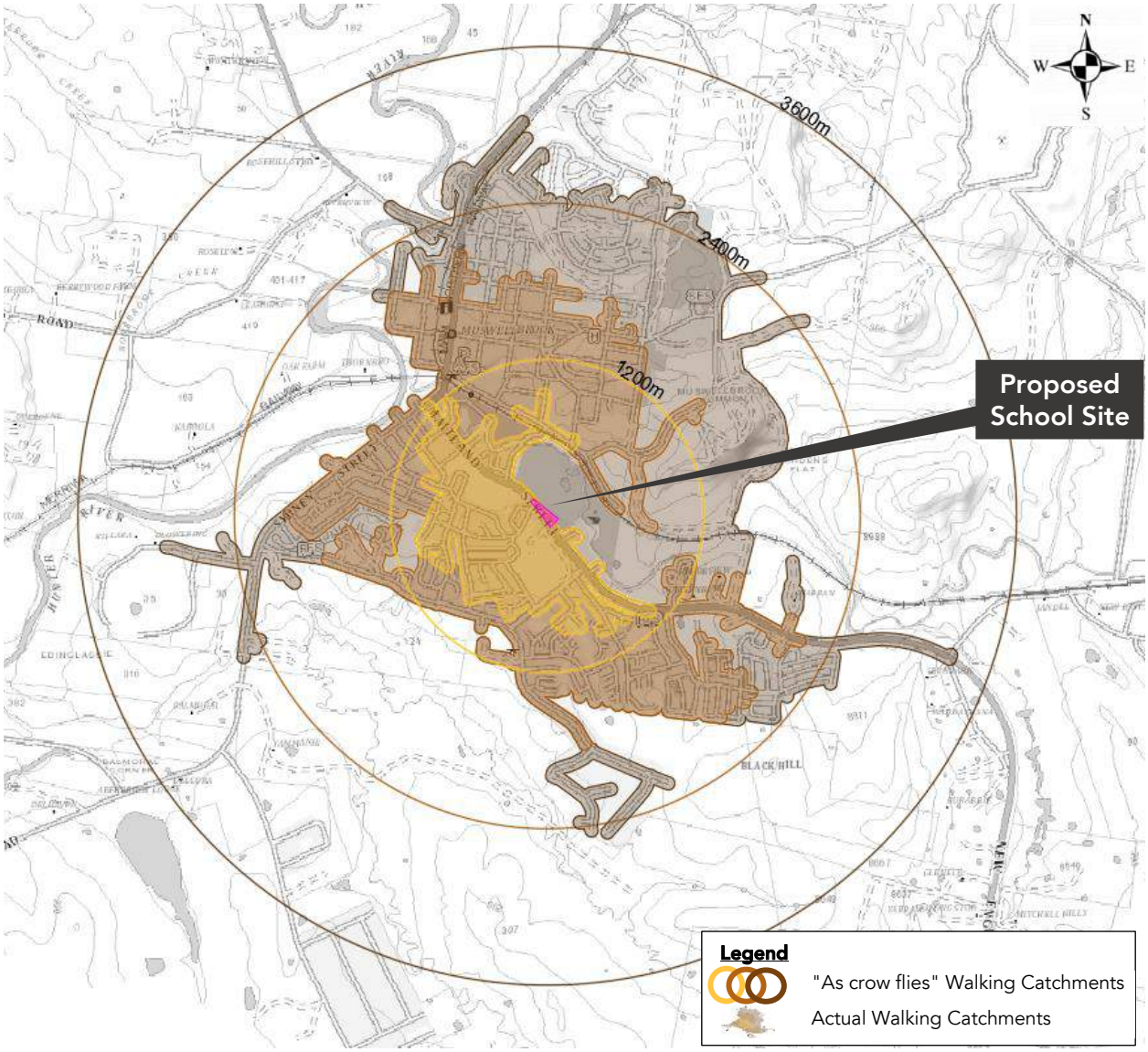


Figure 12 – 1200m, 2400m and 3600mCycling Catchment

© Copyright; **ptc.**

4.2.2.2. Existing Infrastructure and Gap Analysis

The Open Data website has been analysed to determine gaps in the existing and future cycling infrastructure.

Currently, Muswellbrook does not have a comprehensive cycling infrastructure, as shown in Figure 13. Local, residential streets may be acceptable for students to cycle on, but collector and arterial roads would require off-road cycle facilities.

The direct vicinity of the proposed school site is not linked by any safe cycling routes, and the road shoulder on the eastern side of Maitland Street is not an acceptable cycling facility for students.

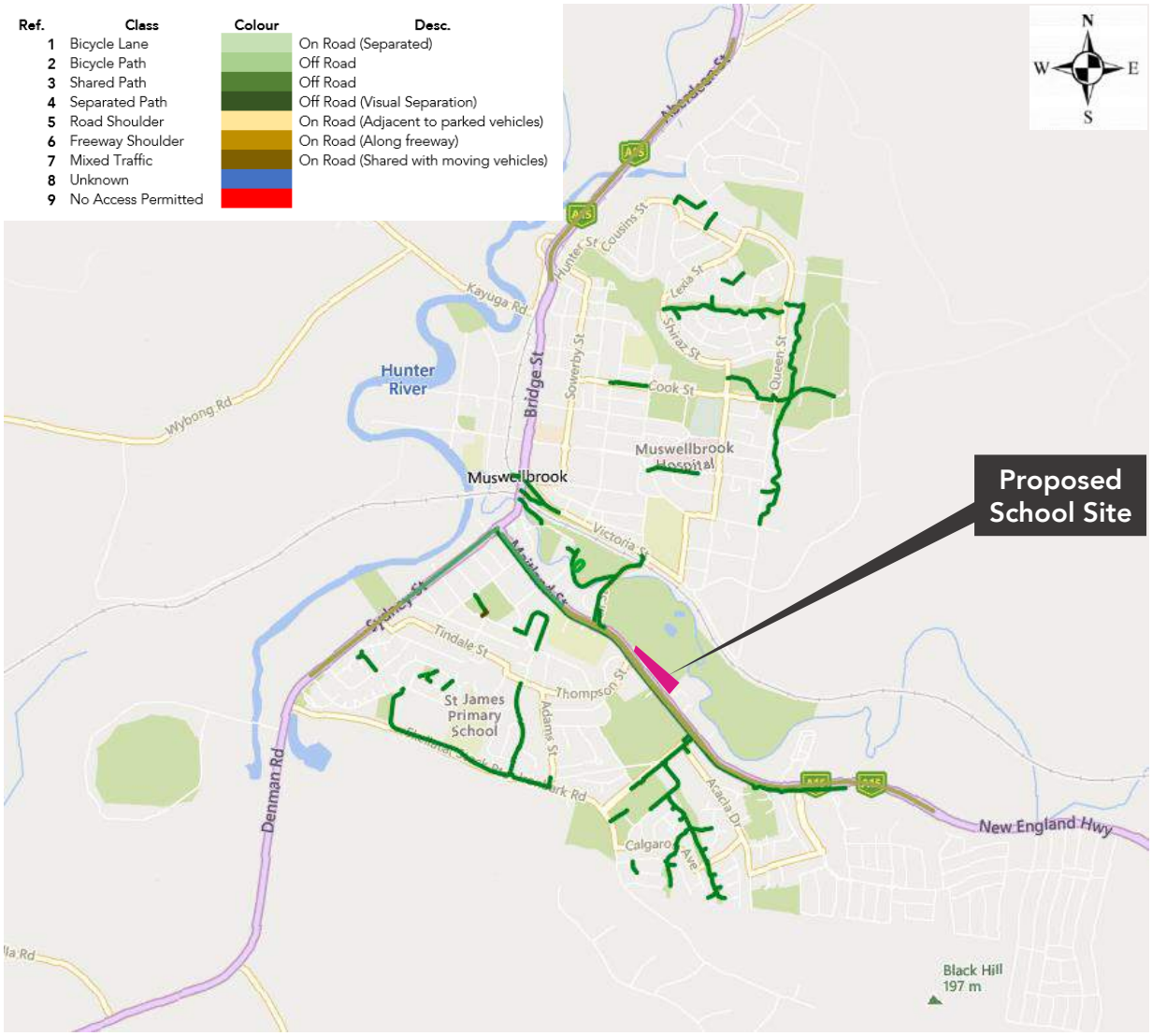


Figure 13 – Existing Bicycle Routes

© Copyright; **ptc.**

As shown in Figure 14, there are both on and off-road bicycle routes in planning, many of which would benefit the potential students and staff of the proposed school.

Ideally, planning and delivery of some of these paths would be expedited to provide better cycling connectivity for the prospective students.

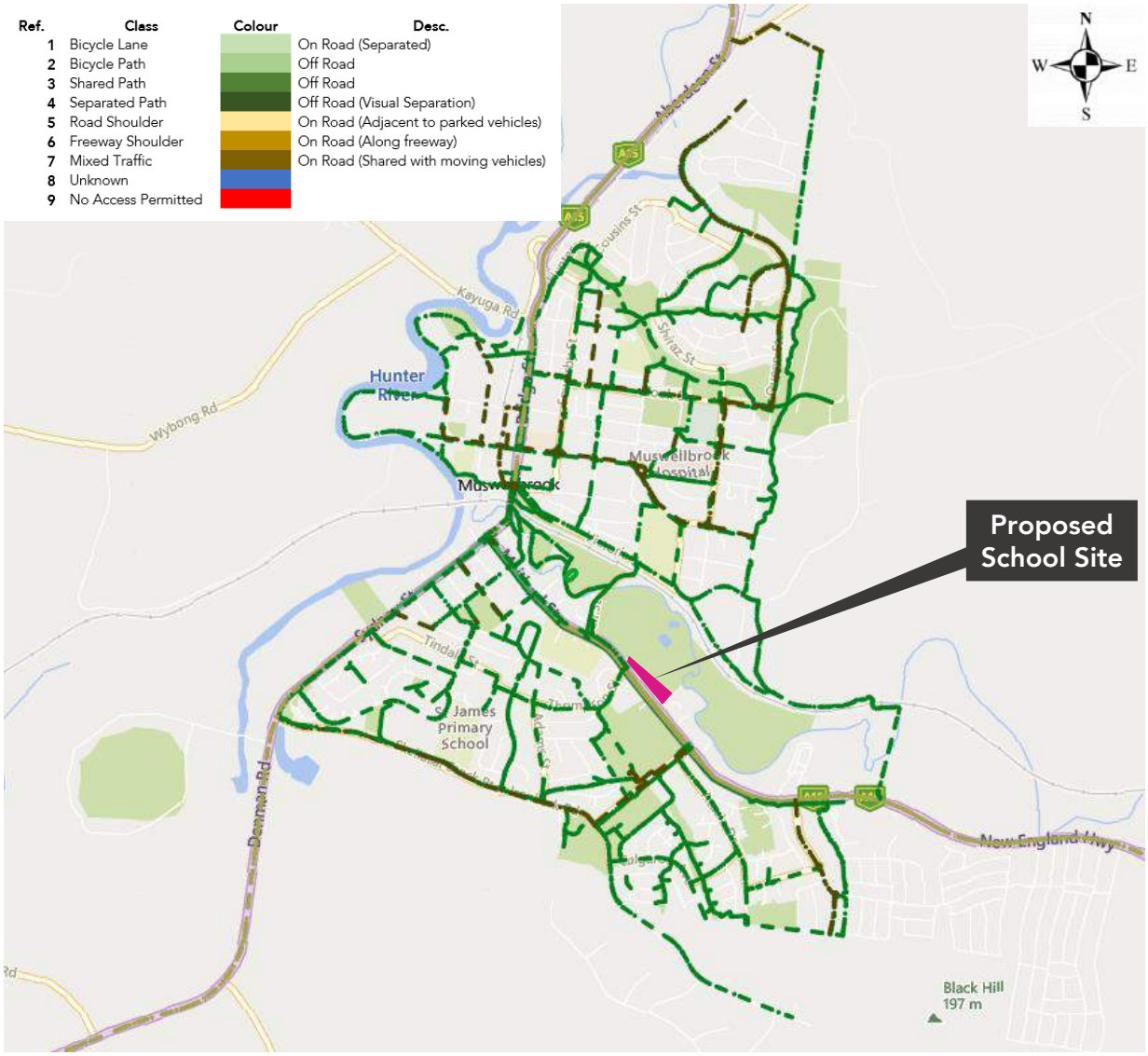


Figure 14 – Proposed Future Bicycle Routes

Based on the analysis of the existing infrastructure, the railway track as shown by the blue line in Figure 15 is a major barrier for walking and cycling towards the north due to the limited connectivity across the railway track. Further, there are gaps in connectivity due to a lack of continuous shared path (see pink circles), a lack of a pedestrian crossing (green cross) and a crossing that could potentially be improved (grey cross). It is therefore assumed that currently students living north of the railway track are more likely to be reliant on either public or private transport.

© Copyright; **ptc.**

Regarding connectivity in the southbound direction, as discussed in Section 3.4 there is currently no direct connectivity across Maitland Street, but the Maitland Street / Thompson Street intersection has recently been approved and will be constructed in the near future.

Ideally, shared paths in the area south of Maitland Street would be prioritised, particularly along Thompson Street.

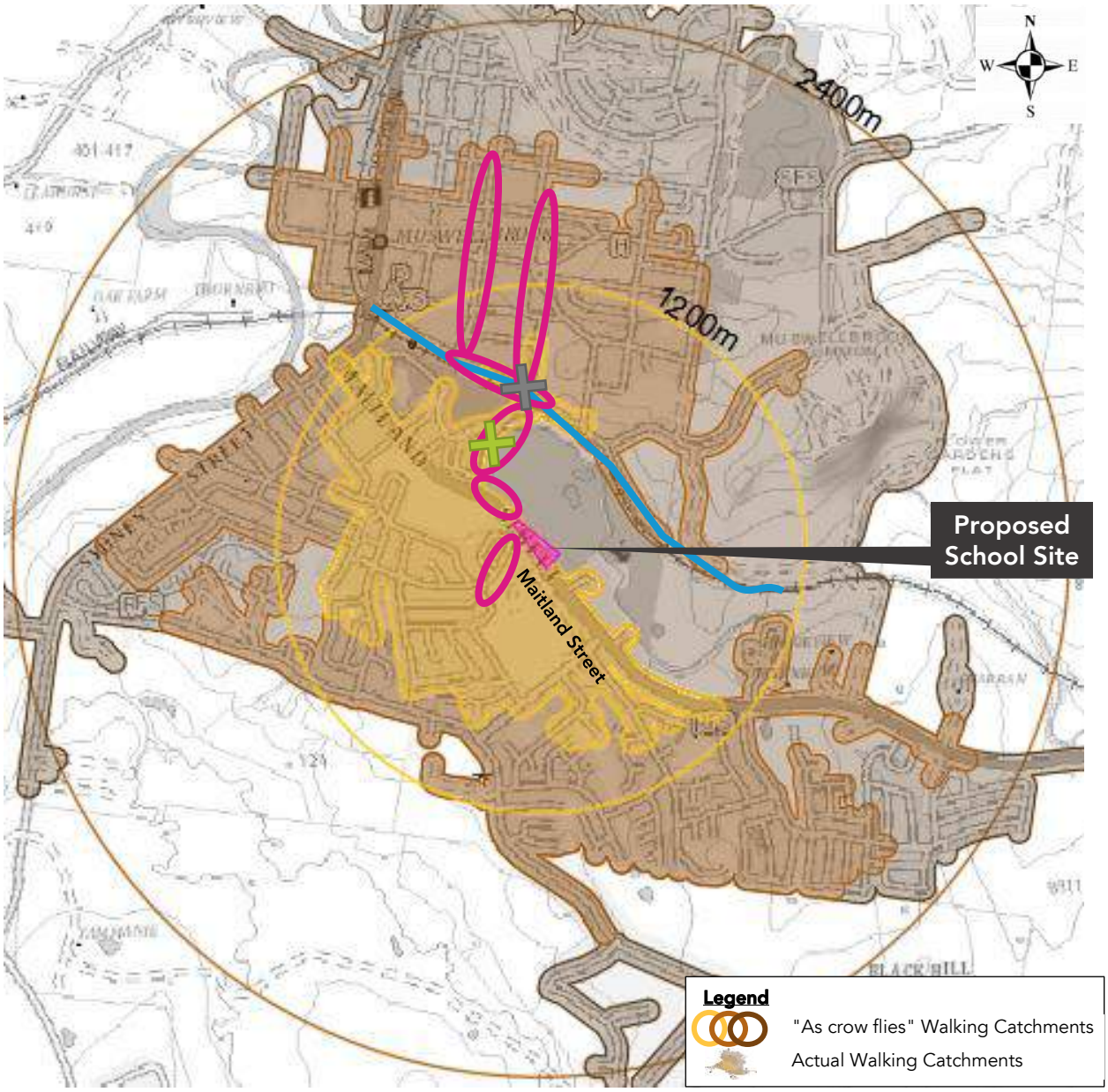


Figure 15 – Cycling Catchment and Barriers

© Copyright; **ptc.**

4.3 Public Transport

The locality of the site has been assessed in the context of available forms of public transport that may be utilised by prospective students, parents and staff. When defining accessibility, the *NSW Planning Guidelines for Walking & Cycling (2004)* suggests that 400m-800m is a comfortable walking distance to access public transport and local amenities.

4.3.1 Eligibility and Potential Usage

Figure 16 presents the SSTS exclusion catchment for the proposed School site. 0% of primary and 45% of secondary students are eligible for the free or discounted student travel pass.

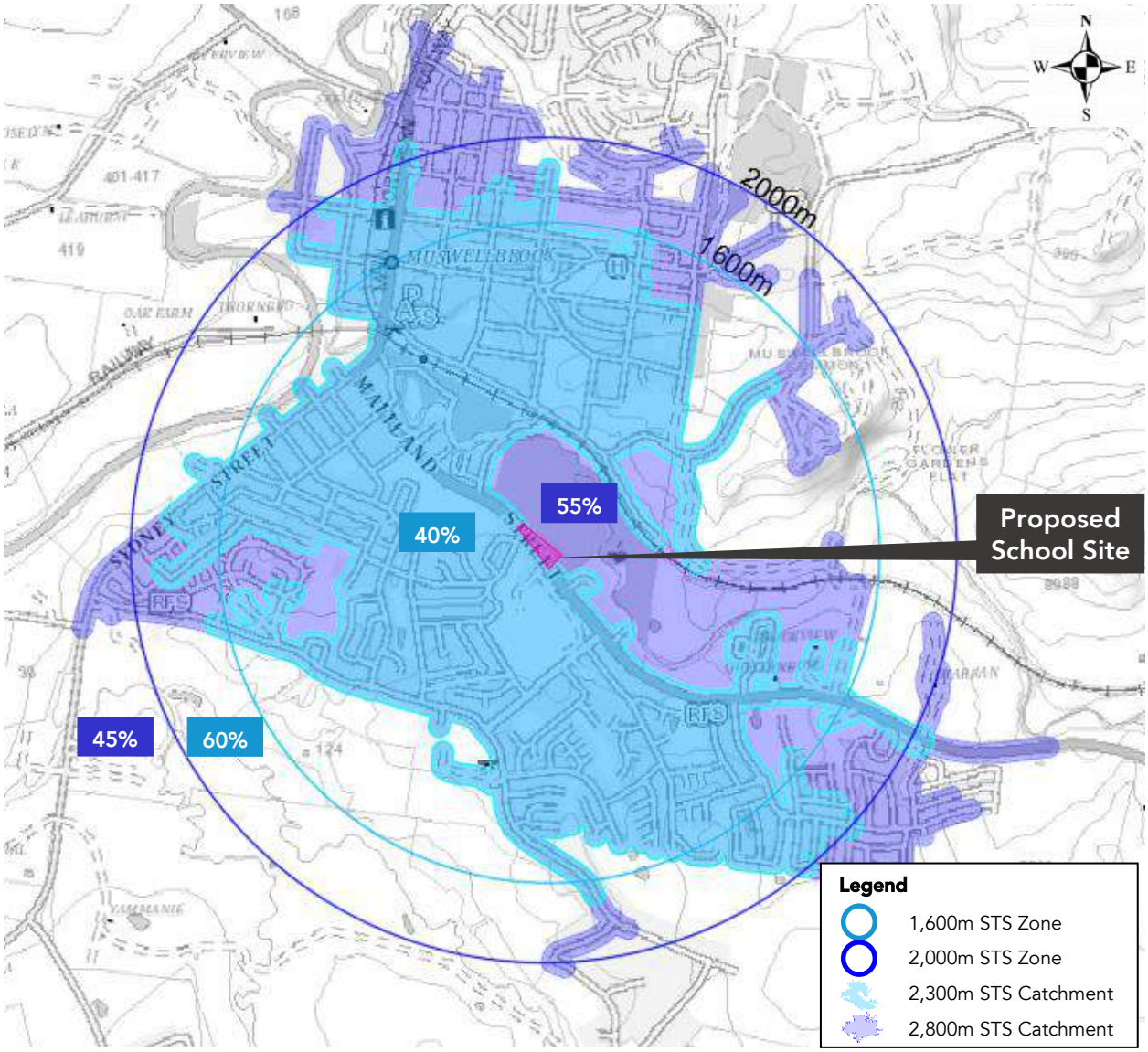


Figure 16 – SSTS Exclusion Zone

© Copyright; **ptc.**

Figure 17 presents the SSTS zone and major barriers. The area highlighted in orange represents 33% of students who are more likely to be reliant on either public or private transport. This is because this area lacks proper connectivity across the railway track in the north and is therefore not ideal from a student safety perspective. For this reason, convenient public transport connectivity would be beneficial for these students.

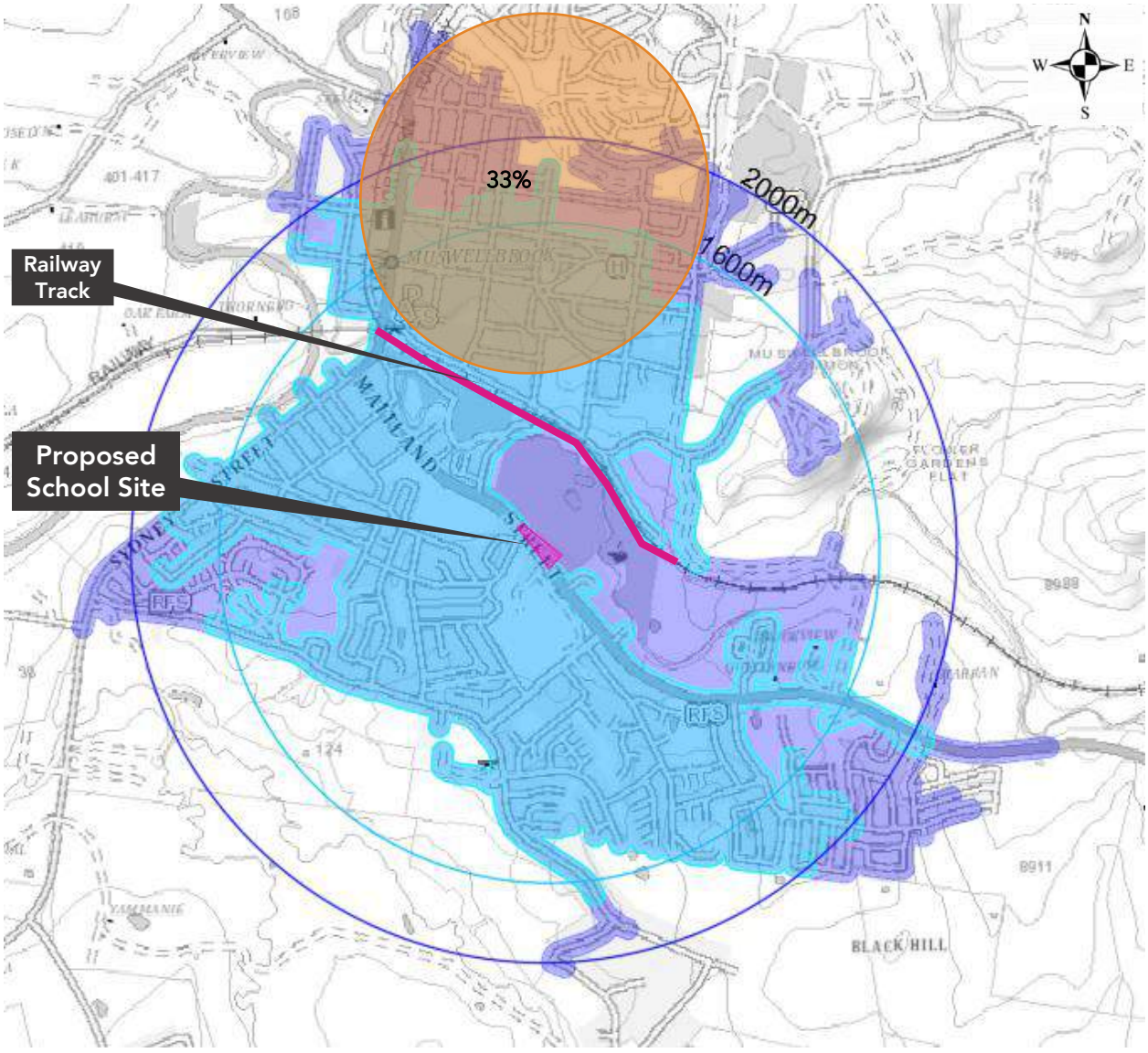


Figure 17 – SSTS Exclusion Zone and Barriers

© Copyright; **ptc.**

4.3.2 Bus Stops

4.3.2.1. Existing Infrastructure

Figure 18 illustrates the 400m and 800m catchments from the proposed School site, together with public transport facilities available in the vicinity of the site. Details of public transport options and their suitability are outlined in the following sections.

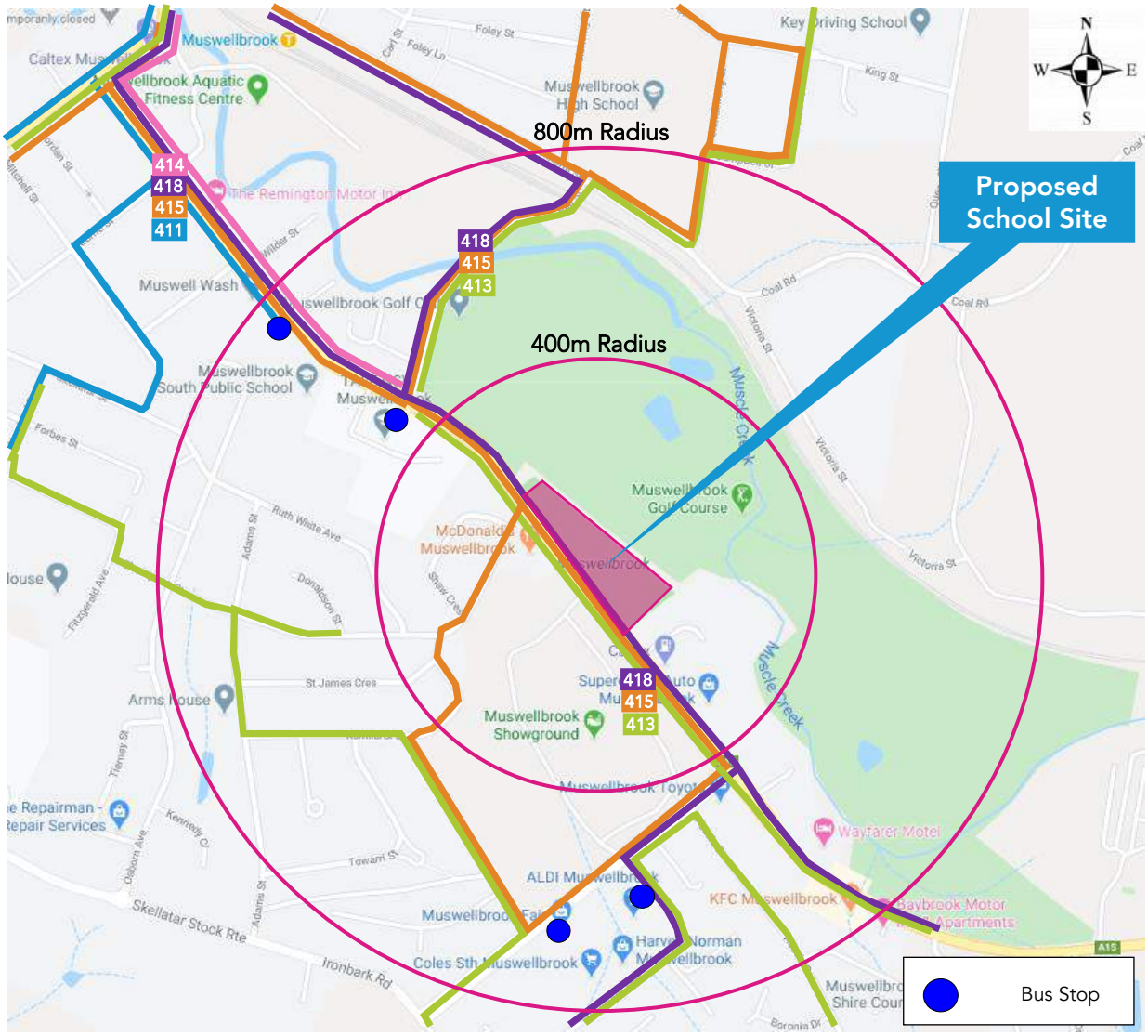


Figure 18 – 400m and 800m Radius of the Subject Site

As shown in Figure 18, there are 4 bus stops within 800m from the proposed school.

It is noted that currently there is a lack of connectivity between any of the bus stops and the site; However, as discussed in Section 3.4, the signalisation of the Maitland Street / Thompson Street intersection has recently been approved and the construction is planned to commence in the near future.

© Copyright; **ptc.**

There are potentially 5 services that could be used by staff and students; However the younger the students the less likely it would be for them to utilise this existing infrastructure due to the distance between the bus stops and the school and the requirement to walk along Maitland Street.

4.3.2.2. Potential Future Bus Stops

Ideally, the school would have a direct access to bus stops; Therefore, an analysis of potential locations has been undertaken as part of this assessment.

The safest option for students would be if a bus stop was positioned directly outside the school, on the eastern carriageway of Maitland Street between the two driveways. Ideally, all buses transporting students would stop at this bus stop, so that students do not need to cross the main road. However, considering that this may not be feasible from a bus route perspective, a second bus stop on the western carriageway of Maitland Street would be beneficial.

Different options were analysed for the bus stop location on the western side of Maitland Street, which are shown in Figure 19 and listed below:

- Option 1 – northwest of Maitland Street / Thompson Street intersection – 75m walking distance from the School Site;
- Option 1 – southwest of Maitland Street / Thompson Street intersection – 130m walking distance from the School Site; and
- Option 3 – northwest of Maitland Street / Rutherford Road intersection – 400m walking distance from the School Site.

Option 1 is seen as the most beneficial location due to its proximity to the secondary school entry. Other locations are unsuitable due to the reasons as illustrated in Figure 19.

© Copyright; **ptc.**

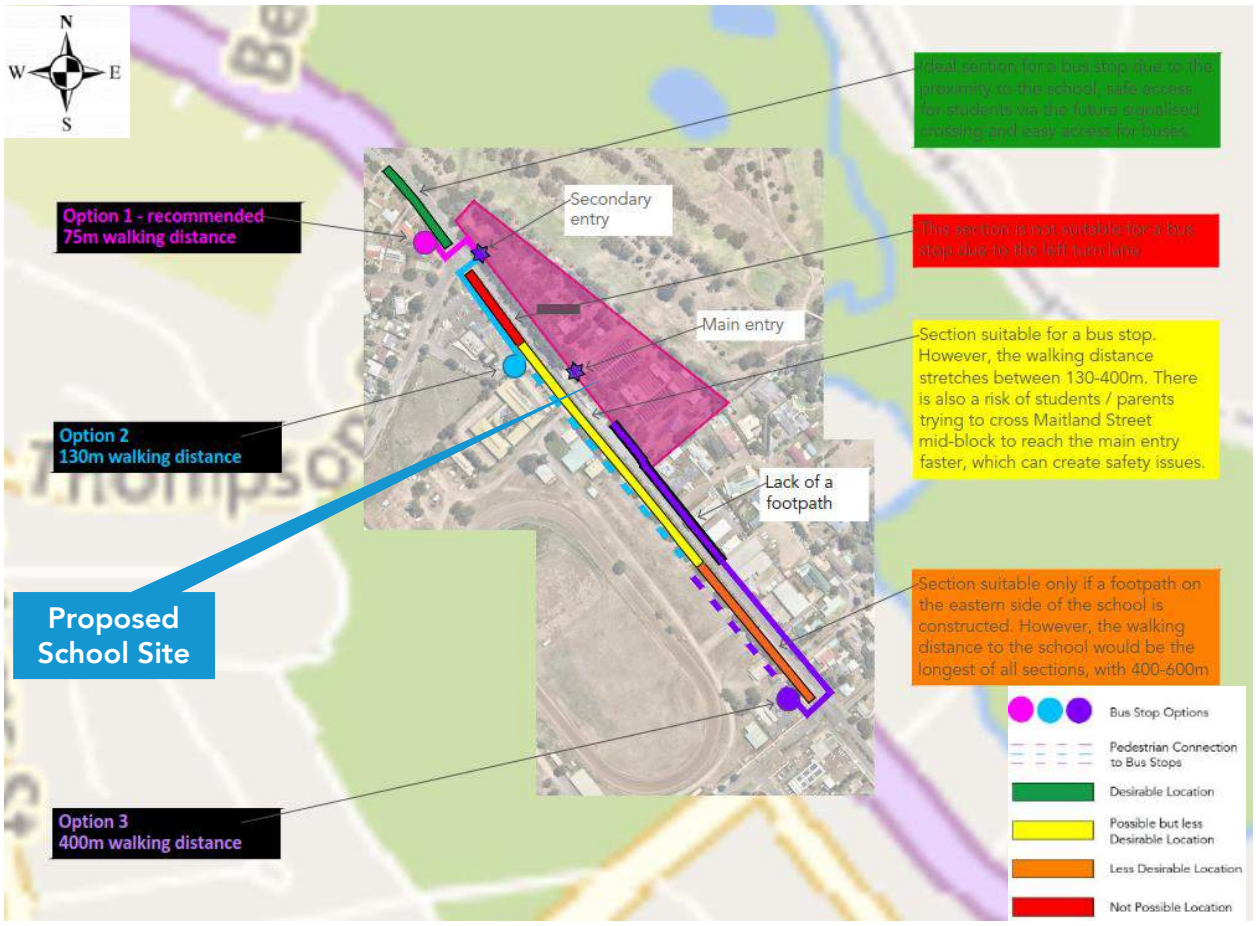


Figure 19 – Bus Stop Location Analysis

© Copyright; **ptc.**

The potential locations of future bus stops are shown in Figure 20 and listed below:

- Bus Stop A adjacent to the School on Maitland Street.
- Bus Stop B at Maitland Street west of Thompson Street.

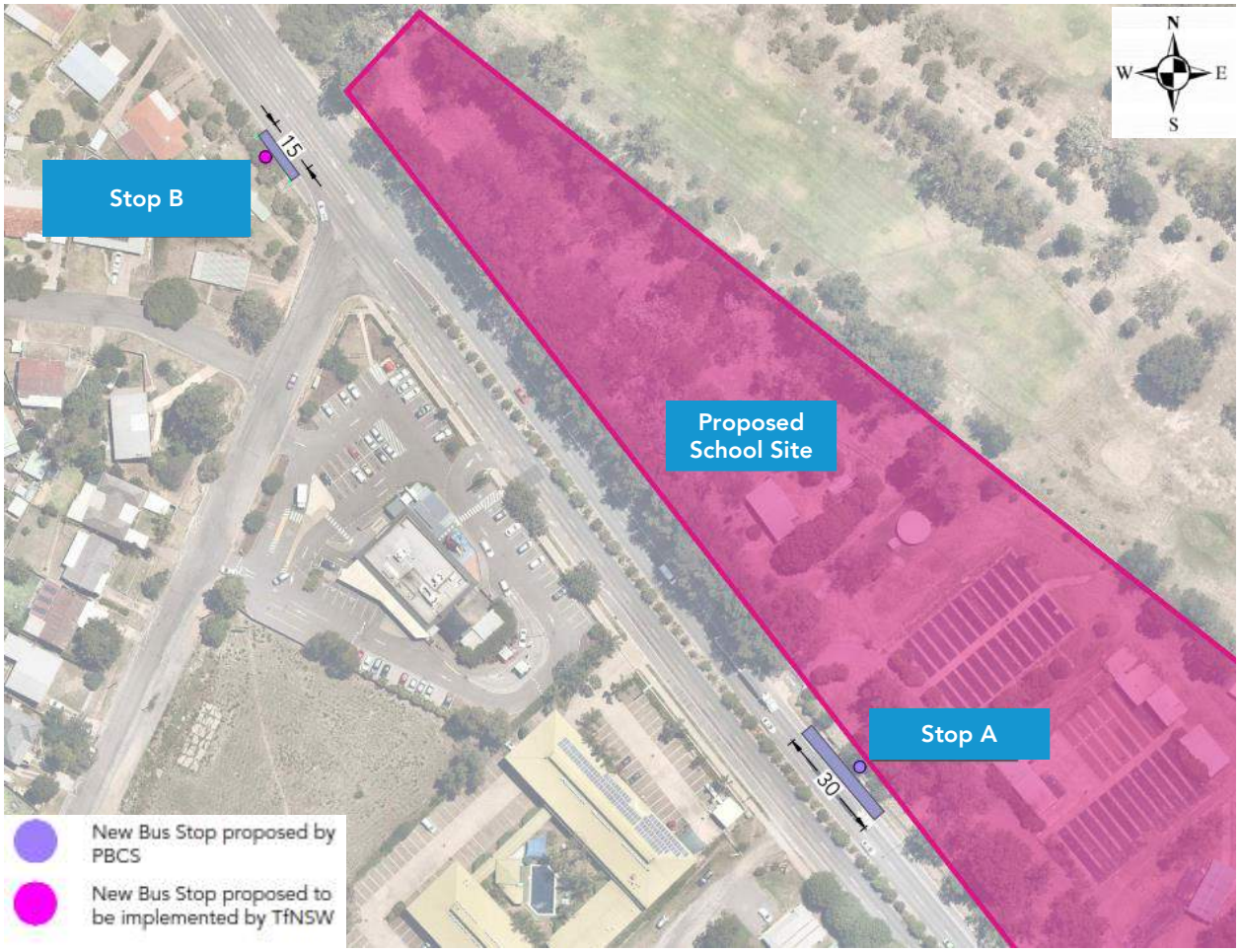


Figure 20 – Proposed Bus Stops

© Copyright; **ptc.**

4.3.3 Public Buses

4.3.3.1. Public Bus Network

In the broader aspect, Muswellbrook appears to have a good bus coverage, in particular the town centre. However, only three services pass the proposed school: the 413, 415 and 418, connecting only the south-eastern and part of the northern area.

The public bus network within Muswellbrook is shown in Figure 21.

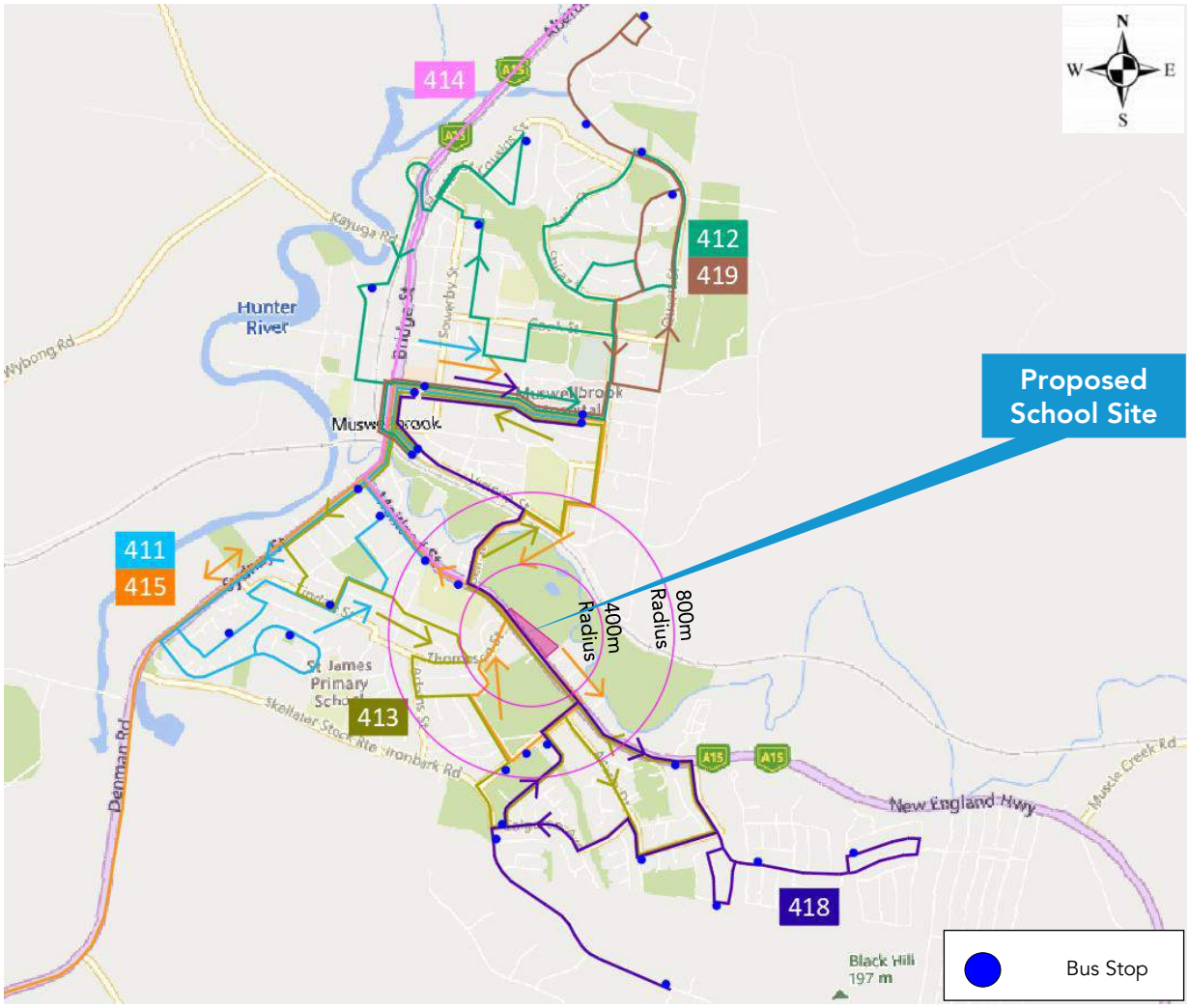


Figure 21 – Bus Route Network within Muswellbrook

© Copyright; **ptc.**

4.3.3.2. Public Bus Services

The bus services within the 800m walking catchment of the school, including coverage, approximate operation times and frequency, are summarised in the table below.

