



SSD-16848913: Murwillumbah Education Campus

Transport Impact Assessment

NSW School Infrastructure

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1. INTRODUCTION

1.1 Background

Bitzios Consulting has been engaged by NSW Department of Education: School Infrastructure (SINSW) to undertake a Transport Impact Assessment (TIA) for the proposed upgrade of Murwillumbah High School (MHS) to develop the Murwillumbah Education Campus (MEC). The proposal is to upgrade the existing school to provide a Kindergarten to Year 12 (K-12) education campus. Additional detail on the proposed development is provided in Section 4. Development plans prepared by Architectus are provided in **Appendix A**.

The subject site is located at 86 Riverview St, Murwillumbah (formally described as Lot 2 DP 578679). The subject site location is shown in Figure 1.1.



Figure 1.1: Existing Murwillumbah High School (MHS) Site

1.2 Stakeholder Engagement

In preparation of this Transport Impact Assessment (TIA), key transport stakeholders were consulted including representatives from, Tweed Shire Council (Council) and Transport for New South Wales (TfNSW) as required by the Planning Secretary's Environmental Assessment Requirements (SEARs).

Consultation regarding the existing transport operations at each of the existing schools was also undertaken with the four current principals. Key outcomes of the stakeholder engagement are as follows:

▪ Council (Transport officers)

- Of the schools across Murwillumbah and the Tweed Shire, MHS was not noted to be a location of any reports of traffic or transport concerns relating to the school operations
- Parking around schools is a key issue for Council across the Tweed Shire. While MHS has not historically been known to Council as a having a parking issue, the MEC has the potential to introduce parking issues on surrounding streets. Council expects that the project will address parking requirements to ensure no adverse parking issues are introduced to the neighbouring properties or streets
- Council acknowledge school staff/student catchment is large and emphasis on bus utilisation will be key to the transport solution of the MEC
- Murwillumbah CBD exhibits a number of traffic congestion pinch points during school drop-off and pick-up periods. This also includes impacts associated with bus circulation around Murwillumbah to the various schools. Council acknowledge that the proposal to combine four schools has the opportunity to consolidate bus movements and reduce bus impacts. Further planning of bus route changes needs to consider traffic pinch points
- Focus on pathway and crossing improvements should be considered adjacent to the MEC to connect to existing pathways and key routes
- Regarding bus planning and updates to Murwillumbah's bus operational plan, consideration should also be made to various bus interchange locations

▪ TfNSW (Roads, Development and Bus Planning officers)

- TfNSW acknowledge that bus planning for the MEC will be critical to the operational success of the new school. TfNSW agreed with SINSW that a separate Bus Operational Plan and working group will be formed and will be responsible for the facilities and operational planning ready for day of opening. While this process is typically undertaken and completed following SSD approval, preliminary work by SINSW and TfNSW is beneficial to the bus planning process
- Any changes to the access configuration and use of the Riverview Street site access need to ensure the operational efficiency of Riverview Street is retained. Need to consider MEC and DoE staff travelling to the site from the west and their local traffic circulation routes to access parking off Riverview Street which is restricted as left-in only
- Assessment is needed to determine suitable crossing treatment types for the proposed locations on Nullum Street and across High School Lane fronting the MEC

▪ School Principals

- Separation of buses from other modes including Kiss n Drop (KnD), Park and Walk and pedestrians should be considered to reduce conflicts and improve operations
- Storage of students waiting for buses should not be outside the school boundary and be designed to allow for safe and efficient management of students
- A KnD facility within the site would vastly improve the operations of child pick-up and drop-off, particularly for K-6
- The existing location of the MHS's KnD facility along Riverview Street does cause some queuing in the southbound direction past the school. A Primary School KnD facility at this location would be expected to have higher demands and result in adverse impacts to traffic flow
- Students who require support currently have difficulty in utilising the existing KnD facilities at existing schools. A facility should be designed fit-for-purpose to address the needs of the Student Support Unit (SSU)
- A series of Transport Working Groups (TWG) were held with Stakeholders throughout 2021 to help inform the design and transport solution to support the new MEC. A TWG Register was developed which outlines a series of issues raised by the TWG and associated actions and responsibilities. The TWG Register is provided in **Appendix B**.

1.3 Report Inclusions

This TIA includes the following components:

- A review of the existing transport conditions including drop-off / pick-up arrangements, pedestrian and cycling facilities, public transport facilities and connectivity surrounding the subject site
- A review of the existing transport planning documents
- A transport assessment of the development's student enrolment catchment and travel modes
- A review of historical crash data
- Assessment of the existing and proposed access arrangements for vehicles, servicing and refuse collection
- Estimation of the development's trip generation and distribution on the local road network
- Assessment of the development's impacts on the surrounding road network
- Assessment of the development's car and bicycle parking provision
- Assessment of the on-site parking layout, access, servicing and refuse collection requirements.

Table 1.1 below summarises how this report addresses SEARs requirements and the relevant report sections for reference.

Table 1.1: SEARS Requirements and Relevant Report Sections

SEARS – Transport and Traffic Requirements	Response and Relevant Report Sections
▪ Provide a transport and accessibility impact assessment, which includes: - an analysis of the existing transport network, including the road hierarchy and any pedestrian, bicycle or public transport infrastructure, current daily and peak hour vehicle movements, and existing performance levels of nearby intersections - details of the proposed development, including pedestrian and vehicular access arrangements (including swept path analysis of the largest vehicle and height clearances), parking arrangements and rates (including bicycle and end-of-trip facilities), drop-off/pick-up-zone(s) and bus bays (if applicable), and provisions for servicing and loading/unloading - analysis of the impacts of the proposed development (including justification for the methodology used), including predicted modal split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling), potential queuing in drop-off/pick-up zones and bus bays during peak periods, identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict), and any cumulative impact from surrounding approved developments	An assessment of the existing transport network situation is provided in Section 3.0 (p. 7-19) Existing intersection performance and traffic information is provided in Section 7.0 (p. 29-43) The proposed development details are summarised in Section 4.0 (p.24) with access arrangements covered in Section 5.0 (p.24-25). An assessment of the site's layout arrangements is covered in Section 9.0. A traffic assessment is provided in Section 7.0 of this report (p. 27-40) The traffic analysis demonstrates that the net increase in traffic movements associated with the MEC can be adequately accommodated by the surrounding road network and its intersections. The MEC will include three separate vehicular crossovers which includes retaining the existing crossover at Riverview Street to service staff parking and the DoE offices as well as the southern Nullum Street crossover to service the High School and back-of-house area.

	Both driveway crossovers will be upgraded in line with Council's Driveway Access to Property - Design Specification 1.2. A new (third) vehicular access to the KnD facility is proposed via Nullum Street and provides a median divided two-way crossover. Works on Nullum Street are proposed to provide for a right turn lane to access this KnD facility and small parking area.
- measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing, viability and mechanisms (including proposed arrangements with local councils or government agencies) of delivery of any infrastructure improvements in accordance with relevant standards.	The traffic analysis demonstrates that the net increase in traffic movements associated with the MEC can be adequately accommodated by the surrounding road network and its intersections without the need for any mitigation works. To improvement accessibility the following works are however proposed: ▪ Additional crossing on Nullum Street south of High School Lane to accommodate crossings from the bus bay to the pedestrian pathway on the southern side of Nullum Street. ▪ Upgrade of pathway along High School Lane ▪ Bus signage and line marking along Mullum Street to support the bus interchange ▪ Traffic lane updates, right turn lane and associated works on Nullum Street to support a proposed KnD facility, crossing improvements and bus interchange formalisation. Further details of these works are summarised in Table 4.1.
- measures to promote sustainable travel choices for employees, students and visitors, such as connections into existing walking and cycling networks, minimising car parking provision, encouraging car share and public transport, providing adequate bicycle parking and high-quality end-of-trip facilities, and implementing a Green Travel Plan	A preliminary School Travel Plan is provided in Appendix C. A review of existing enrolments to all four schools and catchment analysis to the new MEC shows that only 130 students currently live within 1.2km of the MEC, which equates to less than 10% of the projected enrolments. The active transport catchment is limited by this figure and the typography surrounding meaning the chance for a large increase in active transport are limited. These surrounding areas are currently serviced by local bus services, which will continue as part of the bus operational planning and are expected to be adapted to suit the change in patronage mix/dispersion.

	Given the large geographical catchment for the MEC and demonstrates greater reliance on maximising the bus utilisation to service students to minimise private vehicle usage.
- a preliminary operational traffic and access management plan for the development, including drop-off/pick-up zones, bus bays and their operations.	Indicative layouts for parking, traffic and access are incorporated into development plans and a preliminary public domain works plan in Appendix A. A comprehensive operational traffic and access management plan will need to be developed and refined in consultation with the school principal, TSC, and TfNSW. It would be expected as part of a detailed plan which would form part of conditions of approval.
▪ Provide a Construction Traffic Management Plan detailing predicted construction vehicle movements, routes, access and parking arrangements, coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated.	A preliminary CTMP is provided in Appendix D. The CTMP will be refined in consultation with the project's Contractor and TSC, and further detailed assessment would be expected as part of a detailed CTMP which would form part of conditions of approval.

2. TRANSPORT PLANNING CONTEXT

2.1 Overview

A review of State and Local planning documents was undertaken to gain an understanding of the current policies and programs within the Tweed region. This also allows this assessment to align with other related plans. A range of documents were reviewed, and the subsequent sections detail the documents that have outcomes relevant to this assessment.

2.2 State Documents

State documents were reviewed including the NSW Government's Future Transport Strategy 2056, Long-Term Strategic Master Plan, Regional NSW Services, North Coast Regional Plan and Infrastructure Plan, Road Safety Plan and the NSW Planning Guidelines for Walking and Cycling. The following details the outcomes from the relevant state government plans:

- NSW Future Transport Strategy 2056 – This plan outlines the overarching strategy, supported by a suite of plans to achieve a 40-year vision for the NSW transport system
- NSW Long Term Transport Master Plan – This plan identifies that bus service contracts in the region are to be renewed which is an opportunity to improve routes and outcomes for customers. This includes cross-border routes and infrastructure
- Regional NSW Services and Infrastructure Plan – This plan identifies additional cross-border public transport options including short-term bus priority and long-term heavy/light rail
- NSW Planning Guidelines for Walking and Cycling – This plan identifies the value of walking and cycling as tools to reduce congestion, freeing up capacity on public transport and encouraging active transport for short local trips.