Table 1 – Bus Service Summary (Source: Transport NSW)

Bus Route	Coverage	Approximate operation time frame and frequency
411	Muswellbrook - Muswellbrook Hospital (Loop Service)	Mon-Fri: 38-87 minutes intervals, between 9:07am and 2:12pm Sat: 38-87 minutes intervals, between 9:07am and 12:45pm
413	Muswellbrook – Highbrook (Loop Service)	Mon-Fri: 36-90 minutes intervals, between 10:05am and 2:54pm Sat: 38-90 minutes intervals, between 10:05am and 12:40pm
414	Muswellbrook – Scone (Loop Service)	Mon-Fri: 55-150 minutes intervals, between 6:50am and 5:55pm Sat - Sun: No services
415	Muswellbrook – Scone (Loop Service)	Mon-Fri: Approximately 4 hours interval, between 8:03am and 12:58pm Sat - Sun: No services
418	Muswellbrook – Eastlinks (Loop Service)	Mon-Fri: 60-130 minutes intervals, between 9:20am and 2:52pm Sat: 60 minutes intervals, between 9:20am and 12:21pm

The development is poorly serviced by bus, with services every 36 minutes to 4 hours throughout the day on weekdays. In addition, most of the buses commence their services after the morning bell time and conclude their services before the afternoon bell time.

Considering the above, the current public bus services are not a reliable or convenient travel mode option for students, parents and staff.

4.3.4 School Buses

The current school location is serviced by school buses run by Osborn's Transport.

The proposed School site location is not currently serviced; However, preliminary discussions with the local bus operator have already commenced and the routes would be reviewed in due course.

As shown in Figure 22, there is a lack of services towards the north of Muswellbrook during the morning. This gap would ideally be closed, given that many of the students residing towards the north would less likely walk or cycle to the new school location.

© Copyright; **ptc.**

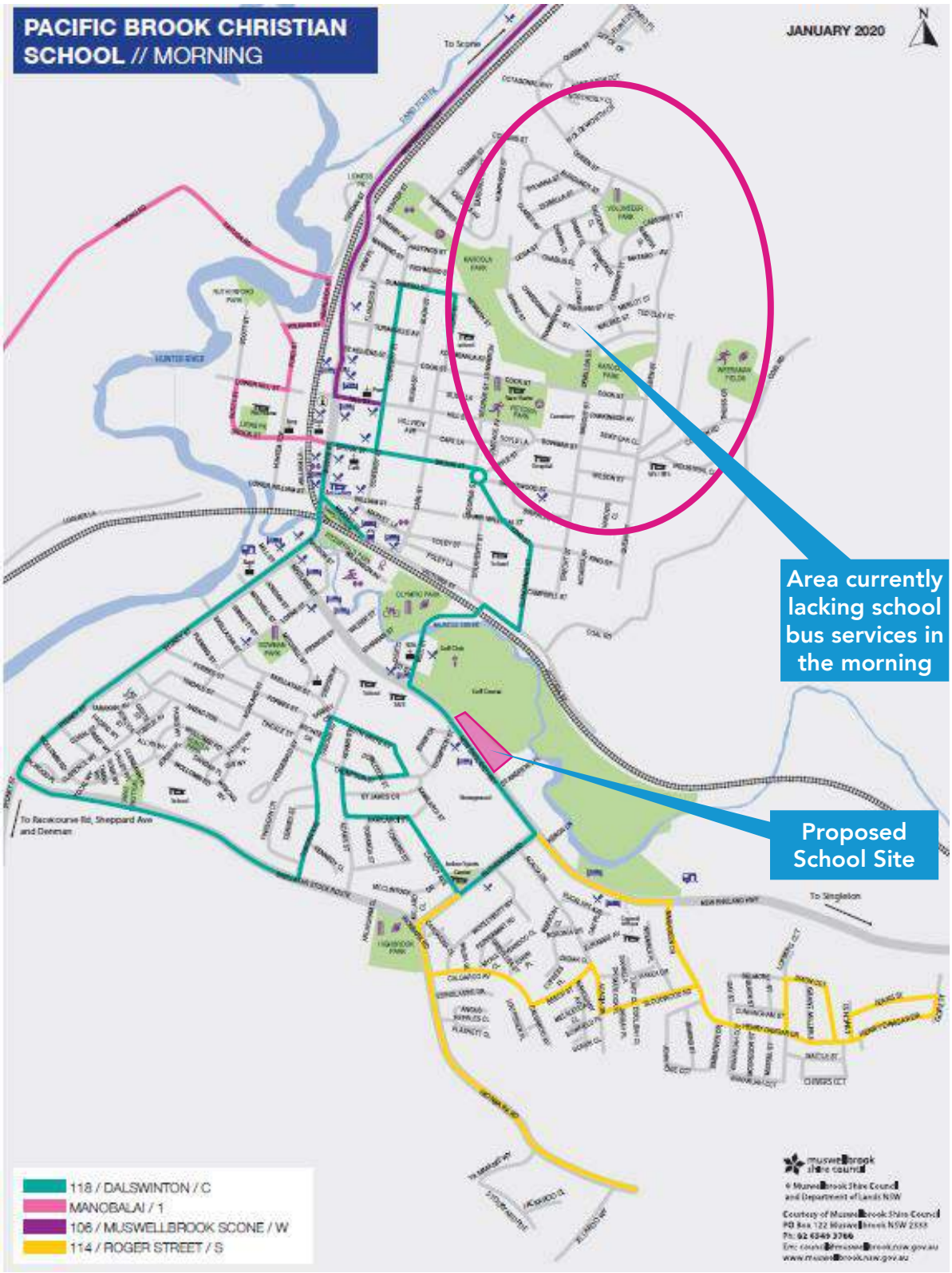


Figure 22 – School Bus Network – AM

© Copyright; **ptc.**

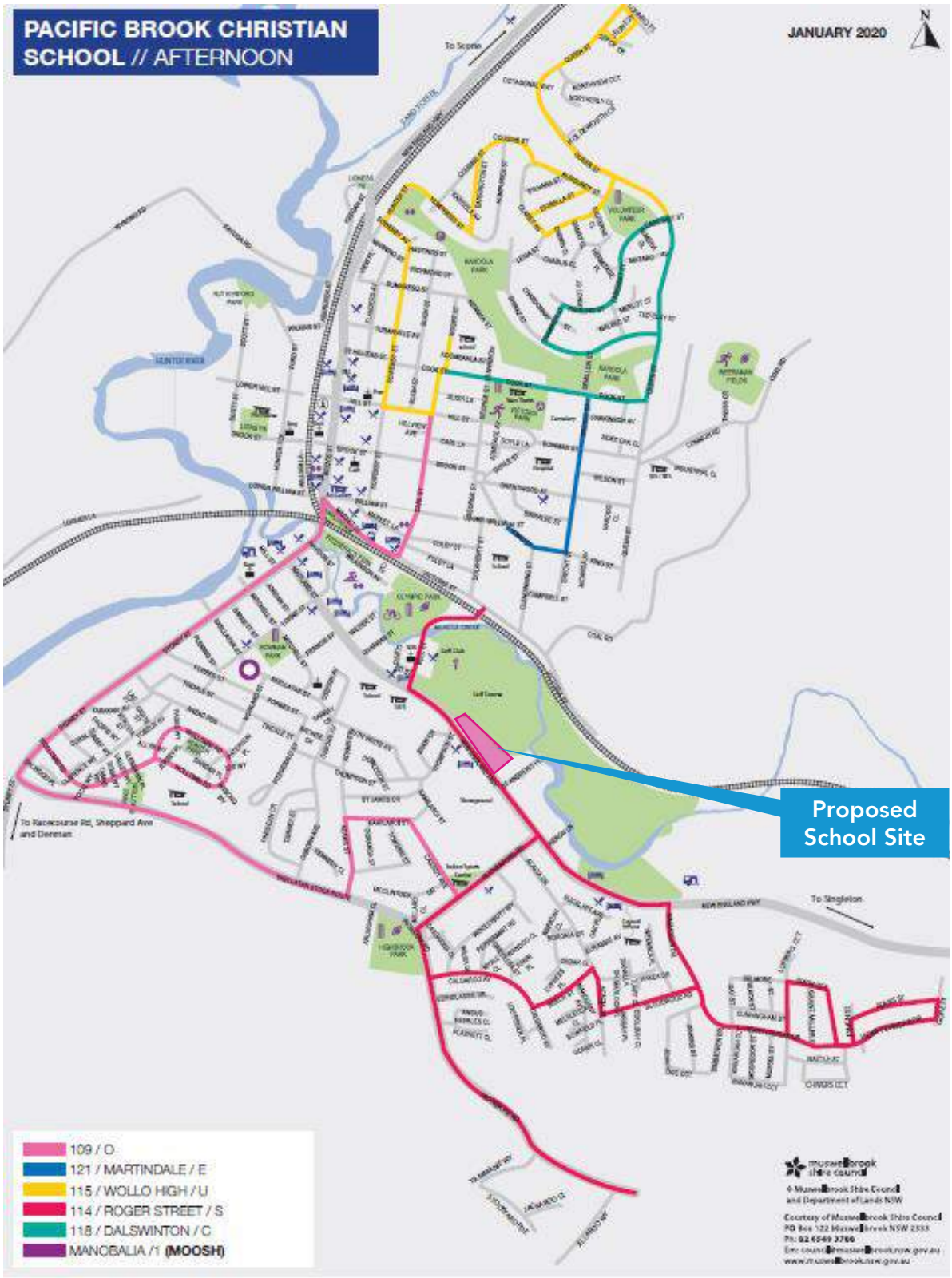


Figure 23 – School Bus Network – PM

© Copyright; **ptc.**

4.3.5 Discussion

Muswellbrook has a good bus coverage providing services from within the entire area to the town centre. However, with the view on the proposed school, the services and frequency are limited and many of the buses do not pass the subject site.

Further, the existing bus stops are inconveniently located in relation to the proposed School site.

Therefore, a detailed analysis of the ideal bus stop location and the bus network has been undertaken, following which some potential bus network changes have been proposed to enable staff to use public transport. This analysis is presented in Attachment 3.

It is noted that in order to enable students to travel to and from school by bus from commencement of the facility, the school has committed to providing a bus stop on the eastern side of Maitland Street. Further detail on this item is provided in Section 6.5. It is requested that TfNSW implement the bus stop on the western side of Maitland Street.

Further, initial consultation with Osborn's Transport was undertaken in February 2021 to confirm the appropriate process of including a new school location in their service planning. It was suggested that consultation with and approval by TfNSW will be required to undertake this task.

Lastly, it is suggested that the public bus services as illustrated in Figure 21 be extended to the proposed bus stops as per the analysis shown in Attachment 3, with additional bus services during, before and after the School bell times to facilitate students, staff and parents. School buses (refer Section 4.3.4) would ideally be planned to drop-off and pick-up students at Bus Stop A during the school hours.

ptc. attempted early consultation with TfNSW in February 2021 in regard to the above points, but has not received any response back.

© Copyright; **ptc.**

4.4 Road Network

The subject site is located in the suburb of Muswellbrook and is primary serviced by Maitland Street i.e., a state road.

A summary of the State, Regional and Council managed local roads serving the site is presented in Figure 24 and the following tables.

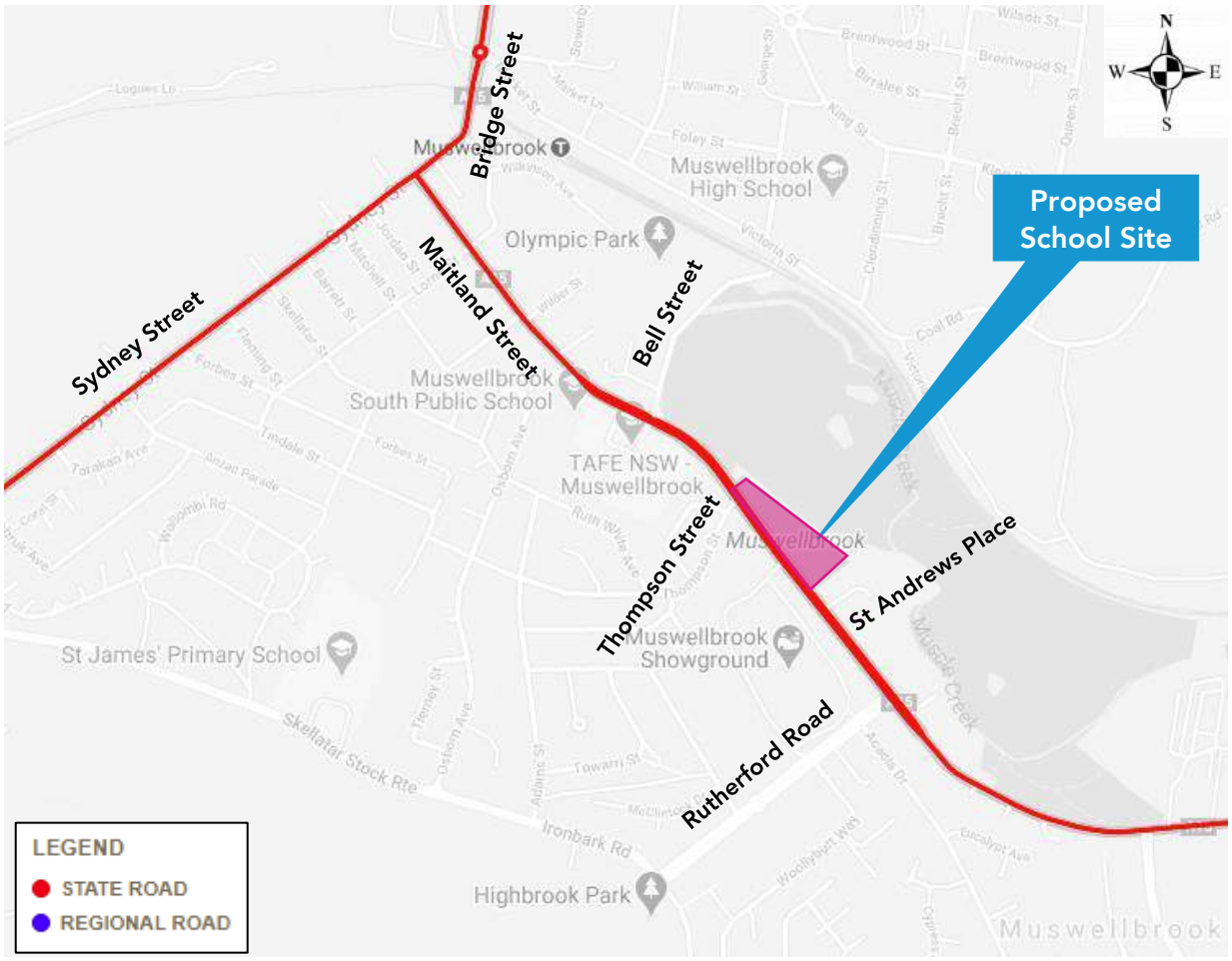


Figure 24 – Surrounding Road Network (Source: RMS Road Hierarchy)

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

State Roads - Freeways and Primary Arterials (generally TfNSW managed)

Regional Roads - Secondary or Sub Arterials (Council managed, partly funded by the State)

Local Roads - Collector and Local Access Roads (Council managed)

© Copyright; **ptc.**

Table 2 – Maitland Street

Maitland Street	
Road Classification	State Road – Council managed
Alignment	Northeast - Southwest
Number of Lanes	2 lanes in each direction
Carriageway Type	Divided
Carriageway Width	23m
Speed Limit	50km/h
School Zone	No
Parking Controls	Northbound – 'Loading Zone 7am – 5pm Mon-Fri' Southbound – no parking restrictions
Forms Site Frontage	Yes

Figure 25 – Maitland Street – Northwestbound towards Thompson Street

Table 3 – Rutherford Road

Rutherford Road	
Road Classification	Local Road
Alignment	Northeast - Southwest
Number of Lanes	1 lane in each direction
Carriageway Type	Divided
Carriageway Width	21m
Speed Limit	50km/h
School Zone	No
Parking Controls	Unrestricted Parking
Forms Site Frontage	No

Figure 26 – Rutherford Road – Southwestbound towards Arcacia Drive

© Copyright; **ptc.**

Table 4 – Thompson Street

Thompson Street	
Road Classification	Local Road
Alignment	North - South
Number of Lanes	1 lane in each direction
Carriageway Type	Undivided
Carriageway Width	12m
Speed Limit	50km/h
School Zone	No
Parking Controls	"No Stopping" on eastern side, unrestricted on western side
Forms Site Frontage	No

Figure 27 – Thompson Street – Northbound towards Maitland Street

Table 5 – Bell Street

Bell Street	
Road Classification	Local Road
Alignment	North - South
Number of Lanes	1 lane in each direction
Carriageway Type	Undivided
Carriageway Width	16m
Speed Limit	50km/h
School Zone	Yes
Parking Controls	Unrestricted
Forms Site Frontage	No

Figure 28 – Bell Street – Northbound towards Clifford Street

© Copyright; **ptc.**

5. Travel Patterns and Travel Demand

The following sections present a review and comparison between an ideal scenario, existing mode share at the School and potential future travel mode share.

5.1 Ideal Case / Potential Achievements Based on Catchments

This section presents potential walking, cycling, public transport and car utilisation in an ideal scenario, where everybody would utilise only alternative transport modes.

5.1.1 Walking

"As crow flies" and actual 400m / 800m / 1200m walking catchments are presented in Figure 29.

Approximately 15% of the students live within the 1200m walking distance.

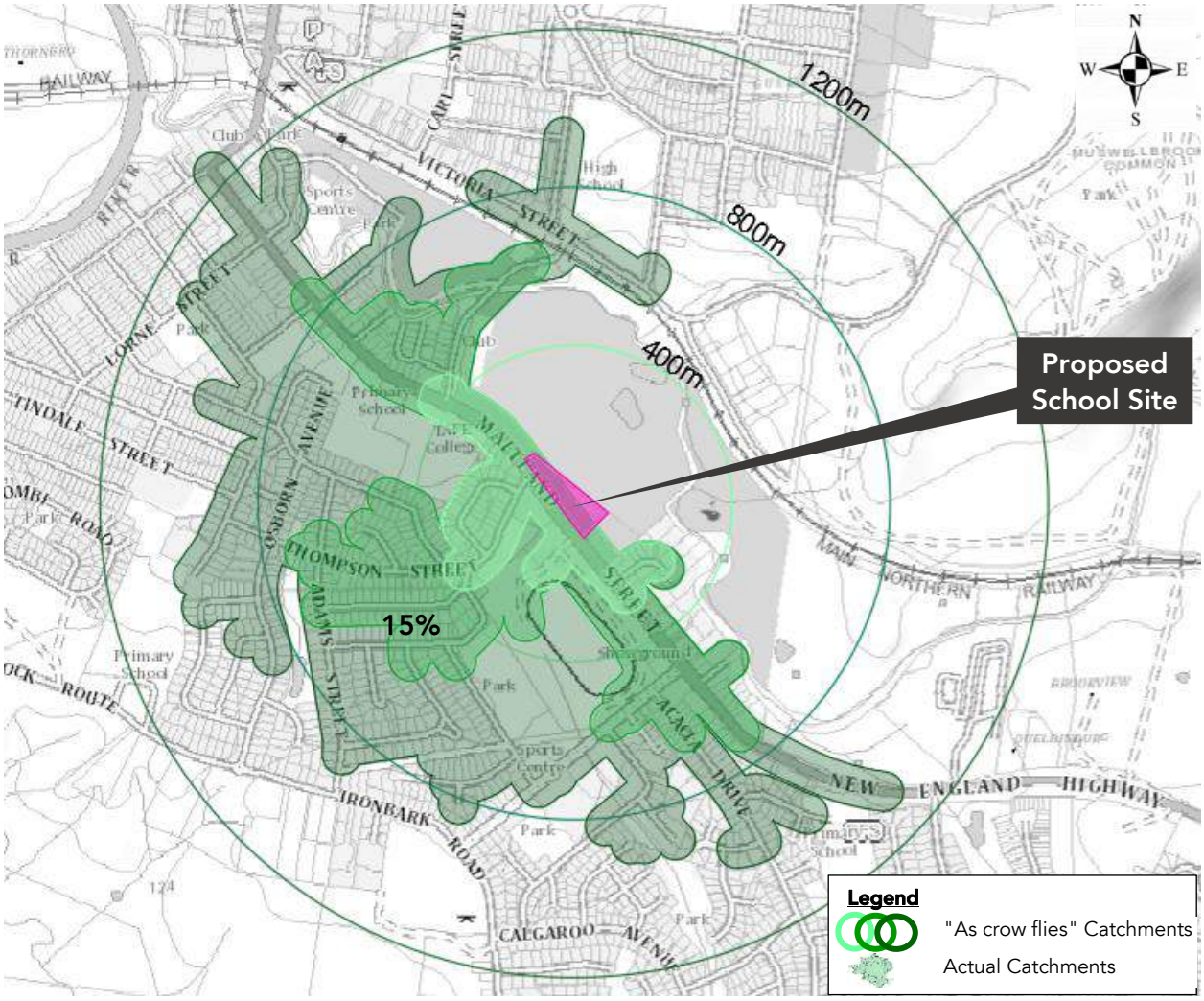


Figure 29 – Walking Catchment and Student Population

© Copyright; **ptc.**

5.1.1 Cycling

"As crow flies" and actual 1200m / 2400m / 3600m cycling catchments are presented in Figure 30.

Approximately 15% students reside within the 1200m walking / cycling catchment, 38% of primary school students reside within the 1201m - 2400m cycling catchment and 73% of secondary school students reside within the 1201m - 3600m cycling catchment.

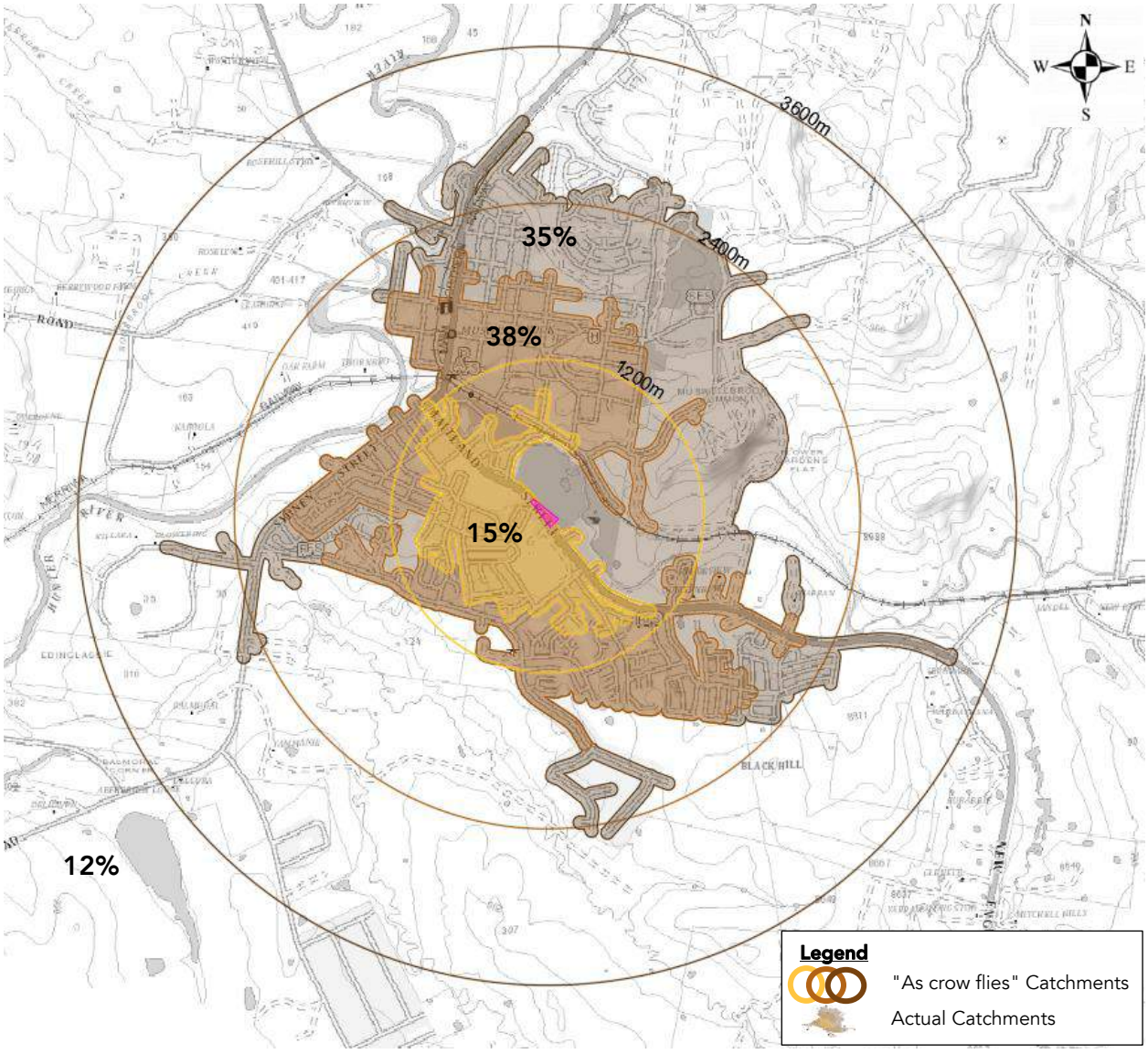


Figure 30 – Cycling Catchment and Student Population

© Copyright; **ptc.**

5.1.2 Public Transport

"As crow flies" 1,600m and actual 2,300m SSTS exclusion zones for primary school students and "as crow flies" 2,000m and actual 2,800m SSTS exclusion zones for secondary school students are presented in Figure 31.

40% of primary school students and 55% of secondary school students live within the SSTS exclusion zone. Therefore, 60% of primary school students and 45% of secondary school students are eligible for the free or discounted student travel pass.

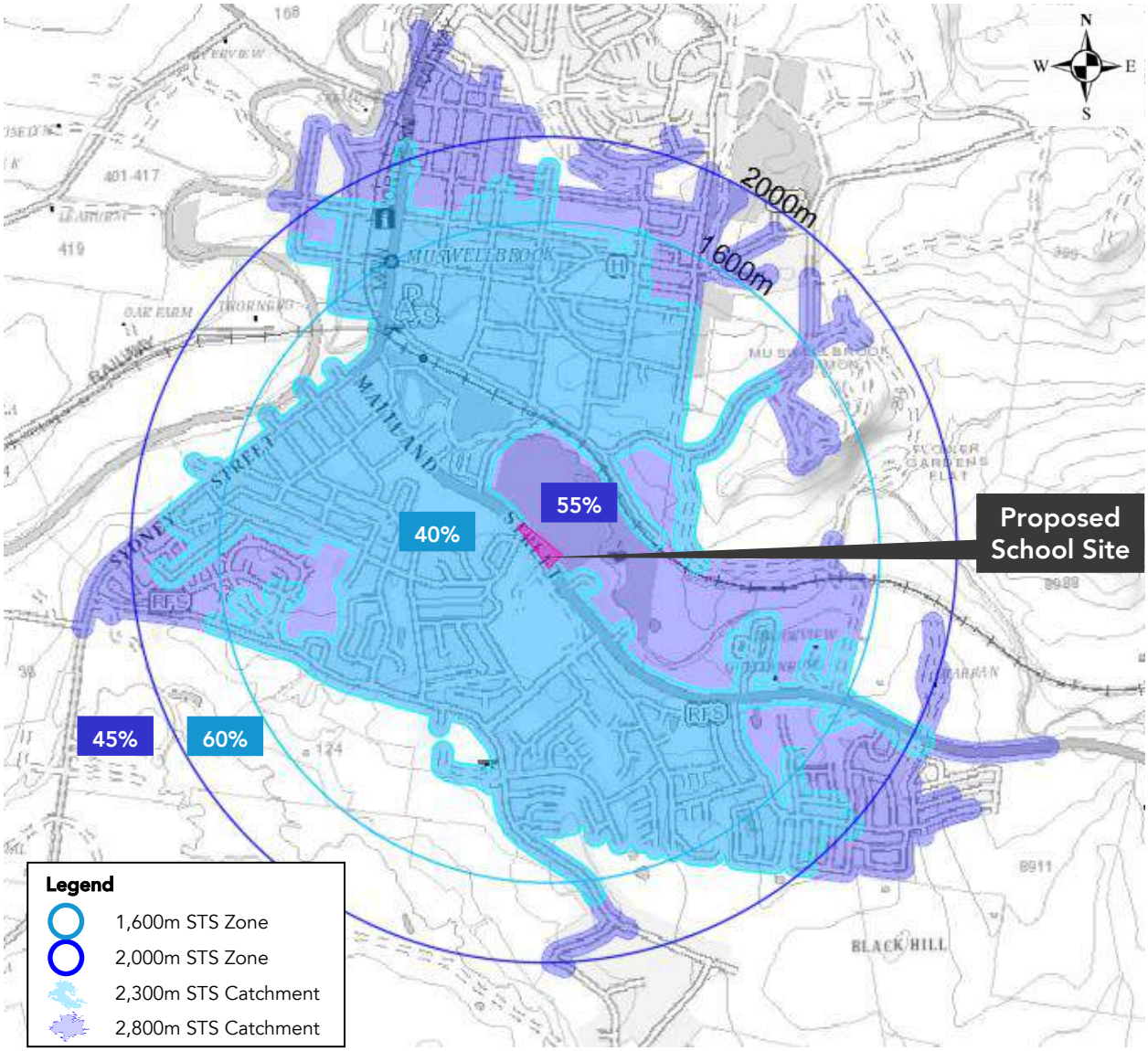


Figure 31 – Public Transport Catchment and Student Population

© Copyright; **ptc.**

5.2 Gap Analysis / Potential Target

Due to the School being relocated, no actual data is available to calculate potential mode share. Therefore, in order to undertake an analysis of potential walking, cycling and public transport catchments, the following considerations have been made:

- The NSW Guidelines to Walking & Cycling (2004) suggests that 400-800m is a comfortable walking distance when considering the distance to public transport, which equals a 5-10 minute walk. A 1.2km distance which equals a 15-minute walk is seen as acceptable if walking is a sole travel mode.
- The comfortable cycling distance is defined by the Guide to be between 800m-1.5km, which equals a 5-10 minute cycle. Distances up to 2.4km and 3.6km are seen as acceptable for primary and secondary school students respectively; and
- Existing infrastructure in the close proximity of the School.

Considering the above, it has been assumed that:

- For approximately 15% students residing in the southwest it is feasible to walk to school.
- For further 42% students residing south of Maitland Street it is feasible to cycle to school.
- Even though 33% students in the north live within walking and cycling catchment, this area lacks proper connectivity across the railway track (refer to the pink line in Figure 32 and Section 4.2) and the existing pedestrian and cycling infrastructure does not support active transport in the northbound direction. For this reason, public transport could be a suitable means of transport for students residing in this area, given appropriate coverage and services.
- The remaining 10% students live outside of the walking and cycling catchment and it is more likely that these students would travel to school on private vehicles.

These assumptions are visualised in Figure 32.

© Copyright; **ptc.**

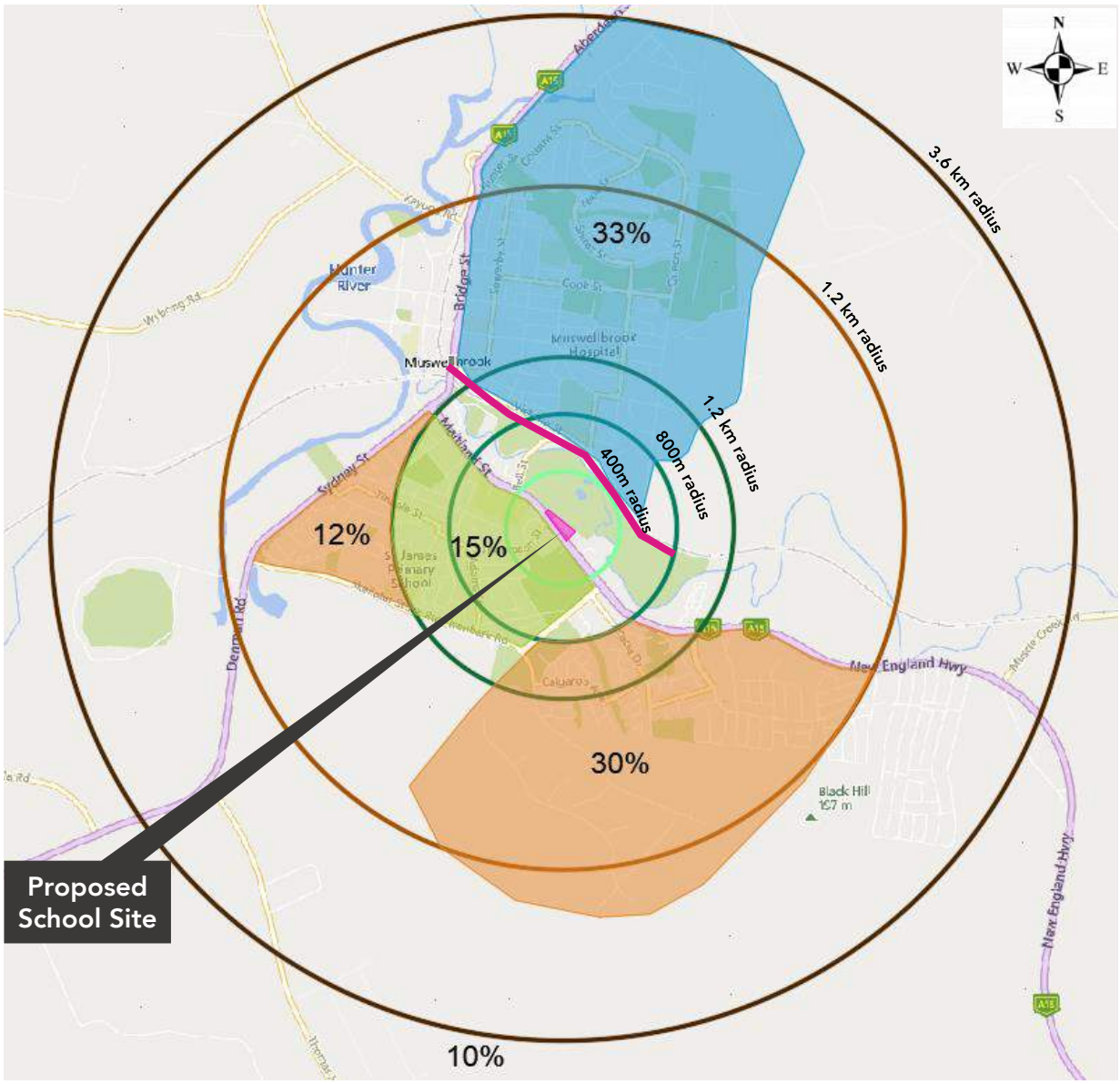


Figure 32 – Walking, Cycling and Public Transport Catchments

© Copyright; **ptc.**

5.3 Existing Travel Mode Share Based on Travel Surveys – Base Case

An online questionnaire was conducted with students and staff (two separate questionnaires). The objectives of the questionnaire are to identify the existing travel behaviour & transport demand and to assist with the post development forecast for traffic modelling purposes.

The survey was active for three weeks in August 2020, which resulted in a total of 47 (100%) student responses and 10 (100%) staff responses.

The survey results are shown below.

5.3.1 Students

The survey responses collected from the student survey (Kindergarten to Year 6) show the existing travel modes to school on a typical morning comprise predominantly 64% car usage (62% with parents and 2% with other family), followed by bus usage (30%) and then walking (4%), as shown in Figure 33.

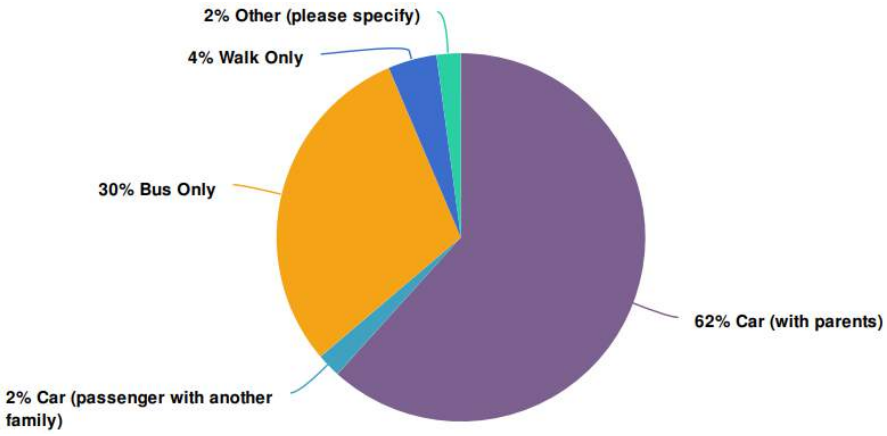


Figure 33 – Surveyed travel mode split for students travelling to school on a typical morning

© Copyright; **ptc.**

The factors that contribute the most to a high proportion of parents who drive their children to school is the multi-purpose use of car (e.g., driving to work), followed by safety and lack of convenient bus stop/train station close to home (refer to Figure 34).

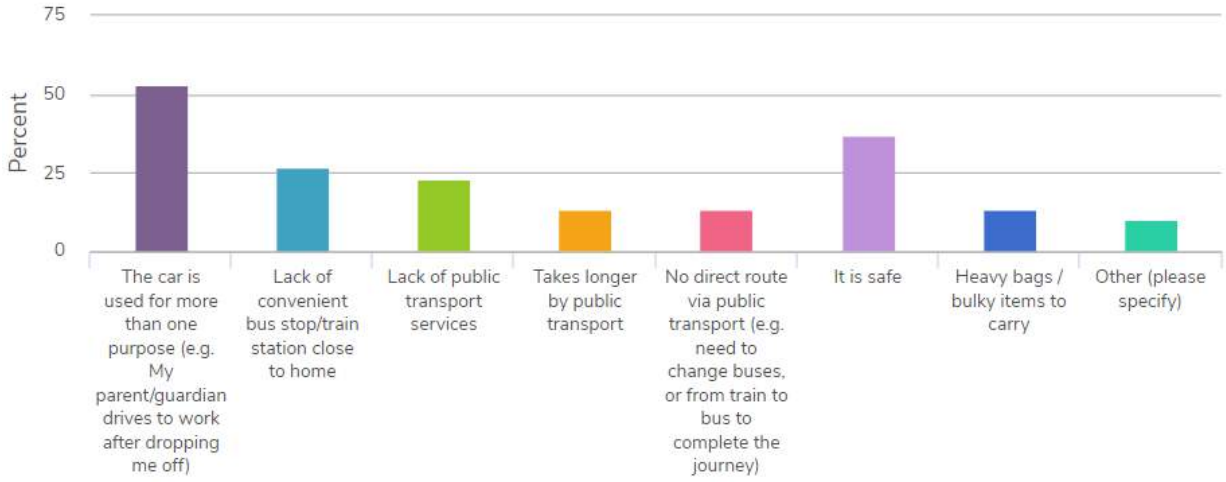
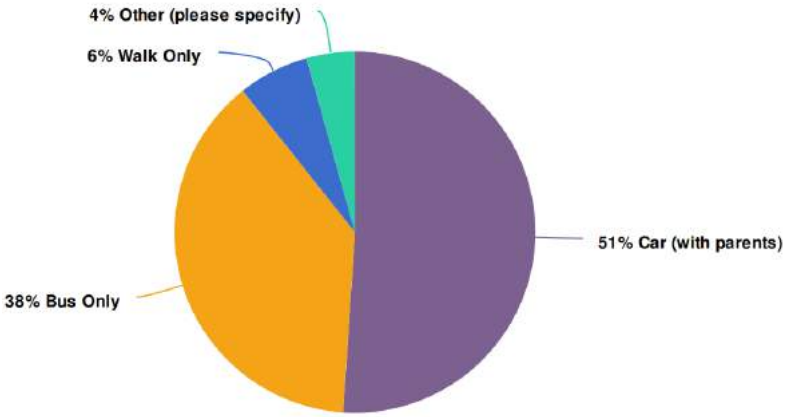


Figure 34 – Typical Reasons for Parents Travelling to School by Car in a typical morning

Surveyed travel mode split for students travelling from school on a typical afternoon is shown in Figure 35. In the afternoon, car usage is still predominant (51%); however, the car usage is reduced by 13%*, while the bus usage increases by 8%* and walking increases by 2%*.



*Compared to the morning mode share

Figure 35 – Surveyed travel mode split for students travelling from school on a typical afternoon

© Copyright; **ptc.**

The factors that contribute the most to a high proportion of parents picking their children up from school by car is safety, followed by the multi-purpose use of car (e.g., driving somewhere else), and a lack of public transport services and convenient bus stop/train station close to home (refer to Figure 36).

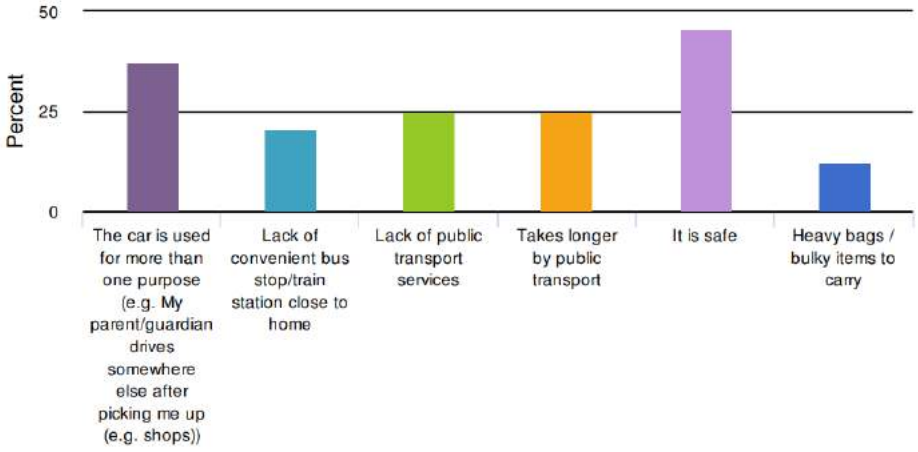


Figure 36 – Typical Reasons for Parents Travelling to School by Car on a typical afternoon

From the survey results, it is found that some cars include more than one student attending the school. Based on the data provided, a weighted car occupancy has been calculated which is 1.62 and 1.71 in the morning and afternoon respectively.

In the morning, out of the students who travel by car, 53% are dropped-off and not accompanied to school, 23% are accompanied to school and 27% are sometimes accompanied to school.

In the afternoon, out of the students who travel by car, all students are picked-up by parents from inside the school.

© Copyright; **ptc.**

5.3.2 Staff

Regarding the travel mode survey for school staff, the results indicate that all staff travel to and from the school by car as driver.

The factors which contribute to all staff driving include the lack of public transport services, the need to carry heavy bags and bulky items (e.g., files and papers), lack of convenient bus stop/train station close to home, as well as the increased journey time associated with travelling by public transport (refer to Figure 37).

This is a good indicator for staff being inclined to use public transport, if the services were convenient.