2.3 Local Documents

Council documents were reviewed including the Local Environment Plan, Development Control Plan, Section 7.11 Developer Contributions, Road Development Strategy, Pedestrian Access, and Mobility Plan (PAMP) and Tweed Public Transport Strategy. The following details the outcomes from the relevant state government plans:

- Tweed PAMP – This plan identifies upgrades on the external pathway network surrounding MHS however there are no relevant actions that directly benefit MHS
- Council is currently in the consultation phase of the Tweed Pedestrian and Bike Plan, which will be an update to the previous PAMP and due for completion in mid-2022
- Tweed Council also operate a Public and Active Transport Group which provides recommendations to Council regarding infrastructure needs, information and education, strategic planning, funding applications and cross-border issues.

3. EXISTING CONDITIONS

3.1 Subject Site

Based on information provided by SINSW and MHS the school currently operates with around 406 students (including 39 student support unit (SSU)) and approximately 84 daily staff population (65 full time equivalent (FTE) teaching, school administration and support staff). The current (year 2021) enrolment handbook shows the school's bell times as 9:00am and 3:20pm. Based on discussions with MHS, due to outside school activities on Wednesday's attendance varies including finish times. This is not a consistent occurrence.

Vehicular access is provided on Riverview Street, Nullum Street and High School Lane. There are two vehicular accesses on Riverview Street though the northern access was recently closed, and one vehicular access on Nullum Street and High School Lane. The vehicular access and parking areas are summarised in Table 3.1.

Table 3.1: MHS Car Parking Details

Road Name	Access Details	Car Parking Spaces	Parking Allocations
Riverview Street	Administration parking area	10 spaces	1x Principal 1x Deputy 1x Persons with Disability (PWD)
	Staff parking area	8 spaces	1x PWD
		Informal parking area (11 cars observed)	1x Ambulance
Nullum Street	Loading, refuse collection and staff and student parking area	Informal parking area (35 cars observed)	2x PWD
High School Lane	Loading only	No marked spaces	Loading zone

The parking area accessed from Nullum Street is primarily used by staff and loading/deliveries/refuse collection though a small area to the east has been allocated as student parking with the use of signage as shown in Figure 3.1.



Source: Bitzios Site Visit 03/03/2020

Figure 3.1: MHS Student Car Parking Area Signage

Pedestrian access is gained from both Riverview Street and Nullum Street. There are two pedestrian gates on Nullum Street though the northern gate was observed to be locked.

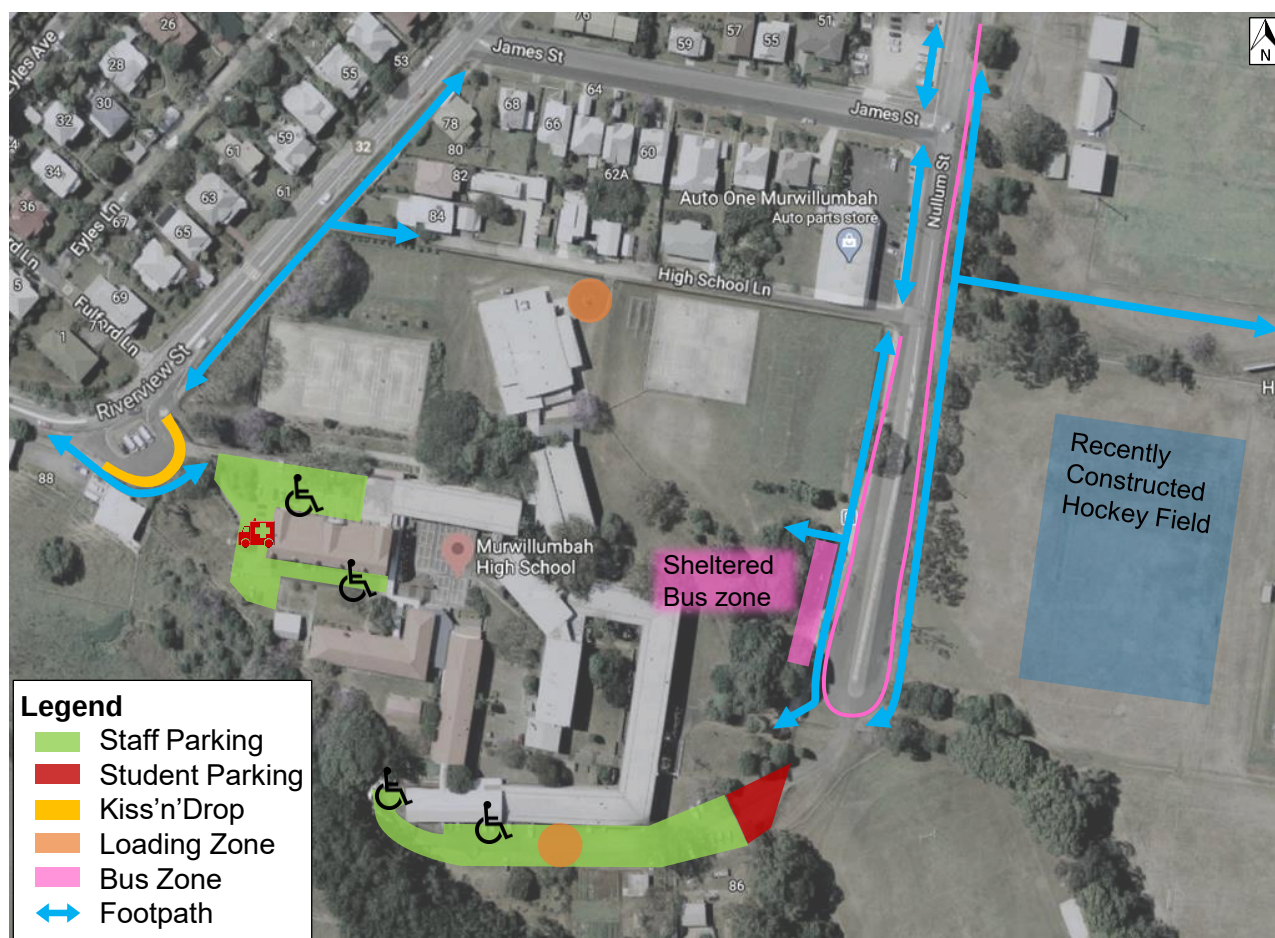
The pedestrian accesses provide connections to the following on-site car parking:

- Riverview Street provides access to the administration parking area
- Nullum Street access to the bus zones and informal staff / student parking.

A KnD area is also provided on site via Riverview Street which is sign posted as “No Parking 8:00-9:30am and 2:30-4:00pm School Days”.

Approximately 35 bicycle parking spaces were observed on-site. It is unknown if an provisions for End of Trip (EoT) facilities exists on-site.

The key transport facilities surrounding the school is shown in Figure 3.2.



Source: Google Maps

Figure 3.2: Key MHS Transport Facilities

3.2 Nearby Schools Proposed to be Amalgamated

The proposed MEC will include the amalgamation of three other nearby schools including the Murwillumbah East Primary School, Murwillumbah Public School and Wollumbin High School. These three school locations are shown in Figure 3.3.



Figure 3.3: Nearby School Locations

Each of the schools' details are as follows:

- Murwillumbah Public School (MPS) has 229 students and approximately 30 typically daily staff population (18.38 FTE). There is no on-site parking for staff and the school utilises all its road frontages for bus operations and pick up/drop off
- Murwillumbah East Public School (MEPS) has 232 students and 33 typically daily staff population (21.7 FTE). There is parking and a pick up/drop off zone on site with bus operations occurring on the school's frontage
- Wollumbin High school (WHS) has 392 students and 57 typical daily staff population (43.88 FTE). There is parking, a pick up/drop off zone and bus operations all on-site.

3.3 Road Network

Details of the road network surrounding the MEC are provided in Table 3.2.

Table 3.2: Surrounding Road Network

Road Name	Jurisdiction	Hierarchy	Lanes	Divided	Posted Speed
Riverview Street / Kyogle Road	Council*	Sub-arterial	2	No	50km/h 40km/h (school peaks)
Nullum Street	Council	Collector	2	No	50km/h 40km/h (school peaks)
High School Lane	Council	Local	1	No	50km/h**
James Street	Council	Collector	2	Yes	60km/h 40km/h (school peaks)

* Riverview Street / Kyogle Road is a regional road of state significance to TfNSW