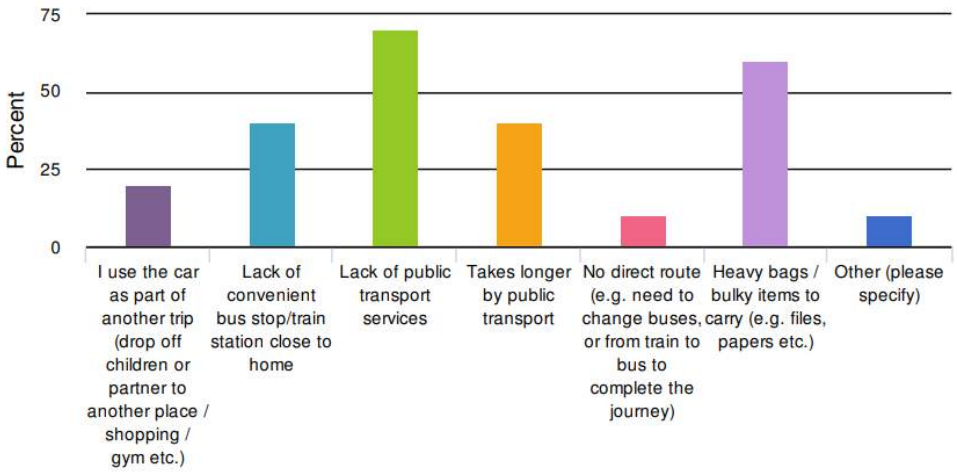


Figure 37 – Typical Reasons for Staff Travelling to School by Car

The survey data indicates that out of all staff, the maximum attendance on a day is 90% and the minimum attendance is 50%. Out of the total staff who attend the school, most of them attend for the whole day.

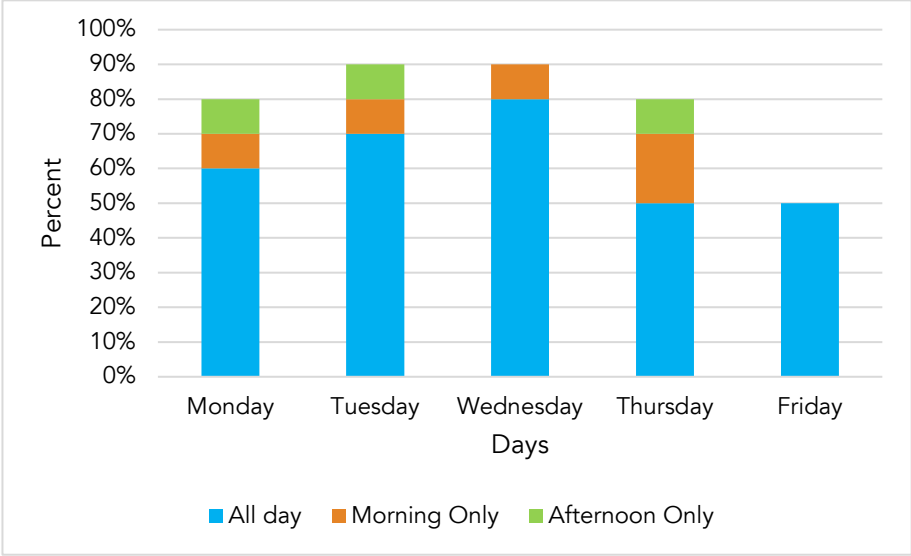


Figure 38 – Staff Attendance on a typical week

© Copyright; **ptc.**

5.4 Potential Travel Mode Share Based on Travel Surveys

The proposal is to relocate the School to a new site within the Muswellbrook area, hence the existing travel modes determined through the online surveys as discussed in Section 5.1 may not be representative of the potential future travel behaviour. Therefore, the survey included questions asking about the likelihood (between "very likely" and "not likely") that a particular transport mode will be chosen at the new location; This is to determine how inclined students / parents / staff would be to walk, cycle or use public transport in the future. The results of these questions are presented below.

5.4.1 Students

The survey results for the new site location indicate the following (also refer to Figure 39):

- Approximately 51% of students are likely or very likely to choose a car as a means of transport to the new site location, and 28% students are neutral about it.

51% of students wanting to use the car aligns with the current car usage in the afternoon

- Approximately 13% of students are likely or very likely to travel as a passenger with another family and 13% students are neutral about it.
- If public bus services and bus stops are provided within a 5-minute walking distance to home/school, approximately 51% students would be likely or very likely to travel on public buses. 17% of students have a neutral opinion.

Currently, approximately 35% of students use public transport, meaning that there is potential to increase this mode share if facilities / services are improved

- If school bus services and bus stops are provided within 5 minutes walking distance to home/school, approximately 70% students are likely or very likely to travel on private school buses. 17% students have a neutral opinion.

The significant difference between the likelihood to use public and private buses may imply that there are safety concerns on public buses. This would align with the main reason why parents currently drive their children to and from school (refer to Figure 36)

Further investigation into ways to improve the perceived safety feeling would be beneficial

- If safe infrastructure and parking/storage facilities are provided, approximately 21% of students are likely or very likely to use scooter or cycle to school. 15% students have a neutral opinion.

This relatively low likelihood to use ridables may be related to the poor cycling infrastructure within Muswellbrook.

- If safe infrastructure and satisfactory connectivity are provided 53% of students are likely or very likely to walk to school. 30% students have a neutral opinion.

This is a very positive trend

© Copyright; **ptc.**

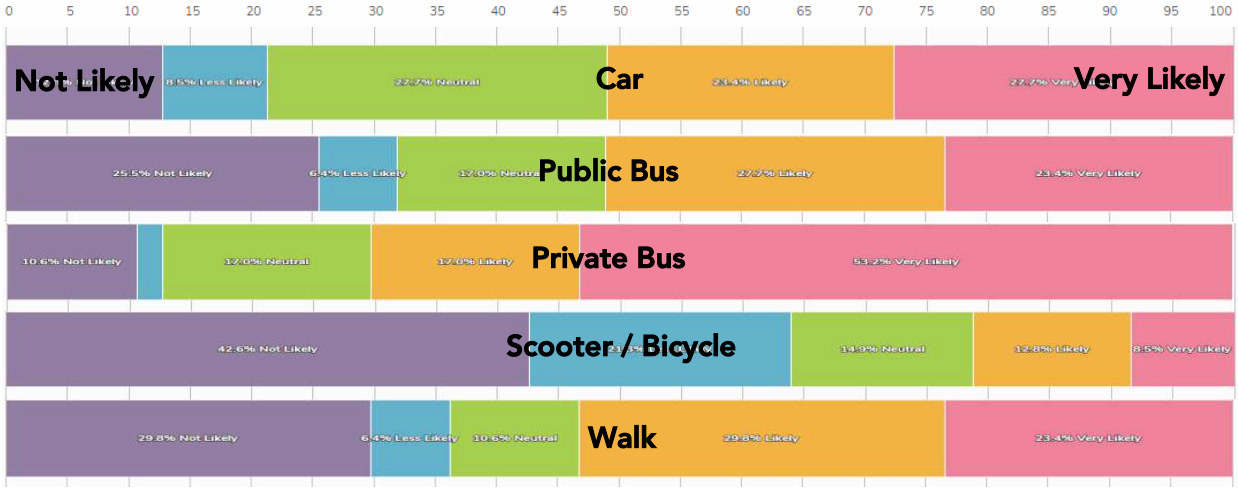


Figure 39 – Potential Travel Mode Share Based on Travel Surveys - Students

5.4.2 Staff

The survey results for the new site location show the following:

- 80% of staff are likely or very likely to choose a car as a means of transport to the new site location. Only 10% of staff have a neutral opinion about travelling to school as a passenger.

This is a strong indication that staff are unlikely to change their travel mode; However, there is a potential to attract 20% of staff to use alternative transport modes

- The vast majority of the staff are less or not likely to use public bus as a means of transport, even if bus stop is located within 5 minutes walking distance to home/school.
- Approximately 20% of staff are likely to use private school buses as a means of transport if bus stop is located within 5 minutes walking distance to home/school. 10% staff have a neutral opinion.

This indicates that some staff would be inclined to use a bus to travel to and from school. It would be beneficial to determine what are the main concerns

- Approximately 20% of staff are likely to use a scooter or cycle to school if safe infrastructure and parking/storage facilities are provided.
- Approximately 50% of staff are likely to walk to school if safe infrastructure and satisfactory connectivity are provided. 10% staff have a neutral opinion.
    - *This is a very positive trend*

© Copyright; **ptc.**

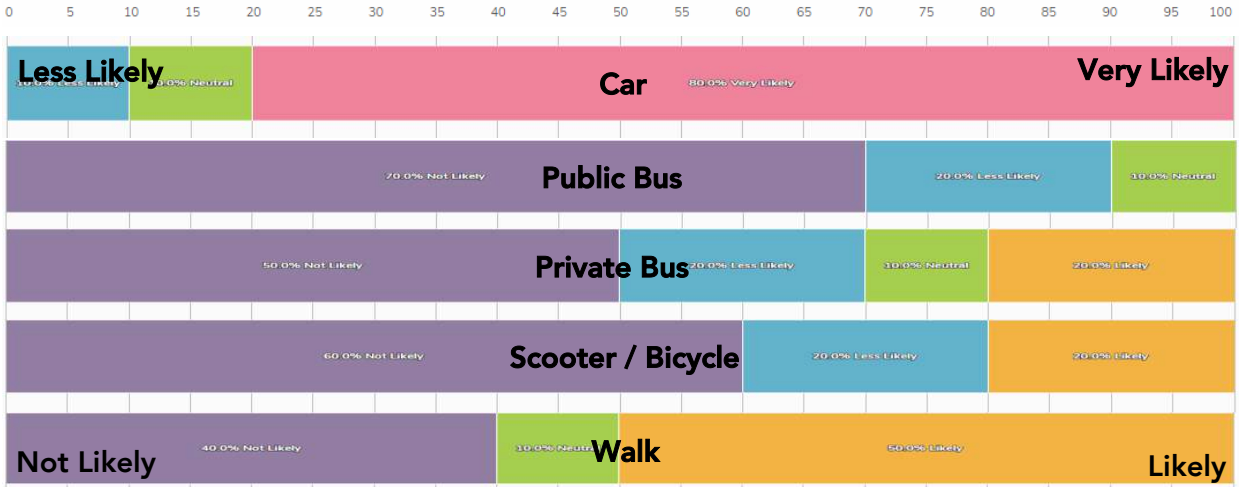


Figure 40 – Potential Travel Mode Share Based on Travel Surveys - Staff

5.5 Travel Modes Summary and Future Target Discussion

Future transport targets can be developed by analysing a variety of different targets, such as those set by the local Council or similar comparable sites. In this case, future travel targets have been developed based on the travel behaviour determined from online surveys and understanding the infrastructure and gaps within the vicinity of the proposed School site.

5.5.1 Students

The following considerations have been made to determine the future transport target for students:

- Based on travel surveys it is understood that currently 5%[1] (refer Section 5.3.1) of students walk to the current School site and approximately 53% (refer Section 5.4.1) of students may walk to the proposed School site if adequate pedestrian infrastructures and connectivity are provided. Based on walking catchments (refer Section 5.2 and Section 5.1), 15% of students live within walking catchment. However, it is not certain that all students within the walking catchment would walk to School, and therefore, a future walking target of 10% has been adopted.
- According to travel surveys, currently no students cycle or scoot, but 21% students feel positive about it if safe infrastructure and parking are provided. The analysis of potential catchments (refer Section 5.2) shows that distance wise it is possible for 42% students to cycle or scoot to school. However, as discussed in Section 4.2.1.2, the lack of active transport infrastructures near the School may not make it safe or possible for all students residing south of Maitland Street to cycle or scoot. Therefore, a future cycling and scooting target of 10% has been adopted.
- Based on travel surveys, currently 34%[2] students use public transport. An analysis on potential target shows that approximately 33% students living in the north are likely to rely on buses. As discussed in

[1] An average of morning and afternoon travel mode

[2] An average of morning and afternoon travel mode

© Copyright; **ptc.**

Section 4.3, the School is proposing to provide a bus stops at the School on Maitland Street. An analysis of potential additional bus stops and bus network improvements has been undertaken and discussions with TfNSW and bus operators are underway to determine if bus stops could be added and specific bus routes extended. Further, the school will promote public transport by implementing the School Transport Plan and providing a Transport Assess Guide. Considering the above, a public transport target of 50% has been adopted.

- Travel surveys shows that currently 58%[3] students use private vehicles to travel and approximately 51% students have indicated that they will continue driving to the proposed school in the future. Based on existing and proposed infrastructure developments, it may be possible to reduce the car usage to 10% (refer Section 5.2); however, it may not be practical. Therefore, a car usage target of 30% has been adopted.

A comparison and summary of all transport scenarios for students is shown in Table 6.

Table 6 – School Transport Scenarios Comparison and Summary for Students

Mode Share	Ideal Case	Potential Target	Existing Base Case[4]	Potential Travel based on Surveys[5]	Target
Walking	15%	15%	5%	~53%	10%
Cycling and Scooting	73%	42%	-	~21%	10%
Public Transport – Bus	(~53%[6])	33%	34%	~61%	50%
Private Vehicles	-	10%	57%	~51%	30%
Carpooling	-	-	1%	~13%	-
Other	-	-	3% (incl. combination of modes)	-	-

[3] An average of morning and afternoon travel mode

[4] Based on online student surveys, an average of morning and afternoon existing travel mode has been adopted for the base case travel analysis

[5] This travel mode based on responses to "How likely are you to choose the following travel modes [e.g., walking, cycling etc.] at the new school location?". The percentages represent the "likely" and "very likely" responses, and therefore, the travel mode share does not add up to a 100%.

[6] Average SSTS catchment for primary and secondary school students

© Copyright; **ptc.**

5.5.2 Staff

The following considerations have been made to determine the future transport targets for staff:

- Travel surveys show that currently all staff drive to the existing School site; However, 20% of staff indicated that they are likely to choose an alternative transport mode to the new School site. As the School will promote alternative transport modes and some staff are positive about using these modes, car usage of 80% is targeted.
- Based on travel surveys it is understood tht currently no staff walk to the existing School site; However, approximately 50% (refer Section 5.4.1) of staff indicated that they may walk to the new School site if adequate pedestrian infrastructure and connectivity are provided. Given the car usage discussed above,, a target of 10% has been adopted.
- According to travel surveys, currently no staff cycle or scoot. However, 20% are positive about cycling and scooting if safe infrastructure and parking are provided. Therefore, a future cycling and scooting target of 5% has been adopted.
- Based on travel surveys, currently no staff use public transport, but 20% indicated that they are positive about using buses if services are provided within a 5-minute walking distance from home / school. Therefore, a future public transport target of 5% has been adopted.

A comparison and summary of all transport scenarios for students is shown in Table 7.

Table 7 – School Transport Scenarios Comparison and Summary for Saff

Mode Share	Existing Base Case	Potential Travel based on Surveys[7]	Target
Walking	-	~50%	10%
Cycling and Scooting	-	~20%	5%
Public Transport – Bus	-	~20%	5%
Private Vehicles	100%	~80%	80%
Carpooling	-	-	-
Other	-	-	-

[7] This travel mode based on responses to "How likely are you to choose the following travel modes [e.g., walking, cycling etc.] at the new school location?". The percentages represent the "likely" and "very likely" responses, and therefore, the travel mode share does not add up to a 100%.

© Copyright; **ptc.**

6. Demand and Design Assessment

6.1 Planning Policy Requirements

The site is identified to be under Muswellbrook Shire Council's *Muswellbrook Local Environment Plan 2009*. In establishing the parking provision requirements, reference is made to the parking provision rates stipulated in the following planning documents.

- *Guide to Traffic Generating Developments*
- *Muswellbrook Shire Development Control Plan 2009 (DCP)*
- *Building Code of Australia 2019*
- *Planning Guidelines for Walking and Cycling (NSW Government 2004)*
- *Austroads Guide to Traffic Management Part 11*

The following sections also outline the minimum parking requirements and discussions around the proposed school development.

The following sections present an assessment of the proposed development with reference to the requirements of AS2890.1:2004 (Off-street car parking), AS2890.2:2018 (Off-street commercial vehicle facilities), AS2890.6:2018 (Off-street parking for people with disabilities) and AS2890.3:2015 (Bicycle parking) and industry best practice.

This section is to be read in conjunction with the architectural plans provided by NBRS Architects shown in **Attachment 1** and **Attachment 2.**

6.2 Proposed School Access

6.2.1 Stage 1

A map showing the access points, car park, pick-up / drop-off areas and the bus stop locations is illustrated in Figure 41. A description of these areas is below.

- In the initial stages, the existing vehicular arrangement will be retained, meaning that all vehicles will enter the site via the northern and exit via southern vehicular driveway (blue arrows).
- The staff and visitor car park will be provided adjacent to the entry driveway (blue area).
- Drop-off / pick-up is proposed to be along the internal laneway (pink line).
- A waste collection area is provided on the east of the buildings, with entry through the northern and exit through the southern driveway (black area and arrows).
- A maintenance area is provided in the north-western corner of the site, with a separate driveway in the northwest, opposite Thompson Street.
- A bus stop is proposed on the eastern side of Maitland Street (orange line), with a direct pedestrian access to the school (green arrow).

© Copyright; **ptc.**

- Two pedestrian gates off Maitland Street are proposed (green arrows); one on the northern corner and another adjacent to the existing vehicle entry only driveway. The gate on the northern corner will provide access to the students walking/cycling from the north, west and south. The gate adjacent to the bus stop will provide access to the students travelling by bus and walking/cycling from the east and southeast. All students travelling by private vehicles will access the site from the internal laneway within the site.

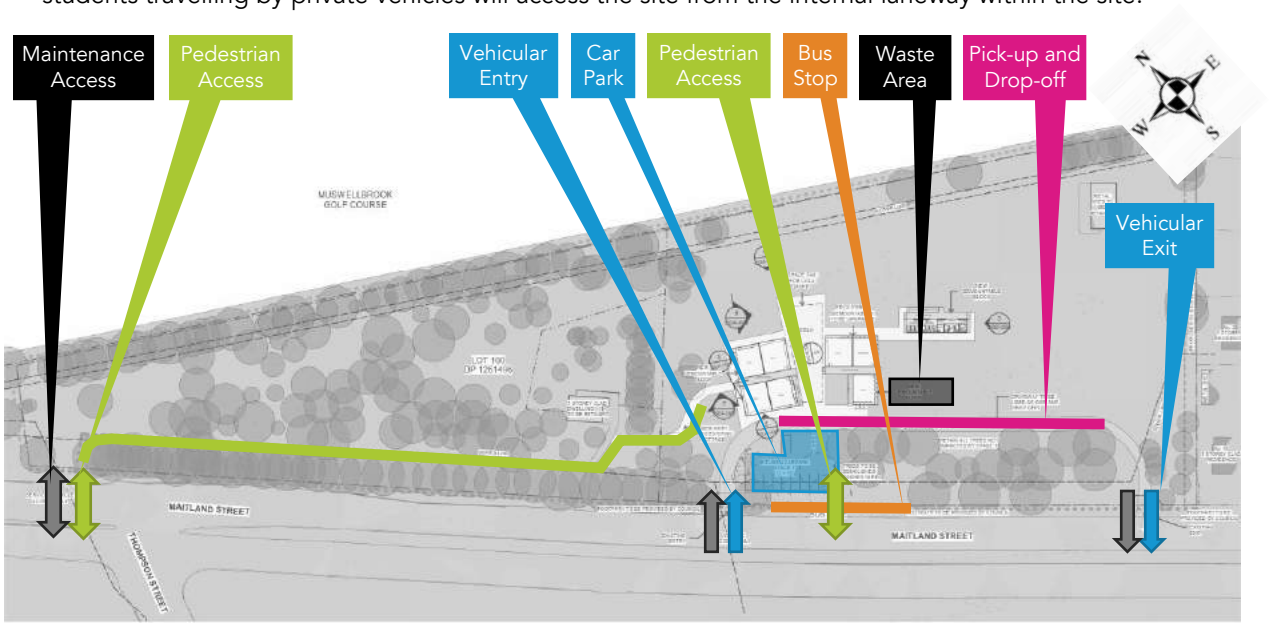


Figure 41 – Stage 1 – School Access Plan

6.2.2 Masterplan

A map showing the access points, car parks, pick-up / drop-off areas and the bus stop locations for the masterplan is illustrated in Figure 42. A description of these areas is below.

- Eventually, it is proposed to combine the main vehicular entry / exit in one gate (blue arrow), to enable more queuing length within the given space. In order to achieve this, the southern driveway will be widened.
- Access will be retained at the current entry gate, but will be restricted to waste, service and maintenance vehicles only. These trucks will exit via the combined entry / exit driveway (black individual arrows).
- The driveway on the northwest corner of the site will continue servicing maintenance vehicles only (black double arrow).
- The staff and visitor car park will be expanded and will extend between the existing entry and exit driveway (blue area). All staff will enter and exit the site via southern driveway.
- Drop-off / pick-up is proposed along the internal driveway (pink line) with all vehicles entering the School via the southern driveway, continuing driving through the staff car park then dropping off / picking up students on the internal laneway. Exit will occur via the southern driveway.

© Copyright; **ptc.**

- A bus stop, is proposed on the eastern side of Maitland Street (orange line), with a direct pedestrian access to the school (green arrow).
- Four pedestrian gates off Maitland Street are proposed (green arrows); first one on the northern corner, second one adjacent to the existing vehicle entry only driveway, third one (main entrance) adjacent to the proposed bus lane and the fourth one on the southern corner. The gate on the northern corner will provide access to students walking/cycling from the north, west and south. The gate adjacent to the bus stop will provide access to students travelling by bus and after hour students/visitors. The gate on the southern corner will provide access to students walking/cycling from the east and southeast.

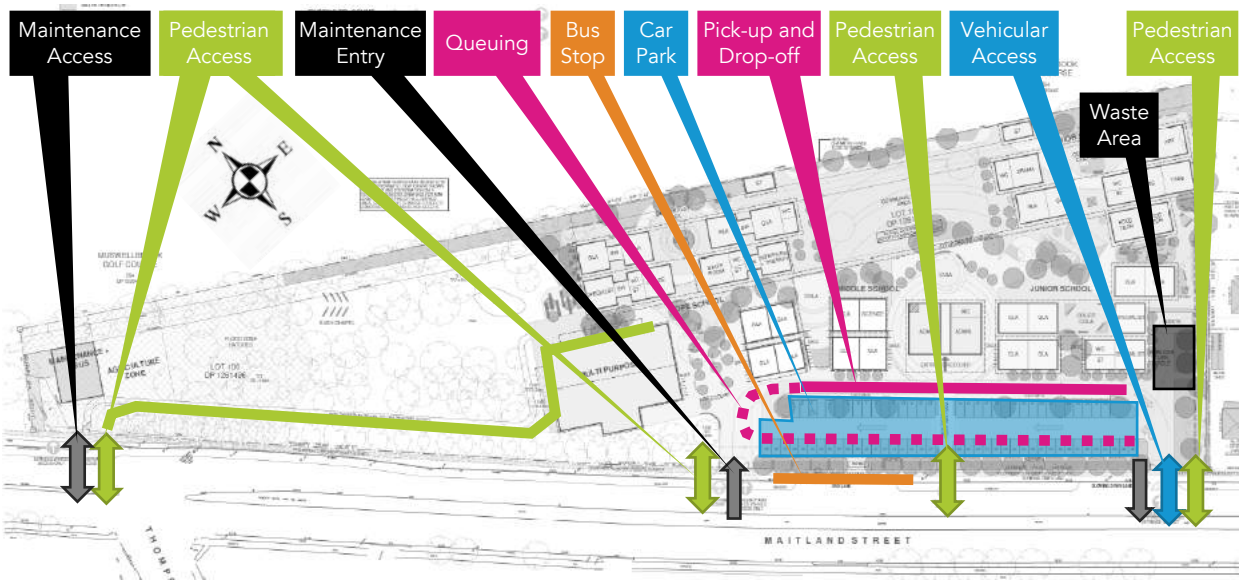


Figure 42 – Masterplan – School Access Plan

© Copyright; **ptc.**

6.3 Pedestrian Access

6.3.1 Stage 1

As shown in Figure 43, 2 pedestrian access gates are proposed along the site frontage of Maitland Street. The following considerations have been made:

- As discussed in Section 4.2, there is currently no pedestrian connectivity to the site. However, as discussed in Section 3.4, the signalisation of Maitland Street / Thompson Street has recently been approved and works are anticipated to commence in approximately 6 months. This intersection will provide pedestrian crossings on all approaches.
- Given the above, the school is proposing to provide a pedestrian gate just off this intersection to enable students to enter the school site immediately after they cross Maitland Street. An internal path will be provided to prove connectivity to the school's buildings. This has been incorporated so that students do not need to walk along Maitland Street, which currently does not have a footpath on the northern side.
- A further pedestrian gate is proposed near the bus stop to enable students direct entry from public transport, where students do not need to cross a driveway to enter the school.

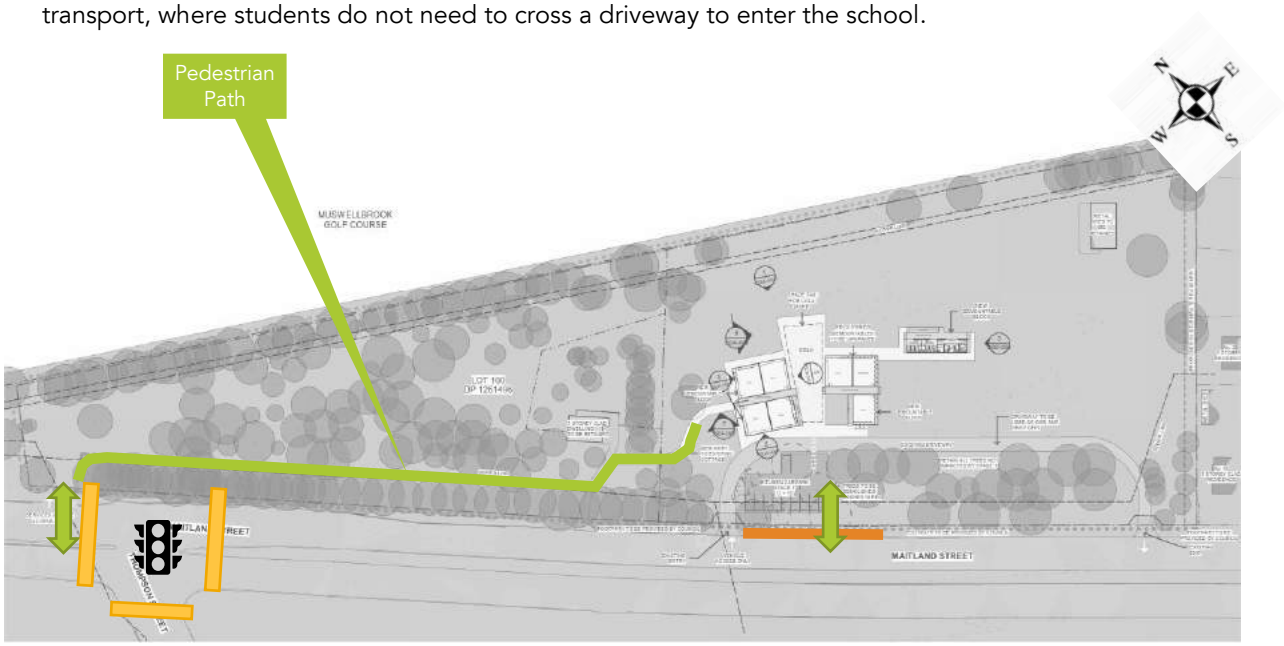


Figure 43 – Pedestrian Acess – Stage 1

© Copyright; **ptc.**

6.3.2 Masterplan

As shown in Figure 44, 4 pedestrian access gates are proposed along the site frontage of Maitland Street. The following considerations have been made:

- It is proposed to retain the access off Maitland Street / Thompson Street intersection, as this provides a safe access for students.
- The middle access will be relocated further south; However, it will retain its function of providing direct access for students using public transport.
- An additional gate on the southern side is being proposed to provide a more direct access for students arriving from this direction. The functionality of this gate is reliant on the provision of a footpath as shown in Figure 11 on page 29. However, once provided, students arriving at the school will be able to enter the site without crossing the school driveway or the car park.

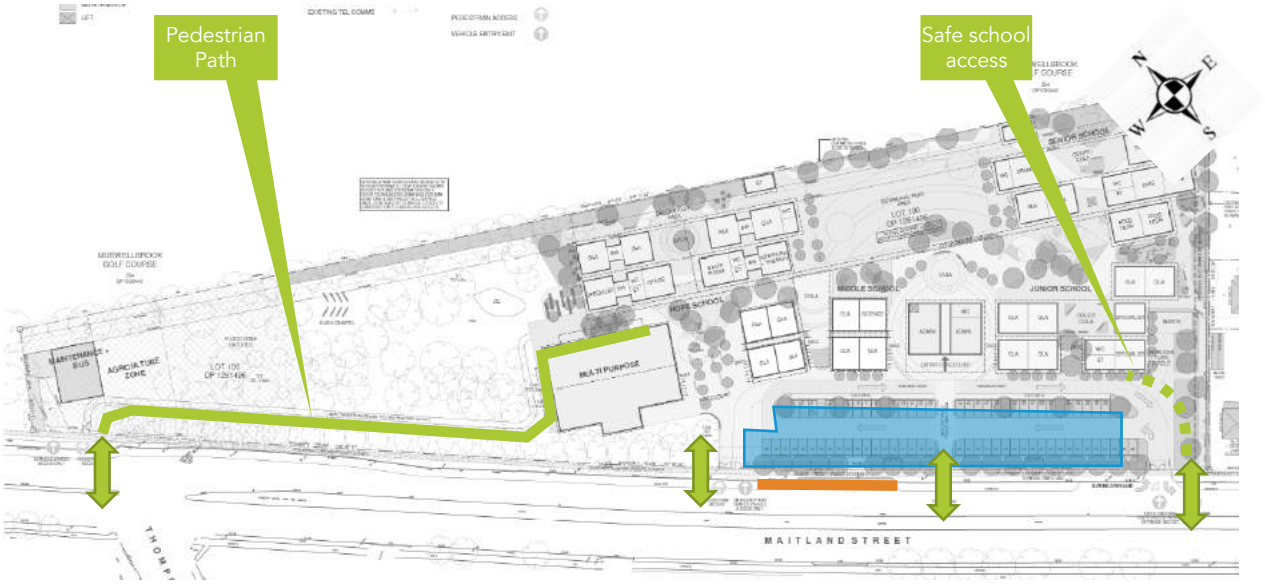


Figure 44 – Pedestrian Acess – Masterplan

© Copyright; **ptc.**

6.4 Bicycles and Scooters

6.4.1 Demand Assessment

The DCP does not stipulate any bicycle parking rates for educational establishments, hence, reference is made to *NSW Planning Guidelines for Walking & Cycling 2004* and *Austroads Guide to Traffic Management Part 11* which outlines the bicycle parking requirement for staff and visitor, and students respectively for both primary and secondary school. The bicycle parking requirement and provision for Stage 1 and Masterplan are summarised in Table 8 and Table 9 respectively.

Bicycle parking facilities shall be designed to comply with AS 2890.3:1993.

6.4.1.1. Stage 1

Table 8 – Bicycle Parking Requirement and Provision for Stage 1

User Group	Number	Bicycle Parking Provision Rate	Bicycle Parking Requirement	Bicycle Parking Provided
Planning Guidelines for Walking and Cycling				
Staff	16	3-5% staff (long-term use)	**1 space**	12
Visitor		5-10% staff (short-term use)	**1 – 2 spaces**	
Austroads Guide to Traffic Management				
Primary School Students	77 (Approx. 22 Year 5 & Year 6)	1 space for 5 students over Year 4	5 spaces	
Secondary School Students	Approx. 66 students in Year 7 - 12	1 space for 20 students	4 spaces	
TOTAL			**11 spaces**	**12**

Based on the planning guidelines the project requires 1 bicycle space for staff, 1-2 bicycle spaces for visitors and 9 spaces for students. The proposal is to provide a total of 12 bicycle spaces in the form of 6 hoops / bike racks for staff, visitors and students, thus satisfying the requirement.

It is noted that 21% of students indicated that they are likely or very likely to use scooters or bicycles to commute to and from the proposed school location. With a total of 140 students, this equates to 29 that may want to cycle. The school will monitor the utilisation of bicycles and will provide more bike spaces if the demand picks up.

Due to the low bicycle facility provision for staff, it is proposed to provide all 12 spaces in the form of 6 hoops.

© Copyright; **ptc.**

6.4.1.2. Masterplan

Table 9 – Bicycle Parking Requirement and Provision for Masterplan

User Group	Number	Bicycle Parking Provision Rate	Bicycle Parking Requirement	Bicycle Parking Provided
Planning Guidelines for Walking and Cycling				
Staff	65	3-5% staff (long-term use)	**2 – 4 spaces**	72
Visitor		5-10% staff (short-term use)	**4 – 7 spaces**	
Austroads Guide to Traffic Management				
Primary School Students	353 (Approx. 101 Year 5 & Year 6)	1 space for 5 students over Year 4	20 spaces	
Secondary School Students	303	1 space for 20 students	15 spaces	
TOTAL			**35 spaces**	**72**

Based on the planning guidelines the project requires 2-4 bicycle spaces for staff, 4-7 bicycle spaces for visitors and 35 spaces for students. The proposal is to provide a total of 72 bicycle spaces in the form of 36 hoops / bike racks for staff, visitors and students, thus providing more spaces than required.

It is noted that 21% of students indicated that they are likely or very likely to use scooters or bicycles to commute to and from the proposed school location. With a total of 656 students, this equates to 138 that may want to cycle. The school will monitor the utilisation of bicycles and will provide more bike spaces if the demand picks up.

The school will look into providing weather protected and lockable storage areas for staff bicycle spaces in the future.

6.4.2 End of Trip Facilities

The *NSW Planning Guidelines for Walking & Cycling 2004* also stipulate a requirement for personal lockers, showers and change rooms for staff bicycle parking facilities. The requirements and provisions are summarised in Table 10 and Table 11 respectively.

Table 10 – Lockers for Staff Requirement and Provision

Stages	Racks	Lockers Provision Rate	Lockers Requirement	Lockers Provided
Stage 1	1	1 locker for 3 bicycle racks	0	0
Masterplan	4	1 locker for 3 bicycle racks	1	TBC

© Copyright; **ptc.**

Table 11 – Showers Requirement and Provision

Stages	No. of Staff	Shower Provision Rate	Showers Requirement	Showers Provided
Stage 1	16	- 1 shower for 0 up to 12 staff - 2 (1 male and 1 female) showers for 13 up to 49 staff - 4 (2 male and 2 female) showers for 50 up to 149 staff	2	1 unisex
Masterplan	65		4 (2 male and 2 female)	TBC, but 4 can be accommodated

Table 12 – Change Rooms Requirement and Provision

Stages	No. of Staff	Change Cubicle Provision Rate	Change Rooms Requirement	Change Rooms Provided
Stage 1	16	- 1 change cubicle for 0 up to 12 staff - 2 (1 male and 1 female) change cubicles for 13 up to 500 staff	2 (1 male and 1 female)	1 unisex
Masterplan	65		2 (1 male and 1 female)	TBC, but 2 can be accommodated

The project is targeting a 20% uptake in non-private vehicle transport, meaning that potentially 3 staff members would take public transport, cycle or walk. Therefore, the provision of 1 unisex shower for Stage 1 is deemed appropriate to cater for the anticipated usage.

The provision for the master plan stage will be determined in due course.

6.4.3 Location

Bicycle parking location for Stage 1 and the Masterplan ais shown in Figure 45 and Figure 46 respectively.

When determining the ideal location for the bike racks, the following has been considered:

- Proximity to the entries
- Passive surveillance
- Potential to increase the provision if the demand increases.

© Copyright; **ptc.**

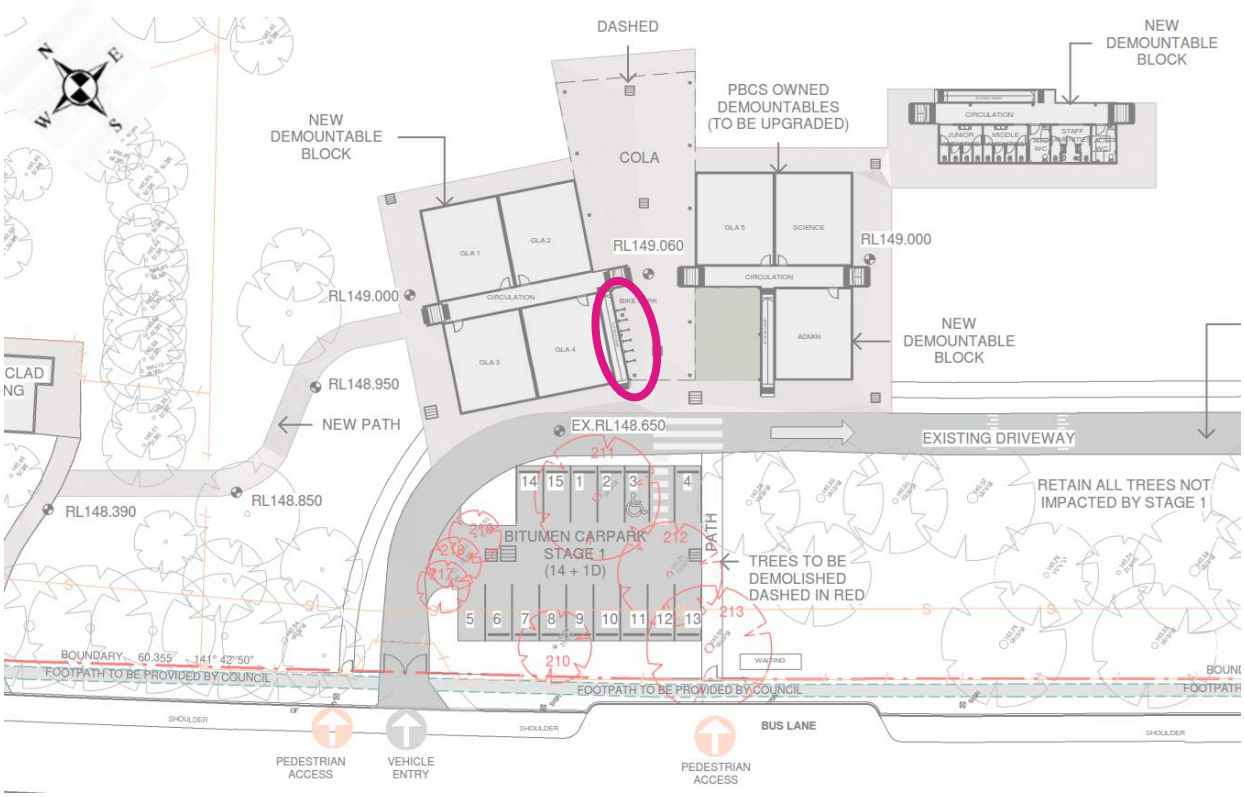


Figure 45 – Bicycle parking location – Stage 1

Figure 46 – Bicycle Parking Location – Masterplan

© Copyright; **ptc.**

6.4.4 Bicycle Parking

The *NSW Planning Guidelines for Walking & Cycling 2004* outlines that the bicycle parking facilities be provided in accordance with Australian Standards AS 2890.3:1993, which means providing class 2 bicycle lockers for staff/employees and that Class 3 bicycle rails for visitors.

Due to the low bicycle facility provision for staff in Stage 1, it is proposed to provide all spaces in the form of rails. As the school grows, staff bicycle racks will be provided in a lockable, weather protected cage, in accordance with the DCP. Spaces for students and visitors will be provided in form of rails.

Bicycle spaces shall be provided according to the standards, where a parking space envelope has the dimensions of 1.8m x 0.5m and an aisle of 1.5m is provided. An assessment of bicycle parking areas is provided in **Attachment 4** for stage 1 and **Attachment 5** for the Masterplan.

To increase the active transport component, additional scooter parking will be provided as per Figure 47 or similar.

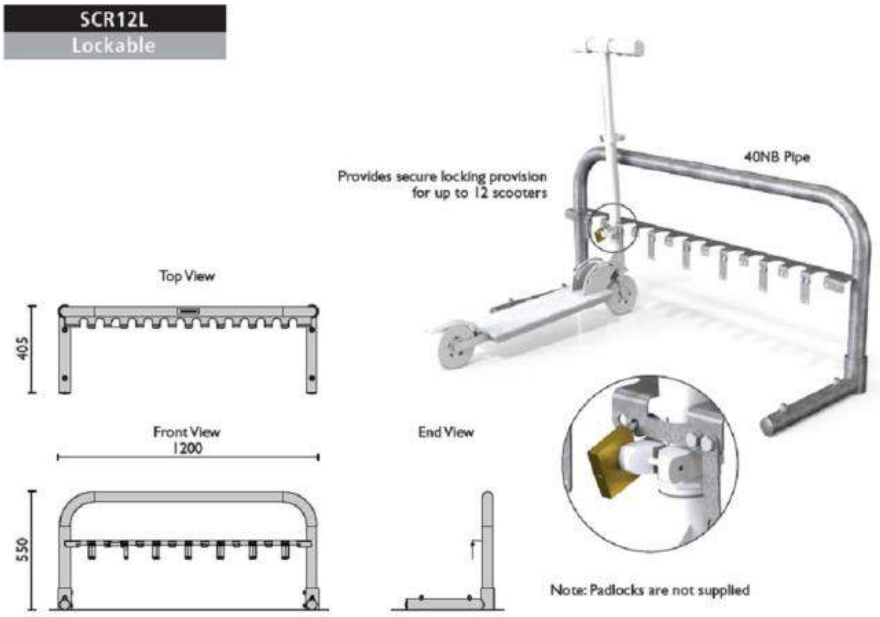


Figure 47 – Scooter Parking

© Copyright; **ptc.**

6.5 Bus Stop

Section 16.6 of the DCP stipulates that "*Where required by Council, provision shall be made for the access and parking of buses and pick up – drop off areas, which may only need to operate during certain hours.*" In response, the planning is to provide an indented bus bay within Maitland Street on the School frontage. The bus bay will provide space to accommodate up to 2 buses at a time. A pedestrian path will provide direct access between the bus stop and the School.

The school will look into providing students and parents with updated information on bus routes and timings as part to encourage students to use public transport as a way to travel to and from school.