** Default speed limit for built-up urban areas

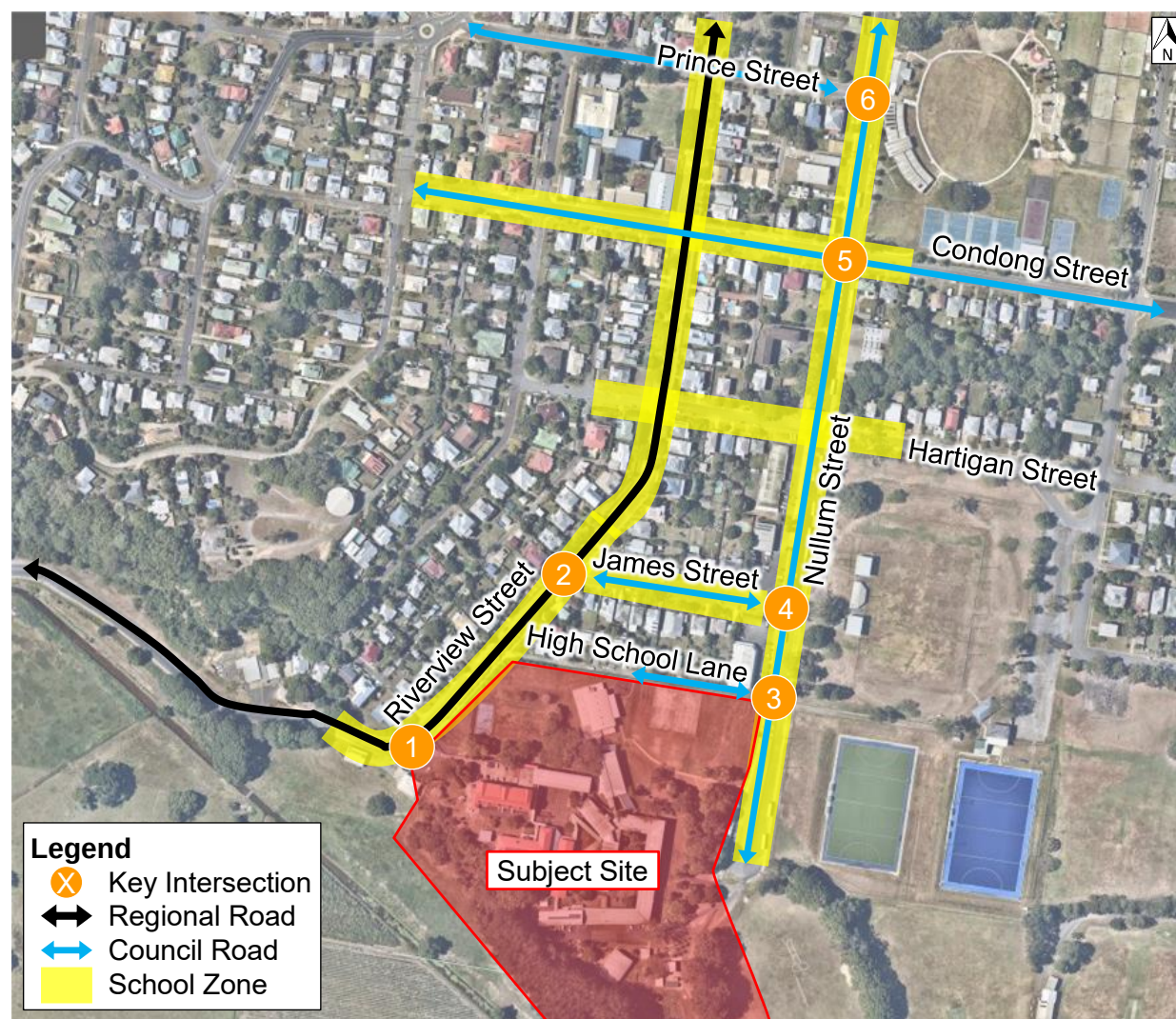
The surrounding roads are generally sign posted with 'No Stopping' or 'Bus Zone' with the exception of James Street. Bus zones are located on Nullum Street from the south of Hartigan Street to the school frontage. Staff parking is accessed via the Riverview Street / Kyogle Road along with a small KnD facility and four central parking spaces.

The surrounding key intersections in proximity to the school are summarised in Table 3.3.

Table 3.3: Surrounding Key Intersection Details

No.	Major Road	Minor Road	Jurisdiction	Control
1	Riverview Street	Kyogle Road	Council	Priority
2	Riverview Street	James Street	Council	Priority
3	Nullum Street	High School Lane	Council	Priority
4	Nullum Street	James Street	Council	Priority
5	Nullum Street	Condong Street	Council	Priority
6	Nullum Street	Prince Street	Council	Priority

The location of the key intersections with respect to the school is shown in Figure 3.4.



Source: Nearmap

Figure 3.4: Key Intersections

3.4 Available Sight Distance

A review of the available sight distance at two key intersections surrounding MEC (intersection 1 & 3) has been undertaken in accordance with Austroads *Guide to Road Design: Part 4A Unsignalised and Signalised Intersections* (AGRD4A) for Safe Intersection Sight Distance (SISD) with sight distance values adopted from Table 3.2 of AGRD4A (for a 2s reaction time). The available sight distance of the three school accesses has also been assessed against AS2890.

Table 3.4 details the sight distance requirements for the Riverview Street / Kyogle Road intersection.

Table 3.4: Riverview Street / Kyogle Road Sight Distance Requirements

Vehicles Approaching From	85th Percentile Speed	Sight Distance Required (SISD)
Riverview Street / Kyogle Road (east)	60km/h	123m
Riverview Street / Kyogle Road (west)	60km/h	123m

Figure 3.5 details the required sight distance is achieved for the Riverview Street / Kyogle Road intersection. It is noted that sight distance requirements reduce under the 40km/hr School Zone conditions, therefore the sight distance provisions are conservative for school related traffic movement during school hours.



Source: Nearmap

Figure 3.5: Riverview Street / Kyogle Road Available Sight Distance

Table 3.5 details the sight distance requirements for the Nullum Street / High School Lane intersection. This is an existing intersection adjacent to the MEC. While school traffic is not proposed to use High School Lane, the MEC will increase traffic volumes using Nullum Street.

Table 3.5: Nullum Street / High School Lane Sight Distance Requirements

Vehicles Approaching From	85th Percentile Speed	Sight Distance Required (SISD)
Nullum Street (North)	60km/h	123m
Nullum Street (South)	60km/h	123m

Figure 3.6 details the required sight distance to the Nullum Street / High School Lane intersection is achieved. It is noted that sight distance requirements for Nullum Street reduce under the 40km/hr School Zone conditions, therefore the sight distance provisions are conservative for school related traffic movement during school hours. In addition, the MEC proposes a series of road upgrades to lane line marking and pedestrian crossings on Nullum Street which aim to reduce vehicle speeds along the southern extent of Nullum Street fronting the MEC.



Source: Nearmap

Figure 3.6: Nullum Street / High School Lane Available Sight Distance

At all intersection locations the available distance exceeds the minimum sight distance required (SISD). A review of historical crash data was also undertaken in Section 3.9 and did not show any noticeable crash trends that would suggest any underlying road safety issues associated with a lack of driver sight lines or intersection configurations.

Based on the above, the available sight distance at all intersections is considered adequate.

3.5 Active Transport (Walking and Cycling)

The active transport network surrounding the subject site is considered well connected towards the Murwillumbah CBD but was observed to include some historical gaps within the residential area to the west.

Along Nullum Street, recent pathway and crossing upgrades provide a level connection to Knox Park and onto the Murwillumbah CBD. This pathway network connects to key routes to the west via Princes Street and onto Byangum Road.

Some existing paths surrounding the site along Riverview Street are noted to be narrow and uneven. The topography to the west of the site coupled with the dispersed grid network has historically limited Council in undertaking any extensive pathway upgrades within this area.

The current pathway network and key routes to the MEC considering the surrounding topography are shown in Figure 3.7.

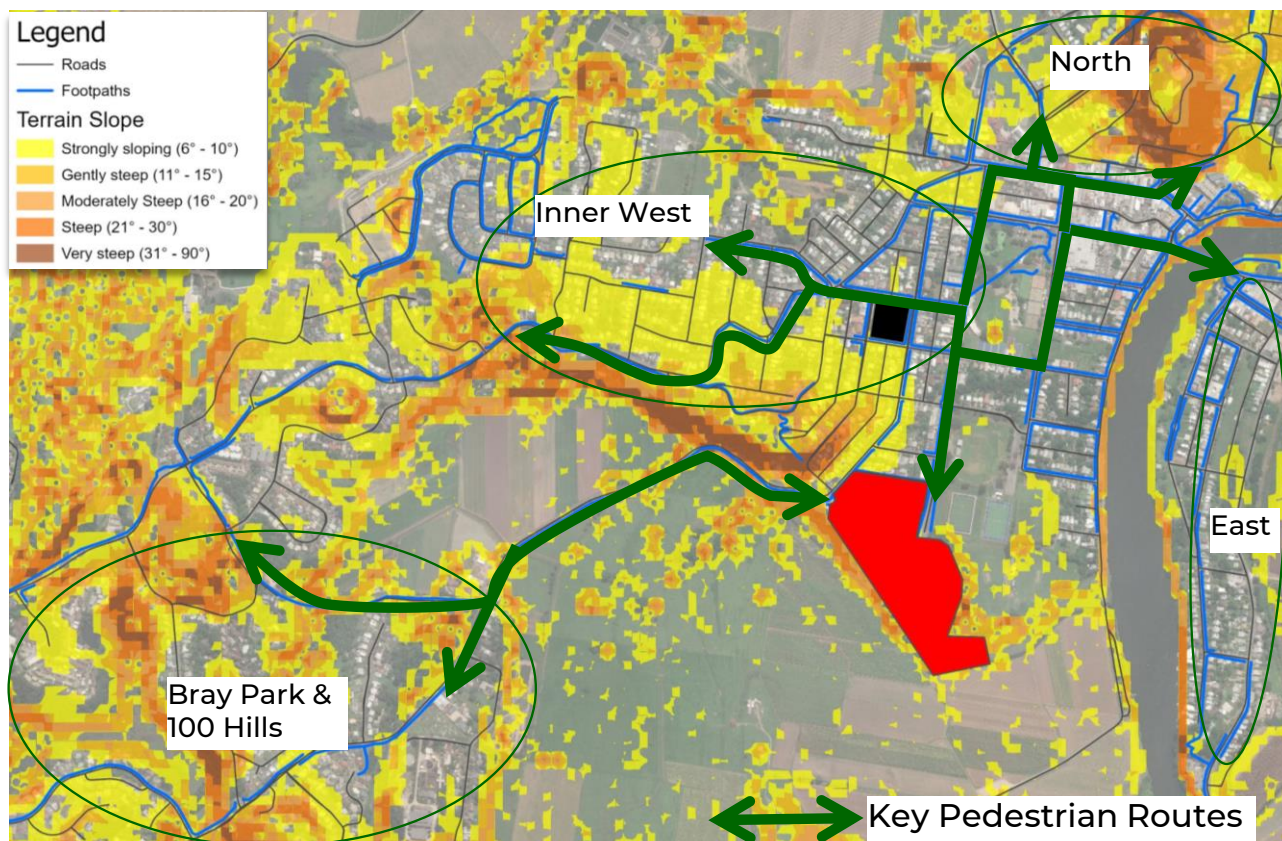


Figure 3.7: Key Active Transport Facilities

A review of existing enrolments to all four schools and catchment analysis to the new MEC shows that only 130 students currently live within 1.2km of the MEC, which equates to less than 10% of the projected enrolments. The local area surrounding the school includes residential areas along Byangum Road, out to Bray Park in the west and east of the Tweed River. These areas are currently serviced by local bus services, which will continue as part of the bus operational planning and are expected to be adapted to suit the change in patronage mix/dispersion.

The active transport catchments for the MEC are shown in Figure 3.8 and Table 3.6 which are notably smaller than other more localised school catchments across the Tweed Shire. Student mode share surveys regarding walking and cycling to school indicated that 93% of students stated “Too Far to Walk” as the reason for not walking or cycling.