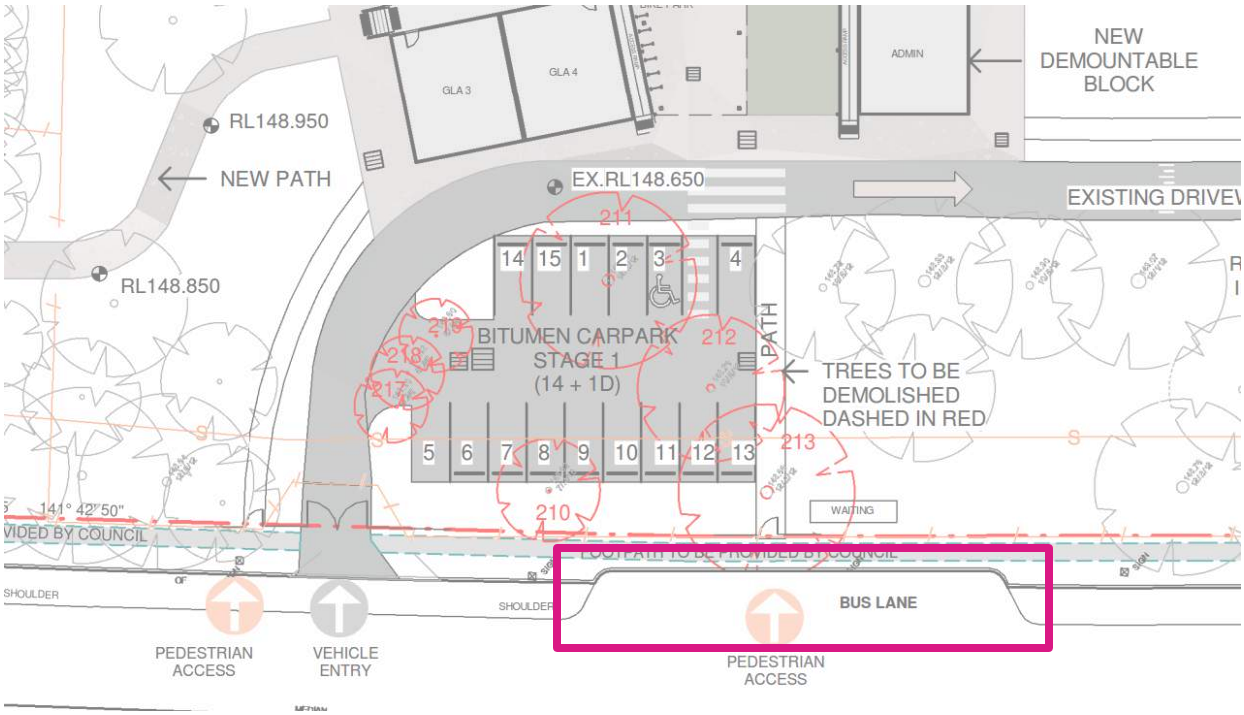


Figure 48 – Proposed Bus Bay

6.6 School Zone

A School Zone is proposed according to the requirements of "*RTA TD 2003/RS02 Installation of 40km/h School Zones on Multi-lane Roads and High Speed Roads (TD 2003/RS02)*".

The *TD 2003/RS02* mentions the following requirement for multi-lane roads of 70km/h or less:

- *School zone installations on multi-lane roads of 70km/h or less should be a minimum of 200m.*
- *Where possible the school zone should be installed such that the point at which most students enter and leave the school is centred within the school zone.*

From Section 6.3, it is understood that 2 pedestrian access gates will be provided along Maitland Street. As pedestrian Gate 1 is proposed to be located near the northern boundary of the site, it is proposed that the School Zone be extended 100m north from Gate 1 along Maitland Street and 100m south from Gate 1 along

© Copyright; **ptc.**

Thompson Street. Since, pedestrian Gate 2 is not located near the site boundaries, it is proposed that the School Zone be extended only 50m south from the site boundary on the southern side. The School Zone along Maitland Street is proposed to be approximately 470 meters long.

It is proposed that the School Zone signage with flashing lights be provided along Maitland Street and Thompson Road to alert drivers of the change in speed limit. In light of this, it is recommended that TfNSW install the School Zone to ensure that it is clear to all drivers travelling along the frontage roads.

The School Zone signs and markings to be installed according to the requirements of *TD 2003/RS02.*

The School Zone recommendation is visually presented in Figure 49.

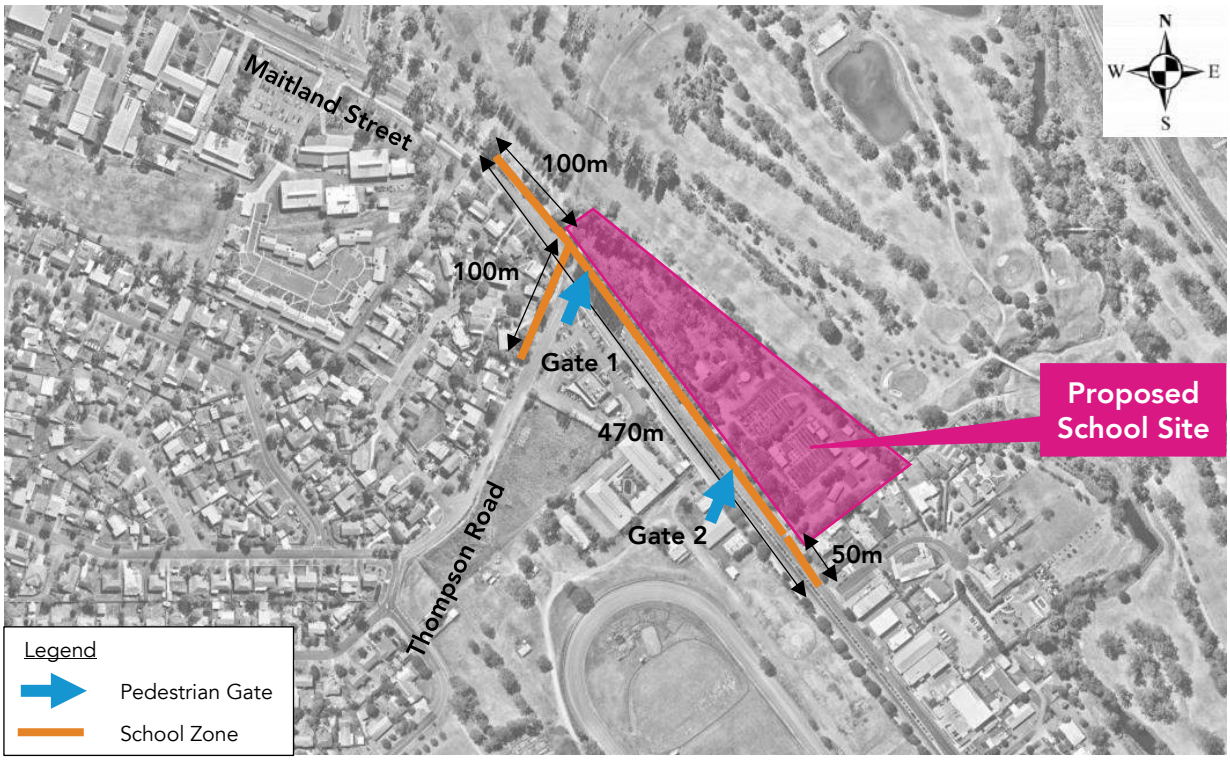


Figure 49 – School Zone

© Copyright; **ptc.**

6.7 Pick-up and Drop-off

6.7.1 Arrangement

Section 16.6 of the DCP stipulates the requirement for a drop off / pick up area for education facility. The pick / drop-off is proposed to be provided within the site boundary on the internal roadway. A figurative location is shown in Figure 50.

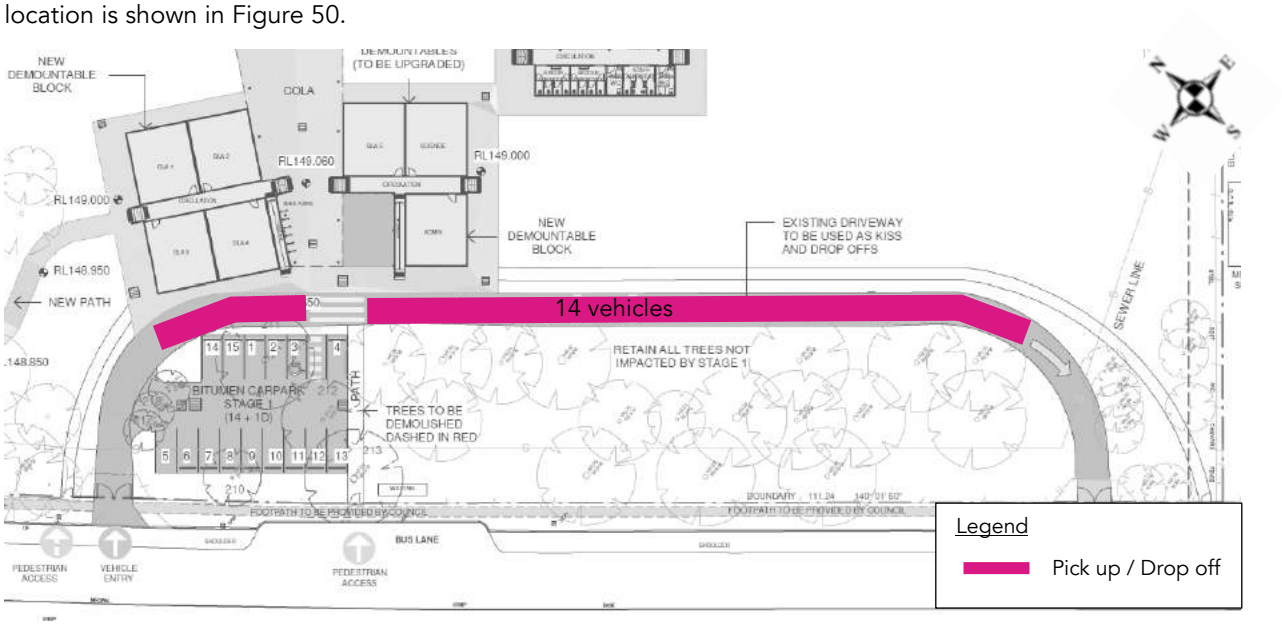


Figure 50 – Pick-up and Drop-off Arrangement

6.7.2 Queuing Options

A queuing analysis has been undertaken to demonstrate the ability of the site to contain all traffic generated by the proposal, and to determine required mitigation measures and trigger points.

As discussed in Section 6.2, there are two access options which result in varying queuing lengths within the site.

All vehicles will enter the site via Maitland Street and both the inbound and outbound movements into/from the site will be left in and left out only.

- At Stage 1, all vehicles will enter the School via the northern entry driveway, drop-off / pick-up the students within the internal laneway and exit via the southern exit only driveway. This layout results in a capacity of approximately 20 vehicles (refer to Figure 51).
- At the Masterplan Stage, all vehicles will enter and exit the site via the southern driveway; An island and line marking will be provided to separate the inbound and outbound lanes. Upon entering the site, all vehicles will drive along the staff car park, drop-off / pick-up the students within the internal laneway and exit the site via the driveway. This results in a capacity of approximately 40 vehicles (refer to Figure 52).

The pick-up and drop-off lane will be restricted to a one-way circulation during both stages.

© Copyright; **ptc.**

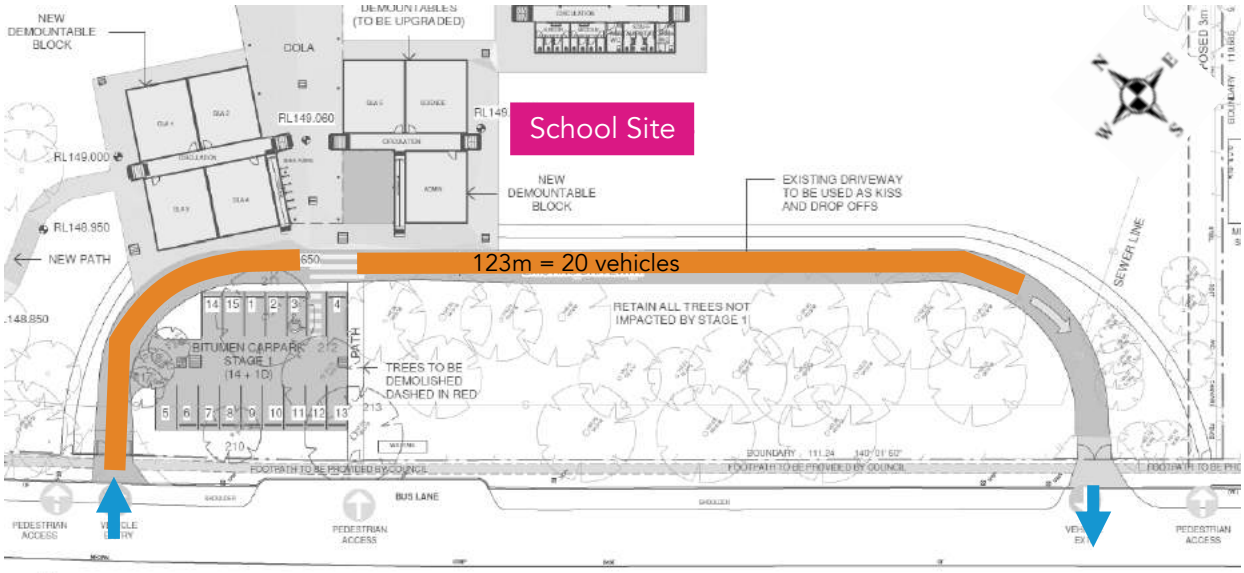


Figure 51 – Stage 1 – Separate Entry / Exit

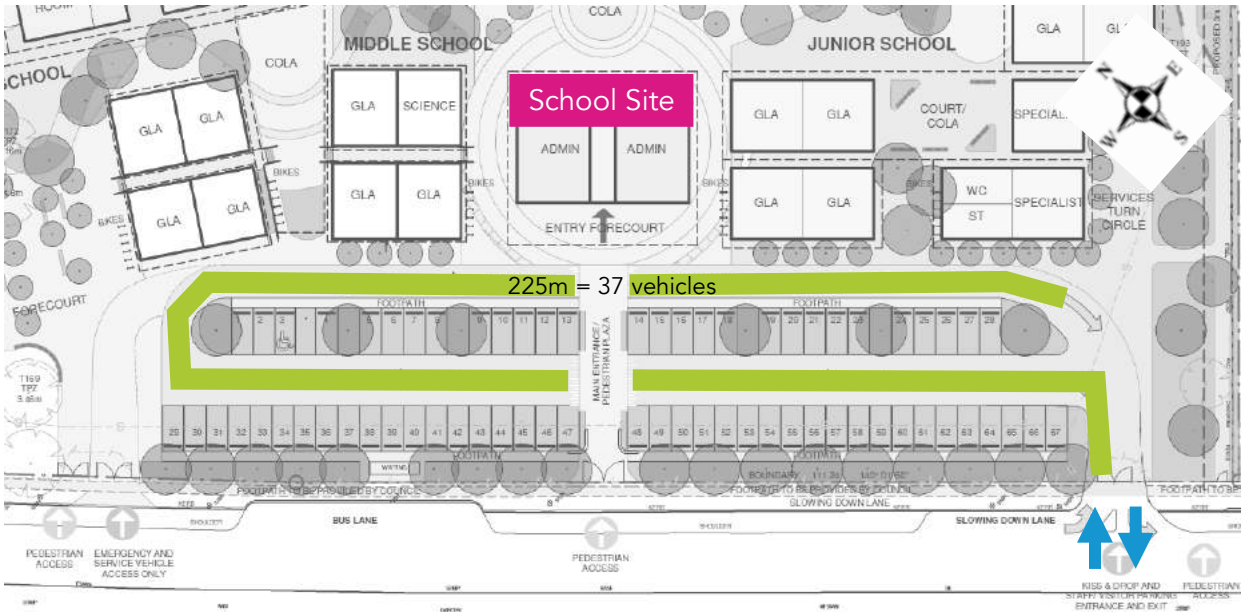


Figure 52 – Masterplan – Combined Entry / Exit

© Copyright; **ptc.**

6.7.3 Demand / Queuing Analysis

The development is proposing to provide an approximately 14 space long pick-up and drop-off area along the internal road, with additional queuing space provided within the car parking aisle. The Poisson distribution has been used to assess the required number of pick-up and drop-off spaces and the potential of queuing. The following factors have been considered based on previous experience:

- Pick-up and drop-off activity occurs within a 30 minute time period per bell time;
- Generally, more students are driven to school in the morning than from school in the afternoon;
- The morning drop-off activity generates less congestion and the drop-off itself occurs faster;
- The afternoon pick-up often generates queuing due to the following reasons:
    - Parents arrive early and block pick-up spaces;
    - It takes time for students to find the correct car;
- Dwell times in the morning have been found to vary between 15-30 seconds per car and in the afternoon 45-210 seconds per car. The large discrepancy in the afternoon is related to the grade of pick-up management.

The Poisson distribution has been used to determine the likelihood of queuing depending on the number of cars, time period, dwell times and number of spaces available. With 14 pick-up and drop-off spaces and the factors described above, the following number of vehicles could theoretically be serviced without generating a queue:

- 1,000 (15 sec dwell time) – 500 (30 seconds dwell time) vehicles in the morning drop-off;
- 350 (45 seconds dwell time) – 75 (210 seconds dwell time) vehicles in the afternoon pick-up.

Usually, car occupancy ranges between 1.2 and 1.8 students per car. Applying these rates to the number of potential vehicles, the following number of students could theoretically be dropped-off in the morning and picked-up in the afternoon:

- 1,200 up to 1,800 (15 sec dwell time) – 600 up to 900 (30 seconds dwell time) students in the morning;
- 420 up to 630 (45 seconds dwell time) – 90 up to 135 (210 seconds dwell time) students in the afternoon.

The above numbers take into account a single bell time and no before and after school activities. Considering that a pick-up and drop-off activity occurs within a 30 minute time period, bell times staggered at 15 to 30 minutes intervals can reduce the traffic activity by half (2 bell times) or two-thirds (3 bell times).

A calculation of the pick-up and drop-off demand for different scenarios and for both the masterplan and Stage 1 are presented in Table 13. The scenarios comprise the following variables:

- Staggered increase of students numbers, starting with 140 students for stage 1 and finishing with 656 students during the masterplan stage
- One, two and three bell times;
- Reduced car usage in favour of public and active transport;

© Copyright; **ptc.**

- Student attendance of before and after school activities;
- A 210s long dwell time;

The colours presented in the table reference which internal pick-up and drop-off arrangement as discussed in Section 6.7.2 is required / is acceptable. For scenarios with numbers with an orange background it is assumed that a separate driveway as shown in Figure 51 is sufficient to accommodate the anticipate pick-up and drop-off generation. For scenarios with numbers with a green background it is assumed that the driveway needs to be combined as shown in Figure 52 in order to achieve a longer queuing within the site. Scenarios with numbers with a grey background are not acceptable from a queuing perspective.

Table 13 – Queuing assessment for potential future travel characteristics

		Stage 1 → Masterplan					
Total number of students (up to)		140	250	350	450	550	656
Scenario 1a: 1 bell time 100% of students use private transport No before and after school activities							
Number of cars (assumed car occupancy of 1.2 students per car)		117	208	292	375	458	542
Modelled queue length using Poisson distribution	spaces	30	40	50	60	65	80
	metres	180	240	300	360	390	480
Scenario 1b: 1 bell time 70% of students use private transport, 30% walk, cycle or use public transport 10% of students attend before and after school activities							
Number of students driven		88	158	221	284	347	410
Number of cars (assumed car occupancy of 1.2 students per car)		74	131	184	236	289	341
Modelled queue length using Poisson distribution	spaces	20	30	35	45	50	55
	metres	120	180	210	270	300	330
Scenario 2a: 2 bell time 100% of students use private transport No before and after school activities							
Number of students driven per bell time		70	125	175	225	275	325
Number of cars (assumed car occupancy of 1.2 students per car)		58	104	146	188	229	271
Modelled queue length using Poisson distribution	spaces	15	25	30	35	40	45
	metres	90	150	180	210	240	270
Scenario 2b: 2 bell times 70% of students use private transport, 30% walk, cycle or use public transport 10% of students attend before and after school activities							
Number of students driven per bell time		44	79	110	142	173	205
Number of cars (assumed car occupancy of 1.2 students per car)		37	66	92	118	144	171
Modelled queue length using Poisson distribution	spaces	10	15	20	25	30	35
	metres	60	90	120	150	180	210

© Copyright; **ptc.**

Scenario 3a: 3 bell times 100% of students use private transport No before and after school activities							
Number of students driven per bell time		47	83	117	150	183	217
Number of cars (assumed car occupancy of 1.2 students per car)		39	69	97	125	153	181
Modelled queue length using Poisson distribution	spaces	10	15	20	25	30	35
	metres	60	90	120	150	180	210
Scenario 3b: 3 bell times 70% of students use private transport, 30% walk, cycle or use public transport 10% of students attend before and after school activities							
Number of students driven per bell time		29	53	74	95	116	137
Number of cars (assumed car occupancy of 1.2 students per car)		25	44	61	79	96	114
Modelled queue length using Poisson distribution	spaces	10	15	15	20	20	25
	metres	60	90	90	120	120	150

For Stage 1, the school is targeting Scenario 1b (circled in pink) with the following characteristics:

- Retention of the existing entry / exit arrangements
- 1 bell time
- 30% of students would use alternative transport modes

It is acknowledged that queuing generated by the pick-up and drop-off activity onto Maitland Street is unacceptable and that preventative measures need to be implemented. Therefore, the school is proposing to implement measures if and when required to reduce car usage and manage school related traffic within the school boundaries. The following strategies are being considered:

- Strict pick-up and drop-off management to reduce the dwell times and therefore the possibility of queuing. Such an arrangement is already in place and works well at other Pacific Group schools;
- Introduction of staggered bell times at later stages, which already is common practice at other Pacific Group schools. It is envisaged that the staggering would occur based on the year groups, see the examples below:
    - One bell time: K-12
    - Two bell times: K-6 7-12
    - Three bell times: K-6 7-9 10-12

    The school will provide care for students who either arrive early in the morning or need to wait for their siblings in the afternoon due to the staggered bell time arrangement.
- Implementation of before and after school activities / care for students who wish to enrol in additional activities or need to be cared for before or after the school;

© Copyright; **ptc.**

- The school is proposing to provide a bus stop along Maitland Street outside the school boundary to provide an opportunity for students to use public transport;
- The school is looking to discuss with TfNSW:
    - The possibility to amend the existing school bus network to service the new school location in discussion with the current bus operators;
    - The option for TfNSW to provide an additional public bus stop in the vicinity of the school and to potentially amend the public bus routes;
- Pedestrian access points have been set out such that students do not need to cross the driveway upon entry / exit from the school. The school is providing a footpath connection from school buildings to the Maitland Street / Thompson Street intersection, which is currently in the process of being signalised;
- Provision of cycle facilities on site;
- Implementation of a Green Travel Plan (in form of a School Transport Plan), which will include programs to promote active and public transport;
- Staff will arrive prior to the main drop-off time and depart following the main pick-up time to minimise conflicts and to spread the vehicular movement over a longer period of time.

6.8 Car Parking

6.8.1 Demand Assessment

6.8.1.1. General Car Parking

Section 16.6 of the DCP stipulates minimum car parking rates for educational establishments. The car parking requirements and provisions for Stage 1 and Masterplan are summarised in Table 14 and Table 15 respectively.

Table 14 – Car Parking Requirement and Provision for Stage 1

User Group	Level	No.	Minimum Car Parking Provision Rate	Minimum car parking requirement	Car parking provided
Staff	-	16	1 space per 2 employees	8	13
Visitor	-	-	-	-	2
Student	Primary School	75	1 space per 12 students	6.3	-
	Secondary School	65	1 space per 10 students	6.5	-
Pick-up and Drop-off		140	-	-	20
			Total	**21[8] (20.8)**	**15 parking spaces + 20 pick-up and drop-off queuing**

[8] According to the DCP, the total number of parking spaces is rounded to the next highest whole number

© Copyright; **ptc.**

During Stage 1, it is anticipated that the school will have 16 staff, which results in a minimum requirement of 8 car parking spaces based on the DCP. The project is aiming to target 80% car use amongst staff (refer to Section 5.5.2) and therefore, a demand of 13 car spaces is anticipated. The proposal is to provide 13 spaces for staff.

According to the DCP, the development requires to provide 13 parking spaces for students. The school is proposing to provide space for up to 20 vehicles for the purpose of pick-up and drop-off for students. A strictly managed pick-up and drop-off will be implemented, where parents would not be allowed to leave the car. The proposed provision of 2 visitor spaces can be used by parents who need / wish to accompany their children to / from the school.

It is noted that the Department of Education's parking policy[9] outlines that *"A school is not obliged to provide parking on site to anyone at any time."*

The proposal is to provide 15 car spaces, which would be used by staff (13 spaces) and visitors (2 spaces). Considering all the above, the proposed car park is considered to meet the demand of the school.

Table 15 – Car Parking Requirement and Provision for the Masterplan

User Group	Level	No.	Minimum Car Parking Provision Rate	Minimum car parking requirement	Car parking provided
Staff	-	65	1 space per 2 employees	32.5	52
Visitor	-	-	-	-	13
New Hope School	-	-	-	-	2*
Student	Primary School	353	1 space per 12 students	29.4	-
	Secondary School	302	1 space per 10 students	30.2	-
Pick-up and Drop-off		656	-	-	37
			Total	**93[10] (92.1)**	**67 parking spaces + 37 pick-up and drop-off queuing**

*special needs spaces, as required by the school

For the masterplan, it is anticipated that the School will have 65 staff, which results in a minimum requirement of 33 car spaces based on the DCP. The project is aiming to target an 80% car use amongst staff (refer to Section 5.5.2) and therefore, a demand of 52 car spaces is anticipated. The proposal is to provide 52 spaces for staff.

According to the DCP, the development requires to provide 61 car spaces for students. The school is proposing to provide space for up to 37 vehicles for the purpose of pick-up and drop-off for students. A strictly managed pick-up and drop-off will be implemented, where parents would not be allowed to leave the

[9] https://education.nsw.gov.au/teaching-and-learning/curriculum/learning-across-the-curriculum/road-safety-education/safe-travel/parking-on-school-grounds

[10] According to the DCP, the total number of parking spaces is rounded to the next highest whole number

© Copyright; **ptc.**

car. The proposed 13 visitor spaces can be used by parents who need / wish to accompany their children to / from the school.

It is noted that the Department of Education's parking policy[11] outlines that *"A school is not obliged to provide parking on site to anyone at any time."*

The proposal is to provide 67 car spaces, which would be used by staff (52 spaces), visitors (13 spaces) and the New Hope school (2 spaces). Considering all the above, the proposed car park is considered to meet the demand of the school.

6.8.1.2. Accessible Car Parking

The DCP does not stipulate any car parking rates for people with disabilities; hence reference is made to *Building Code of Australia 2019* (BCA). Schools are categorised as a Class 9b facility in accordance with Part A6.9 of the BCA. The accessible parking provision requirement for Class 9b buildings are stipulated in Table D3.5 of BCA. The accessible parking requirement and provisions are summarised in Table 16.

Table 16 – Accessible Car Parking Requirement and Provision

Stages	User Group	Total Car Parking Provided	Accessible Car Parking Provision Rate	Accessible Car Parking Requirement	Accessible Car Parking Provided
Stage 1	**Class 9b - School**	13	1 space for every 100 car parking spaces or part thereof	1	1
Masterplan		67		1	1

For Stage 1, 13 car spaces are proposed, which results in a minimum requirement for 1 accessible car parking space. The development proposes to provide 1 accessible space, thereby meeting the DCP requirement.

The proposed staff car park accommodates a total of 67 car spaces, which results in a minimum requirement for 1 accessible car parking space. The development proposes to provide 1 accessible space, thereby meeting the DCP requirement.

6.8.2 Design Assessment

6.8.2.1. Vehicular Access and Circulation

There is a total of 2 vehicular access gates to the school. It is proposed to utilise the existing driveways, but to change their use in the future. During Stage 1, Gate 1 would provide an entry for all vehicles and Gate 2 exit for all vehicles, as per the existing arrangement, refer to Figure 53.

[11] https://education.nsw.gov.au/teaching-and-learning/curriculum/learning-across-the-curriculum/road-safety-education/safe-travel/parking-on-school-grounds

© Copyright; **ptc.**

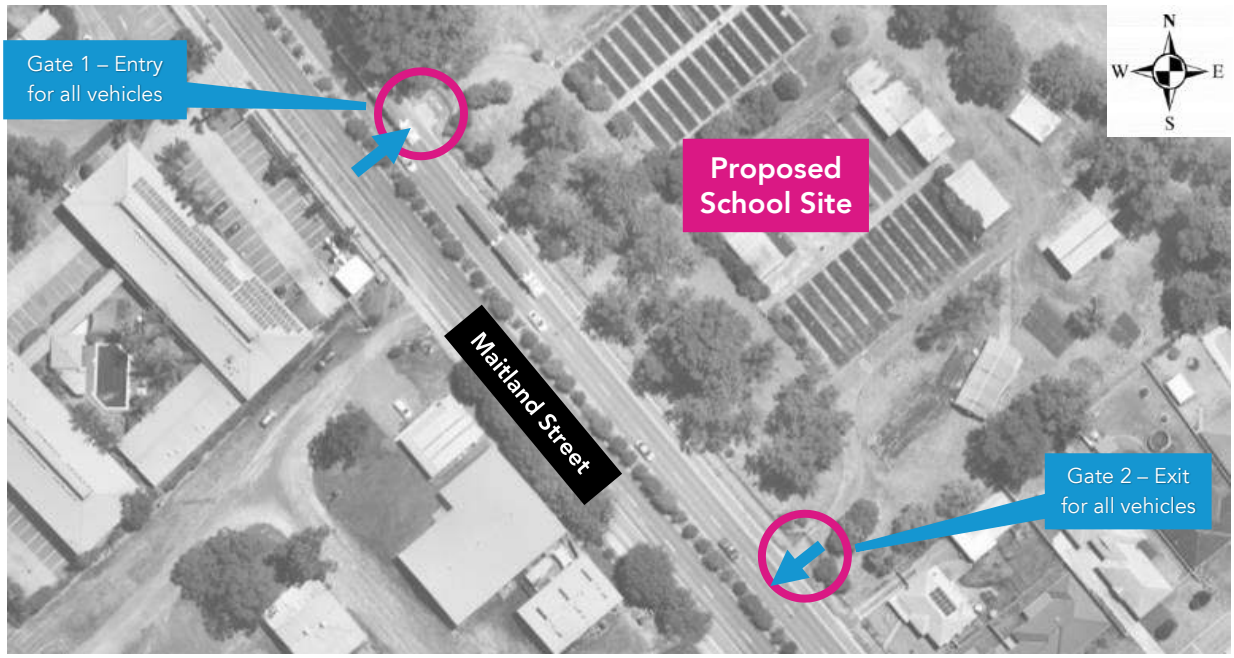


Figure 53 – Vehicluar Access Gates – Stage 1

With the increase of student population, it is proposed to collocate the entry and exit for light vehicle at Gate 2, but to retain the Gate 1 entry for waste and maintenance vehicles, refer to Figure 54.

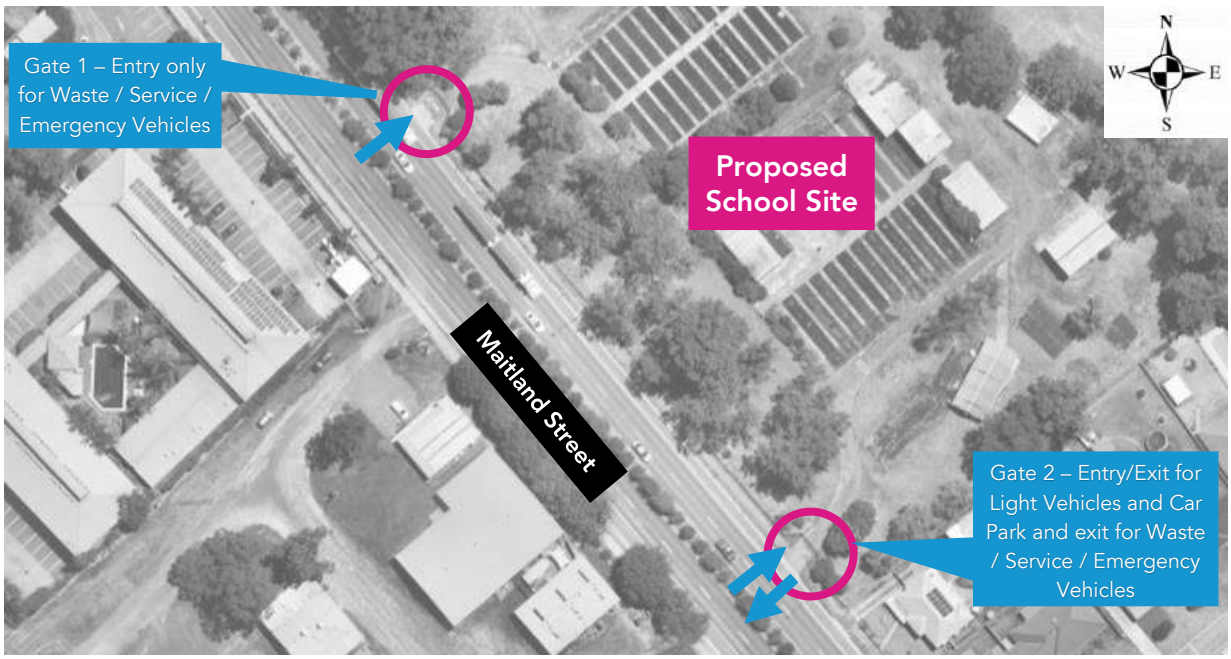


Figure 54 – Vehicluar Access Gates - Masterplan

The vehicular access arrangements are to comply with the requirements of AS2890.1 for Class 1A (employee facilities) and AS2890.2 for heavy vehicles.

© Copyright; **ptc.**

- The concept design for 67 employee car spaces with access to Maitland Street (arterial road) will require a Category 2 driveway, being a combined entry and exit with a width of 6 to 9 metres. The site is capable of accommodating the required driveway at gate 2.
- The swept path assessment of an HRV shows that the driveway at gate 1 needs to be a minimum of 8 metres wide to allow the truck to enter the site. The site is capable of accommodating the required width at gate 1.

The vehicular access, circulation, aisle width and car space dimensions shall comply with AS 2890.1, AS 2890.2 & 2890.6. Two-way circulation will be provided inside the car park; However, the pick-up & drop-off lane will be one-way.

A swept path assessment demonstrating two-way passing of a B99 vehicle at the driveway with appropriate clearance is included in Attachment 4 for stage 1 and Attachment 5 for the Masterplan. Any minor inconsistencies will be refined in design development and subject to further approval processes.

6.8.2.2. Car Parking Arrangement

The car parking arrangements have been assessed against the requirements of AS2890.1:2004, with reference to Class 1A (residential/employee) Class 1A (residential/employee facilities):

- Car Spaces: 2.4m x 5.4m
- Aisle Width: 5.8m (minimum)

  additional 300mm need to be provided where one side of the aisle is bound by high obstruction (i.e. wall or column)

The car spaces shall be installed to meet the minimum requirement of AS 2890.1.

All accessible parking spaces shall comply with the requirements of AS2890.6. Accessible parking spaces are to be designed based on the following dimensions:

- Accessible Space: 2.4m x 5.4m
- Adjacent Shared Bay: 2.4m x 5.4m (with bollard)

All shared bays and accessible spaces shall be installed in accordance with AS2890.6, including the installation of bollards and relevant pavement markings. A minimum height clearance of 2.5m is to be maintained above all accessible and shared bays.

6.8.2.3. Sight Distance

The sight distance requirements are outlined in Section 3.2 of AS2890.1 and are prescribed on the basis of the posted speed limit or 85th percentile vehicle speeds along the frontage road.

Maitland Street near the site has a speed limit of 50km/h which requires a desirable visibility distance of 69 metres and a minimum stopping sight distance of 45 metres. No changes are proposed to the location of existing driveways and the driveways comply with the minimum sight distance requirement.

AS2890.1 requires the driveway to comply with triangular pedestrian sight splays (2.0m x 2.5m). The existing driveway is able to meet the minimum sight lines for pedestrian safety.

© Copyright; **ptc.**

6.8.2.4. Headroom Clearance

Headroom clearances must be provided in accordance with the minimum requirements of AS2890.1 and AS2890.2. These requirements are stipulated below:

- Minimum 2.2m above all general spaces;
- Minimum 2.5m above all accessible spaces and adjacent shared bays; and
- Minimum 2.2m above all bicycle spaces.

6.9 Motorbike Parking

The DCP does not stipulate any motorbike parking requirement and the development does not propose to provide any.

6.10 Service and Delivery

Section 16.4.4 of the DCP outlines that the loading and unloading facilities can be undertaken on site.

The project is proposing that servicing and waste collection will be undertaken from within the site boundary. Day-to-day waste will be collected by Pacific Brook Christian School staff and disposed in an area located in the south-eastern corner of the site, and then regularly collected by professional waste management company. Collection will occur by a private contractor from the secure waste area near the Junior School.

It is proposed that the waste truck enters the site via the currently entry driveway, drives through the site using the pick-up and drop-off lane, undertakes a U-turn manoeuvre outside the waste collection area and reverses back to collect the container. Following this, the truck would exit the site via the southern driveway. A swept path assessment has been undertaken and it shows that the site is capable of accommodating a Heavy Rigid Vehicle (HRV) to enter and exit the site for waste collection purposes in a forward direction.

Waste collection will be conducted outside of peak hours (i.e., early morning or late in the evening) once or twice a week, and therefore will not interfere with vehicle and pedestrian movements.

Deliveries to the site are minimal and will be limited to materials for educational and trading use. Delivery vehicles will use the Kiss and Drop for Canteen deliveries where they can park outside of peak hours.

Smaller deliveries will be undertaken during normal operation hours, but outside of peak traffic times of pick up and drop off.

A swept path assessment has been conducted to ensure the feasibility of the design, refer to **Attachment 4** for stage 1 and **Attachment 5** for the Masterplan.

6.11 Emergency Vehicles

Emergency vehicles will enter the site through the northern entry and exit through the exit driveway, or use the bus bay to stop, if required.

© Copyright; **ptc.**

7. Traffic Impact Assessment

7.1 Key Intersections

In order to determine the traffic activity in the surrounding road network, following key intersections were analysed:

- Intersection 1 - Maitland Street / Thompson Street; and
- Intersection 2 - Maitland Street / Rutherford Road.

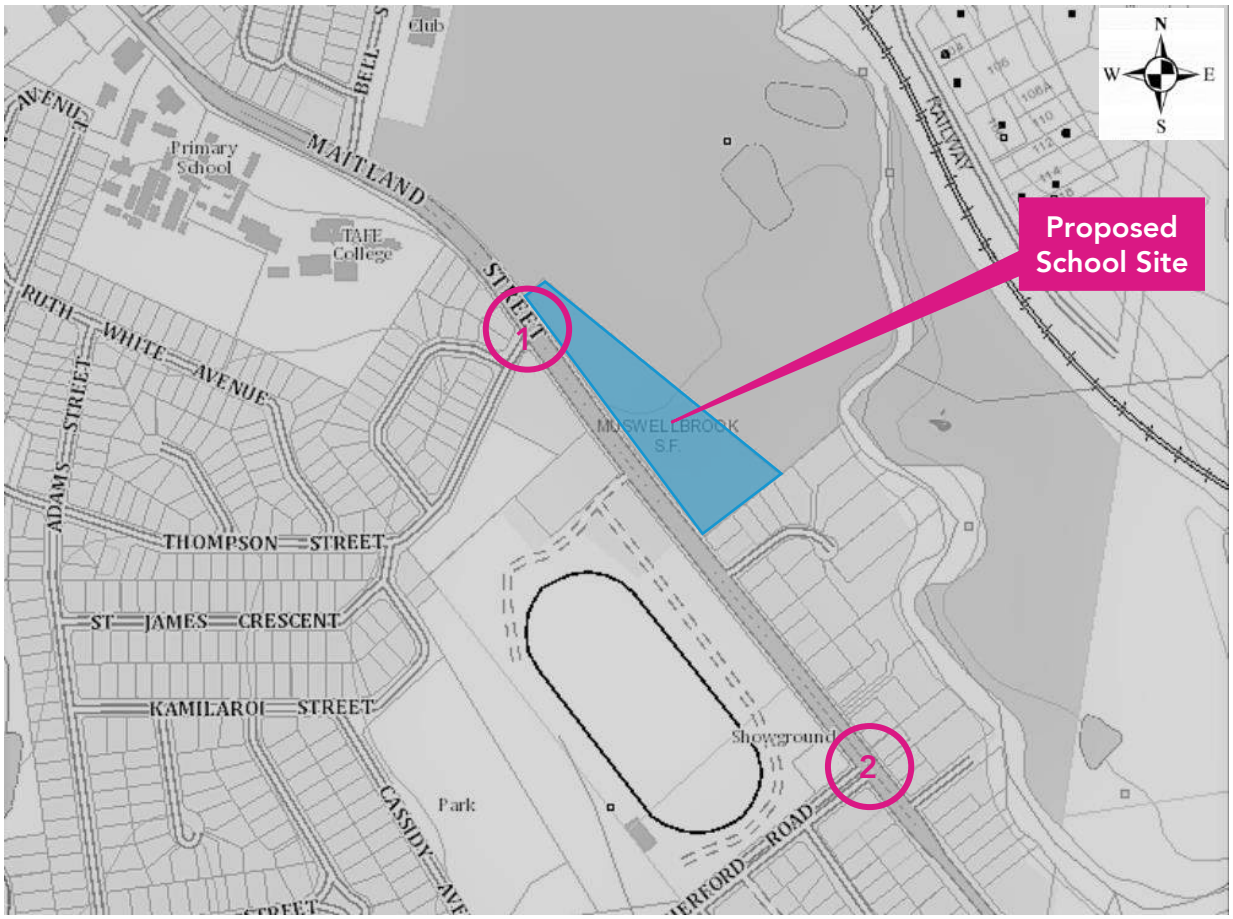


Figure 55 – Key Intersections

The analysis and the results of these surveys are described in the following sections.

© Copyright; **ptc.**

7.2 Existing Traffic and Peak Hour Volumes

In order to determine the existing traffic conditions within the road network serving the School, traffic count surveys undertaken on Tuesday, 6th August 2019 between 6:30am and 9:30am as well as between 3:00pm and 6:00pm have been analysed. The surveys were done at the key intersections.

The peak hours have been determined based on the traffic volumes during the morning and evening weekday commuter peaks. The two intersections were studied as a network and the AM and PM peak hours were identified to be from 8:15am to 9:15am and from 4:30pm to 5:30pm respectively. It should be noted that the network AM peak hour aligns with the school drop off hour, whereas, the network PM peak hour does not align with the school pick up peak hour. In order to study the traffic impact of the school traffic, the school peaks are adopted for the PM peak hour in the traffic analysis. It should also be noted that the intersection survey spanned between 3pm and 6pm in the evening and therefore does not cover the 15 minutes interval between 2:45pm to 3pm. Therefore, traffic volumes from 3pm to 4pm were taken instead for the analysis. The network peak hours adopted for the analysis are summarised in Table 17.