These findings are expected given the large geographical catchment for the MEC and demonstrates greater reliance on maximising the bus utilisation to service students to minimise private vehicle usage.

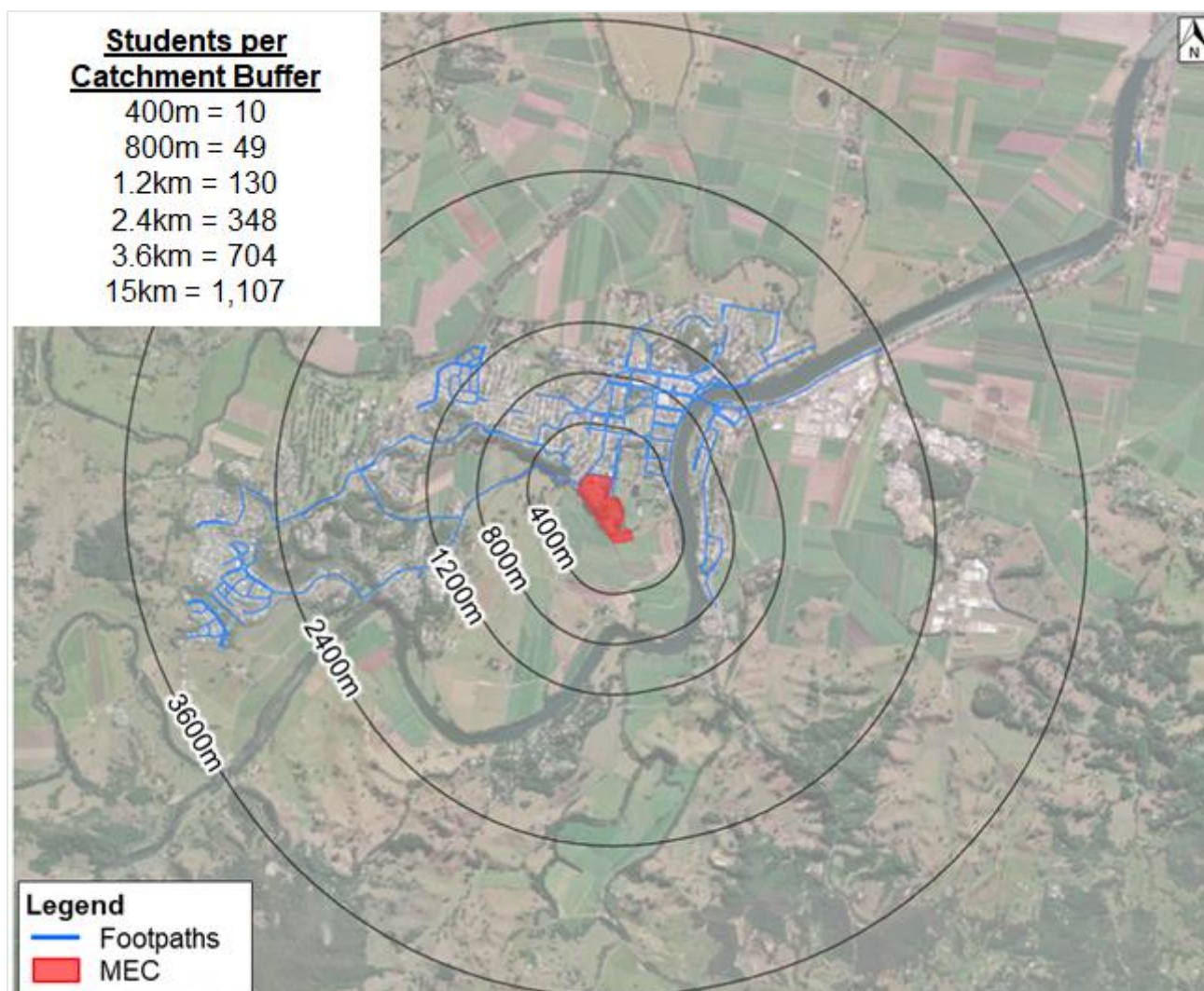


Figure 3.8: Active Transport Student Market Catchment

Table 3.6: Student Population within Walk and Bicycle Catchments

Catchment	Distance	Student Population	Proportion
400m	5min walk	10 students	1%
800m	10min walk	49 students	4%
1200m	15min walk / 5min bicycle	129 students	10%
2400m	10min bicycle	348 students	25%
3600m	15min bicycle	699 students	52%

Existing pedestrian accesses to the school are located on Riverview Street and Nullum Street as shown in Figure 3.9. Historically, the front door of MHS has been located off Riverview Street. This location is positioned adjacent to both the KnD facility as well as staff and administration parking area.

The secondary access is located north of the bus shelter on Nullum Street and directs all pedestrians along the western side of Nullum Street across High School Lane and north towards the nearby retail and commercial businesses.

Access or connection to the eastern side of Nullum Street is restricted by a continuous pedestrian fence located within the central median of Nullum Street.



Source: Nearmap

Figure 3.9: Existing Pedestrian Access Locations

3.6 Public Transport and Bus Services

MHS is currently serviced by both public and school bus services. The public services are operated by Surfside Bus Lines as well as local services provided by Murwillumbah Bus Co, Gosels, Parsons and Singh's as shown in Figure 3.10. The four existing schools operate a well-established and integrated bus service plan which includes the following features:

- Primary School's start and finish times allow for bus services to collect students prior to high schools, which allows for both short, localised, routes as well as connecting to other services at Nullum Street (MHS)
- MHS incorporates a substantial bus interchange facility and road space allocation on Nullum Street which allows various bus services from across the various Murwillumbah schools to interchange (see Figure 3.11)
- The operations of the bus interchange currently comprises of MHS students predominately residing along the western boundary within the recently constructed shelter. This includes management of MHS students to board buses, however this is currently undertaken along the public pathway on Nullum Street

- The eastern side of the bus interchange is used by various service providers to layover and perform student transfers. During this process students generally wait on the buses and do not dwell or are corralled on the pathway. No management of students outside the buses is currently undertaken
- Buses layover along the eastern side of Nullum Street, then move to pick up MHS students before continuing on the service
- The current bus network and operation results in buses passing through Murwillumbah's CBD road network and traffic pinch points during morning and afternoon periods. It was observed that buses would undertake numerous journeys between schools during these periods.

As outlined in Section 1, consultation with TfNSW's Bus Planning has been undertaken as part of the TWG process. TfNSW have acknowledged that bus planning for the MEC will be critical to the operational success of the new school. TfNSW agreed with SINSW that a separate Bus Operational Plan and working group will be formed and will be responsible for the facilities and operational planning ready for day of opening. This will also include detailed consultation with transport operators on the existing operations and required improvements to support the MEC.

While this process will be completed following SSD approval, preliminary work by SINSW and TfNSW is beneficial to the bus planning process and initial planning for updates have commenced. Further details regarding bus facilities and operational planning is provided in Section 8.

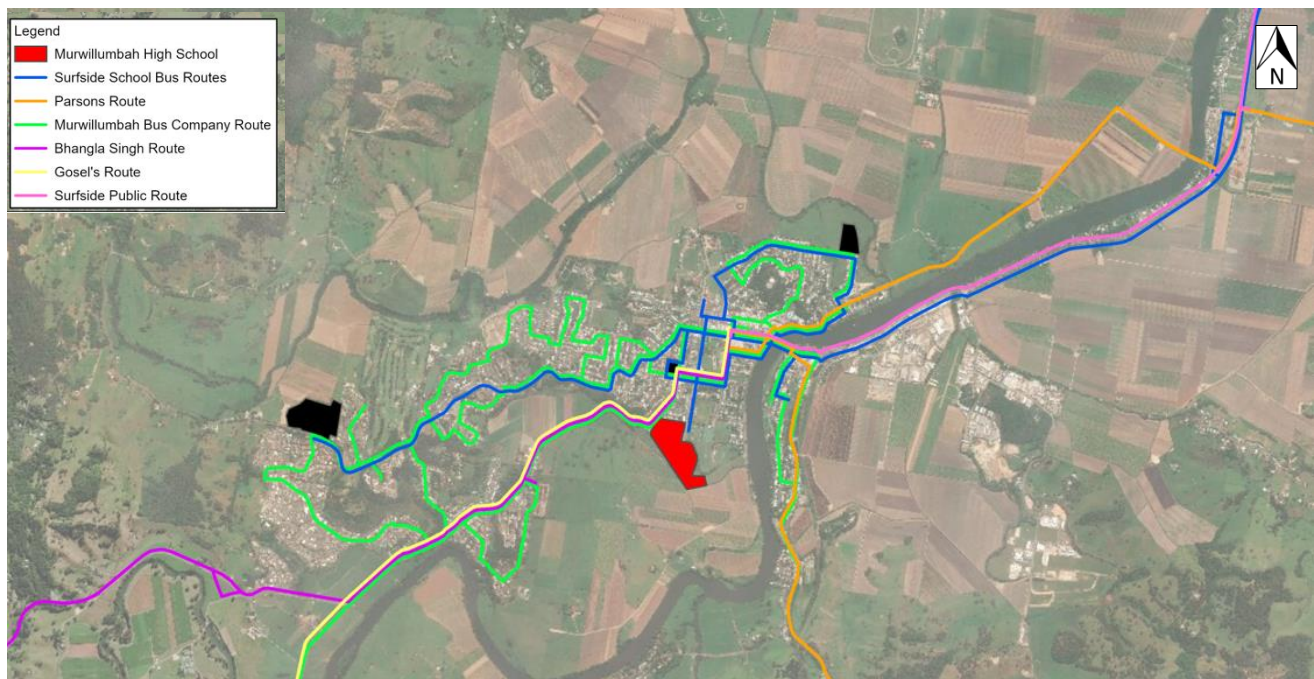


Figure 3.10: Existing Public and School Bus Routes



Figure 3.11: Existing Bus Interchange Facility on Nullum Street

3.6.1 Community Transport

The existing MEPS and MHS facilities provide Student Support Unit (SSU) for students with special needs. Associated with this service, some students are currently provided with subsidised transport options by TfNSW or through other government programs. Pick-up and drop-off facilities are therefore required to facilitate persons with a disability (PWD), specific vehicle requirements and to ensure movement of all users is undertaken in a safe, secure, and efficient manner.

3.7 School Arrival and Departure Operations

3.7.1 Morning Peak Operations (Arrival)

Site visits were undertaken in March 2021 to observe drop-off / pick -up operations and general traffic and parking conditions during the morning and afternoon peak periods. The following traffic and transport-related observations were made during the morning peak:

Riverview Street:

- Parents use the KnD area off Riverview Street however it was observed to be relatively quiet compared to Nullum Street. This is expected given the left-in access limitation and the tidal flow of traffic using Nullum Street to be northbound
- Approximately 60% turn right and 40% turn left when exiting the site via Riverview Street. This is consistent with tidal flow operations of Riverview Street
- Parking spaces were observed to be occupied by staff as well as students

- Riverview Street includes a constrained road alignment with no road shoulder. The right turn from Riverview Street is restricted though signage and line marking

A 40km/hr School Zone is incorporated along the full extent of school frontage on Riverview Street, which extends north past Murwillumbah Primary School.

Nullum Street:

- Buses were observed to utilise both the eastern and western side of Nullum Street Bus Interchange to store and transfer students. Bus operators were generally separated into defined locations, with spare space throughout the kerbside allocated areas
- While Riverview Street is a designated KnD location, the majority of drop-off's were observed to occur on Nullum Street in 'unused' bus space located north of the bus shelter
- Drop-off related to the Student Support Unit (SSU) was observed to occur within the bus zone
- Students were observed walking along both sides of Nullum Street to access MHS including from the adjacent Hockey fields
- Informal staff and student parking occurs on-site via the southern access off Nullum Street.



Source: Site visit 03/03/2021

Figure 3.12: On-Site Parking via Nullum Street

3.7.2 Afternoon Peak Operations (Departure)

The drop-off operations and issues observed during the morning peak are consistent with the afternoon peak, however, are exacerbated due to the larger concentration of vehicles. The following traffic and transport-related observations were made during the afternoon peak:

Riverview Street

- Parents arrive in KnD 20 minutes before bell and store within the KnD bays
- No significant queueing issues observed to extend out to Riverview Street, however feedback from MHS identified that during busy periods or days of inclement weather the queues are longer and do impact southbound through traffic operations on Riverview Street.

Nullum Street

- Buses pick up from both sides of Nullum Street (Refer to Section 3.6)

- Majority of students egressing the site on Nullum Street walk north or east through the adjacent sports fields
- Informal parent pick-ups were observed along the western (northbound) side of Nullum Street. Some use of parking within adjacent off-street commercial parking areas was observed, however this operation was minor and not widespread
- The traffic and pedestrian peak period was completed within 10 minutes after the bell
- No significant safety or traffic related issues were observed along Nullum Street or at nearby intersections
- The bus interchange operations were largely appropriate and orderly, however the following observations were recorded
 - Only Gosels, Surfside and Crossans' buses displayed any easily identifiable bus route information, numbering or destinations
 - The eastern side of the bus layover was not efficiently used with many bus bays not used throughout the afternoon period.

3.8 Transport Mode Share

3.8.1 Student Surveys

A student and staff travel mode share survey was undertaken to determine the existing travel behaviours. The mode share split of primary and high school students is provided in Figure 3.13 and Figure 3.14.

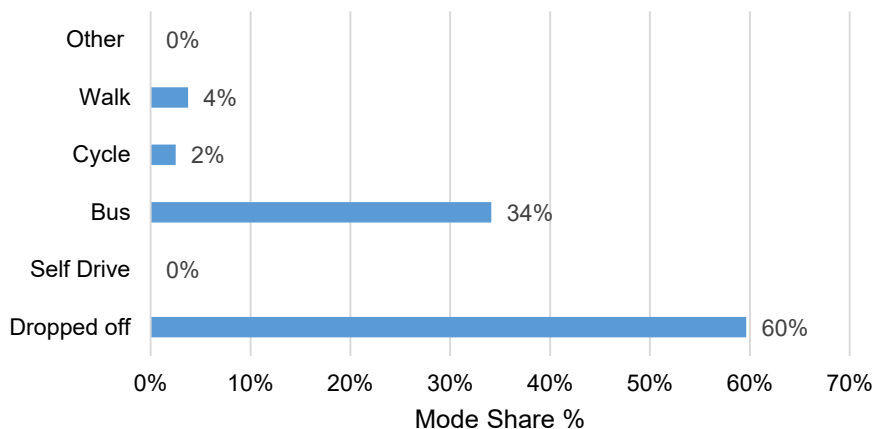


Figure 3.13: Primary School Student Travel Mode Share

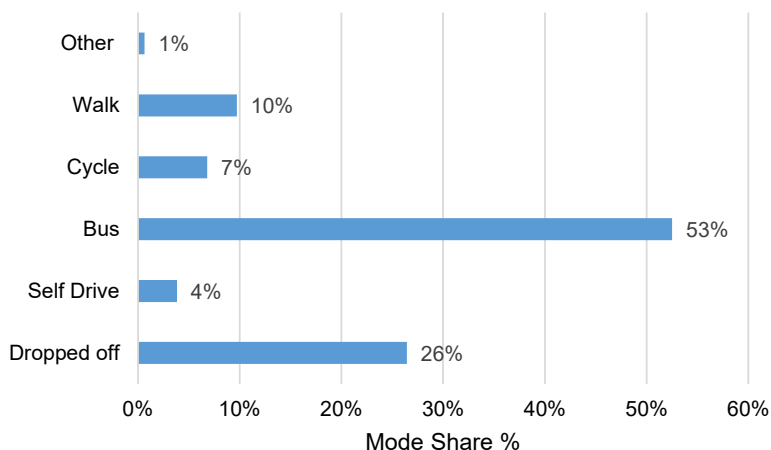


Figure 3.14: High School Student Travel Mode Share

As shown, buses are generally well used by students particularly by high school students (53%). Reasons for not catching the bus were varied as outlined in Figure 3.15 and these aspects are key to the bus operational plan development in consultation with the SINSW, TfNSW and operators with each stakeholder having responsibilities to further increase the bus utilisation for the MEC.

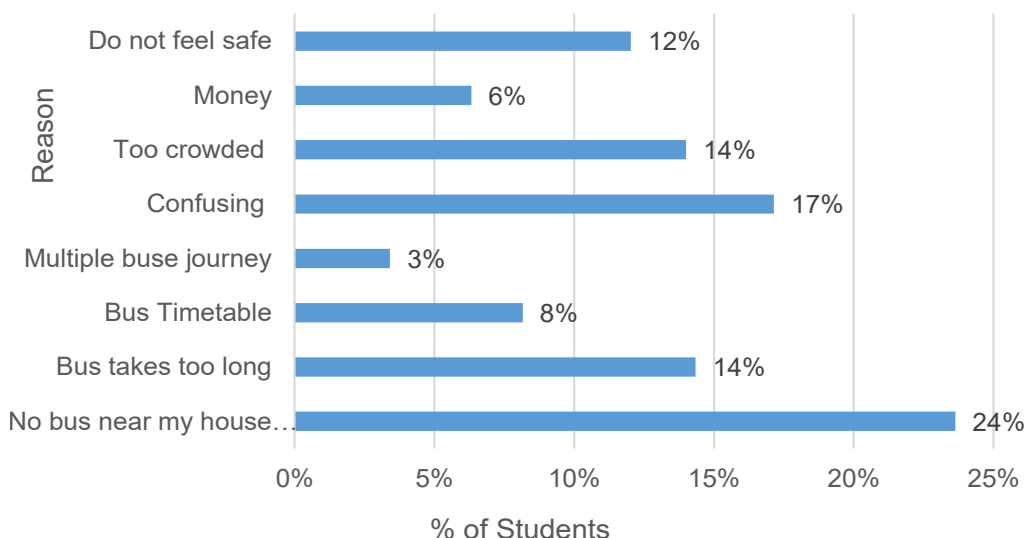


Figure 3.15: Reasons for Not Catching Bus

Active transport participation, in particular cycling, could be potentially increase given there is approximately 10% of students living within 1.2km walking catchment (i.e. 15-minute walk) and 52% of students within a 3.6km cycling catchment (i.e. 15-minute ride) to the school. It is however noted that the topography surrounding the school is a deterrent to active transport. Additionally, availability of local bus services for ‘outer suburban’ Murwillumbah means bus travel is a more attractive option for the MEC. Active transport uptake should therefore be focused on capturing those students living in proximity to the MEC.

3.8.2 Staff Travel Surveys

The mode share spilt of staff is provided in Figure 3.16.

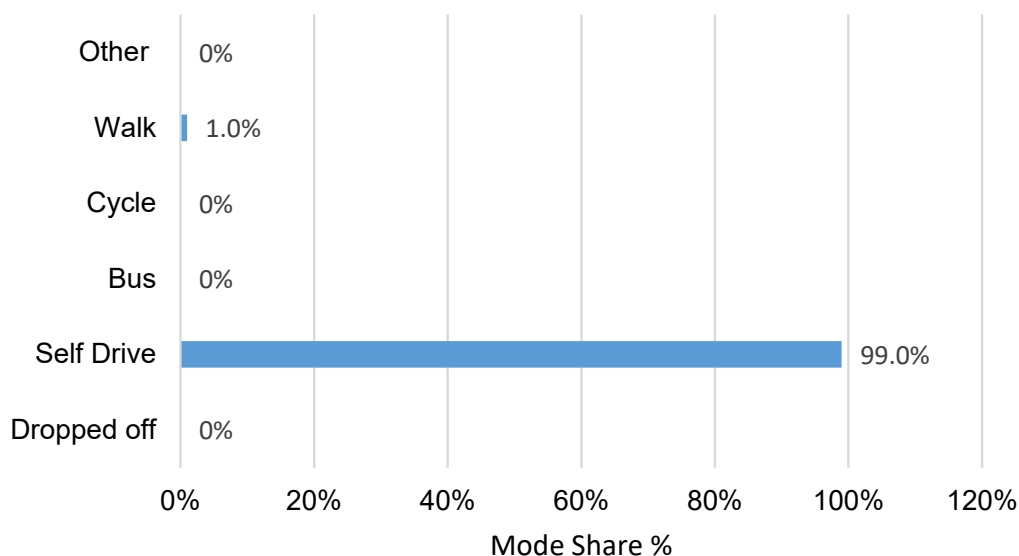


Figure 3.16: Staff Travel Mode Share

As shown in Figure 3.16, the vast majority of surveyed staff drive to school and there is little alternate transport participation currently across the four schools. It was identified in the survey that staff who drive to school typically participate in before and/or after work events of which there is no easy transport option aside from private vehicle. Further, unlike students in a defined catchment, staff are not employed based on their place of residence and do not have to live within the school's enrolment catchment. As a result, the vast majority of (teaching) staff travel from outside Murwillumbah as shown in Figure 3.17. Based on this, the use of private vehicle is expected to be the primary travel mode for MEC. It is however noted that administration and ancillary support staff were not surveyed for existing schools. Anecdotally, these types of roles are often undertaken by a more localised employee base who can participate in alternative travel modes.