Table 17 – Network Peak Hour

Road Intersection	Weekday AM Network Peak Hour	Weekday PM Network Peak Hour
Maitland Street / Thompson Street	8:15am – 9:15pm	3:00pm – 4:00pm
Maitland Street / Rutherford Road		

The results of the intersections surveys during the network peak hours are illustrated in the following figures for the AM peak hour and PM peak hour respectively:

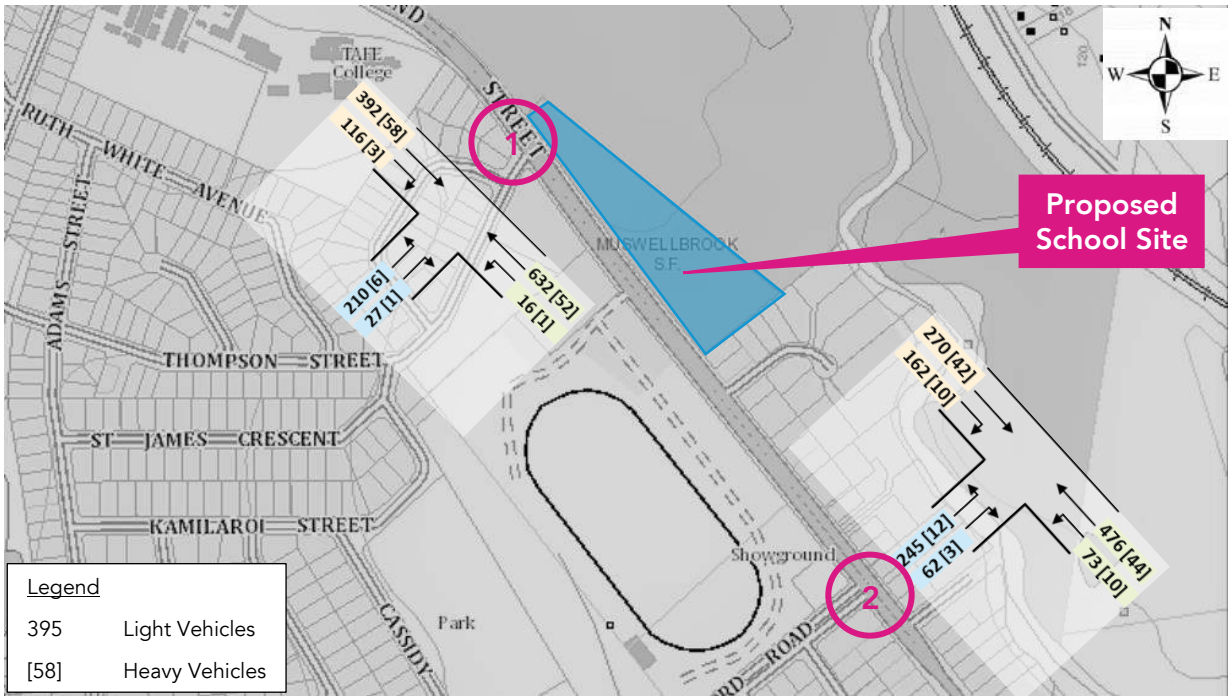


Figure 56 – Traffic Volumes during AM Peak Hour – Existing Situation

© Copyright; **ptc.**

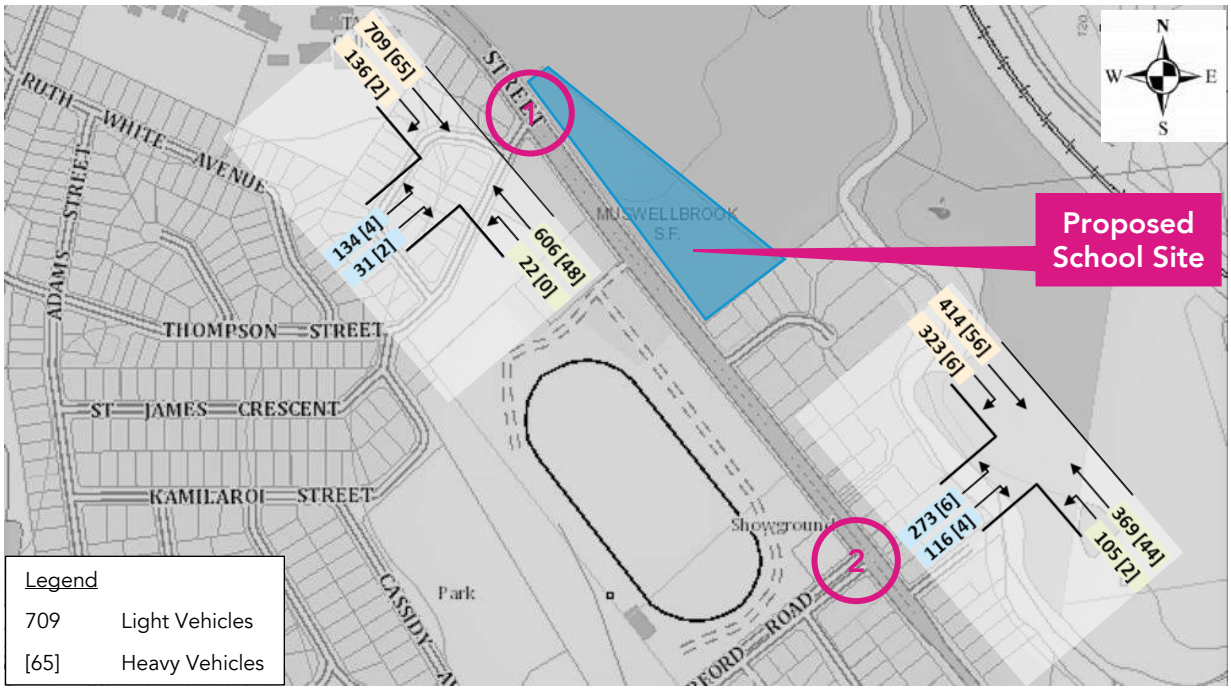


Figure 57 – Traffic Volumes during PM Peak Hour – Existing Situation

7.3 Future Intersection Arrangements

Through discussions with Council, it is understood that TfNSW is planning to undertake modifications on the Maitland Street / Thompson Street intersection as a part of future upgrades. The modifications significant to this project are as follows:

- Maitland Street / Thompson Street is a T – intersection with Maitland Street traversing northwest-southeast and Thompson Street traversing southwest. All turn movements are allowed at this priority-controlled intersection. As part of future modifications, this intersection will be signalised which has been taken into consideration when undertaking modelling for the future development traffic.

7.4 Development Traffic

7.4.1 Traffic Distribution

Area of students' residence has been analysed based on actual student location data. For the purposes of the development traffic analysis, the local residential areas surrounding the proposed School site have been divided into areas as shown in Figure 58.

© Copyright; **ptc.**

Figure 58 – Student Residential Zones

The likely travel route of where students commute to and from the School is based on the assumption that the trips originate from their place of residence in the morning and vice versa in the afternoon can be deduced based on these residential zones.

Maitland Street has a median in front of the proposed School site and therefore, right turn from Maitland Street into the site and right turn from the site into the Maitland Street is not possible. All vehicles will enter the site turning left from Maitland Street and exit the site by turning left into Maitland Street.

The trip distribution at the key intersections and adjacent roads is presented in Figure 59.

© Copyright; **ptc.**

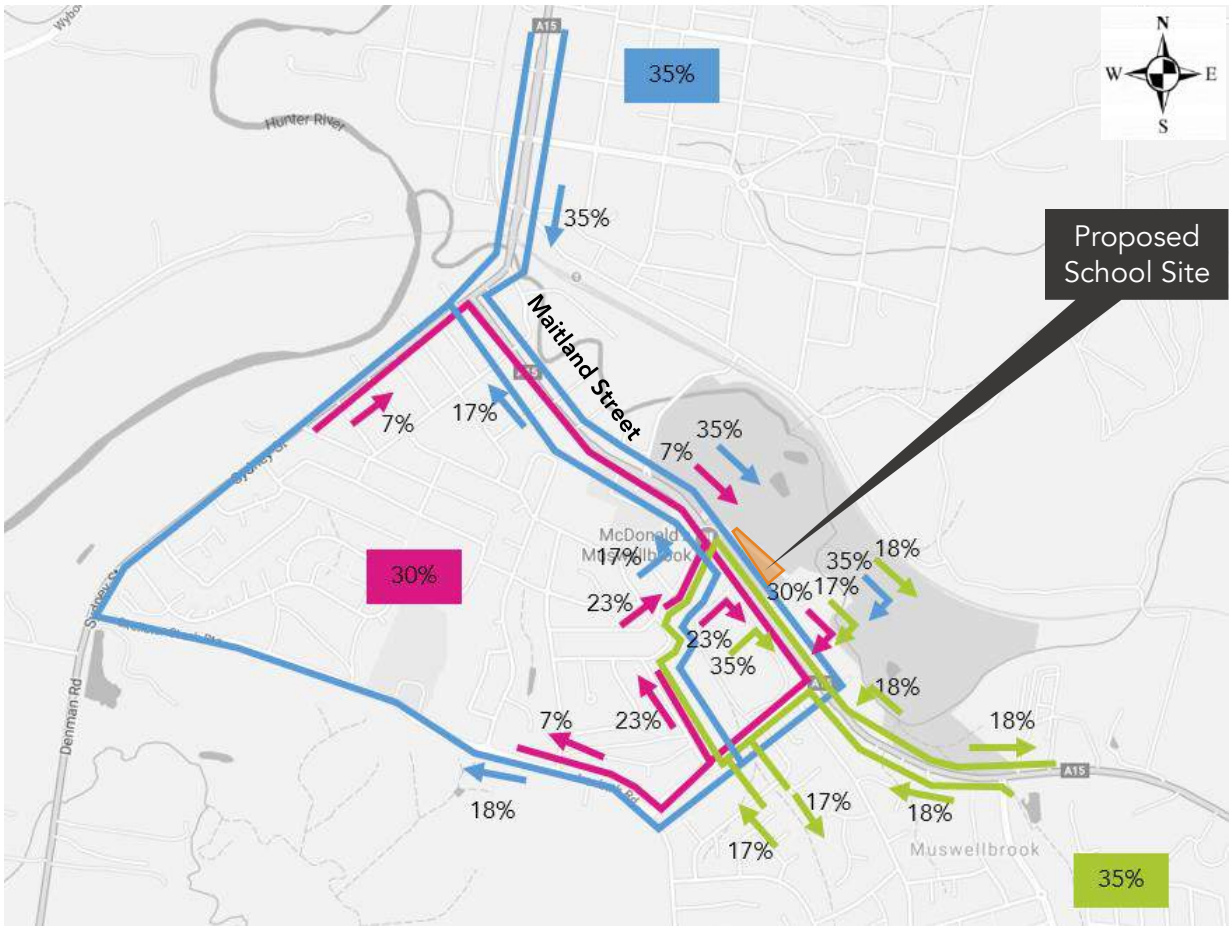


Figure 59 – Proposed Traffic Distribution for the AM and PM Peak Hours

7.4.2 Development Traffic Volumes

For a conservative assessment, development traffic volumes for the masterplan stage has been adopted.

7.4.2.1. Student Traffic Volumes

Traffic volumes for future students has been calculated based on the total number of future students, car occupancy, bell times and travel mode. Following assumptions are made:

- From the travel mode survey (refer Section 5.3.1) it is understood that the car occupancy for students is 1.62 and 1.71 for the morning and afternoon peak hour respectively. However, for a conservative assessment a car occupancy is 1.2 is considered. This information has been acquired from ptc.'s experience on other schools;
- Since the existing School is proposed to be relocated to a new site, it is not certain that the existing travel mode will be retained, and therefore, for a conservative assessment it is estimated that all students are dropped-off and picked-up by private vehicles;

© Copyright; **ptc.**

- From the information provided by the School it is understood that at least 2 bell times will be implemented at the Masterplan stage; and
- For a conservative assessment, it is also assumed that no students will attend Out of School Hours (OOSH) activities (though this is unlikely), meaning that all students will be arriving and leaving the School during the school peak periods.

Considering all these factors, following number of vehicles are estimated during the morning and afternoon peak hour:

Table 18 – Summary of Existing Travel Characteristics

Travel Mode	Future Student Number	Mode Share – Private Vehicles	No. of Students not attending before and after school care	Proposed Bell Times	Vehicle Occupancy (students/vehicle)	Projected No. of Vehicles
Private Vehicle	656	100%	100%	2	1.2	273

As shown in Table 18, it is estimated that 273 vehicles will arrive and depart during the peak hour. It is expected that the trip generation will be applicable for both AM and PM peak hours, as it is anticipated that students will utilise the same travel mode to and from school.

Considering short dwell times, it is assumed that all 273 vehicles will arrive and depart during each of the peak hours, resulting in 273 inbound and outbound trips in the morning and afternoon peaks.

The number of trips at each intersection has been determined based on the above and the proposed traffic distribution described in Section 7.4.1.

The proposed future student traffic volumes for the AM and PM peak hours are presented in Figure 60 and Figure 61 respectively.

7.4.2.2. Staff Traffic Volumes

As outlined in Section 3.5.2, a total of 65 staff is anticipated for the masterplan. For a conservative assessment it is assumed that all 65 staff will travel by car, with a car occupancy of 1 staff per car. Therefore, it is estimated that the total number of vehicles during the peak hour is 65.

Although it can be expected that staff will generally arrive prior to the arrival of students in the morning and depart after students in the afternoon, a worst-case assessment of the potential staff trip generation has been undertaken.

As a worst-case assessment, it has been assumed that a 1 staff per vehicle ratio may be adopted, therefore 65 vehicles will arrive in the morning school peak and all 65 vehicles will depart in the afternoon school peak. These volumes have been incorporated into the SIDRA traffic model for the post-development scenarios to assess the development traffic activity.

The trip distribution for staff is considered to be the same as for students as described in Section 7.4.1. The only difference is that all staff trips are considered to be inbound only in the morning and outbound only in the afternoon.

© Copyright; **ptc.**

The proposed future staff and students traffic volumes for the AM and PM peak hours are presented in Figure 60 and Figure 61 respectively.

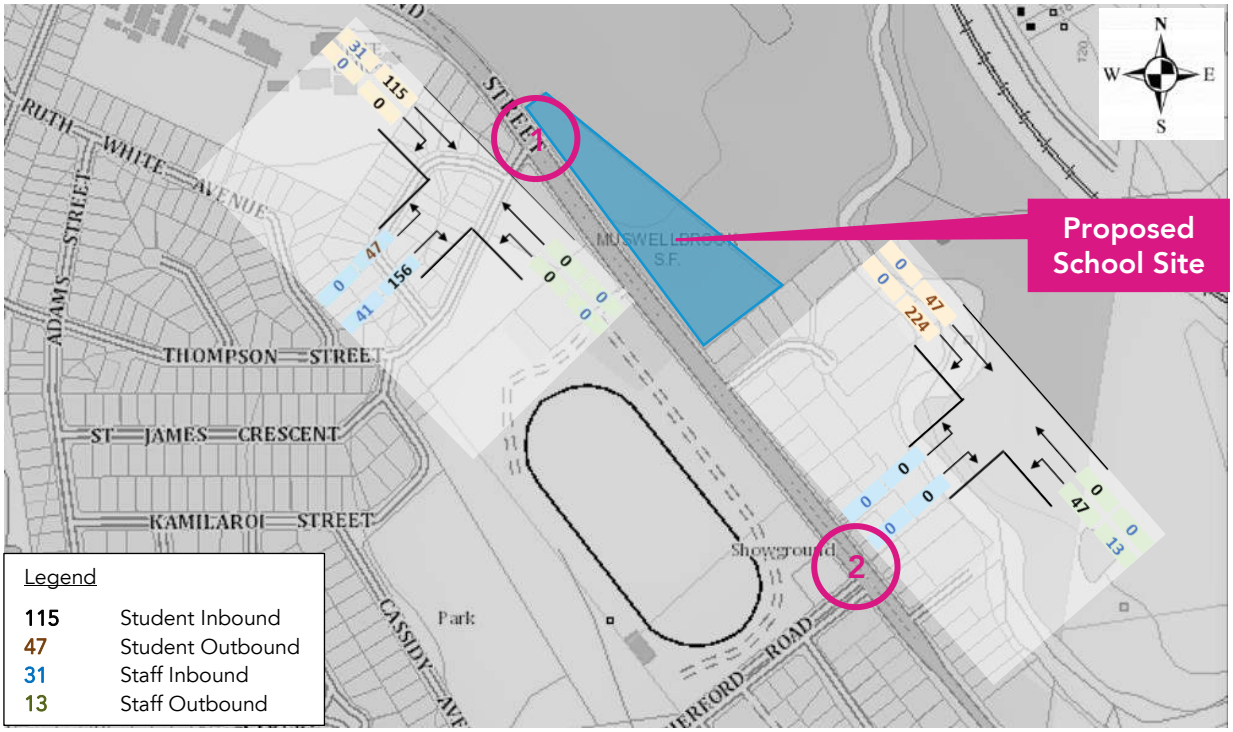


Figure 60 – Proposed Future Student and Staff Traffic Volumes during the AM Peak Hour

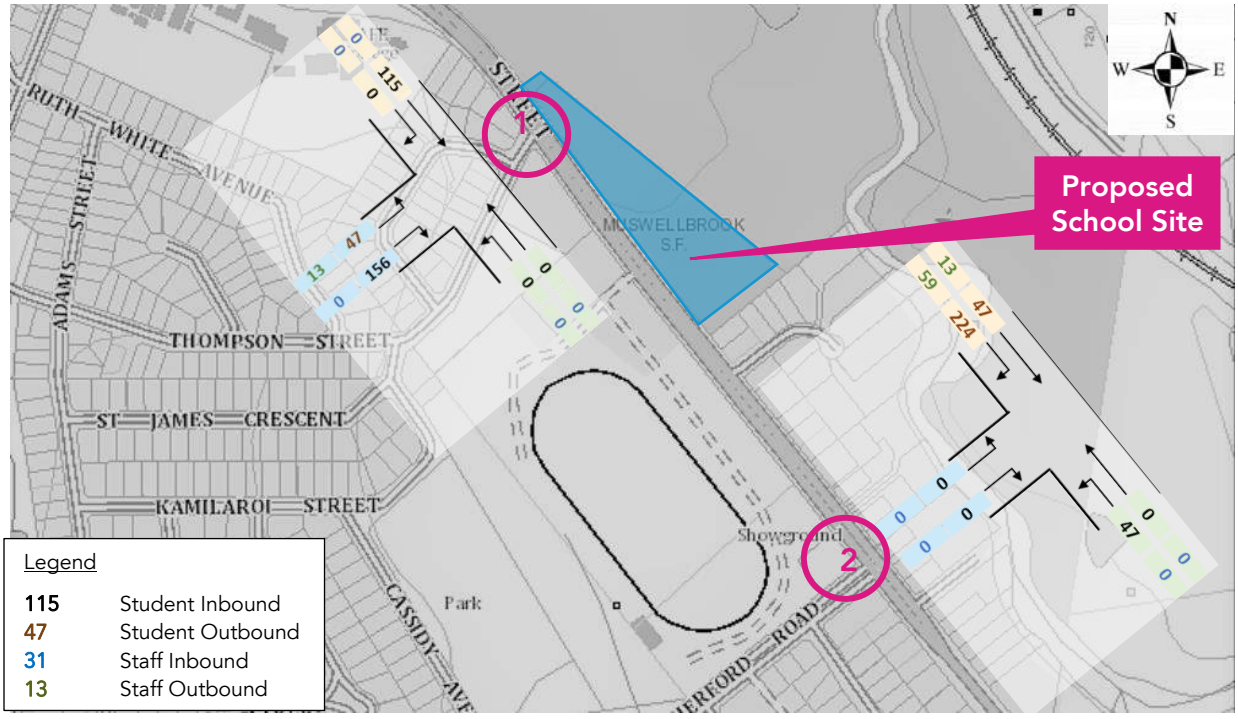


Figure 61 – Proposed Future Student and Staff Traffic Volumes during the PM Peak Hour

© Copyright; **ptc.**

7.5 10-Year Traffic Growth

In order to determine the 10-years traffic growth, the major development projects in the vicinity of the School in Muswellbrook area have been analysed. Reference has been made to Gateway Application for West Muswellbrook Project which is a coal mining project. From the government website (refer https://www.planningportal.nsw.gov.au/major-projects/project/3026) it is understood that a conditional gateway certificate has been issued to the West Muswellbrook Project in 2015, and no other documents regarding the approval of the development has been found.

Furthermore, no other information has been found regarding the major developments in the vicinity of the School and therefore reference has been made to the traffic volume information provided by TfNSW on the website *Traffic Volume Viewer*[12]. Traffic counters recording the recent traffic counts for the years 2015 – 2021 are located on New England Highway 1.6km south of Muscle Creek Road and New England Highway 60m north of Burtons Lane which is shown in Figure 62.

Figure 62 – Traffic Growth

[12] https://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.htm

© Copyright; **ptc.**

2020 – 2021 information are post COVID-19 and may not be the actual representations of the traffic growth in the area. Therefore, the data for 2015 – 2012 has been considered.

Traffic counts on New England Highway 1.6km south of Muscle Creek Road shows a traffic growth of 0.56% per annum and traffic counts on New England Highway 60m north of Burtons Lane shows a traffic growth of 0.4% per annum. For a conservative assessment counts on New England Highway 1.6km south of Muscle Creek Road has been considered, and therefore a growth rate of 0.56% per annum is adapted to determine the future 10-year background traffic.

The growth rate has been applied to the surveyed traffic volumes (refer to Section 7.2) for the assessment of 2019 background traffic volumes.

The expected 2029 background traffic for the AM and PM peak hours at the key intersections are presented in Figure 63and Figure 64 respectively.

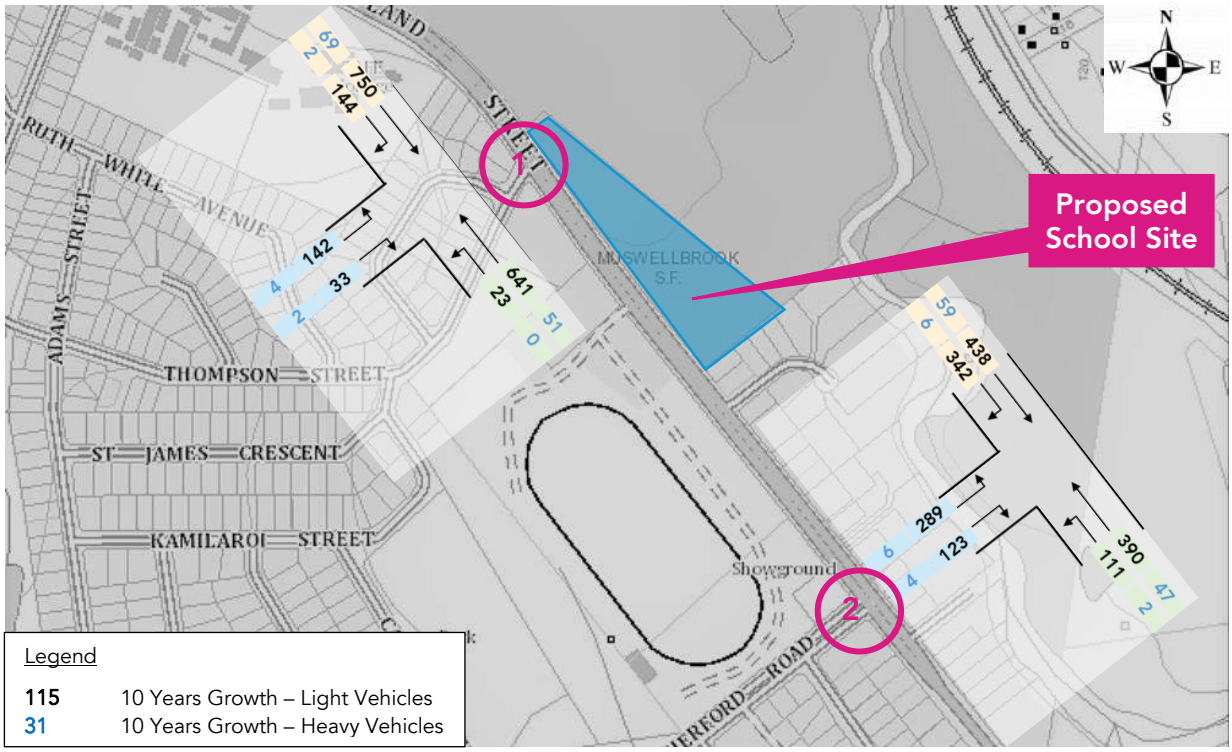


Figure 63 – Proposed 10 Years Growth Traffic Volumes during the AM Peak Hour

© Copyright; **ptc.**

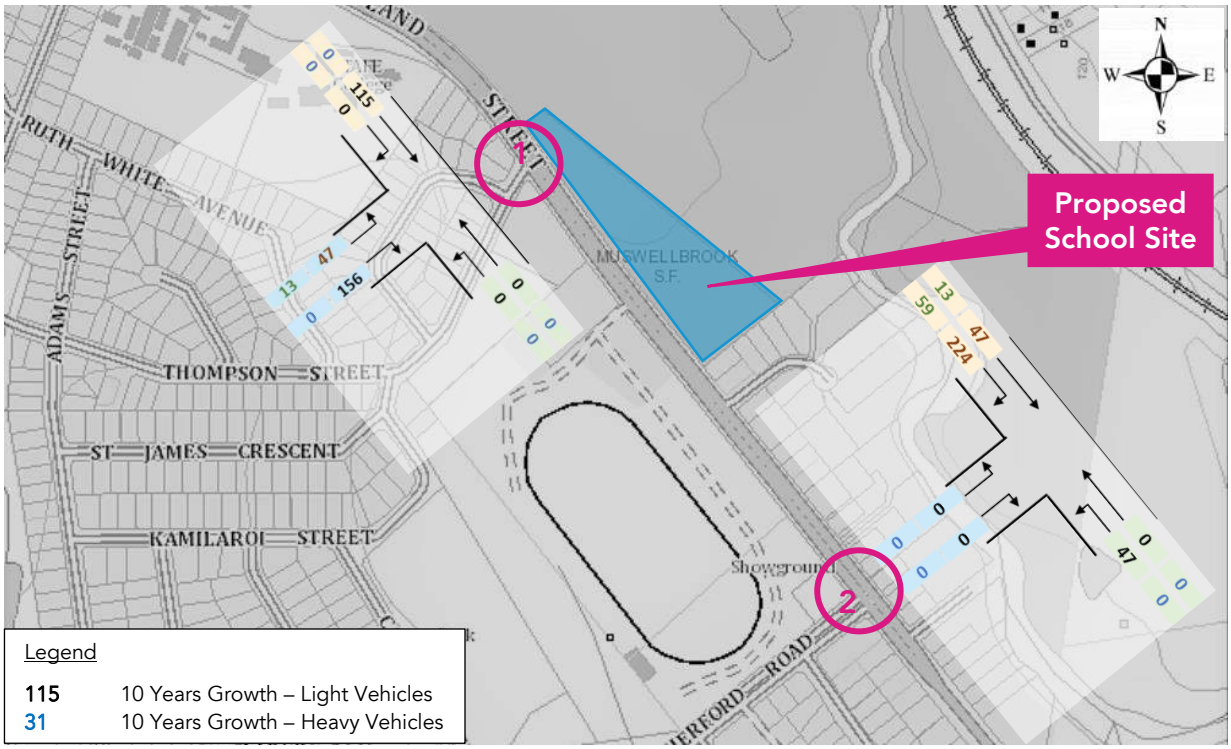


Figure 64 – Proposed 10 Years Growth Traffic Volumes during the PM Peak Hour

7.6 Intersection Modelling

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

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

- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- Degree of Saturation (DoS) – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (e.g. 0.8=80% saturation).
- 95% Queue lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.
- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference. The RMS adopts the following bands:

Table 19 – Level of Service Criteria

© Copyright; **ptc.**

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

7.6.1 Modelling Scenarios

The intersections have been modelled with three different scenarios as follows:

- **Existing Scenario**

  The existing scenario is modelled with the existing intersection arrangements with the existing traffic.

- **Future Existing Scenario**

  The future existing scenario is modelled with the proposed changes to the Maitland Street / Thompson Street intersection (as mentioned in Section 7.3) with the existing traffic.

- **Future Development Scenario**

  The future development scenario is modelled with the proposed changes to the Maitland Street / Thompson Street intersection with the additional traffic volumes for parents/students and staff as described in Section 7.4.2.

- **10 Years Growth Scenario**

  This scenario has been modelled with the estimated traffic growth within the next 10 year period as described in Section 7.5. with the proposed changes to the Maitland Street / Thompson Street intersection.

- **10 Years Growth + Future Development Scenario**

  This scenario has been modelled with the estimated additional traffic growth within the next 10 year period and the additional traffic volumes for students and staff with the proposed changes to the Maitland Street / Thompson Street intersection.

© Copyright; **ptc.**

7.6.2 SIDRA Results

Table 20 summarises the most relevant SIDRA results for the existing condition, future existing condition, and future development condition with the summary and a comparison of the network operation. Full SIDRA results can be found in **Attachment 6.**

Table 20 – SIDRA Modelling Results for pre and post-development

Intersection	Time	Scenario	LoS [13]	Delay (s) [14]	Highest DoS (v/s)	Highest Q95 (m)
Maitland Street / Thompson Street	AM Peak	Existing	E	57.9	0.370	9.0
		Future Existing	A	9.7	0.402	44.3
		Future Development	B	14.8	0.583	68.5
		10-Yrs Growth	A	11.2	0.456	68.1
		10-Yrs Growth + Future Dev	B	14.7	0.621	72.5
	PM Peak	Existing	F	374.7	1.122	47.6
		Future Existing	A	7.9	0.392	54.7
		Future Development	A	13.7	0.552	70.8
		10-Yrs Growth	A	9.9	0.446	69.2
		10-Yrs Growth + Future Dev	A	13.8	0.580	74.7
Maitland Street / Rutherford Road	AM Peak	Existing	A	13.4	0.426	47.1
		Future Existing	A	13.6	0.426	6.3
		Future Development	B	15.8	0.645	58.2
		10-Yrs Growth	A	13.6	0.451	50.4
		10-Yrs Growth + Future Dev	B	16.3	0.696	65.0
	PM Peak	Existing	A	14.4	0.582	45.4
		Future Existing	A	13.7	0.582	45.4
		Future Development	B	17.0	0.801	80.6
		10-Yrs Growth	B	15.2	0.615	54.3
		10-Yrs Growth + Future Dev	B	17.2	0.763	91.0

[13] For signalised intersections, the average performance indicators have been reported. It is noted that for priority-controlled intersections, the minor road usually experiences the highest delay whereas the major road experiences zero delay. In light of this, the average performance indicators may not be a suitable method of assessing the performance of an intersection. Therefore, the performance indicators for the worst movement have been reported for priority-controlled intersections.

[14] For signalised intersections, the average performance indicators have been reported. It is noted that for priority-controlled intersections, the minor road usually experiences the highest delay whereas the major road experiences zero delay. In light of this, the average performance indicators may not be a suitable method of assessing the performance of an intersection. Therefore, the performance indicators for the worst movement have been reported for priority-controlled intersections.

© Copyright; **ptc.**

It is noted that the development traffic used for the purpose of this SIDRA analysis is assumed to represent the worst case scenario for the following reasons:

- For conservative reasons, the car occupancy of 1.2 students per car is lower than the car occupancy determined through the online surveys. With a higher car occupancy the number of vehicles will be reduced;
- A 100% car usage has been assumed despite the provision of pubic and active transport facilities. From the online surveys it is known that the school community is likely to use these alternative transport options, therefore, it is likely that the car usage will be lower than 100%; and
- For the purpose of this traffic model, it has been assumed that no students would attend before and after school activities. The school has advised that there is potential to implementing OOSH.

Maitland Street / Thompson Street Intersection
The LoS for the right turn movement from Thompson Street is E and F in the AM and PM peak hours respectively. This is due to the long waiting time for the vehicles to exit the Thompson Street. For future existing scenario, the LoS of the right turn movement on Thompson Street changes to C for both AM and PM peak hours. This is due to the signalisation of the intersection, which improves the performance of Thompson Street.

Future traffic volumes and future development result in marginal changes to the performance measures of the intersection; however, the changes are not considered significant as the intersection will still operate with a minimum 38% spare capacity during the peak hours.

Maitland Street / Rutherford Road Intersection
The overall LoS for the existing and future existing conditions is A during the peak hours. With the projected future traffic volumes, minor changes are expected to the performance measures of the intersection, and the overall LoS is expected to be B during the peak hours. In future, the intersection is still expected to operate with a minimum 23% spare capacity, and therefore, the future development will have no major impacts on the performance of the intersection.

7.7 Summary

The SIDRA modelling indicates that the proposed development at the masterplan stage will have a negligible effect on the surrounding road network. It can therefore be concluded that traffic related to Stage 1 can be easily accommodated within the capacities of the surrounding roads and intersections.

© Copyright; **ptc.**

8. Access Assessment

8.1 References

An investigation has been undertaken to determine if a deceleration lane is required along Maitland Road in the eastbound direction upon approach of the School driveway.

Reference is made to the following planning documents:

- Guide to Traffic Management – Part 6: Intersections Interchanges and Crossings (AGTM)
- Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections (GRD)

In accordance with AGTM Section 2.3.6, a slip lane may be required and if so is to be designed based on warrants for different turn treatments, which are largely dependent on the design speed of the main road. The posted speed limit of Maitland Road is 50km/h; However, it is noted that the road will be subject to a 40km/h school zone during school peak hours. As such, noting that the speed limit falls below 70km/h, Figure 2.26(c) from AGTM has been adopted (shown in Figure 65 below).

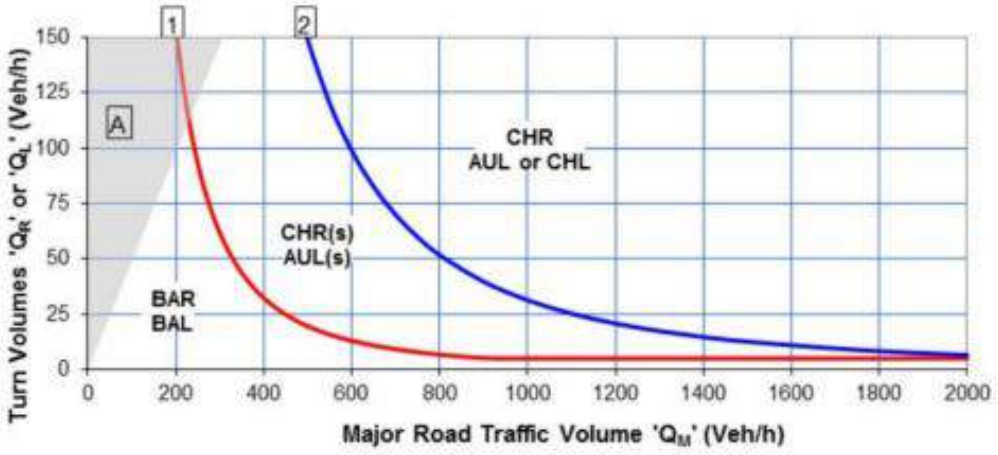


Figure 65 – Adopted warrant table (Source: AGTM, Sectoion 2.3.6, Figure 2.26(c))

In order to determine the type of turn treatment required, the major road traffic volume Q_M and the turn volumes Q_L need to be established, which is presented in the following sections.

© Copyright; **ptc.**

The major road traffic volume, Q_M on x-axis, is the volume of traffic travelling along the main road, Maitland Road. These are obtained from the traffic surveys of the existing intersection 1, Maitland Road and Thompson Street, as described in Section 7.2. As Maitland Road has a median, only traffic travelling in the southeast direction is relevant for this assessment. The relevant travel movements from the intersection are shown in Figure 66 and Figure 67 for AM and PM traffic, respectively. The sums of the traffic volumes are as follows:

$$Q_{M\_AM} = 392 + 27 + 58 + 1 = 478$$

$$Q_{M\_PM} = 709 + 31 + 65 + 2 = 807$$

The worst-case scenario, $Q_{M\_PM} = 807$ vehicles per hour, has been used for the purpose of further calculations.

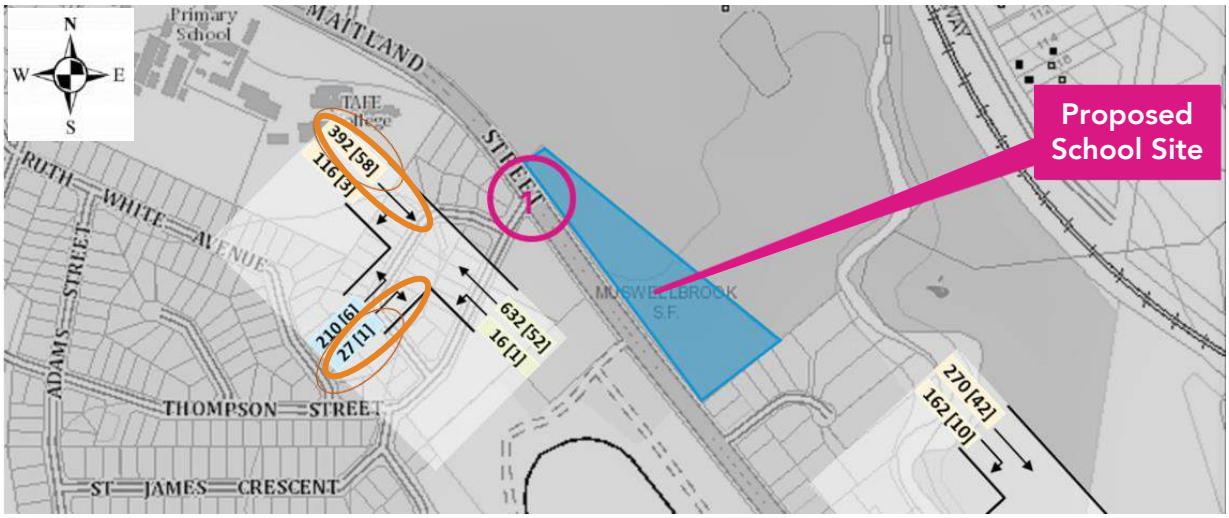


Figure 66 – Existing AM Peak – Relevant Traffic Movements

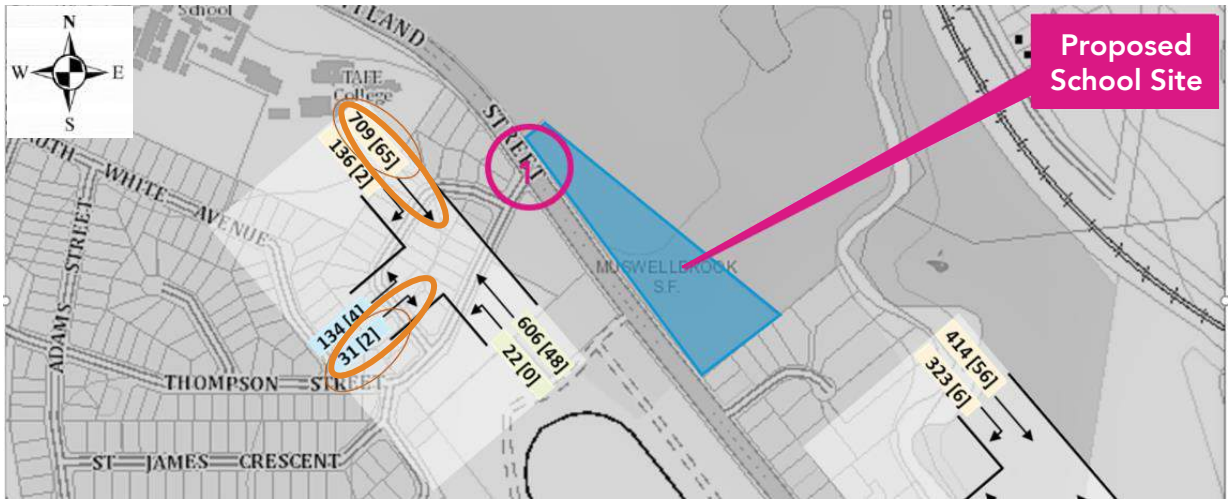
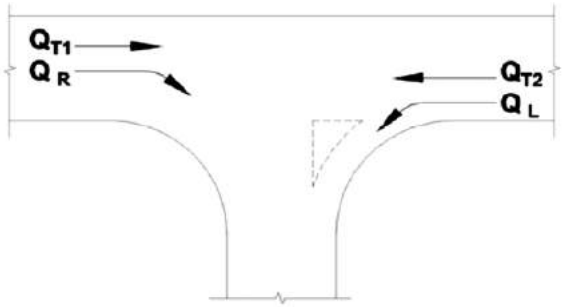


Figure 67 – Existing PM Peak – Relevant Traffic Movements

© Copyright; **ptc.**

According to Figure 2.27 in the AGTM, the major road traffic volume needs to be adjusted based on the road and turn type (refer to Figure 68 below). Maitland Street is a four-lane, two-way road type, meaning that there are two lanes in each direction. Furthermore, only the left turn type is considered because the right turn movement is prohibited due to the presence of a concrete median island. Following this, the total traffic volume will be divided into half, regardless of the presence of a splitter island; The total traffic volume, Q_M, is half of Q_{T2}.

$$Q_{T2} = 0.5 \times Q_{M\_PM} = 0.5 \times 807 = 404 \text{ vehicles per hour}$$



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Source: TMR (2016a).

Figure 68 – Calculation of the major road traffic volume Q_M (Source: AGTM, Figure 2.27)

© Copyright; **ptc.**

8.2 Turn Movements Q_L

For the purpose of this assessment, only the left turn volume Q_L is required because the driveway will be designed in a left-in-left-out arrangement and right turn movements are not permitted due to the presence of a concrete median island dividing Maitland Road effectively into two roads.

The left turn movements will be generated solely by the proposed development and therefore, reference is made to the travel scenario analysis presented in Section 6.7.3, excerpt of which is shown in Figure 69. For the masterplan and with a full occupancy of 656 students, the most feasible travel characteristic will be as per Scenario 3b, with three bell times and some students traveling by active or public transport (refer to the blue circle in the below figure). However, for conservative reasons, the highest number of trips of all scenarios has been adopted (refer to the pink circle in the below figure). Following this, Q_L is as follows:

$Q_L = 181$ vehicles per hour

		Stage 1 →					Masterplan
Total number of students (up to)		140	250	350	450	550	656
Scenario 2b: 2 bell times 70% of students use private transport, 30% walk, cycle or use public transport 10% of students attend before and after school activities							
Number of students driven per bell time		44	79	110	142	173	205
Number of cars (assumed car occupancy of 1.2 students per car)		37	66	92	118	144	171
Modelled queue length using Poisson distribution	spaces	**10**	**15**	**20**	**25**	**30**	**35**
	metres	**60**	**90**	**120**	**150**	**180**	**210**
Scenario 3a: 3 bell times 100% of students use private transport No before and after school activities							
Number of students driven per bell time		47	83	117	150	183	217
Number of cars (assumed car occupancy of 1.2 students per car)		39	69	97	125	153	181
Modelled queue length using Poisson distribution	spaces	**10**	**15**	**20**	**25**	**30**	**35**
	metres	**60**	**90**	**120**	**150**	**180**	**210**
Scenario 3b: 3 bell times 70% of students use private transport, 30% walk, cycle or use public transport 10% of students attend before and after school activities							
Number of students driven per bell time		29	53	74	95	116	137
Number of cars (assumed car occupancy of 1.2 students per car)		25	44	61	79	96	114
Modelled queue length using Poisson distribution	spaces	**10**	**15**	**15**	**20**	**20**	**25**
	metres	**60**	**90**	**90**	**120**	**120**	**150**

Figure 69 – Excerpt of Propjected Future Travel Characteristic

It is acknowledged that the access also serves a car park accommodating 67 staff parking spaces; However, staff are assumed to arrive before and depart after the peak period. Therefore, the assumed maximum turning volume remains at 181 vehicles per hour.

© Copyright; **ptc.**

8.3 Warrant Application

Reading off both Q_L and Q_M, this means that the auxiliary lane treatment for the development would be AUL(s) (auxiliary left-turn treatment – short turn lane). This is reflected in Figure 70.