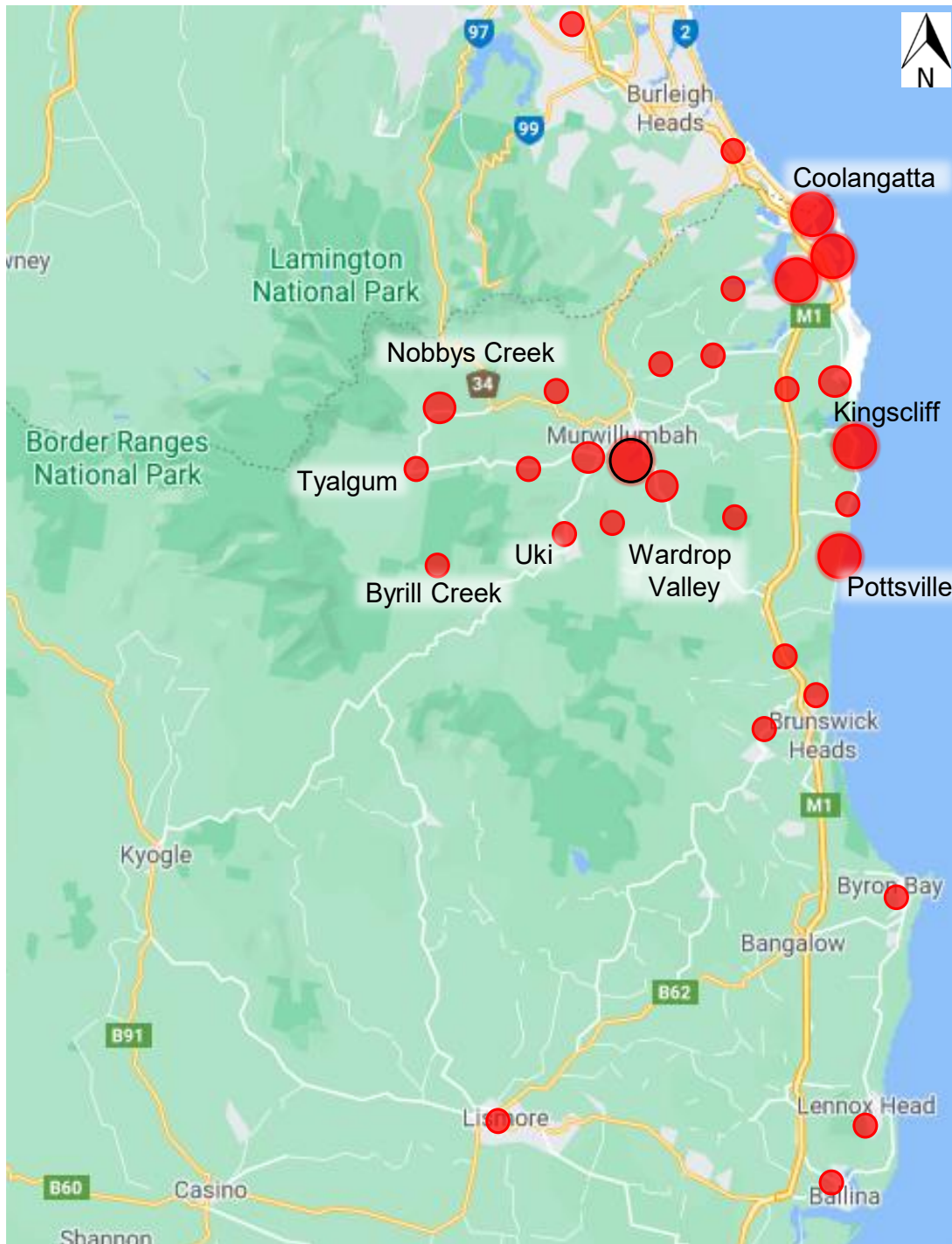
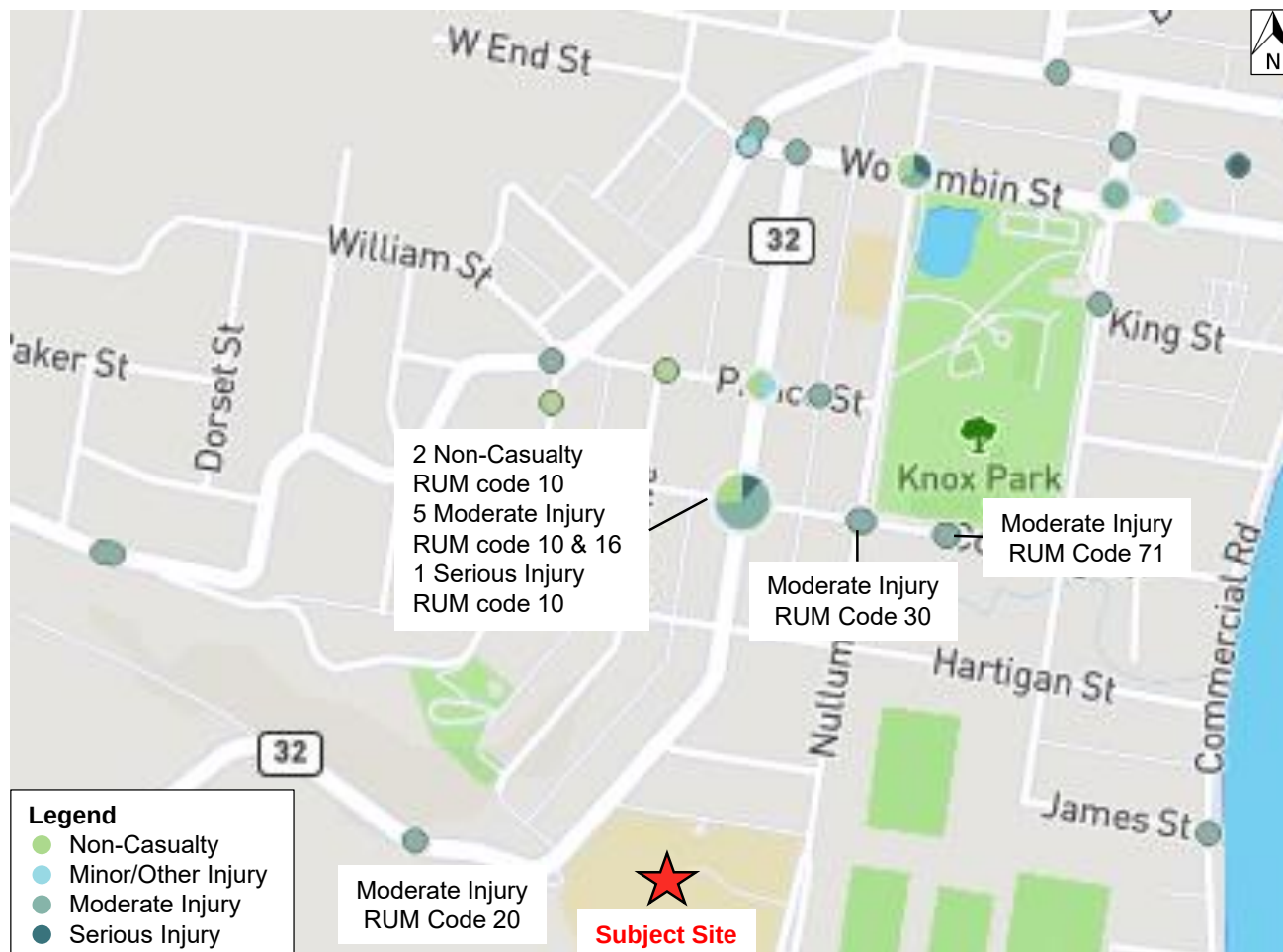


Figure 3.17: Staff Resident Location Travelling to Murwillumbah

3.9 Historical Crash Analysis

The location of historical crashes from TfNSW's online road safety data surrounding MEC for the five-year period (2015-2019) is shown in Figure 3.18.



Source: TfNSW Centre for Road Safety

Figure 3.18: Crash Analysis

One crash occurred on Kyogle Road west of the Riverview Street access. This crash resulted in a moderate injury and occurred as the result of a head on crash within the bend of the road.

Eight (8) crashes have also occurred at the Riverview Street / Condong Street intersection fronting the existing Murwillumbah Public School to the north. The majority of crashes (88%) were a result of cross traffic collisions (RUM Code 10) caused by drivers attempting to cross Riverview Street from Condong Street. Potential factors identified as part of the crash analysis include:

- Poor sightlines on Condong Street due to both vegetation and grades
- High traffic volumes on Condong Street as a primary route to the town centre / shopping centre
- Give-way sign treatment on Condong Street as opposed to Stop sign treatment on Hartigan Street / Riverview Street to the south.

4. PROPOSED DEVELOPMENT

4.1 Development Details

The NSW Department of Education is planning for a new primary school and a new high school which will be located on the same campus at the current Murwillumbah High School site.

The Murwillumbah Education Campus (MEC) will enhance public education in Murwillumbah by supporting contemporary teaching approaches and providing students with access to new, modern, flexible learning environments and facilities.

The MEC will include facilities to support:

- A maximum of 1,722 students in total consisting of:
 - 582 primary school students
 - 1,140 second school students
- A total of 150 FTE* staff for the school consisting of:
 - 43.4 primary school staff FTE positions
 - 106.6 secondary school staff FTE positions
- A total Department of Education (DoE) regional office consisting of:
 - 340m² of GFA office space
 - 25 staff and 7 fleet vehicles.

** Note: The number of staff employed or on-site on any given day may be higher than the full time-equivalent (FTE) number. FTE figures includes teaching and school administration and support staff.*

Based on review of existing school ratios the estimated daily staff (when the Campus is at capacity) is expected to be in the order 168 based on an average +12.13% ratio of daily staff to FTE. It is noted that the MEC campus will retain existing staff from the four school sites for a period until the end of 2025. In this initial period based on available information there could be up to 203 staff on any given day. It is noted however not all of these staff may be on-site at the one time (i.e. based on part-time casual roles and leave absences). These interim staffing levels are therefore considered for the short-term (approximately two years) operational needs for the school however are not expected to continue as part of the longer-term operations of the school.

4.2 Proposed Transport Facility Improvements

Additional transport facility upgrades are included in the proposal to accommodate the increase in enrolments and changes to the transport strategy associated with the MEC. The development plans prepared by Architectus are provided in **Appendix A**.

The transport related components are discussed in Table 4.1. All road works would be on Council controlled roads and subject to S138 Application with Tweed Shire Council.

Table 4.1: Proposed Transport Facility Upgrades

Infrastructure Description	Benefit
New pedestrian crossing on Nullum Street south of High School Lane	Provides a new crossing location for pedestrians travelling from the school entrance to the eastern side of Nullum Street. This is a key desire line and connects to the eastern pathway network along Nullum Street. The location is also strategically placed between the KnD access location to the north and the bus interchange facility to the south.

Infrastructure Description	Benefit
Crossing on High School Lane	Provides an improved crossing facility for pedestrians travelling from the school to the northern end of Nullum Street. This is an existing desire line that connects the school to the external pathway network and crosses the existing High School Lane intersection
Kiss'n'drop (KnD) facility	An KnD facility is provided on site and accessed via new dedicated right turn lane on Nullum Street. The KnD facility includes a median divided driveway crossover accommodating right in/ left out only traffic movements. The facility includes 6 KnD bays positioned adjacent to the primary school forecourt and can accommodate a total of 210m of queueing including the bays and storage lane on Nullum Street. The facility also includes 18 car parking spaces that will be used by primary school staff. The KnD bays will also allow for visitor parking use between 9:30am – 2:30pm.
Bus Interchange	The existing bus zone is proposed to provide passenger pick-up/drop-off areas on the western side of Nullum Street fronting the school, with the remaining bus storage area designated for bus layover and storage. Improvements to pedestrian fencing for boarding and alighting will be incorporated into the works along Nullum Street. Updates to signage and line marking will also be undertaken along Nullum Street to support the bus Interchange and incorporate other associated works including traffic lane updates and a new pedestrian crossings.
Signage and line marking updates on Riverview Street	The existing KnD facility on Riverview Street will be removed and replaced with standard on-street parking bays
Cycle Parking	The MEC will incorporate three separate cycle parking facilities which will accommodate various mode types including bikes, scooters, and skateboards
Pathway Upgrades on High School Lane	The frontage to High School Lane will be improved with a pathway connection provided along the southern side and connecting Nullum Street to Riverview Street. This pathway will connect to the Primary School entry as well as designated cycle / scooter / skateboard storage.

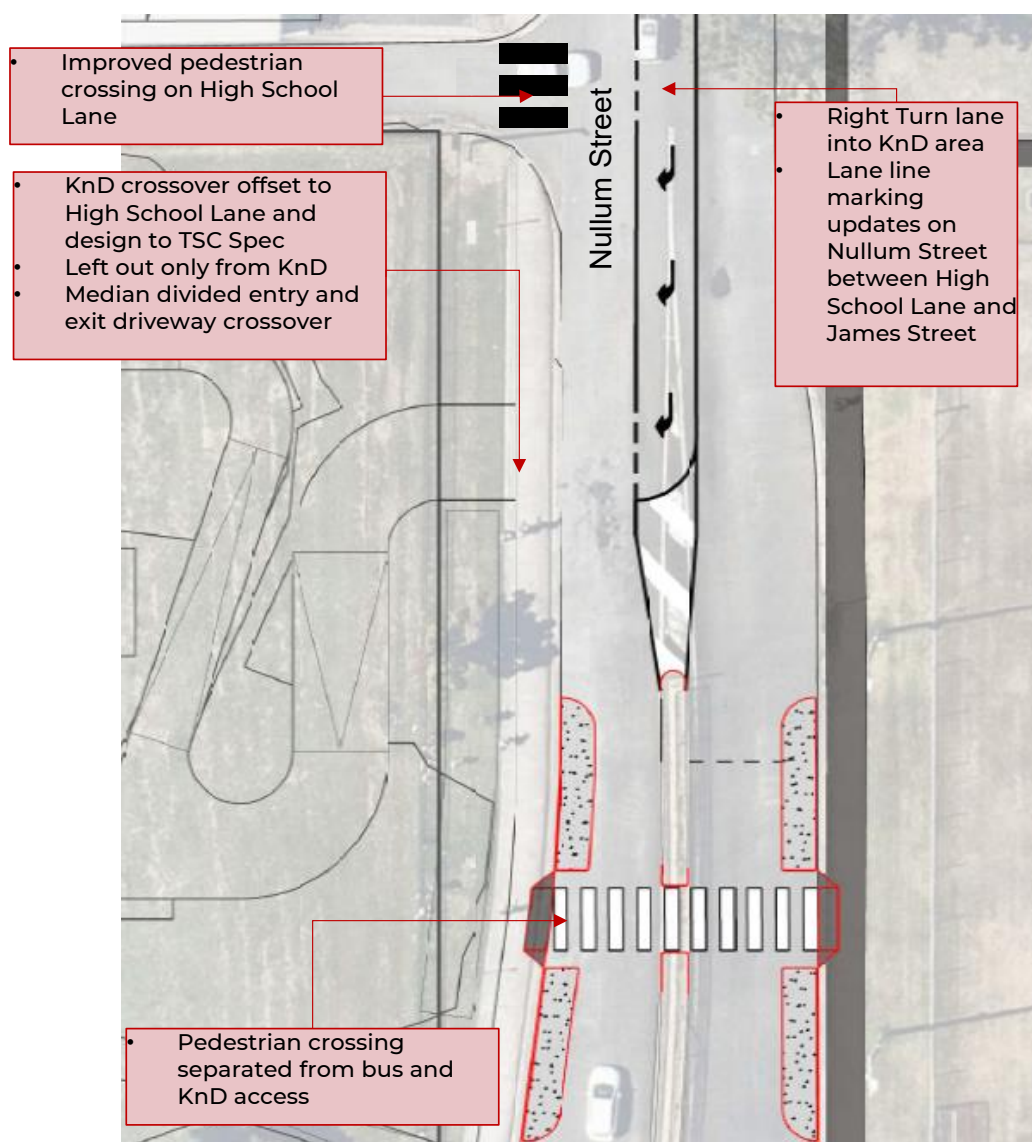
5. ACCESS ASSESSMENT

5.1 Pedestrian Access

Pedestrian access to the subject site is provided at two locations on Riverview Street and Nullum Street. The proposal includes an additional crossing on Nullum Street south of High School Lane to accommodate crossings from the bus bay to the pedestrian pathway on the southern side of Nullum Street. The location and type of crossing on Nullum Street will be confirmed at detailed design and comply with the following requirements:

- Australian Standards AS1742.10 Manual of Uniform Traffic Control devices: Pedestrian Facilities
- Crossing sight distance (CSD) as stipulated in Section 3.3 of Austroads Guide to Road Design Part 4A: Signalised and Unsignalised Crossings (AGRD4A).

Figure 5.1 details the proposed pedestrian crossing facilities fronting the MEC on Nullum Street and High School Lane.



Proposed works on road subject to detailed design and Local Traffic Committee (LTC) endorsement

Figure 5.1: Pedestrian Crossing Facility on Nullum Street

5.2 Vehicular Access

The MEC will include three separate vehicular crossovers which includes retaining the existing crossover at Riverview Street to service staff parking and the DoE offices as well as the southern Nullum Street crossover to service the High School and back-of-house area. Both driveway crossovers will be upgraded in line with Council's *Driveway Access to Property - Design Specification 1.2*.

A new (third) vehicular access to the KnD facility is proposed via Nullum Street and provides a median divided two-way crossover. The location of the new KnD driveway is set back from High School Lane a minimum of 6.0m from the tangent point of the intersection as defined by AS2890.1. The driveway crossover will incorporate a raised median island separator to reduce pedestrian crossing distance and manage ingress and egress movements. Figure 5.2 demonstrates the nominated location and operation of the new driveway crossover to support the proposed KnD facility off Nullum Street.