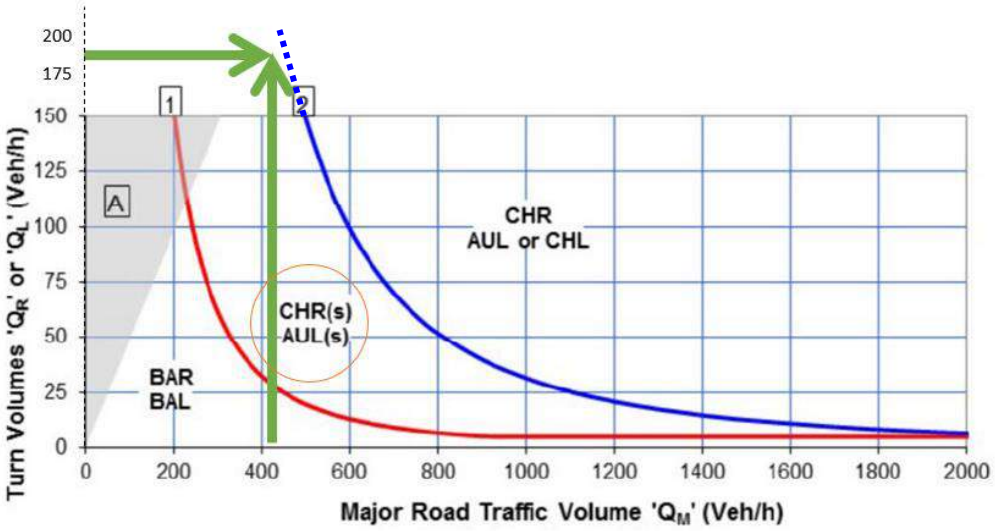


Figure 70 – Determination of Auxiliary Lane Treatment (Source: AGTM, Section 2.3.6, Figure 2.26(c))

The turn treatments are described in the following sections.

8.4 Auxiliary Left-Turn Treatment – Short Turn Lane (AUL(s))

According to the GRD, Section 8.2.2: Rural Auxiliary Left-Turn Treatments – Short Turn Lane [AUL(s)] on the Major Road, this treatment is appropriate for low to moderate through and turning volumes. A rural AUL(s) treatment with a short left-turn lane comprises a diverge/deceleration length D (m) and taper length T (m) based on the design speed of the major road approach. As such, it is designed to function as a deceleration lane without impacting on the existing traffic utilising the main road being Maitland Road. The rural AUL(s) treatment is shown in Figure 42 below.

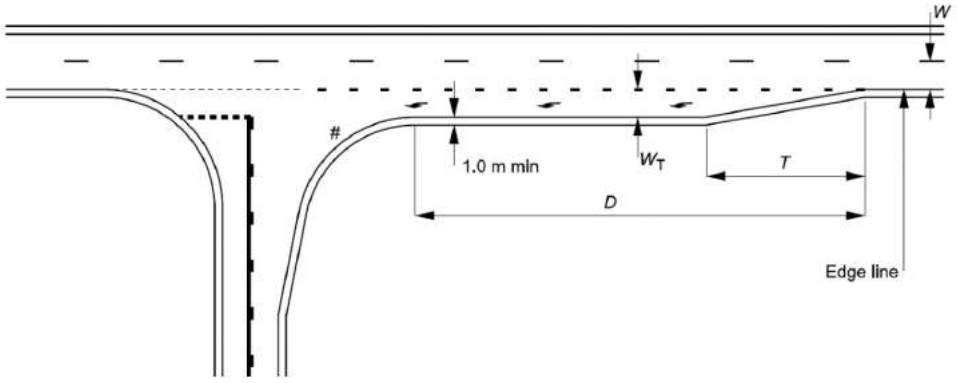


Figure 71 – Rural AUL(s) treatment with a short left-turn lane (Source: GRD, Figure 8.3)

© Copyright; **ptc.**

Noting that the posted speed limit of the major road is 50km/h and that the vast majority of turn movements will occur during school zone speed restrictions, the deceleration length is assumed to be D = T = 15m, as highlighted in Figure 72 below.

Design speed of major road approach (km/h)	Diverge/deceleration length *D* (m)[1]	Taper length *T* (m)[2]
50	15	15
60	25	15
70	35	20
80	45	20
90	55	25
100	70	30
110	85	30
120	100	35

Figure 72 – Dimensions for AUL(s) treatment on major leg (Source: GRD, Table 8.2)

Figure 73 shows a concept of the AUL(s) treatment at the proposed School driveway along Maitland Street, with the deceleration and taper length of 15m. A swept path has been prepared showing a B99 vehicle entering the combined entry and exit driveway.

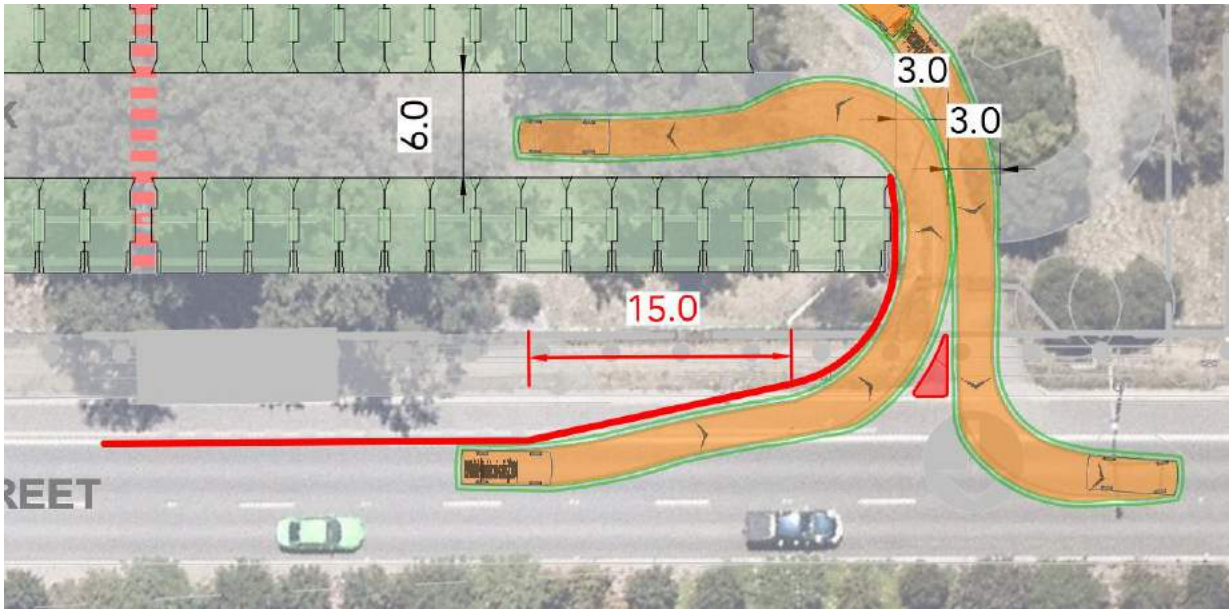


Figure 73 – AUL(s) treatment at the proposed driveway

© Copyright; **ptc.**

8.5 Rural Basic Left-Turn Treatment (BAL)

Considering that the highest turn traffic will occur during school pick-up and drop-off while school zone speed restrictions are in place, the rural basic left-turn treatment (BAL) has also been analysed for the purpose of this report.

This treatment provides tapers leading into and out of the left-turn treatment to cater for the swept path of the largest design vehicle. Figure 74 shows the rural basic left-turn treatment (BAL).

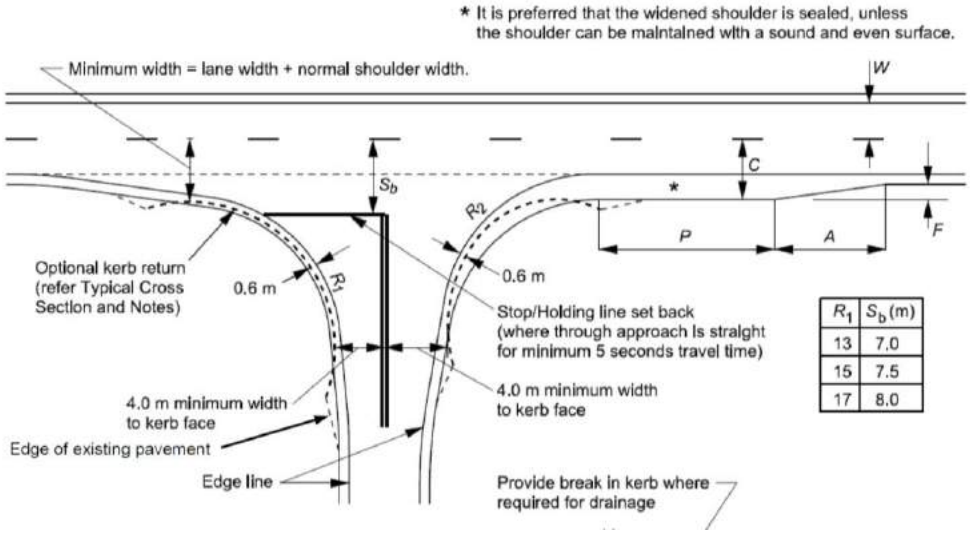


Figure 74 – Rural basic left-turn treatment (BAL) (Source: GRD, Figure 8.2)

According to Table 8.1, the minimum length of the widened parallel shoulder P, as shown in Figure 75 below, is 0m for a major road approach with a design speed of 50km/h.

Table 8.1: Minimum length of widened parallel shoulder

Design speed of major road approach (km/h)	Minimum length of parallel widened shoulder *P* (m)
50	0
60	5
70	10
80	15
90	20
100	25
110	35
120	45

Figure 75 – Minimum length of parallel widened shoulder

The taper length A, in front of the parallel shoulder P is calculated as follows (according to AGRD Part 4A, page 80):

$$A = 0.5VF/3.6 = (0.5 \times 50 \times 2.5)/3.6 = 17.3\ m$$

© Copyright; **ptc.**

Figure 76 shows a concept of the BAL treatment at the proposed THE SCHOOL driveway along Maitland Street, with the deceleration and taper A length of 17.3m and formation / carriageway widening of 2.5m. A swept path has been prepared showing a B99 vehicle entering the combined entry and exit driveway.

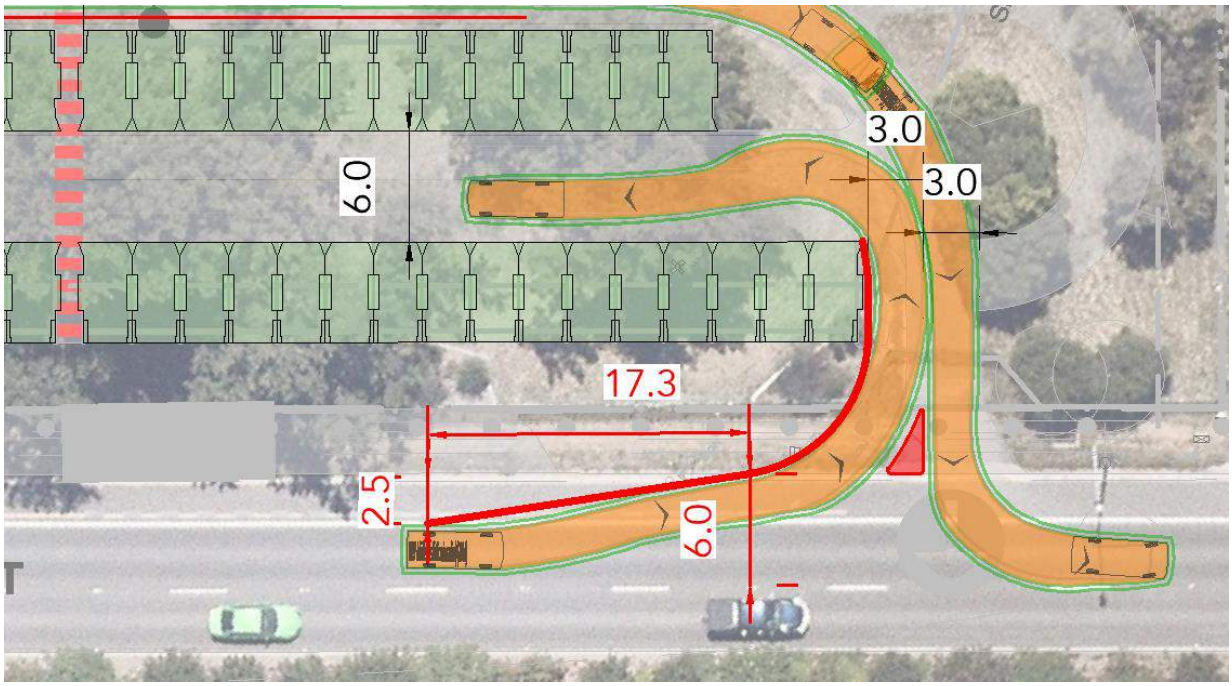


Figure 76 – BAL treatment at the proposed driveway

© Copyright; **ptc.**

8.6 Summary and Discussion

Having considered both the BAL and AUL(s) treatments, it is noted that the rationale for implementing these treatments stems from the concerns over queuing and road safety on the main road, being Maitland Road when the school becomes operational. The following should be noted:

- According to AGTM06-17 Guide to Traffic Management Commentary 9 Warrants for Unsignalised Intersection Turn Treatments Clause 9.2,

  > *"The warrants are based on the construction of intersections on new roads (i.e. Greenfield sites). Therefore, their most appropriate application is to the selection of turn types for intersections on new roads. However, the warrants may also be used:*
  >
  > - *as a reference for the construction of new intersections on existing roads*
  > - *as a reference for intervention levels when upgrading existing intersection turn treatments*
  > - *although no intended for direct application to access and driveways, they may be used as a reference for such."*

  This means that the application of the warrants in Figure 37 is theoretically not essential.

- A school zone will be established upon approach to the driveway and therefore, the posted speed limit will be reduced to 40km/h.
- The planned bypass will likely lead to a significant reduction in traffic along Maitland Street.

The AULs and the BAL do not have a significant difference in their layout, but based on the concept design the AULs may impact on some services located in the ground. Understanding that TfNSW favours the AULs treatment, it is proposed to agree that a left-turn treatment will be required in the future, but the exact design shall be determined at the time of combining the entry and exit. It is also noted that it would be beneficial to undertake new traffic surveys at the time of planning for the driveway, as the Muswellbrook bypass will likely lead to a reduction of traffic along Maitland Street.

© Copyright; **ptc.**

9. Conclusion

The following section outlines the key findings throughout the course of study:

- The proposal involves the relocation of the existing Pacific Brook Public School from 96-104 Hill Street, Muswellbrook to 72-74 Maitland Street, Muswellbrook. The school facilities are to accommodate 140 students and 16 staff in Stage 1 and 656 students and approximately 65 staff at the master plan stage.
- A review of the available public transport services operating within the vicinity of the proposed School site indicates that public transport is currently not a viable option for students and staff. Discussions between TfNSW, Council and the School should be undertaken to deliver more convenient public transport connections to the School. As part of the project, it is planned that a bus stop will be provided on Maitland Street along the School frontage close to the main school entry.
- A review of the existing walking and cycling facilities has found that the pedestrian and cycling networks are currently underdeveloped with lack of footpaths and cycling routes. Particularly students residing north of the proposed sit would have difficulties to walk or cycle to and from the school. However, with the upgrade of the Maitland Street / Thompson Street intersection, signalised and therefore safe access will be provided for students residing south of the school.
- Online questionnaires have been undertaken for students and staff to determine the existing traffic and parking profile on a typical school day. The following are the main results:
    - The primary mode of transport for students is by car (64% in the AM and 51% in the PM peaks, respectively);
    - This was followed by bus which comprised 30% and 38% in the AM and PM peaks respectively;
    - The weighted average vehicle occupancy rates were 1.62 and 1.71 occupants/vehicle in the AM and PM peaks respectively; and
    - In terms of staff travel mode, all staff travel by car (as driver).

  The surveys also questioned the potential student and staff travel mode share for the new location. While car is likely to remain the mot prevalent transport mode, many students responded that they would likely use a bus or walk in the future. Cycling and scooting was the least preferred travel option, despite good facilities within the school grounds.
- A car park has been designed to accommodate up to 67 car spaces. A pick-up and drop-off area has been proposed within the internal roadway of the car park. A loading/waste collection bay is proposed within the property boundary.
- A queuing assessment has been undertaken to estimate the pick-up and drop-off space requirement for the school. For 140 students in Stage 1, 1 bell time and 30% of students using public and active transport to travel to and from school, a 20 vehicle long queue is required within the site boundary. This can be accommodated along the existing drive-through. With a growing student population, the school has a number of tools to accommodate the queue within the site, i.e. through implementing a second bell time, offer additional before and after school care activities etc. Eventually though, the school will

© Copyright; **ptc.**

combine the entry and exit to one driveway to enable the internal pick-up and drop-off queue to loop around the car park and thereby increase to a capacity of 37 vehicles.

- The school is proposing to provide 12 bicycle spaces for Stage 1 and 72 for the master plan. The bicycle usage will be monitored and more spaces will be added should the demand increase.
- The existing, post-development and future scenarios for the surrounding road network have been modelled using the SIDRA 9 intersection software. Overall, the traffic modelling indicates that the proposed development will not have any significant impact on the performance of the surrounding road network.
- A preliminary review of the proposed car park layout indicates that the design is capable of complying with the design requirements of the AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009. The concept car park design submitted as part of this SSDA will be finalised in the detailed design stage to ensure full compliance with the Australian Standards.
- At the time of combining the entry and exit driveway, a deceleration lane will be constructed utilising the road shoulder.

In light of the above, the proposed development is endorsed in the context of parking and traffic.

© Copyright; **ptc.**

Attachment 1 Architectural Drawings – Stage 1

© Copyright; **ptc.**

NBRSARCHITECTURE.

LEGEND (STAGE 1)

EXISTING TREES TO BE RETAINED

EXISTING TREES TO BE REMOVED
(refer to arborist report)

PEDESTRIAN ACCESS

VEHICLE ENTRY/EXIT

BOUNDARY

EXISTING FENCE

EXISTING ELECTRIC

EXISTING GAS

EXISTING SEWER

EXISTING STORMWATER

EXISTING TEL COMMS

PROPOSED LOCATION FOR PEDESTRIAN FOOTPATH ON COUNCIL LAND — PEDESTRIAN FOOTPATH

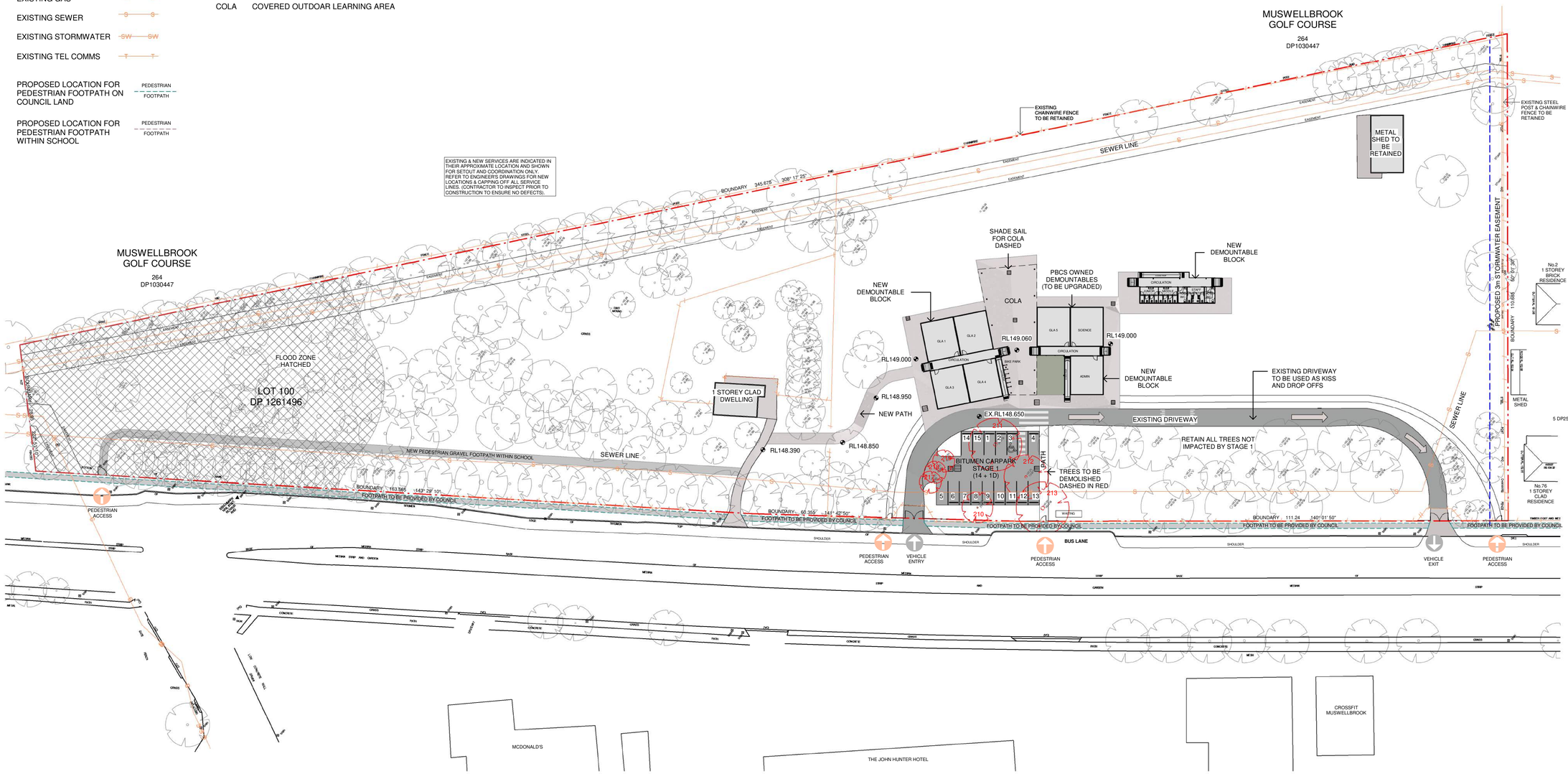
PROPOSED LOCATION FOR PEDESTRIAN FOOTPATH WITHIN SCHOOL — PEDESTRIAN FOOTPATH

PLANTING & PAVING LEGEND

- SYNTHETIC TURF
- CONCRETE SURFACE
- PARKING ZONE
- DRIVEWAY ZONE

ABBREVIATION

WC	TOILET BLOCK
ST	STORE
SW	SHARED WITHDRAWAL
GLA	GENERAL LEARNING AREA
COLA	COVERED OUTDOAR LEARNING AREA



1 STAGE 1 - SITE PLAN
1 : 500

Planner
DFP Planning Pty Ltd
Natasha Bartley
11 Dartford Road, Thornleigh NSW 2120
P: 02 9980 6933
E: nbartley@dfpplanning.com.au

Ecological Consultant
Abel Ecology
Dr Danny Wotherspoon
Unit 2, 10-11 Ferguson Road, Springwood NSW 2777
P: 02 4751 9487
E: info@abelecology.com.au

Traffic Engineer
PTC Consultants
Kasia Balsam
Suite 502, 1 James Place, North Sydney NSW 2060
P: 02 8920 0800
E: kasia.balsam@ptcconsultants.co

Geotech Engineer
Douglas Partners
Chris Bozinovski
15 Callistemon Close, Warabrook NSW 2304
P: 02 4960 9600
E: Chris.Bozinovski@douglaspartners.com.au

Structural and Civil Engineer
Birzulis
Michael Grogan
583 Darling Street, Rozelle NSW 2039
P: 02 9555 7230
E: mgrogan@birzulisassociates.com

Services Engineers
ACOR Consultants
Warwick Meadows
Suite 2, Level 1, 33 Herbert Street, St Leonards NSW 2065
P: 02 9438 5098
E: Wmeadows@acor.com.au

Issue

No.	Date	Description	Chkd
8	29.04.2021	Issued for BGA	NBRS
9	12.05.2021	Issued for Consultant Coordination	NBRS
10	16.06.2021	Issued for Consultant Coordination	NBRS
11	30.06.2021	SSDA	NBRS
12	09.07.2021	ISSUED FOR REVIEW	NBRS
13	30.08.2021	Issue for Coordination	NBRS
14	03.09.2021	SSDA	NBRS
15	14.09.2021	Issued for SSDA	NBRS

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

Any form of replication of this drawing in full or in part without the written permission of NBRS+PARTNERS Pty Ltd consistitutes an infringement of the copyright.

Nominated Architect:
Andrew Duffin NSW 5602
NBRS & Partners Pty Ltd VIC 51197

© 2019

ABN 16 002 247 565

Project

PACIFIC BROOK CHRISTIAN SCHOOL

at

Lot 100 DP1261496, 72-74 Maitland Street, Muswellbrook NSW

for

Pacific Brook Christian School Ltd

Drawing Title

Stage 1 Site Plan

Date 21/09/2021 11:30:18 PM
Scale As indicated @ A1

Drawing Reference
19055-NBRS-DR-A-SSDA-2000

Revision
15

0 10 20 30 40 50 60 70 80 90 100

Attachment 2 Architectural Drawings – Masterplan

© Copyright; **ptc.**

BUILDING LEGEND

- MIDDLE SCHOOL ZONE
- ADMIN / LIBRARY
- JUNIOR SCHOOL ZONE
- SENIOR SCHOOL ZONE
- HOPE SCHOOL ZONE
- SPORTS ZONE
- MAINTENANCE
- LIFT

PLANTING & PAVING LEGEND

- PLANTING ZONE
- SYNTHETIC TURF
- ASPHALT SURFACE
- CONCRETE SURFACE
- DECORATIVE PAVING
- PARKING ZONE

LEGEND

- BOUNDARY
- EXISTING FENCE
- EXISTING ELECTRIC
- EXISTING GAS
- EXISTING SEWER
- EXISTING STORMWATER
- EXISTING TEL COMMS
- EXISTING TREES TO BE RETAINED
- EXISTING TREE PROTECTION ZONE (TPZ) (refer to arborist report)
- EXISTING TREES TO BE REMOVED (refer to arborist report)
- PROPOSED TREES (refer to landscape drawings)
- PEDESTRIAN ACCESS
- VEHICLE ENTRY/EXIT
- PROPOSED LOCATION FOR STORMWATER EASEMENT
- PROPOSED LOCATION FOR PEDESTRIAN FOOTPATH ON COUNCIL LAND
- PROPOSED LOCATION FOR PEDESTRIAN FOOTPATH WITHIN SCHOOL

ABBREVIATION

WC	TOILET BLOCK
ST	STORE
SW	SHARED WITHDRAWAL
GLA	GENERAL LEARNING AREA
COLA	COVERED OUTDOAR LEARNING AREA

EXISTING & NEW SERVICES ARE INDICATED IN THEIR APPROXIMATE LOCATION AND SHOWN FOR SETOUT AND COORDINATION ONLY. REFER TO ENGINEERS DRAWINGS FOR NEW LOCATIONS & CAPPING OFF ALL SERVICE LINES. (CONTRACTOR TO INSPECT PRIOR TO CONSTRUCTION TO ENSURE NO DEFECTS).

MUSWELLBROOK GOLF COURSE
264
DP1030447

MUSWELLBROOK GOLF COURSE
264
DP1030447

LOT 100
DP 1261496

FOR ALL EXTERNAL WORKS REFER TO LANDSCAPE DRAWINGS

SENIOR SCHOOL
MIDDLE SCHOOL
JUNIOR SCHOOL
HOPE SCHOOL
COMMUNAL PLAY AREA
SECURE PLAY AREA
COVERED WALKWAY
MULTI PURPOSE
FORECOURT
ENTRY FORECOURT
MAIN ENTRANCE / PEDESTRIAN PLAZA
KISS AND DROP
FOOTPATH
BUS LANE
SLOWING DOWN LANE
BUSH CHAPEL
FLOOD ZONE HATCHED
AGRICULTURE ZONE
MAINTENANCE + BUS
NEW PEDESTRIAN GRAVEL FOOTPATH WITHIN SCHOOL
EXISTING CHAINWIRE FENCE TO BE RETAINED
EXISTING STEEL POST & CHAINWIRE FENCE TO BE RETAINED
PROPOSED 2m STORMWATER EASEMENT
No.2 1 STOREY BRICK RESIDENCE
No.76 1 STOREY CLAD RESIDENCE
METAL SHED
SERVICES TURN CIRCLE
SERVICES VEHICLE ACCESS ONLY
PEDESTRIAN ACCESS
EMERGENCY AND SERVICE VEHICLE ACCESS ONLY
KISS & DROP AND STAFF/ VISITOR PARKING ENTRANCE AND EXIT
FOOTPATH TO BE PROVIDED BY COUNCIL
BOUNDARY 345.67° 308° 17' 25"
BOUNDARY 163.565 143° 29' 10"
BOUNDARY 60.359 141° 42' 50"
BOUNDARY 111.24 140° 01' 50"
BOUNDARY 222.51 90° 00' 00"
BOUNDARY 29.98 90° 00' 00"
BOUNDARY 50.3 90° 01' 30"
BOUNDARY 110.656 90° 00' 00"
T51 TPZ 4.8m
T73 TPZ 11.88m
T127 TPZ 5.16m
T128 TPZ 4.8m
T102 TPZ 3.04m
T130 TPZ 6.59m
T169 TPZ 3.46m
T190 TPZ 3.66m
T193 TPZ 8.16m
THOMPSON STREET
MAITLAND STREET
MCDONALD'S
THE JOHN HUNTER HOTEL
CROSSFIT MUSWELLBROOK

Planner
DFP Planning Pty Ltd
Natasha Bartley
11 Dartford Road, Thornleigh NSW 2120
P: 02 9980 6933
E: nbartley@dfpplanning.com.au

Ecological Consultant
Abel Ecology
Dr Danny Wotherspoon
Unit 2, 10-11 Ferguson Road, Springwood NSW 2777
P: 02 4751 9487
E: info@abelecology.com.au

Traffic Engineer
PTC Consultants
Kasia Balsam
Suite 502, 1 James Place, North Sydney NSW 2060
P: 02 8920 0800
E: kasia.balsam@ptcconsultants.co

Geotech Engineer
Douglas Partners
Chris Bozinovski
15 Callistemon Close, Warabrook NSW 2304
P: 02 4960 9600
E: Chris.Bozinovski@douglaspartners.com.au

Structural and Civil Engineer
Birzulis
Michael Grogan
583 Darling Street, Rozelle NSW 2039
P: 02 9555 7230
E: mgrogan@birzulisassociates.com

Services Engineers
ACOR Consultants
Warwick Meadows
Suite 2, Level 1, 33 Herbert Street, St Leonards NSW 2065
P: 02 9438 5098
E: Wmeadows@acor.com.au

Issue

No.	Date	Description	Chkd
6	16.06.2021	Issued for Consultant Coordination	NBRS
7	30.06.2021	SSDA	NBRS
8	09.07.2021	ISSUED FOR REVIEW	NBRS
9	22.02.2021	Issued for Consultant Coordination	NBRS
10	25.08.2021	Issue for Information	NBRS
11	30.08.2021	Issue for Coordination	NBRS
12	03.09.2021	SSDA	NBRS
13	14.09.2021	Issued for SSDA	NBRS

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

Any form of replication of this drawing in full or in part without the written permission of NBRS+PARTNERS Pty Ltd consistitutes an infringement of the copyright.

Nominated Architect:
Andrew Duffin NSW 5602
NBRS & Partners Pty Ltd VIC 51197

© 2019

ABN 16 002 247 565

Project
PACIFIC BROOK CHRISTIAN SCHOOL

at
Lot 100 DP1261496, 72-74 Maitland Street, Muswellbrook NSW

for
Pacific Brook Christian School Ltd

Drawing Title
Ground Floor Concept Masterplan

Date 22/09/2021 10:09:12 AM
Scale 1:500 @ A1

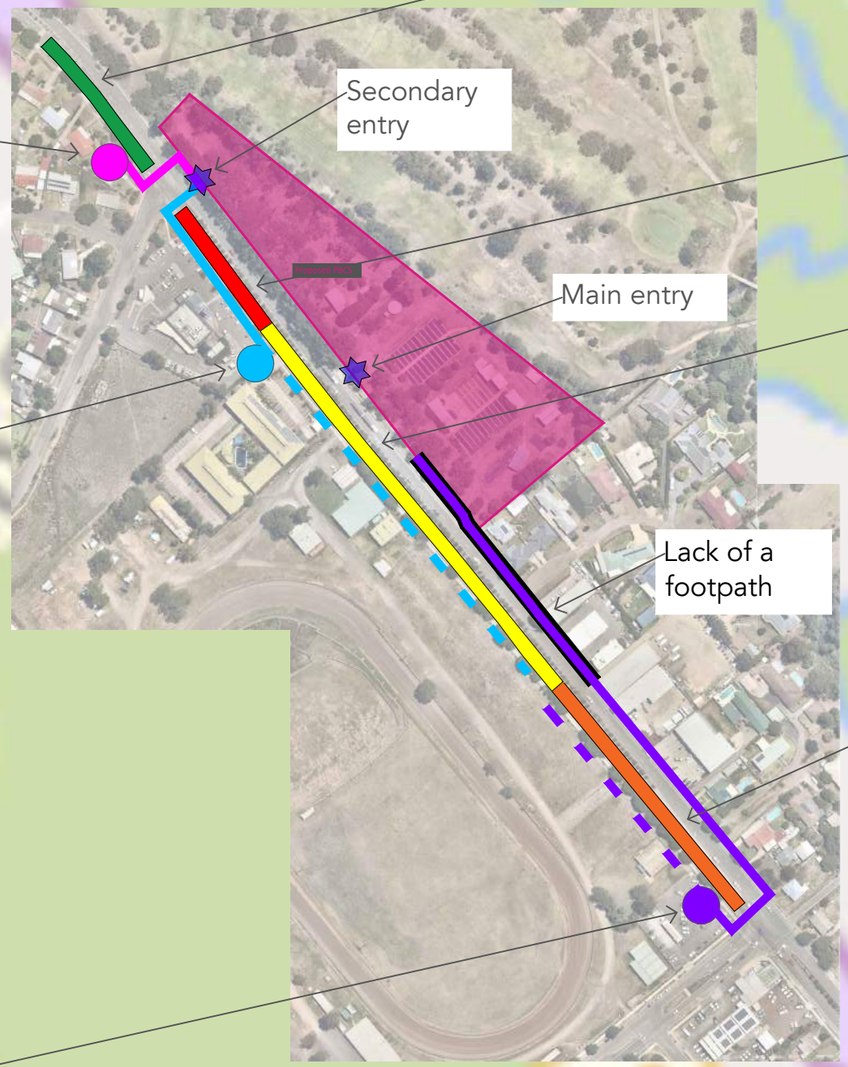
Drawing Reference
19055-NBRS-DR-A-SSDA-1000

Revision
13

0 5m 10m 15m 20m 25m 30m 35m 40m 1:500

Attachment 3 Public Transport Analysis

© Copyright; **ptc.**



Option 1 - recommended
75m walking distance

Ideal section for a bus stop due to the proximity to the school, safe access for students via the future signalised crossing and easy access for buses.

This section is not suitable for a bus stop due to the left turn lane.

Option 2
130m walking distance

Section suitable for a bus stop. However, the walking distance stretches between 130-400m. There is also a risk of students / parents trying to cross Maitland Street mid-block to reach the main entry faster, which can create safety issues.

Section suitable only if a footpath on the eastern side of the school is constructed. However, the walking distance to the school would be the longest of all sections, with 400-600m

Option 3
400m walking distance

comments

A3

- Bus Stop Options
- Pedestrian Connection to Bus Stops
- Desirable Location
- Possible but less Desirable Location
- Less Desirable Location
- Not Possible Location

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Bus Stop Location Analysis

client	Pacific Brook Christian School
drawing #	ptc-001
project #	KB-2829
scale	1 : 4,000

rev 1

comments

A3

New Bus Stop proposed by PBCS

New Bus Stop proposed to be implemented by TfNSW

Proposed Changes:

1. Proposed bus stops at the following locations to service Pacific Brook Christian School:
- Bus Stop A at Pacific Brook Christian School, implemented by the school
- Bus Stop B at Maitland Street west of Thompson Street, proposed to be implemented by TfNSW

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

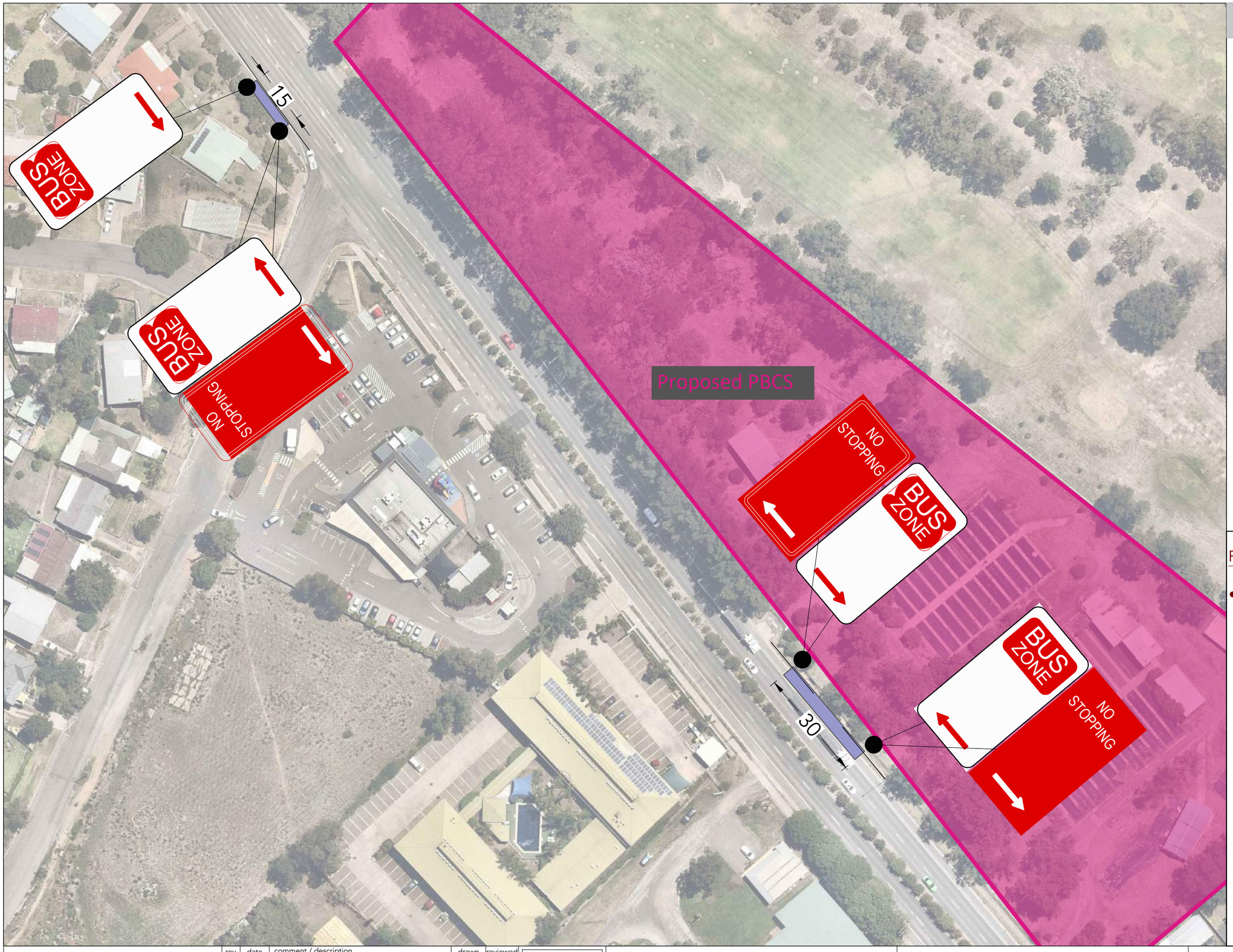
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project: Pacific Brook Chrisan School

drawing title: Proposed Bus Stops at Maitland Street

client	Pacific Brook Christian School
drawing #	ptc-002
project #	KB-2829
scale	1 : 1000

rev 1



comments

A3

Proposed Changes:

- Proposed 'Bus Zone' and 'No Stopping' signs at the proposed bus stop locations at Pacific Brook Public School and Maitland Street west of Thompson Street

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

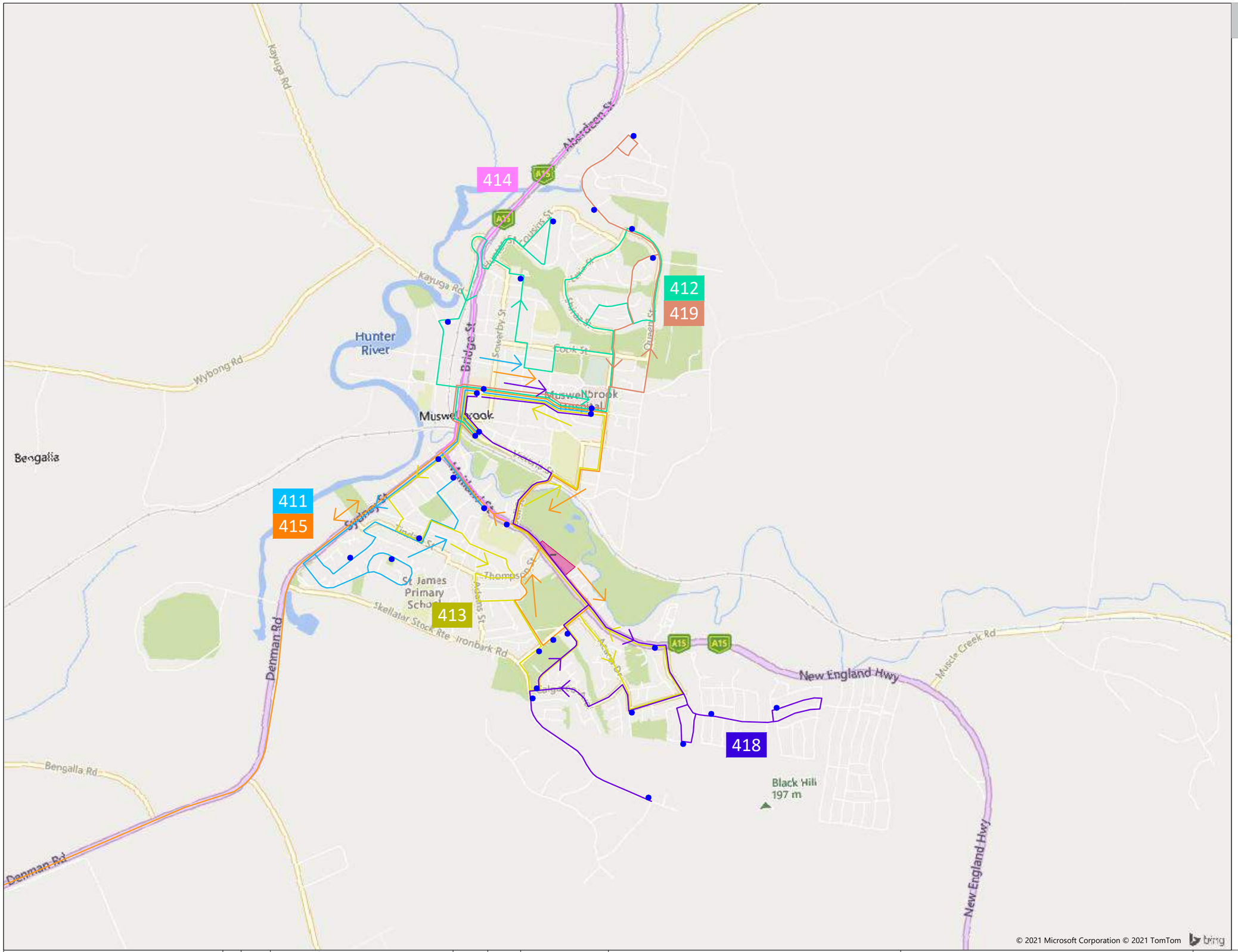
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Signage Plan at the Proposed Bus Stop Locations

client	Pacific Brook Christian School
drawing #	ptc-003
project #	KB-2829
scale	1 : 1000

rev 1



comments

A3

Existing Bus Stops

Existing Bus Routes

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Existing Bus Services and Bus Stops- Overview

client	Pacific Brook Christian School
drawing #	ptc-004
project #	KB-2829
scale	1 : 30,000

rev 1

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Currently the closest bus stop and time of arrival are:
Lorne St at Maitland St, Muswellbrook - 9:27am

Proposed additional bus arrival time between 8:30am - 9:00am at the proposed Bus Stop A

Dotted lines represent two options of proposed extension to the bus route for the morning peak

Monday to Friday	♿	♿	♿	♿	♿	♿
Osborn Bus Depot, Maitland St, Muswellbrook	09:07	-	-	-	13:05	-
Brook St before Bridge St, Muswellbrook	–	10:35	12:02	12:40	–	13:44
Muswellbrook Station	–	10:39	12:06	–	13:10	13:48
Sydney St after Maitland St, Muswellbrook	09:10	10:42	12:09	–	13:15	13:51
Hunter Park, Wollombi Rd, Muswellbrook	09:13	10:45	12:11	–	–	13:52
32 Tobruk Av, Muswellbrook	09:20	10:51	12:17	–	–	13:56
Tindale St at Nowland St, Muswellbrook	09:25	10:55	12:19	–	13:18	14:02
Lorne St at Maitland St (Hail & Ride), Muswellbrook	09:27	10:57	-	–	-	14:05
Muswellbrook Station	09:30	10:59	-	–	-	14:08
Brook Medical Centre, Brook St, Muswellbrook	09:35	11:02	-	12:42	-	14:10
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:37	11:05	-	12:45	-	14:12

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service before school bell time at approximately 8:30am (exact timing TBC)

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

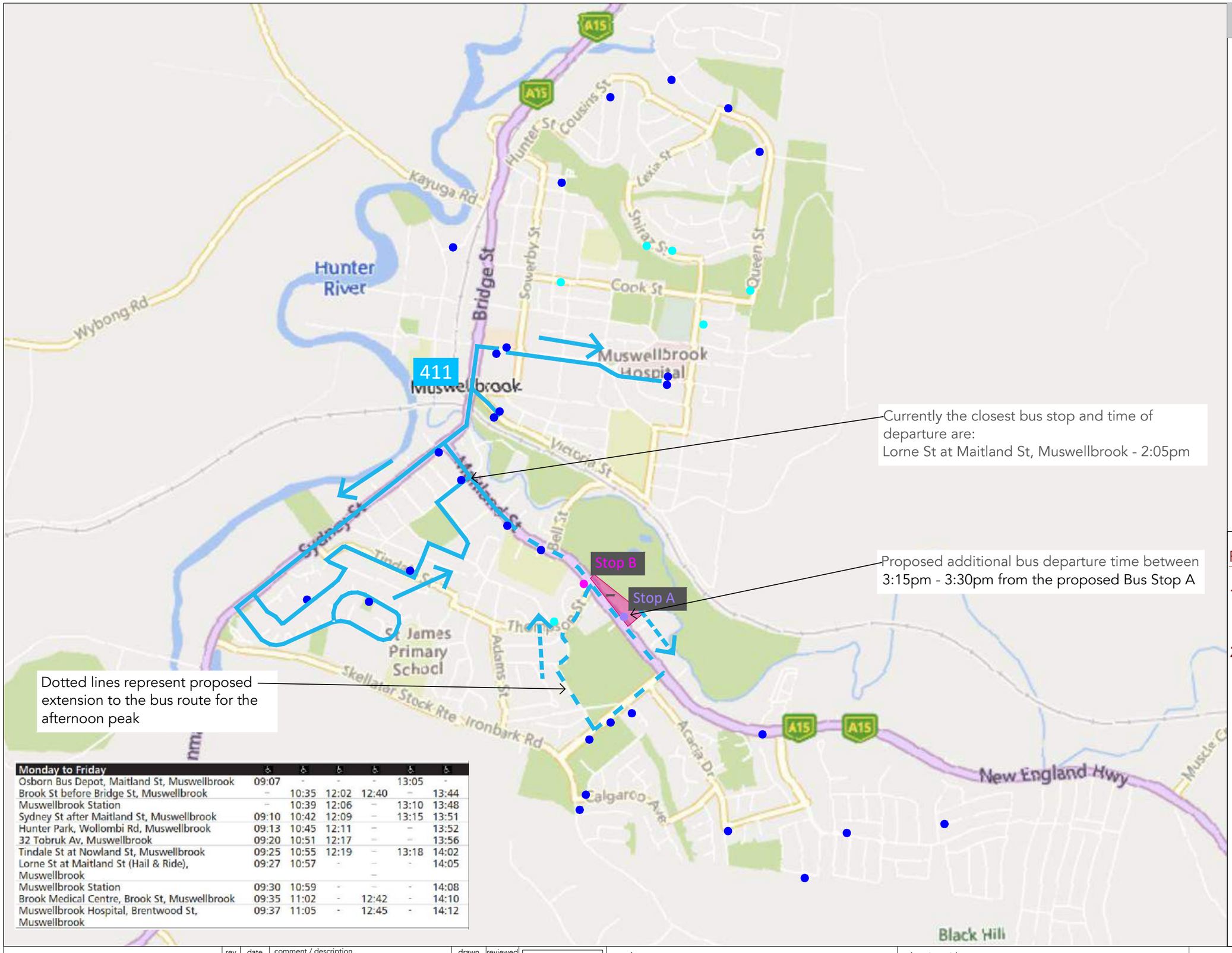
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 411 Bus Route and Timetable for the Morning School Peak

client	Pacific Brook Christian School
drawing #	ptc-005
project #	KB-2829
scale	1 : 20,000

rev 1



Monday to Friday	♿	♿	♿	♿	♿	♿
Osborn Bus Depot, Maitland St, Muswellbrook	09:07	-	-	-	13:05	-
Brook St before Bridge St, Muswellbrook	–	10:35	12:02	12:40	–	13:44
Muswellbrook Station	–	10:39	12:06	–	13:10	13:48
Sydney St after Maitland St, Muswellbrook	09:10	10:42	12:09	–	13:15	13:51
Hunter Park, Wollombi Rd, Muswellbrook	09:13	10:45	12:11	–	–	13:52
32 Tobruk Av, Muswellbrook	09:20	10:51	12:17	–	–	13:56
Tindale St at Nowland St, Muswellbrook	09:25	10:55	12:19	–	13:18	14:02
Lorne St at Maitland St (Hail & Ride), Muswellbrook	09:27	10:57	-	–	-	14:05
Muswellbrook Station	09:30	10:59	-	–	-	14:08
Brook Medical Centre, Brook St, Muswellbrook	09:35	11:02	-	12:42	-	14:10
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:37	11:05	-	12:45	-	14:12

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service after school bell time at approximately 3:15pm (exact timing TBC)

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

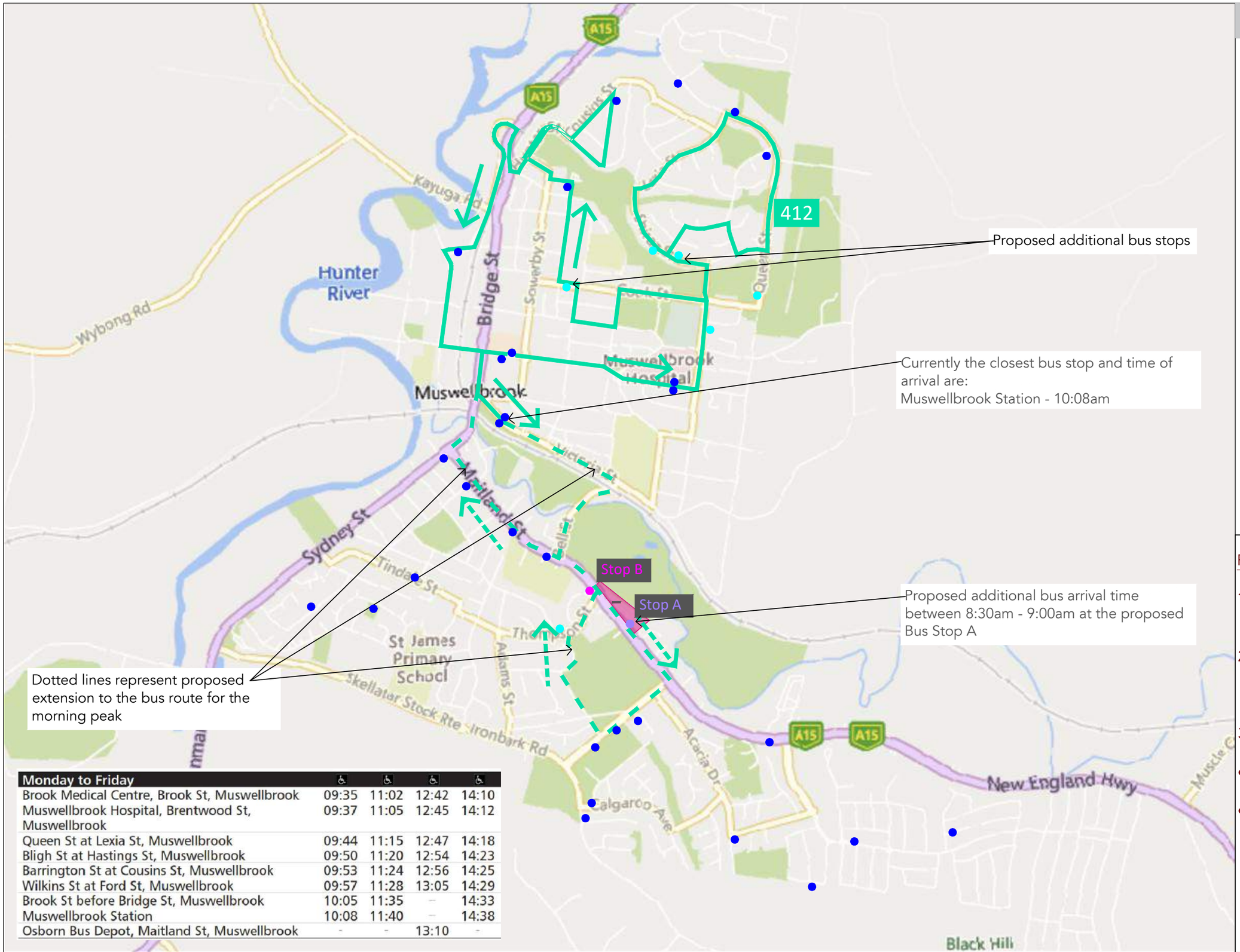
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 411 Bus Route and Timetable for the Afternoon School Peak

client	Pacific Brook Christian School
drawing #	ptc-006
project #	KB-2829
scale	1 : 20,000

rev 1



Monday to Friday	♿	♿	♿	♿
Brook Medical Centre, Brook St, Muswellbrook	09:35	11:02	12:42	14:10
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:37	11:05	12:45	14:12
Queen St at Lexia St, Muswellbrook	09:44	11:15	12:47	14:18
Bligh St at Hastings St, Muswellbrook	09:50	11:20	12:54	14:23
Barrington St at Cousins St, Muswellbrook	09:53	11:24	12:56	14:25
Wilkins St at Ford St, Muswellbrook	09:57	11:28	13:05	14:29
Brook St before Bridge St, Muswellbrook	10:05	11:35	–	14:33
Muswellbrook Station	10:08	11:40	–	14:38
Osborn Bus Depot, Maitland St, Muswellbrook	-	-	13:10	-

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service before school bell time at approximately 8:30am (exact timing TBC)
3. Addition of two bus stops at the following locations:
   - Shiraz Street after Traminer Street
   - Cook Street before Bligh Street

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

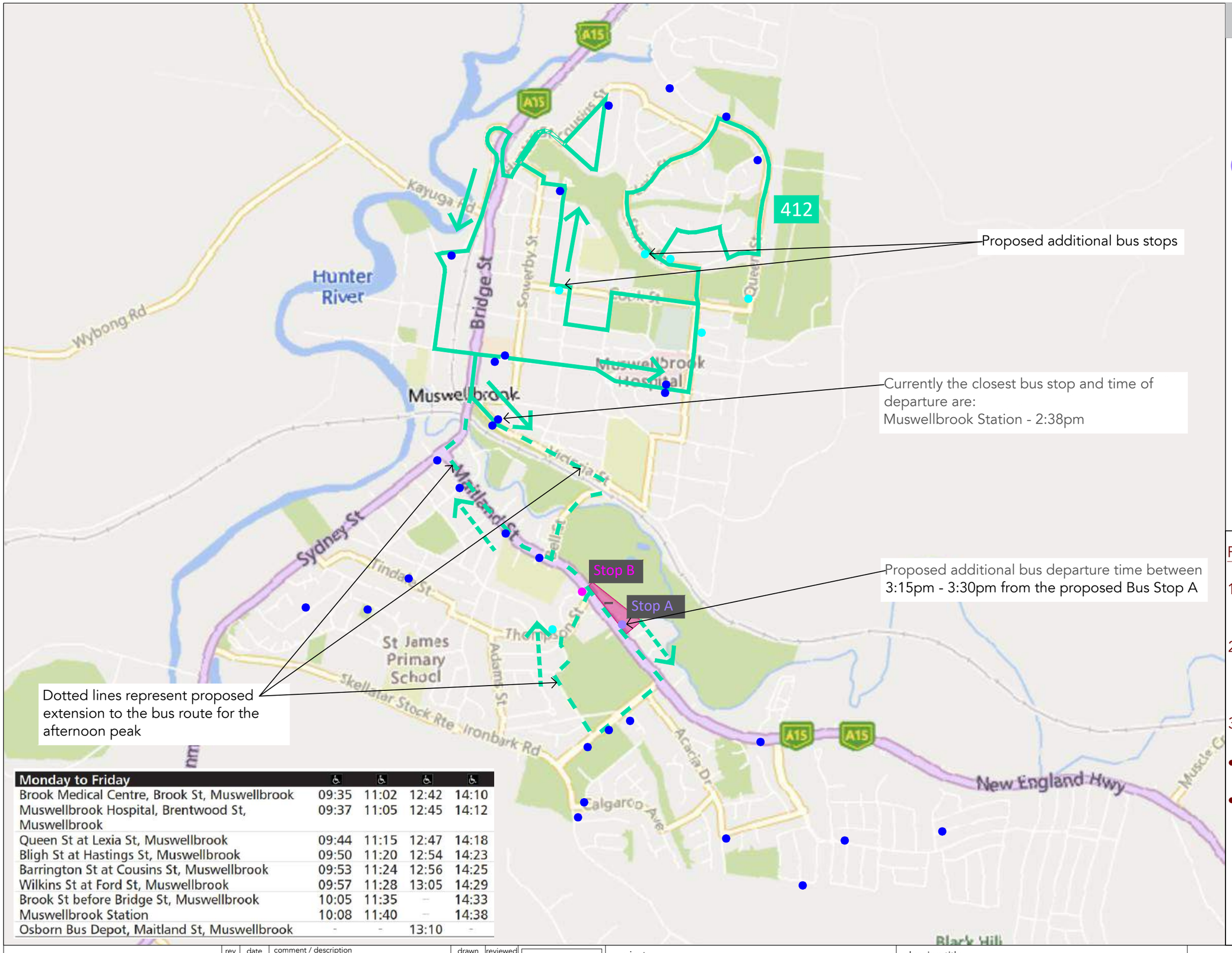
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project: Pacific Brook Chrisan School

drawing title: Proposed Changes to 412 Bus Route and Timetable for the Morning School Peak

client	Pacific Brook Christian School
drawing #	ptc-007
project #	KB-2829
scale	1 : 20,000

rev 1



Monday to Friday	♿	♿	♿	♿
Brook Medical Centre, Brook St, Muswellbrook	09:35	11:02	12:42	14:10
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:37	11:05	12:45	14:12
Queen St at Lexia St, Muswellbrook	09:44	11:15	12:47	14:18
Bligh St at Hastings St, Muswellbrook	09:50	11:20	12:54	14:23
Barrington St at Cousins St, Muswellbrook	09:53	11:24	12:56	14:25
Wilkins St at Ford St, Muswellbrook	09:57	11:28	13:05	14:29
Brook St before Bridge St, Muswellbrook	10:05	11:35	–	14:33
Muswellbrook Station	10:08	11:40	–	14:38
Osborn Bus Depot, Maitland St, Muswellbrook	-	-	13:10	-

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service after school bell time at approximately 3:15pm (exact timing TBC)
3. Addition of two bus stops on the following locations -
   - Shiraz Street opposite Traminer Street
   - Cook Street before Bligh Street

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project: Pacific Brook Chrisan School

drawing title: Proposed Changes to 412 Bus Route and Timetable for the Afternoon School Peak

client	Pacific Brook Christian School
drawing #	ptc-008
project #	KB-2829
scale	1 : 20,000

rev 1

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed additional bus arrival time between 8:30am - 9:00am at the proposed Bus Stop B

Currently the closest bus stop and time of arrival are:
New England Highway after Bimbadeen Drive, Muswellbrook - 10:23am

Proposed additional bus stop

Stop B

Stop A

413

Monday to Friday	♿	♿	♿	♿	♿
Brook St before Bridge St, Muswellbrook	10:05	11:35	-	-	14:33
Muswellbrook Station	10:08	11:40	-	-	14:38
32 Tobruk Av, Muswellbrook	–	–	-	-	14:40
Nowland St at Skellatar St (Hail & Ride), Muswellbrook	10:13	11:43	12:19	13:18	14:41
Rutherford Rd at Cassidy Av, Muswellbrook	10:18	11:46	12:25	13:25	14:45
Calgaroo Av at Woollybutt Way, Muswellbrook	10:21	11:52	12:29	13:33	14:48
New England Hwy after Bimbadeen Dr (Hail & Ride), Muswellbrook	10:23	11:57	12:35	13:36	14:54
Muswellbrook Hospital, Brentwood St, Muswellbrook	10:32	12:01	12:38	13:40	-
Brook St before Bridge St, Muswellbrook	10:35	12:02	12:40	13:44	-

Proposed Changes:

1. Provision of an additional bus service before school bell time at approximately 8:30am (exact timing TBC)
2. Addition of one bus stop at the following location:
   - Ruth White Avenue before Thompson Street

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 413 Bus Timetable for the Morning School Peak

client	Pacific Brook Christian School
drawing #	ptc-009
project #	KB-2829
scale	1 : 20,000

rev 1

Monday to Friday	♿	♿
Osborn Bus Depot, Maitland St, Muswellbrook	08:03	-
Muswellbrook Station	08:05	-
Muswellbrook Hospital, Brentwood St, Muswellbrook	–	11:53
Muswellbrook Station	–	11:56
Denman Public School, Paxton St, Denman	08:32	12:20
St Joseph's Primary School, Paxton St, Denman	08:35	–
Macauley St opp Hunter St, Denman	08:38	12:24
Denman Information Centre, Palace St, Denman	08:40	12:30
Muswellbrook Station	–	12:50
Brook Medical Centre, Brook St, Muswellbrook	09:01	–
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:03	12:55
Brook St before Bridge St, Muswellbrook	–	12:56
Muswellbrook Fair, Rutherford Rd, Muswellbrook	09:10	–
Osborn Bus Depot, Maitland St, Muswellbrook	09:13	12:58

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed Changes:

1. Modification to the bus route to provide a more convenient service from the Pacific Brook Christian School
2. Provision of an additional bus service after school bell time at approximately 3:15pm (exact timing TBC)

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project: Pacific Brook Chrisan School

drawing title: Proposed Changes to 415 Bus Route and Timetable for the Afternoon School Peak

client	Pacific Brook Christian School
drawing #	ptc-010
project #	KB-2829
scale	1 : 20,000

rev 1

comments A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed additional bus arrival time between 8:30am - 9:00am at the proposed Bus Stop B

Currently the closest bus stop and time of arrival are:
Woollybutt Way before Rutherford Road, Muswellbrook - 9:43am

Monday to Friday	♿	♿	♿	♿	♿
Osborn Bus Depot, Maitland St, Muswellbrook	09:20	-	-	13:58	-
Brook St before Bridge St, Muswellbrook	–	10:13	11:13	–	14:22
Muswellbrook Station	–	10:17	11:17	–	14:26
Bimbadeen Dr after New England Hwy, Muswellbrook	09:23	10:23	11:23	–	14:32
Henry Dangar Dr after Day St, Muswellbrook	09:25	10:25	11:25	–	14:34
Jeans St at Lynch St, Muswellbrook	09:27	10:27	11:27	–	14:36
John Howe Cct opp Jenkins St, Muswellbrook	09:31	10:31	11:31	–	14:40
Bloodwood Rd at Acacia Dr, Muswellbrook	09:33	10:33	11:33	–	14:42
Ironbark Rd at Edinglassie Dr, Muswellbrook	09:37	10:37	11:37	–	14:46
Ironbark Rd opp Jillaroo Way, Muswellbrook	09:39	10:39	11:39	–	14:48
Calgaroo Av at Woollybutt Way, Muswellbrook	09:42	10:42	11:42	–	14:51
Woollybutt Way before Rutherford Rd, Muswellbrook	09:43	10:43	11:43	–	14:52
Muswellbrook Station	09:50	10:50	11:50	–	-
Brook Medical Centre, Brook St, Muswellbrook	09:54	10:54	11:54	14:03	-
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:58	10:58	11:58	14:07	-

Proposed Changes:

1. Provision of an additional bus service before school bell time at approximately 8:30am (exact timing TBC)

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

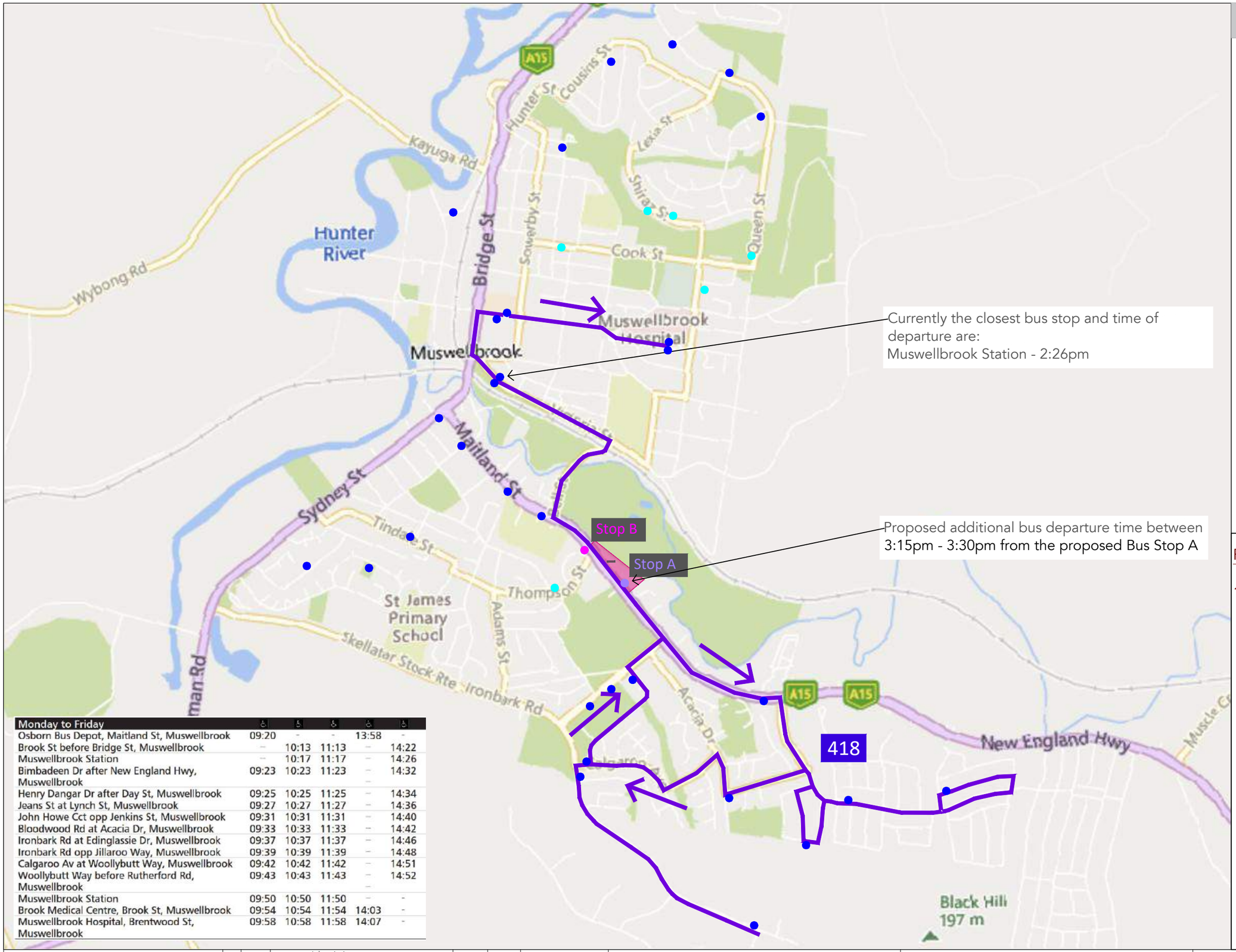
rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 418 Bus Timetable for the Morning School Peak

client	Pacific Brook Christian School
drawing #	ptc-011
project #	KB-2829
scale	1 : 20,000

rev 1



Monday to Friday	♿		♿	♿	♿
Osborn Bus Depot, Maitland St, Muswellbrook	09:20	-	-	13:58	-
Brook St before Bridge St, Muswellbrook	–	10:13	11:13	–	14:22
Muswellbrook Station	–	10:17	11:17	–	14:26
Bimbadeen Dr after New England Hwy, Muswellbrook	09:23	10:23	11:23	–	14:32
Henry Dangar Dr after Day St, Muswellbrook	09:25	10:25	11:25	–	14:34
Jeans St at Lynch St, Muswellbrook	09:27	10:27	11:27	–	14:36
John Howe Cct opp Jenkins St, Muswellbrook	09:31	10:31	11:31	–	14:40
Bloodwood Rd at Acacia Dr, Muswellbrook	09:33	10:33	11:33	–	14:42
Ironbark Rd at Edinglassie Dr, Muswellbrook	09:37	10:37	11:37	–	14:46
Ironbark Rd opp Jillaroo Way, Muswellbrook	09:39	10:39	11:39	–	14:48
Calgaroo Av at Woollybutt Way, Muswellbrook	09:42	10:42	11:42	–	14:51
Woollybutt Way before Rutherford Rd, Muswellbrook	09:43	10:43	11:43	–	14:52
Muswellbrook Station	09:50	10:50	11:50	–	-
Brook Medical Centre, Brook St, Muswellbrook	09:54	10:54	11:54	14:03	-
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:58	10:58	11:58	14:07	-

comments

A3

- Existing Bus Stops
- Proposed Additonal Bus Stops
- Proposed New Bus Stops along Maitland Street
- Existing Bus Route
- Proposed Route Changes

Proposed Changes:

1. Provision of an additional bus service after school bell time at approximately 3:15pm (exact timing TBC)

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 418 Bus Timetable for the Afternoon School Peak

client	Pacific Brook Christian School
drawing #	ptc-012
project #	KB-2829
scale	1 : 20,000

rev 1

comments

A3

Existing Bus Stops

Proposed Additonal Bus Stops

Proposed New Bus Stops along Maitland Street

Existing Bus Route

Proposed Route Changes

Proposed additional bus stops

Currently the closed bus stop and time of arrival are:
Muswellbrook Station - 10:17am

Proposed additional bus arrival time between 8:30am - 9:00am at the proposed Bus Stop A

Dotted lines represent proposed extension to the bus route for the morning peak

Monday to Friday	♿	♿	♿	♿
Brook Medical Centre, Brook St, Muswellbrook	09:54	10:54	11:54	14:03
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:58	10:58	11:58	14:07
Bowman St before Queen St, Muswellbrook	09:59	10:59	11:59	14:08
Queen St opp Holdsworth Cr, Muswellbrook	10:03	11:03	12:03	14:12
Lonhro Pl at Queen St, Muswellbrook	10:04	11:04	12:04	14:13
Cabernet St after Queen St, Muswellbrook	10:07	11:07	12:07	14:16
Muswellbrook Hospital, Brentwood St, Muswellbrook	10:11	11:11	12:11	14:20
Brook St before Bridge St, Muswellbrook	10:13	11:13	12:13	14:22
Muswellbrook Station	10:17	11:17	12:17	14:26

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service before school bell time at approximately 8:30am (exact timing TBC)
3. Addition of two bus stops at the following locations:
   - Queen Street after Cook Street
   - Brecht Street after Paekinson Avenue

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 419 Bus Route and Timetable for the Morning School Peak

client	Pacific Brook Christian School
drawing #	ptc-013
project #	KB-2829
scale	1 : 20,000

rev 1

comments A3

Existing Bus Stops

Proposed Additonal Bus Stops

Proposed New Bus Stops along Maitland Street

Existing Bus Route

Proposed Route Changes

Proposed additional bus stops

Currently the closest bus stop and time of departure are:
Muswellbrook Station - 2:26pm

Proposed additional bus departure time between 3:15pm - 3:30pm from the proposed Bus Stop A

Dotted lines represent proposed extension to the bus route for the afternoon peak

Monday to Friday	♿	♿	♿	♿
Brook Medical Centre, Brook St, Muswellbrook	09:54	10:54	11:54	14:03
Muswellbrook Hospital, Brentwood St, Muswellbrook	09:58	10:58	11:58	14:07
Bowman St before Queen St, Muswellbrook	09:59	10:59	11:59	14:08
Queen St opp Holdsworth Cr, Muswellbrook	10:03	11:03	12:03	14:12
Lonhro Pl at Queen St, Muswellbrook	10:04	11:04	12:04	14:13
Cabernet St after Queen St, Muswellbrook	10:07	11:07	12:07	14:16
Muswellbrook Hospital, Brentwood St, Muswellbrook	10:11	11:11	12:11	14:20
Brook St before Bridge St, Muswellbrook	10:13	11:13	12:13	14:22
Muswellbrook Station	10:17	11:17	12:17	14:26

Proposed Changes:

1. Extension to the bus route to service Pacific Brook Christian School
2. Provision of an additional bus service after school bell time at approximately 3:15pm (exact timing TBC)
3. Addition of two bus stops at the following locations:
- Queen Street after Cook Street
- Brecht Street after Parkinson Avenue

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
1	01/02/21	for information	PS	KB/SW

project
Pacific Brook Chrisan School

drawing title
Proposed Changes to 419 Bus Route and Timetable for the Afternoon School Peak

client	Pacific Brook Christian School
drawing #	ptc-014
project #	KB-2829
scale	1 : 20,000

rev 1

Attachment 4 Design Review – Stage 1

© Copyright; **ptc.**

SHADE SAIL FOR COLA DASHED

NEW DEMOUNTABLE BLOCK

PBCS OWNED DEMOUNTABLES (TO BE UPGRADED)

NEW DEMOUNTABLE BLOCK

COLA

NEW DEMOUNTABLE BLOCK

EXISTING DRIVEWAY TO BE USED AS KISS AND DROP OFFS

NEW PATH

EXISTING DRIVEWAY

RETAIN ALL TREES NOT IMPACTED BY STAGE 1

TREES TO BE DEMOLISHED DASHED IN RED

BITUMEN CARPARK STAGE 1 (14 + 1D)

PATH

SEWER LINE

METAL SHED

No.76 1 STOREY CLAD RESIDENCE

BIKE PARK

6.00

RL149.060

RL149.000

RL148.950

RL148.850

141° 42' 50"

BOUNDARY 111.24 140° 01' 50"

FOOTPATH TO BE PROVIDED BY COUNCIL

SHOULDER

BUS LANE

WAITING

PEDESTRIAN ACCESS

VEHICLE ENTRY

VEHICLE EXIT

CROSSFIT MUSWELLBROOK

comments

A3

TYPICAL

Please note the following compliance requirements:

Height Clearance:	2.2m (min) throughout all areas of the car park accessible to vehicles and bicycles. 4.5m wherever access is required for a refuse vehicle (and safety clearance envelope)
Sight Splays:	Visibility splays in the form of a 2.5m x 2m right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)
Parking Spaces:	The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).
Accessible Spaces:	To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).
Bicycle Parking:	Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.
Control Measures:	Please note recommended control measures, including line markings, signage, bollards, etc.

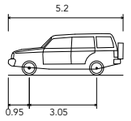
Recommended changes to kerb alignment / space requirement

Recommended roll kerb

2.6m x 5.4m staff and visitor parking space envelopes

2.4m x 5.4m accessible parking space envelope

0.5m x 1.8m bicycle parking space envelope



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

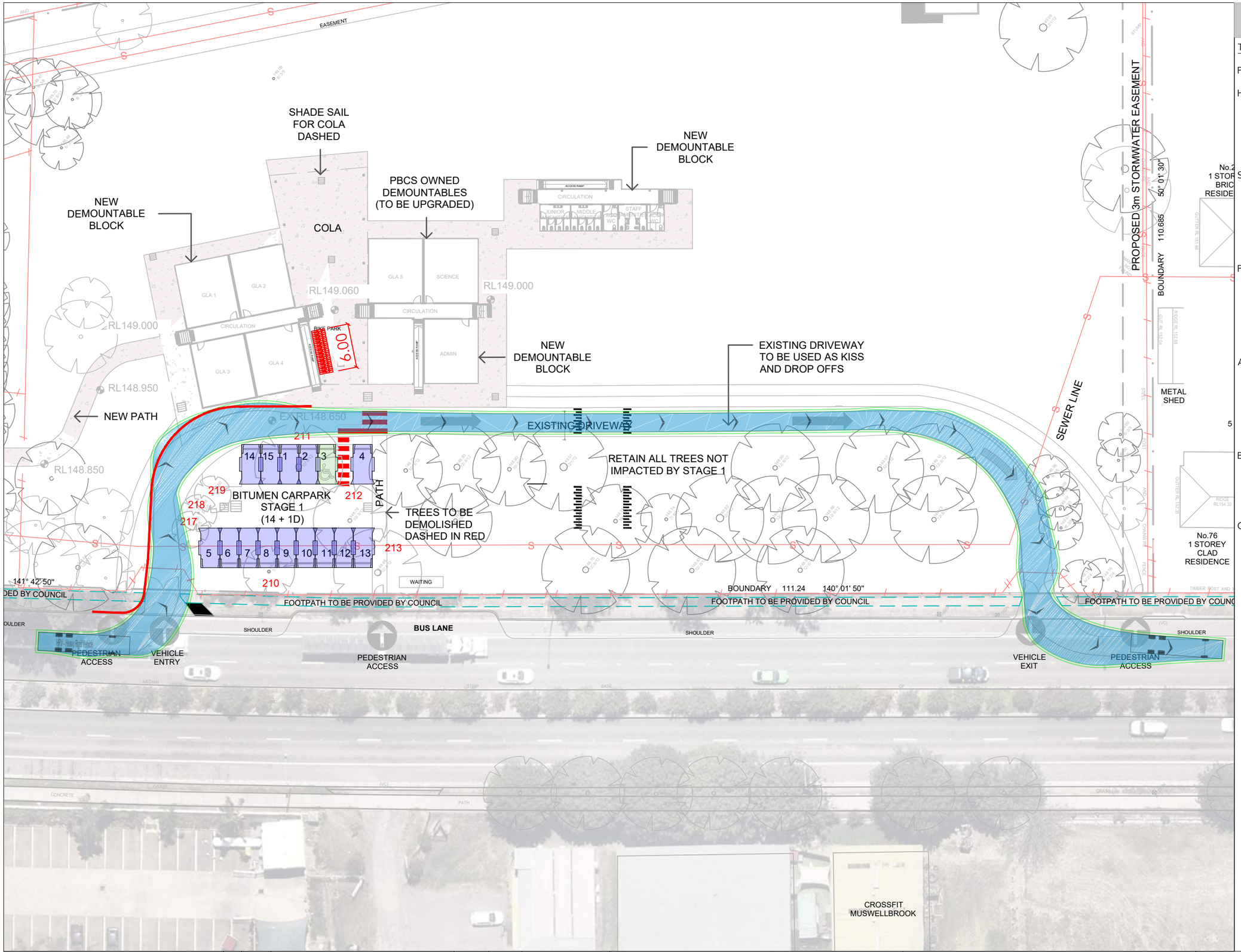
rev	date	comment / description	drawn	reviewed
3	21.09.21	For Review	PS	KB
2	08.07.21	For Review	PS	KB
1	23.02.21	For Review	PS	KB

project
Pacific Brook Christian School

drawing title
Stage 1
Car Park Design Review, Vehicle Circulation and Bicycle Spaces

client	Pacific Brook Christian School
drawing #	ptc-001
project #	KB-2829
scale	1 : 500

rev 3



comments

A3

TYPICAL

Please note the following compliance requirements:

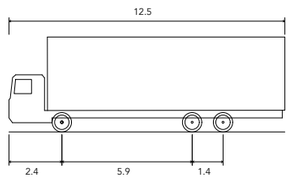
Height Clearance:	2.2m (min) throughout all areas of the car park accessible to vehicles and bicycles. 4.5m wherever access is required for a refuse vehicle (and safety clearance envelope)
Sight Splays:	Visibility splays in the form of a 2.5m x 2m right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)
Parking Spaces:	The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).
Accessible Spaces:	To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).
Bicycle Parking:	Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.
Control Measures:	Please note recommended control measures, including line markings, signage, bollards, etc.

Recommended changes to kerb alignment / space requirement

Recommended roll kerb

2.6m x 5.4m staff and visitor parking space envelopes

2.4m x 5.4m accessible parking space envelope



HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
3	21.09.21	For Review	PS	KB
2	08.07.21	For Review	PS	KB
1	23.02.21	For Review	PS	KB

project
Pacific Brook Christian School

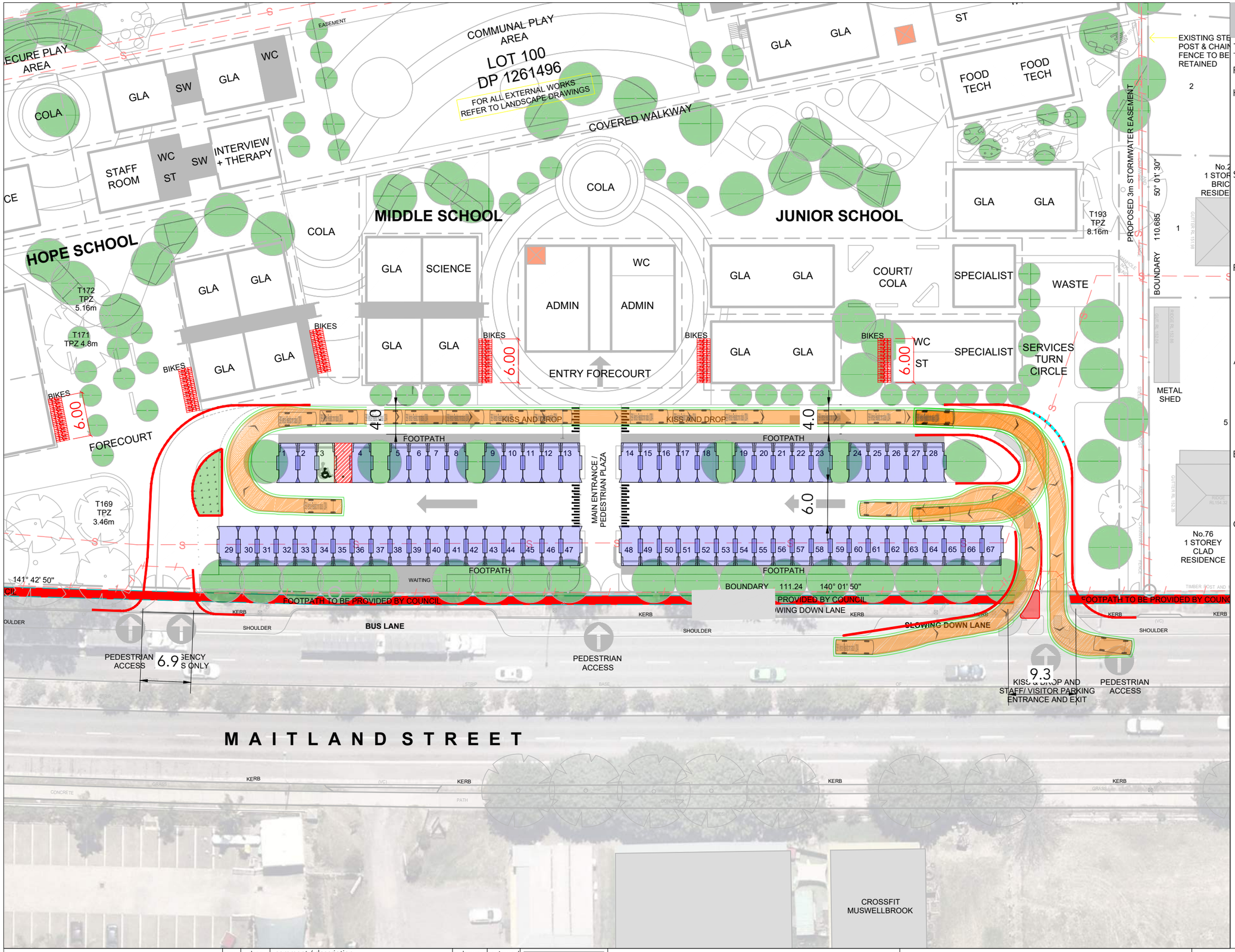
drawing title
Stage 1
Waste Collection Vehicle Paths

client	Pacific Brook Christian School
drawing #	ptc-002
project #	KB-2829
scale	1 : 500

rev 3

Attachment 5 Design Review – Masterplan

© Copyright; **ptc.**



comments

A3

TYPICAL

Please note the following compliance requirements:

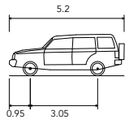
Height Clearance:	2.2m (min) throughout all areas of the car park accessible to vehicles and bicycles. 4.5m wherever access is required for a refuse vehicle (and safety clearance envelope)
Sight Splays:	Visibility splays in the form of a 2.5m x 2m right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)
Parking Spaces:	The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).
Accessible Spaces:	To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).
Bicycle Parking:	Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.
Control Measures:	Please note recommended control measures, including line markings, signage, bollards, etc.

Recommended changes to kerb alignment / space requirement

Recommended roll kerb

2.6m x 5.4m staff and visitor parking space envelopes

2.4m x 5.4m accessible parking space envelope



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

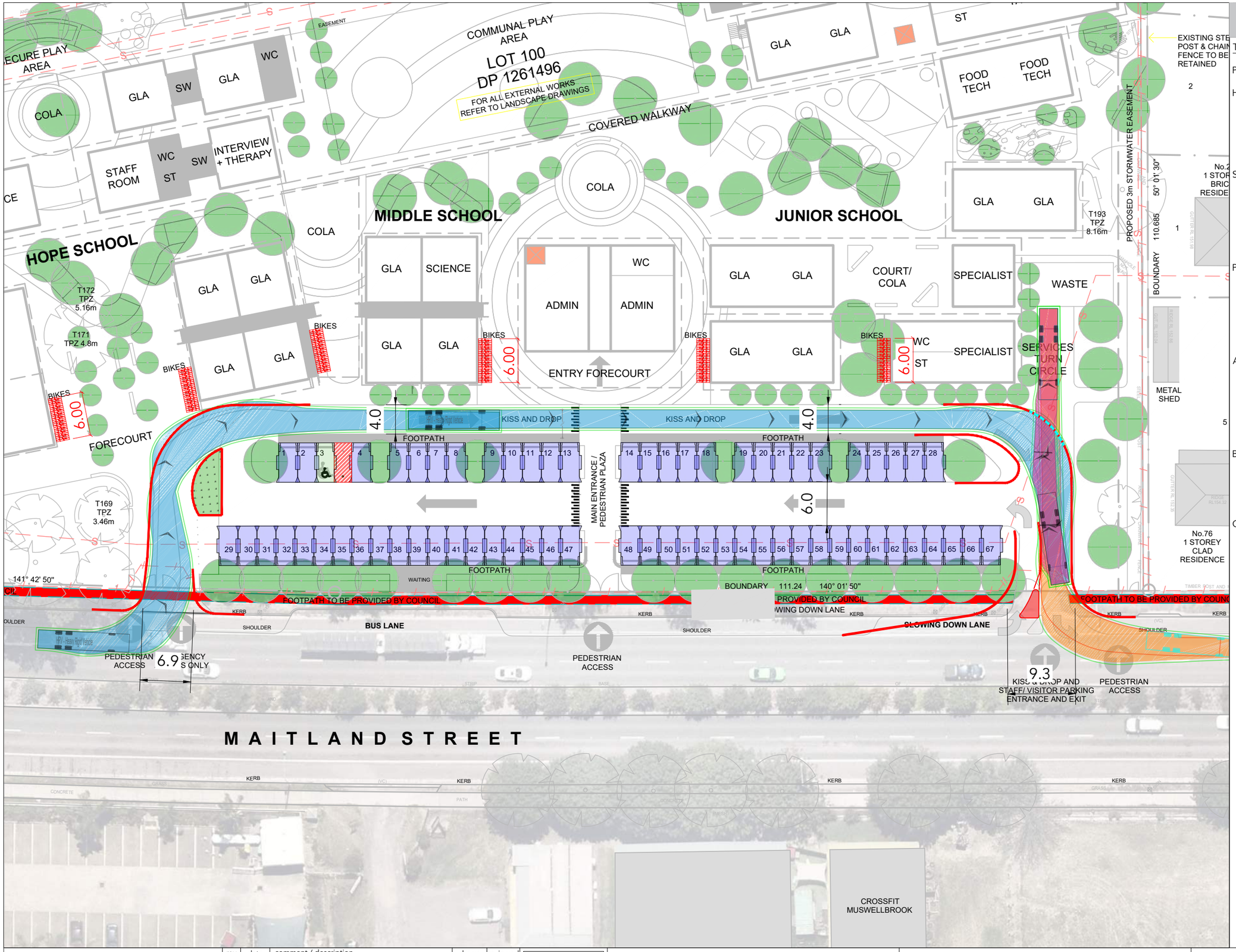
rev	date	comment / description	drawn	reviewed
3	21.09.21	For Review	PS	KB
2	08.07.21	For Review	PS	KB
1	23.02.21	For Review	PS	KB

project
Pacific Brook Christian School

drawing title
Masterplan
Car Park Design Review and Vehicle Circulation

client	Pacific Brook Christian School
drawing #	ptc-101
project #	KB-2829
scale	1 : 500

rev 3



comments

A3

TYPICAL

Please note the following compliance requirements:

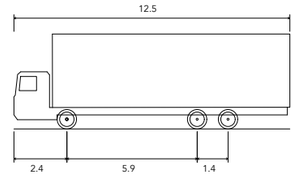
Height Clearance:	2.2m (min) throughout all areas of the car park accessible to vehicles and bicycles. 4.5m wherever access is required for a refuse vehicle (and safety clearance envelope)
Sight Splays:	Visibility splays in the form of a 2.5m x 2m right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)
Parking Spaces:	The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).
Accessible Spaces:	To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).
Bicycle Parking:	Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.
Control Measures:	Please note recommended control measures, including line markings, signage, bollards, etc.

Recommended changes to kerb alignment / space requirement

Recommended roll kerb

2.6m x 5.4m staff and visitor parking space envelopes

2.4m x 5.4m accessible parking space envelope



HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
3	21.09.21	For Review	PS	KB
2	08.07.21	For Review	PS	KB
1	23.02.21	For Review	PS	KB

project
Pacific Brook Christian School

drawing title
Masterplan
Waste Collection Vehicle Paths

client	Pacific Brook Christian School
drawing #	ptc-102
project #	KB-2829
scale	1 : 500

rev 3

comments

A3

TYPICAL

Please note the following compliance requirements:

Height Clearance:	2.2m (min) throughout all areas of the car park accessible to vehicles and bicycles. 4.5m wherever access is required for a refuse vehicle (and safety clearance envelope)
Sight Splays:	Visibility splays in the form of a 2.5m x 2m right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)
Parking Spaces:	The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).
Accessible Spaces:	To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).
Bicycle Parking:	Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.
Control Measures:	Please note recommended control measures, including line markings, signage, bollards, etc.

Recommended changes to kerb alignment / space requirement

Recommended roll kerb

2.6m x 5.4m staff and visitor parking space envelopes

2.4m x 5.4m accessible parking space envelope

0.5m x 1.8m bicycle parking space envelope

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

rev	date	comment / description	drawn	reviewed
3	21.09.21	For Review	PS	KB
2	08.07.21	For Review	PS	KB
1	23.02.21	For Review	PS	KB

project
Pacific Brook Christian School

drawing title
Masterplan
Car Park Design Review - Bicycle Spaces

client	Pacific Brook Christian School
drawing #	ptc-103
project #	KB-2829
scale	1 : 250

rev 3

Attachment 6 SIDRA Results

© Copyright; **ptc.**

MOVEMENT SUMMARY

Site: 101 [1a. Maitland St/Thompson St - Existing AM Peak (Site Folder: Existing - AM Peak)]

Network: N101 [Existing AM Peak (Network Folder: Existing Scenario)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	18	5.9	18	5.9	0.010	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.8
22	T1	720	7.6	720	7.6	0.194	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		738	7.6	738	7.6	0.194	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.8
NorthWest: Maitland St (NW)														
28	T1	474	12.9	474	12.9	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
29	R2	132	1.6	132	1.6	0.309	12.5	LOS A	1.3	9.0	0.67	0.89	0.80	42.4
Approach		605	10.4	605	10.4	0.309	2.8	NA	1.3	9.0	0.15	0.19	0.17	47.0
SouthWest: Thompson Street (SW)														
30	L2	227	2.8	227	2.8	0.249	6.7	LOS A	1.1	7.7	0.47	0.67	0.47	45.4
32	R2	29	3.6	29	3.6	0.370	57.9	LOS E	1.1	8.3	0.94	1.01	1.10	19.6
Approach		257	2.9	257	2.9	0.370	12.6	LOS A	1.1	8.3	0.52	0.71	0.54	42.0
All Vehicles		1600	7.9	1600	7.9	0.370	3.1	NA	1.3	9.0	0.14	0.19	0.15	47.5

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

MOVEMENT SUMMARY

Site: 102 [2a. Maitland St / Rutherford Rd - Existing AM Peak (Site Folder: Existing - AM Peak)]

Network: N101 [Existing AM Peak (Network Folder: Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	87	12.0	87	12.0	0.094	11.6	LOS A	1.2	9.4	0.50	0.66	0.50	42.7
22	T1	547	8.5	547	8.5	* 0.426	16.4	LOS B	6.3	47.1	0.81	0.68	0.81	34.7
Approach		635	9.0	635	9.0	0.426	15.7	LOS B	6.3	47.1	0.77	0.68	0.77	36.3
NorthWest: Maitland St (NW)														
28	T1	328	13.5	328	13.5	0.131	3.2	LOS A	1.6	12.4	0.35	0.29	0.35	48.1
29	R2	181	5.8	181	5.8	* 0.263	11.8	LOS A	2.8	20.5	0.63	0.72	0.63	43.1
Approach		509	10.7	509	10.7	0.263	6.2	LOS A	2.8	20.5	0.45	0.44	0.45	46.2
SouthWest: Rutherford Road (SW)														
30	L2	271	4.7	271	4.7	0.315	16.1	LOS B	5.1	37.3	0.68	0.74	0.68	34.9
32	R2	68	4.6	68	4.6	* 0.371	34.0	LOS C	2.0	14.7	0.97	0.75	0.97	33.9
Approach		339	4.7	339	4.7	0.371	19.7	LOS B	5.1	37.3	0.74	0.74	0.74	34.6
All Vehicles		1483	8.6	1483	8.6	0.426	13.4	LOS A	6.3	47.1	0.65	0.61	0.65	40.2

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	8	24.3	LOS C	0.0	0.0	0.90	0.90	190.2	215.6	1.13
All Pedestrians		11	24.3	LOS C	0.0	0.0	0.90	0.90	190.8	216.4	1.13

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.

Project: Z:\PCI - PROJECT WORK FILES\NSW\NBRS ARCHITECTURE - Pacific Brook Christian School\4. DA Stage\3. Modelling & Surveys \SIDRA Modelling\210225 Pacific Brook Public School - Future- Layout Change.sip9

MOVEMENT SUMMARY

Site: 101 [1b. Maitland St/Thompson St - Existing PM (Site Folder: Existing - PM Peak)]

Network: N101 [Existing PM Peak (Network Folder: Existing Scenario)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	23	0.0	23	0.0	0.013	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.9
22	T1	688	7.3	688	7.3	0.185	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		712	7.1	712	7.1	0.185	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
NorthWest: Maitland St (NW)														
28	T1	815	8.4	815	8.4	0.276	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
29	R2	145	1.4	145	1.4	0.327	12.2	LOS A	1.4	9.8	0.66	0.89	0.81	42.6
Approach		960	7.3	960	7.3	0.327	1.9	NA	1.4	9.8	0.10	0.13	0.12	47.8
SouthWest: Thompson Street (SW)														
30	L2	145	2.9	145	2.9	0.156	6.4	LOS A	0.6	4.5	0.43	0.63	0.43	45.5
32	R2	35	6.1	35	6.1	1.122	374.7	LOS F	6.5	47.6	1.00	1.43	2.69	4.4
Approach		180	3.5	180	3.5	1.122	77.5	LOS F	6.5	47.6	0.54	0.79	0.86	22.6
All Vehicles		1852	6.9	1852	6.9	1.122	8.6	NA	6.5	47.6	0.10	0.15	0.15	43.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 102 [2b. Maitland St / Rutherford Rd - Existing PM Peak (Site Folder: Existing - PM Peak)]

Network: N101 [Existing PM Peak (Network Folder: Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	113	1.9	113	1.9	0.144	15.7	LOS B	2.0	14.3	0.64	0.70	0.64	40.8
22	T1	435	10.7	435	10.7	* 0.554	23.6	LOS B	5.9	45.4	0.94	0.77	0.94	30.6
Approach		547	8.8	547	8.8	0.554	22.0	LOS B	5.9	45.4	0.88	0.76	0.88	33.4
NorthWest: Maitland St (NW)														
28	T1	495	11.9	493	11.9	0.199	3.7	LOS A	2.7	20.5	0.39	0.33	0.39	47.7
29	R2	346	1.8	345	1.8	* 0.414	13.2	LOS A	6.0	42.7	0.70	0.76	0.70	42.5
Approach		841	7.8	837 N1	7.8	0.414	7.6	LOS A	6.0	42.7	0.52	0.51	0.52	45.4
SouthWest: Rutherford Road (SW)														
30	L2	294	2.2	294	2.2	0.259	11.2	LOS A	4.2	30.1	0.52	0.70	0.52	38.4
32	R2	126	3.3	126	3.3	* 0.582	34.0	LOS C	3.8	27.4	0.99	0.81	1.05	33.9
Approach		420	2.5	420	2.5	0.582	18.0	LOS B	4.2	30.1	0.66	0.73	0.68	36.2
All Vehicles		1808	6.9	1805 N1	6.9	0.582	14.4	LOS A	6.0	45.4	0.66	0.63	0.66	40.4

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)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	190.1	215.6	1.13
All Pedestrians		3	24.3	LOS C	0.0	0.0	0.90	0.90	192.3	218.4	1.14

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [1c. Maitland St/Thompson St - Future Existing AM Peak (Site Folder: Future Existing - AM Peak)]

Network: N101 [Future Existing AM Peak (Network Folder: Future Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	18	5.9	18	5.9	0.015	7.0	LOS A	0.1	0.8	0.22	0.57	0.22	45.5
22	T1	720	7.6	720	7.6	* 0.402	10.3	LOS A	5.9	44.3	0.59	0.51	0.59	44.3
Approach		738	7.6	738	7.6	0.402	10.2	LOS A	5.9	44.3	0.58	0.51	0.58	44.3
NorthWest: Maitland St (NW)														
28	T1	474	12.9	474	12.9	0.234	0.9	LOS A	0.7	5.8	0.09	0.07	0.09	48.9
29	R2	132	1.6	132	1.6	* 0.245	11.4	LOS A	1.9	13.7	0.61	0.71	0.61	42.8
Approach		605	10.4	605	10.4	0.245	3.2	LOS A	1.9	13.7	0.20	0.21	0.20	46.5
SouthWest: Thompson Street (SW)														
30	L2	227	2.8	227	2.8	0.384	22.2	LOS B	5.3	38.0	0.82	0.78	0.82	38.1
32	R2	29	3.6	29	3.6	* 0.165	33.1	LOS C	0.8	6.1	0.95	0.71	0.95	26.4
Approach		257	2.9	257	2.9	0.384	23.4	LOS B	5.3	38.0	0.84	0.77	0.84	37.1
All Vehicles		1600	7.9	1600	7.9	0.402	9.7	LOS A	5.9	44.3	0.48	0.44	0.48	43.4

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.6	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.8	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	38	24.3	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		40	24.3	LOS C	0.1	0.1	0.90	0.90	187.8	212.5	1.13

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

MOVEMENT SUMMARY

Site: 102 [2c. Maitland St / Rutherford Rd - Future Existing AM Peak (Site Folder: Future Existing - AM Peak)]

Network: N101 [Future Existing AM Peak (Network Folder: Future Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	87	12.0	87	12.0	0.094	11.6	LOS A	1.2	9.4	0.50	0.66	0.50	42.7
22	T1	547	8.5	547	8.5	* 0.426	16.4	LOS B	6.3	47.1	0.81	0.68	0.81	34.7
Approach		635	9.0	635	9.0	0.426	15.7	LOS B	6.3	47.1	0.77	0.68	0.77	36.3
NorthWest: Maitland St (NW)														
28	T1	328	13.5	328	13.5	0.131	3.7	LOS A	2.1	16.2	0.44	0.36	0.44	47.7
29	R2	181	5.8	181	5.8	* 0.263	12.2	LOS A	3.1	22.8	0.70	0.74	0.70	42.9
Approach		509	10.7	509	10.7	0.263	6.7	LOS A	3.1	22.8	0.53	0.50	0.53	45.9
SouthWest: Rutherford Road (SW)														
30	L2	271	4.7	271	4.7	0.315	16.1	LOS B	5.1	37.3	0.68	0.74	0.68	34.9
32	R2	68	4.6	68	4.6	* 0.371	34.0	LOS C	2.0	14.7	0.97	0.75	0.97	33.9
Approach		339	4.7	339	4.7	0.371	19.7	LOS B	5.1	37.3	0.74	0.74	0.74	34.6
All Vehicles		1483	8.6	1483	8.6	0.426	13.6	LOS A	6.3	47.1	0.68	0.63	0.68	40.1

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	8	24.3	LOS C	0.0	0.0	0.90	0.90	190.2	215.6	1.13
All Pedestrians		11	24.3	LOS C	0.0	0.0	0.90	0.90	190.8	216.4	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [1d. Maitland St/Thompson St - Future Existing PM Peak (Site Folder: Future Existing - PM Peak)]

Network: N101 [Future Existing PM Peak (Network Folder: Future Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	23	0.0	23	0.0	0.019	8.5	LOS A	0.3	1.9	0.43	0.62	0.43	44.8
22	T1	688	7.3	688	7.3	* 0.384	11.2	LOS A	7.4	54.7	0.73	0.63	0.73	43.8
Approach		712	7.1	712	7.1	0.384	11.1	LOS A	7.4	54.7	0.72	0.63	0.72	43.8
NorthWest: Maitland St (NW)														
28	T1	815	8.4	815	8.4	0.392	1.0	LOS A	1.6	11.9	0.11	0.09	0.11	48.7
29	R2	145	1.4	145	1.4	* 0.274	12.1	LOS A	2.3	16.0	0.64	0.72	0.64	42.5
Approach		960	7.3	960	7.3	0.392	2.7	LOS A	2.3	16.0	0.19	0.19	0.19	46.9
SouthWest: Thompson Street (SW)														
30	L2	145	2.9	145	2.9	0.246	21.3	LOS B	3.2	23.1	0.78	0.75	0.78	38.4
32	R2	35	6.1	35	6.1	* 0.198	33.3	LOS C	1.0	7.4	0.95	0.72	0.95	26.4
Approach		180	3.5	180	3.5	0.246	23.6	LOS B	3.2	23.1	0.81	0.74	0.81	36.6
All Vehicles		1852	6.9	1852	6.9	0.392	7.9	LOS A	7.4	54.7	0.45	0.41	0.45	44.0

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.6	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.8	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	38	24.3	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		40	24.3	LOS C	0.1	0.1	0.90	0.90	187.8	212.5	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 102 [2d. Maitland St / Rutherford Rd - Future Existing PM Peak (Site Folder: Future Existing - PM Peak)]

Network: N101 [Future Existing PM Peak (Network Folder: Future Existing Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	113	1.9	113	1.9	0.144	15.7	LOS B	2.0	14.3	0.64	0.70	0.64	40.8
22	T1	435	10.7	435	10.7	* 0.554	23.6	LOS B	5.9	45.4	0.94	0.77	0.94	30.6
Approach		547	8.8	547	8.8	0.554	22.0	LOS B	5.9	45.4	0.88	0.76	0.88	33.4
NorthWest: Maitland St (NW)														
28	T1	495	11.9	495	11.9	0.200	2.0	LOS A	1.5	11.9	0.19	0.16	0.19	48.8
29	R2	346	1.8	346	1.8	* 0.416	12.2	LOS A	4.9	34.9	0.57	0.72	0.57	43.0
Approach		841	7.8	841	7.8	0.416	6.2	LOS A	4.9	34.9	0.35	0.39	0.35	46.2
SouthWest: Rutherford Road (SW)														
30	L2	294	2.2	294	2.2	0.259	11.2	LOS A	4.2	30.1	0.52	0.70	0.52	38.4
32	R2	126	3.3	126	3.3	* 0.582	34.0	LOS C	3.8	27.4	0.99	0.81	1.05	33.9
Approach		420	2.5	420	2.5	0.582	18.0	LOS B	4.2	30.1	0.66	0.73	0.68	36.2
All Vehicles		1808	6.9	1808	6.9	0.582	13.7	LOS A	5.9	45.4	0.58	0.58	0.58	40.8

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	190.1	215.6	1.13
All Pedestrians		3	24.3	LOS C	0.0	0.0	0.90	0.90	192.3	218.4	1.14

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

MOVEMENT SUMMARY

Site: 101 [1e. Maitland St/Thompson St - Future Development AM Peak (Site Folder: Future Development - AM Peak)]

Network: N101 [Future Development AM Peak (Network Folder: Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	18	5.9	18	5.9	0.015	5.0	LOS A	0.1	0.5	0.15	0.49	0.15	38.2
22	T1	720	7.6	720	7.6	* 0.583	18.3	LOS B	9.2	68.5	0.87	0.74	0.87	33.8
Approach		738	7.6	738	7.6	0.583	18.0	LOS B	9.2	68.5	0.85	0.73	0.85	33.8
NorthWest: Maitland St (NW)														
28	T1	627	9.7	627	9.7	0.399	6.2	LOS A	4.7	35.6	0.41	0.35	0.41	35.3
29	R2	132	1.6	132	1.6	* 0.336	18.9	LOS B	2.9	20.7	0.84	0.75	0.84	33.2
Approach		759	8.3	759	8.3	0.399	8.4	LOS A	4.7	35.6	0.48	0.42	0.48	34.7
SouthWest: Thompson Street (SW)														
30	L2	277	2.3	277	2.3	0.316	14.3	LOS A	5.1	36.5	0.66	0.72	0.66	34.7
32	R2	237	0.4	237	0.4	* 0.557	26.2	LOS B	6.4	44.8	0.93	0.80	0.93	25.6
Approach		514	1.4	514	1.4	0.557	19.8	LOS B	6.4	44.8	0.79	0.76	0.79	31.3
All Vehicles		2011	6.3	2011	6.3	0.583	14.8	LOS B	9.2	68.5	0.70	0.62	0.70	33.4

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 102 [2e. Maitland St / Rutherford Rd - Future Development AM Peak (Site Folder: Future Development - AM Peak)]

Network: N101 [Future Development AM Peak (Network Folder: Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	151	7.0	151	7.0	0.199	16.1	LOS B	2.8	20.5	0.65	0.72	0.65	40.6
22	T1	547	8.5	547	8.5	* 0.645	23.8	LOS B	7.8	58.2	0.95	0.82	1.00	30.5
Approach		698	8.1	698	8.1	0.645	22.1	LOS B	7.8	58.2	0.89	0.80	0.92	33.4
NorthWest: Maitland St (NW)														
28	T1	378	11.7	378	11.7	0.149	4.6	LOS A	2.8	21.5	0.53	0.44	0.53	47.3
29	R2	417	2.5	417	2.5	* 0.512	15.4	LOS B	6.7	47.7	0.68	0.81	0.68	41.6
Approach		795	6.9	795	6.9	0.512	10.2	LOS A	6.7	47.7	0.61	0.63	0.61	44.1
SouthWest: Rutherford Road (SW)														
30	L2	271	4.7	271	4.7	0.250	11.7	LOS A	4.0	29.1	0.54	0.70	0.54	38.1
32	R2	68	4.6	68	4.6	* 0.371	34.0	LOS C	2.0	14.7	0.97	0.75	0.97	33.9
Approach		339	4.7	339	4.7	0.371	16.2	LOS B	4.0	29.1	0.62	0.71	0.62	36.6
All Vehicles		1832	7.0	1832	7.0	0.645	15.8	LOS B	7.8	58.2	0.72	0.71	0.73	39.4

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	8	24.3	LOS C	0.0	0.0	0.90	0.90	190.2	215.6	1.13
All Pedestrians		11	24.3	LOS C	0.0	0.0	0.90	0.90	190.8	216.4	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [1f Maitland St/Thompson St - Future Development PM Peak (Site Folder: Future Development - PM Peak)]

Network: N101 [Future Development PM Peak (Network Folder: Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	23	0.0	23	0.0	0.019	5.6	LOS A	0.1	0.9	0.20	0.51	0.20	38.0
22	T1	688	7.3	688	7.3	* 0.530	19.9	LOS B	9.5	70.8	0.93	0.80	0.93	33.3
Approach		712	7.1	712	7.1	0.530	19.4	LOS B	9.5	70.8	0.91	0.79	0.91	33.4
NorthWest: Maitland St (NW)														
28	T1	936	7.3	936	7.3	0.552	5.4	LOS A	7.3	54.2	0.41	0.36	0.41	35.8
29	R2	145	1.4	145	1.4	* 0.345	18.3	LOS B	3.2	22.5	0.84	0.75	0.84	33.4
Approach		1081	6.5	1081	6.5	0.552	7.2	LOS A	7.3	54.2	0.47	0.42	0.47	35.2
SouthWest: Thompson Street (SW)														
30	L2	208	2.0	208	2.0	0.247	14.5	LOS A	3.8	27.1	0.65	0.70	0.65	34.6
32	R2	199	1.1	199	1.1	* 0.548	27.8	LOS B	5.5	38.8	0.95	0.80	0.95	25.0
Approach		407	1.6	407	1.6	0.548	21.0	LOS B	5.5	38.8	0.80	0.75	0.80	30.8
All Vehicles		2200	5.8	2200	5.8	0.552	13.7	LOS A	9.5	70.8	0.67	0.60	0.67	33.5

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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

MOVEMENT SUMMARY

Site: 102 [2f. Maitland St / Rutherford Rd - Future Development PM Peak (Site Folder: Future Development - PM Peak)]

Network: N101 [Future Development PM Peak (Network Folder: Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	162	1.3	162	1.3	0.256	19.8	LOS B	3.5	24.4	0.75	0.74	0.75	39.0
22	T1	435	10.7	435	10.7	* 0.801	31.9	LOS C	7.1	54.5	1.00	0.99	1.32	26.9
Approach		597	8.1	597	8.1	0.801	28.6	LOS C	7.1	54.5	0.93	0.92	1.17	31.0
NorthWest: Maitland St (NW)														
28	T1	558	10.6	558	10.6	0.218	4.8	LOS A	4.3	32.9	0.55	0.47	0.55	47.1
29	R2	644	1.0	644	1.0	* 0.694	16.6	LOS B	11.4	80.6	0.84	0.92	0.84	41.1
Approach		1202	5.4	1202	5.4	0.694	11.1	LOS A	11.4	80.6	0.71	0.71	0.71	43.7
SouthWest: Rutherford Road (SW)														
30	L2	294	2.2	294	2.2	0.233	9.2	LOS A	3.5	25.2	0.44	0.67	0.44	40.1
32	R2	126	3.3	126	3.3	* 0.679	36.1	LOS C	4.0	28.7	1.00	0.86	1.18	33.3
Approach		420	2.5	420	2.5	0.679	17.3	LOS B	4.0	28.7	0.61	0.73	0.66	36.6
All Vehicles		2219	5.6	2219	5.6	0.801	17.0	LOS B	11.4	80.6	0.75	0.77	0.82	39.5

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	190.1	215.6	1.13
All Pedestrians		3	24.3	LOS C	0.0	0.0	0.90	0.90	192.3	218.4	1.14

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

MOVEMENT SUMMARY

Site: 101 [1g. Maitland St/Thompson St -10 Yrs Growth AM Peak (Site Folder: 10 Yrs Growth - AM Peak)]

Network: N101 [10 Yrs Growth AM Peak (Network Folder: 10 Yrs Growth Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	19	5.6	19	5.6	0.015	4.9	LOS A	0.1	0.5	0.14	0.49	0.14	38.2
22	T1	761	7.6	761	7.6	* 0.456	13.5	LOS A	9.1	68.1	0.79	0.69	0.79	35.2
Approach		780	7.6	780	7.6	0.456	13.3	LOS A	9.1	68.1	0.78	0.68	0.78	35.3
NorthWest: Maitland St (NW)														
28	T1	501	12.8	501	12.8	0.266	2.0	LOS A	1.6	12.4	0.18	0.15	0.18	38.3
29	R2	139	1.5	139	1.5	* 0.313	14.7	LOS B	2.7	18.8	0.75	0.73	0.75	34.5
Approach		640	10.4	640	10.4	0.313	4.8	LOS A	2.7	18.8	0.30	0.28	0.30	36.9
SouthWest: Thompson Street (SW)														
30	L2	240	2.6	240	2.6	0.367	19.4	LOS B	5.3	38.3	0.79	0.75	0.79	33.1
32	R2	32	3.3	32	3.3	* 0.152	30.7	LOS C	0.9	6.4	0.93	0.71	0.93	24.1
Approach		272	2.7	272	2.7	0.367	20.7	LOS B	5.3	38.3	0.81	0.75	0.81	32.3
All Vehicles		1692	7.8	1692	7.8	0.456	11.2	LOS A	9.1	68.1	0.60	0.54	0.60	35.1

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 102 [2g. Maitland St / Rutherford Rd -10 Yrs Growth AM Peak (Site Folder: 10 Yrs Growth - AM Peak)]

Network: N101 [10 Yrs Growth AM Peak (Network Folder: 10 Yrs Growth Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	94	15.7	94	15.7	0.104	11.6	LOS A	1.3	10.4	0.50	0.66	0.50	42.6
22	T1	579	8.5	579	8.5	* 0.451	16.6	LOS B	6.7	50.4	0.82	0.69	0.82	34.5
Approach		673	9.5	673	9.5	0.451	15.9	LOS B	6.7	50.4	0.78	0.69	0.78	36.2
NorthWest: Maitland St (NW)														
28	T1	346	13.4	346	13.4	0.138	3.3	LOS A	1.9	14.5	0.37	0.31	0.37	48.0
29	R2	192	6.0	192	6.0	* 0.284	12.5	LOS A	3.1	22.9	0.66	0.73	0.66	42.8
Approach		538	10.8	538	10.8	0.284	6.5	LOS A	3.1	22.9	0.47	0.46	0.47	46.0
SouthWest: Rutherford Road (SW)														
30	L2	286	4.8	286	4.8	0.333	16.2	LOS B	5.5	39.9	0.69	0.75	0.69	34.8
32	R2	73	4.3	73	4.3	* 0.393	34.1	LOS C	2.2	15.7	0.98	0.75	0.98	33.9
Approach		359	4.7	359	4.7	0.393	19.8	LOS B	5.5	39.9	0.75	0.75	0.75	34.5
All Vehicles		1569	8.9	1569	8.9	0.451	13.6	LOS A	6.7	50.4	0.67	0.62	0.67	40.0

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	8	24.3	LOS C	0.0	0.0	0.90	0.90	190.2	215.6	1.13
All Pedestrians		11	24.3	LOS C	0.0	0.0	0.90	0.90	190.8	216.4	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 101 [1h. Maitland St/Thompson St - 10 Yrs Growth PM Peak (Site Folder: 10 Yrs Growth - PM Peak)]

Network: N101 [10 Yrs Growth PM Peak (Network Folder: 10 Yrs Growth Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	24	0.0	24	0.0	0.019	5.4	LOS A	0.1	0.9	0.19	0.51	0.19	38.1
22	T1	728	7.4	728	7.4	* 0.436	15.1	LOS B	9.3	69.2	0.85	0.73	0.85	34.7
Approach		753	7.1	753	7.1	0.436	14.8	LOS B	9.3	69.2	0.83	0.72	0.83	34.8
NorthWest: Maitland St (NW)														
28	T1	862	8.4	862	8.4	0.446	2.3	LOS A	3.5	26.0	0.22	0.19	0.22	38.1
29	R2	154	1.4	154	1.4	* 0.343	14.9	LOS B	3.0	21.1	0.77	0.74	0.77	34.5
Approach		1016	7.4	1016	7.4	0.446	4.2	LOS A	3.5	26.0	0.30	0.27	0.30	37.1
SouthWest: Thompson Street (SW)														
30	L2	154	2.7	154	2.7	0.235	18.5	LOS B	3.2	23.2	0.75	0.72	0.75	33.4
32	R2	37	5.7	37	5.7	* 0.180	30.9	LOS C	1.0	7.6	0.94	0.71	0.94	24.0
Approach		191	3.3	191	3.3	0.235	20.9	LOS B	3.2	23.2	0.78	0.72	0.78	32.0
All Vehicles		1959	6.9	1959	6.9	0.446	9.9	LOS A	9.3	69.2	0.55	0.49	0.55	35.3

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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

MOVEMENT SUMMARY

Site: 102 [2h. Maitland St / Rutherford Rd - 10 Yrs Growth PM Peak (Site Folder: 10 Yrs Growth - PM Peak)]

Network: N101 [10 Yrs Growth PM Peak (Network Folder: 10 Yrs Growth Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	119	1.8	119	1.8	0.152	15.8	LOS B	2.1	15.1	0.64	0.70	0.64	40.8
22	T1	460	10.8	460	10.8	* 0.587	23.8	LOS B	6.4	48.6	0.95	0.78	0.95	30.4
Approach		579	8.9	579	8.9	0.587	22.2	LOS B	6.4	48.6	0.88	0.77	0.89	33.3
NorthWest: Maitland St (NW)														
28	T1	523	11.9	523	11.9	0.211	4.7	LOS A	3.8	29.0	0.51	0.44	0.51	47.2
29	R2	366	1.7	366	1.7	* 0.444	15.8	LOS B	7.6	54.3	0.86	0.83	0.86	41.4
Approach		889	7.7	889	7.7	0.444	9.3	LOS A	7.6	54.3	0.65	0.60	0.65	44.6
SouthWest: Rutherford Road (SW)														
30	L2	311	2.0	311	2.0	0.274	11.3	LOS A	4.5	32.1	0.53	0.70	0.53	38.4
32	R2	134	3.1	134	3.1	* 0.615	34.3	LOS C	4.1	29.3	1.00	0.83	1.08	33.8
Approach		444	2.4	444	2.4	0.615	18.2	LOS B	4.5	32.1	0.67	0.74	0.69	36.1
All Vehicles		1913	6.8	1913	6.8	0.615	15.2	LOS B	7.6	54.3	0.73	0.68	0.73	39.9

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	190.1	215.6	1.13
All Pedestrians		3	24.3	LOS C	0.0	0.0	0.90	0.90	192.3	218.4	1.14

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

MOVEMENT SUMMARY

Site: 101 [1i. Maitland St/Thompson St -10 Yrs Growth + Future Development AM Peak (Site Folder: 10 Yrs Growth + Future Development - AM Peak)]

Network: N101 [10 Yrs Growth + Future Development AM Peak (Network Folder: 10 Yrs Growth + Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	19	5.6	19	5.6	0.015	5.1	LOS A	0.1	0.6	0.16	0.50	0.16	38.2
22	T1	761	7.6	761	7.6	* 0.587	17.8	LOS B	9.7	72.5	0.87	0.75	0.87	33.9
Approach		780	7.6	780	7.6	0.587	17.5	LOS B	9.7	72.5	0.85	0.74	0.85	34.0
NorthWest: Maitland St (NW)														
28	T1	655	9.8	655	9.8	0.404	5.5	LOS A	4.6	34.9	0.38	0.33	0.38	35.7
29	R2	139	1.5	139	1.5	* 0.364	19.2	LOS B	3.1	22.3	0.86	0.76	0.86	33.1
Approach		794	8.4	794	8.4	0.404	7.9	LOS A	4.6	34.9	0.47	0.40	0.47	34.9
SouthWest: Thompson Street (SW)														
30	L2	289	2.2	289	2.2	0.343	15.1	LOS B	5.6	39.7	0.69	0.73	0.69	34.4
32	R2	239	0.4	239	0.4	* 0.621	27.6	LOS B	6.7	46.9	0.95	0.83	0.99	25.1
Approach		528	1.4	528	1.4	0.621	20.7	LOS B	6.7	46.9	0.81	0.77	0.82	31.0
All Vehicles		2102	6.3	2102	6.3	0.621	14.7	LOS B	9.7	72.5	0.70	0.62	0.70	33.5

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: PARKING AND TRAFFIC CONSULTANTS | Licence: NETWORK / 1PC | Processed: Friday, 26 February 2021 9:36:30 AM
Project: Z:\PCI - PROJECT WORK FILES\NSW\NBRS ARCHITECTURE - Pacific Brook Christian School\4. DA Stage\3. Modelling & Surveys\SIDRA Modelling\210225 Pacific Brook Public School - Future- Layout Change.sip9

MOVEMENT SUMMARY

Site: 102 [2i. Maitland St / Rutherford Rd -10 Yrs Growth + Future Development AM Peak (Site Folder: 10 Yrs Growth + Future Development - AM Peak)]

Network: N101 [10 Yrs Growth + Future Development AM Peak (Network Folder: 10 Yrs Growth + Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	157	9.4	157	9.4	0.211	16.2	LOS B	2.9	21.9	0.66	0.72	0.66	40.5
22	T1	579	8.5	579	8.5	* 0.696	24.7	LOS B	8.7	65.0	0.96	0.87	1.06	30.0
Approach		736	8.7	736	8.7	0.696	22.9	LOS B	8.7	65.0	0.90	0.84	0.97	33.0
NorthWest: Maitland St (NW)														
28	T1	396	11.7	396	11.7	0.156	4.5	LOS A	2.9	22.1	0.52	0.43	0.52	47.3
29	R2	427	2.7	427	2.7	* 0.529	15.8	LOS B	7.0	50.0	0.71	0.83	0.71	41.4
Approach		823	7.0	823	7.0	0.529	10.4	LOS A	7.0	50.0	0.61	0.64	0.61	44.1
SouthWest: Rutherford Road (SW)														
30	L2	286	4.8	286	4.8	0.265	11.7	LOS A	4.3	31.2	0.54	0.70	0.54	38.0
32	R2	73	4.3	73	4.3	* 0.393	34.1	LOS C	2.2	15.7	0.98	0.75	0.98	33.9
Approach		359	4.7	359	4.7	0.393	16.3	LOS B	4.3	31.2	0.63	0.71	0.63	36.5
All Vehicles		1918	7.2	1918	7.2	0.696	16.3	LOS B	8.7	65.0	0.73	0.73	0.76	39.1

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	8	24.3	LOS C	0.0	0.0	0.90	0.90	190.2	215.6	1.13
All Pedestrians		11	24.3	LOS C	0.0	0.0	0.90	0.90	190.8	216.4	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: PARKING AND TRAFFIC CONSULTANTS | Licence: NETWORK / 1PC | Processed: Friday, 26 February 2021 9:36:30 AM
Project: Z:\PCI - PROJECT WORK FILES\NSW\NBRS ARCHITECTURE - Pacific Brook Christian School\4. DA Stage\3. Modelling & Surveys\SIDRA Modelling\210225 Pacific Brook Public School - Future- Layout Change.sip9

MOVEMENT SUMMARY

Site: 101 [1j. Maitland St/Thompson St - 10 Yrs Growth + Future Development PM Peak (Site Folder: 10 Yrs Growth + Future Development - PM Peak)]

Network: N101 [10 Yrs Growth + Future Development PM Peak (Network Folder: 10 Yrs Growth + Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	24	0.0	24	0.0	0.019	5.6	LOS A	0.1	0.9	0.20	0.51	0.20	38.0
22	T1	728	7.4	728	7.4	* 0.561	20.0	LOS B	10.0	74.7	0.92	0.79	0.92	33.3
Approach		753	7.1	753	7.1	0.561	19.5	LOS B	10.0	74.7	0.90	0.78	0.90	33.4
NorthWest: Maitland St (NW)														
28	T1	983	7.4	983	7.4	0.580	5.5	LOS A	7.9	59.1	0.43	0.38	0.43	35.7
29	R2	154	1.4	154	1.4	* 0.373	18.6	LOS B	3.4	24.3	0.85	0.76	0.85	33.3
Approach		1137	6.6	1137	6.6	0.580	7.3	LOS A	7.9	59.1	0.48	0.43	0.48	35.1
SouthWest: Thompson Street (SW)														
30	L2	217	1.9	217	1.9	0.256	14.6	LOS B	4.0	28.3	0.66	0.70	0.66	34.6
32	R2	201	1.0	201	1.0	* 0.554	27.8	LOS B	5.6	39.3	0.95	0.80	0.95	25.0
Approach		418	1.5	418	1.5	0.554	20.9	LOS B	5.6	39.3	0.80	0.75	0.80	30.8
All Vehicles		2307	5.8	2307	5.8	0.580	13.8	LOS A	10.0	74.7	0.68	0.60	0.68	33.5

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

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
SouthEast: Maitland St (SE)											
P5	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	193.7	220.1	1.14
NorthWest: Maitland St (NW)											
P7	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	192.9	219.1	1.14
SouthWest: Thompson Street (SW)											
P8	Full	91	24.4	LOS C	0.1	0.1	0.90	0.90	187.5	212.1	1.13
All Pedestrians		196	24.4	LOS C	0.1	0.1	0.90	0.90	190.6	216.1	1.13

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: PARKING AND TRAFFIC CONSULTANTS | Licence: NETWORK / 1PC | Processed: Friday, 26 February 2021 9:36:47 AM
Project: Z:\PCI - PROJECT WORK FILES\NSW\NBRS ARCHITECTURE - Pacific Brook Christian School\4. DA Stage\3. Modelling & Surveys\SIDRA Modelling\210225 Pacific Brook Public School - Future- Layout Change.sip9

MOVEMENT SUMMARY

Site: 102 [2j. Maitland St / Rutherford Rd - 10 Yrs Growth + Future Development PM Peak (Site Folder: 10 Yrs Growth + Future Development - PM Peak)]

Network: N101 [10 Yrs Growth + Future Development PM Peak (Network Folder: 10 Yrs Growth + Future Development Scenario)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 60 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

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
SouthEast: Maitland St (SE)														
21	L2	168	1.3	168	1.3	0.253	19.1	LOS B	3.5	24.8	0.74	0.74	0.74	39.3
22	T1	460	10.8	460	10.8	* 0.763	29.8	LOS C	7.3	55.7	1.00	0.95	1.23	27.7
Approach		628	8.2	628	8.2	0.763	26.9	LOS B	7.3	55.7	0.93	0.89	1.10	31.6
NorthWest: Maitland St (NW)														
28	T1	586	10.6	586	10.6	0.230	4.9	LOS A	4.6	34.9	0.56	0.48	0.56	47.1
29	R2	664	1.0	664	1.0	* 0.733	18.6	LOS B	12.9	91.0	0.88	0.95	0.91	40.3
Approach		1251	5.5	1251	5.5	0.733	12.2	LOS A	12.9	91.0	0.73	0.73	0.75	43.2
SouthWest: Rutherford Road (SW)														
30	L2	311	2.0	311	2.0	0.252	9.7	LOS A	4.0	28.2	0.46	0.68	0.46	39.6
32	R2	134	3.1	134	3.1	* 0.717	36.7	LOS C	4.3	30.7	1.00	0.89	1.23	33.1
Approach		444	2.4	444	2.4	0.717	17.8	LOS B	4.3	30.7	0.63	0.74	0.70	36.3
All Vehicles		2323	5.6	2323	5.6	0.763	17.2	LOS B	12.9	91.0	0.76	0.78	0.83	39.3

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

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
SouthEast: Maitland St (SE)											
P5	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	193.8	220.4	1.14
NorthWest: Maitland St (NW)											
P7	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	192.9	219.2	1.14
SouthWest: Rutherford Road (SW)											
P8	Full	1	24.3	LOS C	0.0	0.0	0.90	0.90	190.1	215.6	1.13
All Pedestrians		3	24.3	LOS C	0.0	0.0	0.90	0.90	192.3	218.4	1.14

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: PARKING AND TRAFFIC CONSULTANTS | Licence: NETWORK / 1PC | Processed: Friday, 26 February 2021 9:36:47 AM
Project: Z:\PCI - PROJECT WORK FILES\NSW\NBRS ARCHITECTURE - Pacific Brook Christian School\4. DA Stage\3. Modelling & Surveys\SIDRA Modelling\210225 Pacific Brook Public School - Future- Layout Change.sip9