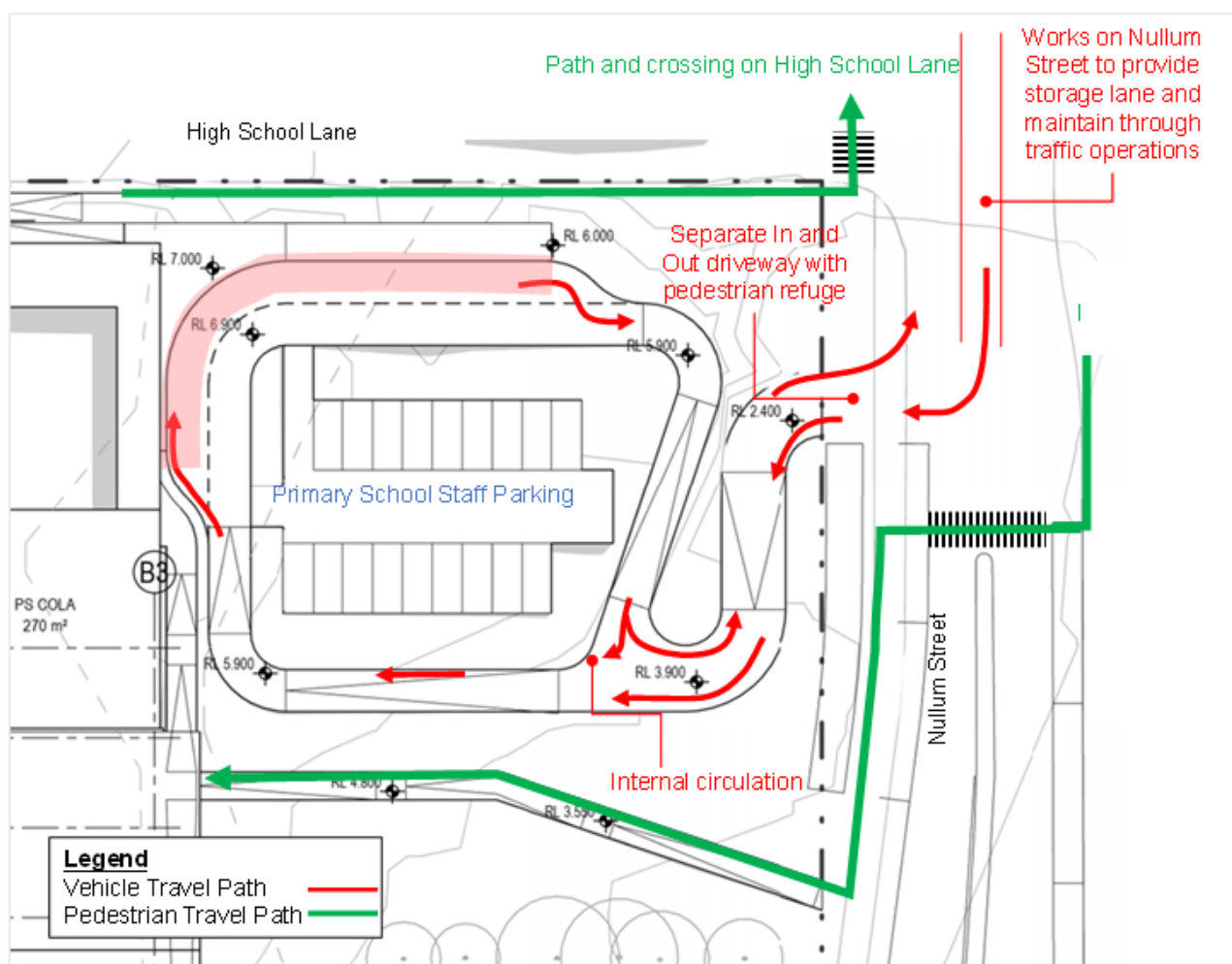


Figure 5.2: New Access Driveway and Operation of KnD Facility

6. BUS FACILITY AND OPERATIONS

6.1 Bus Facility Upgrades

With over 50% of high school students currently using buses, maintaining bus utilisation and public transport mode share for students is critical to the success of the MEC.

The existing bus interchange facility fronting the site is a key driver for the MEC and improvements to both the facility and services are recommended to enhance the bus system and ensure the service remains safe, efficient, and desirable.

As part of the MEC facility, the following upgrades to the bus facility are proposed:

- The designated bus pick up / drop off area is to be relocated and formalised further north from the existing location to increase storage capacity at interchange on the western side of Nullum Street
- School fencing will be amended along the length of the bus bays with a designated bus gate at the northern extent of the bus zone
- Student storage area within forecourt / play space to be provided to reduce students waiting within the footpath and outside school grounds
- Shelter and designated bay improvements including signage and line marking to define pick-up/drop-off bays for various services.

6.2 Operational Recommendations

The existing school bus system operating for the MHS and the various other schools across Murwillumbah is well established as previously outlined in Section 3.6. With the amalgamation of the four schools brings an opportunity to review the service structures as well as introduce initiatives to streamline operations, increase student catchments as well as improve the experience for students and increase utilisation.

As part of on-going consultation with TfNSW's Bus Planning team, they have advised that changes to bus services and contracts are scheduled to occur in 2025. Given MEC plans to open in 2024 these changes to contracts will be required to be fast-tracked or revised in consultation with each of the service operators. Through the TWG process, attendees agreed that a separate Bus Operational Plan for Murwillumbah would be required to be developed in partnership between SINSW, TfNSW and service providers. This bus operational plan is expected to include, but not be limited to the following:

- Develop a Nullum Street Bus Interchange Operations Plan and Reference Guide
- Common Service Route maps and integrated timetabling across all service providers (MEC and other schools)
- Bus Services updates based on new 'combined' student catchments
- Bus Service information to be included on TfNSW's Journey Planner for all service providers
- MEC as well as public interface improvements via the School's and TfNSW's website
- Contract updates and journey planning info ready for day-of-opening
- External bus interchange locations identification and facilities.

Bitzios Consulting has recently been engaged to work with SINSW and TfNSW to develop bus planning updates to support the MEC. This work will include ongoing consultation with TfNSW bus planning as well as DPIE.

7. TRAFFIC ASSESSMENT

7.1 Overview and Methodology

The purpose of this traffic assessment is to determine the impacts of the proposed MEC upgrade on the external network due to the consolidation of the four existing school campuses, increase in student enrolments and changes to the access configurations.

Traffic impacts have been assessed at the following key surrounding intersections:

1. Prince Street / Riverview Street
2. Riverview Street / James Street
3. Riverview Street / Western MHS access
4. Nullum Street / Condong Street
5. Nullum Street / James Street
6. Nullum Street Cul-de-sac / South-east MHS access.



Figure 7.1: Key Intersections

The additional traffic associated with the MEC upgrade has been determined based on the existing schools making up the future MEC and the proposed increase to capacity for the ultimate design year (2034).

As part of the traffic assessment, travel mode surveys were undertaken at all four school to determine the realistic range of private vehicle usage as well as a ratio of students per car / family. In addition to the travel mode surveys, the existing MHS school traffic volumes were also captured in intersection surveys, which assisted in providing a realistic volume of school related trips.

The mode shares have been developed based on a catchment analysis of students located within relevant active transport and public transport service catchments as was noted in section 3.5. Accordingly lower and more practical targets have been developed based on the local context and catchments.

For staff the mode share targets are based on TfNSW's Regional Transport Strategy. The adopted mode shares are illustrated in Figure 7.2 below.

Primary School					
Travel Mode	Existing	Catchment Analysis* / Regional Target **	Mode Share Targets*	% Change	
Staff					
Private Vehicle	99%	82%	82%	-17%	
Walking	1%	8%	8%	7%	
Cycling	0%	5%	5%	5%	
Bus	0%	5%	5%	5%	
Student					
Private Vehicle	60%	21%	35%	-25%	
Walking	4%	14%	5%	1%	
Cycling	2%	69%	10%	8%	
Bus	34%	76%	50%	16%	
High School					
Travel Mode	Existing	Catchment Analysis* / Regional Target **	Mode Share Targets	% Change	
Staff					
Private Vehicle	99%	82%	82%	-17%	
Walking	1%	8%	8%	7%	
Cycling	0%	5%	5%	5%	
Bus	0%	5%	5%	5%	
Student					
Private Vehicle	30%	40%	24%	-6%	
Walking	10%	7%	7%	-3%	
Cycling	7%	42%	10%	3%	
Bus	53%	59%	59%	6%	

* Percentage of students based on catchment analysis

** TfNSW Regional Transport Strategy – Travel Mode Share Targets for Staff

Figure 7.2: Mode Share Targets

7.2 Background Traffic

Background traffic volumes were obtained from traffic surveys undertaken by Traffic Data and Control (TDC) on 3rd March 2021 at the following intersections:

- Prince Street / Riverview Street
- Riverview Street / James Street
- Riverview Street / Western MHS access
- Nullum Street / Condong Street
- Nullum Street / James Street
- Nullum Street Cul-de-sac / South-east MHS access.

Surveys found that the AM peak hour occurred between 7:45-8:45am and PM peak hour 2:30-3:30pm.

In addition to the intersection surveys, Council provided mid-block weekly vehicle counts from 2017 at the following locations surrounding the school:

- Brisbane Street bus lane only opposite Sunny Side Mall
- Brisbane Street north of King Street
- Nullum Street at No. 8
- Nullum Street at school crossing No.21-27
- Nullum Street south of Condong Street
- Wollumbin Street at No. 121.

The survey results represent the existing background and school traffic volumes for the MHS. At the time of surveying, MHS had a total enrolment of 434 students and 84 Full Time Equivalent (FTE) staff.

The traffic survey data is provided in **Appendix B** and the traffic network diagrams provided in **Appendix C**.

7.3 Existing School Traffic

Existing school traffic was extracted from the intersection surveys by isolating all light vehicle movements into/from the school accesses as follows:

- Nullum Street / James Street Intersection
 - All movements southbound
 - All movements entering the intersection from the southern approach
- Nullum Street Access
 - All movements southbound from the Nullum Street / James Street intersection
 - All movements entering the intersection from the southern approach (Nullum Street)
 - All movements entering / exiting from the Nullum Street cul-de-sac
- Riverview Street western Access
 - All traffic turning left-in from Riverview
 - All traffic exiting onto Riverview from the western access

Table 7.1 summarises the cumulative school trips based on the existing school accesses on Riverview Street and Nullum Street.

Table 7.1: Murwillumbah High School Peak Hour Trips

Access	AM			PM		
	IN	OUT	Total	IN	OUT	Total
Nullum Street	73	55	128	46	67	111
Riverview Street	62	38	100	23	43	66
Total Existing	135	83	218	69	110	179

The existing school traffic was determined to be 218 trips during the AM peak and 179 trips during the PM peak. The variance between AM and PM peak volumes can be qualified by a range of factors including:

- Changes in travel patterns and different modes between morning and afternoon periods (i.e drop-off during AM peak, bus home in PM peak)
- Traffic volumes on Nullum Street have conservatively assumed all traffic south of James Street is associated with the MHS, however it is noted that nearby retail and local residential land uses would be included
- Staff movements during peak periods were observed to vary with staff observed to have left the school grounds prior to 2:30pm and other staff remain after 3:30pm.

The recorded existing volumes were distributed into the surrounding intersections based on the survey distributions for each of the relevant movements.

7.4 Forecast Background Traffic

A compounding growth rate of 2.0% per annum was applied to the background traffic excluding the existing MHS volumes (to account for zero school growth in the background scenario). This forecast growth rate is considered conservative given the limited land release and growth planned for the surrounding region of Murwillumbah.

Traffic diagrams showing the forecast background traffic volumes through the network at the anticipated year of opening (year 2024) and the 10-year design horizon (year 2034) are provided in **Appendix C**.

7.5 Design Traffic

7.5.1 Traffic Generation

Traffic generation associated with the school upgrade has been estimated based on the anticipated MEC enrolments and full-time staff. The student travel mode surveys were used to provide a baseline of existing peak hour student related operations and was compared to the *target mode share*. The target mode share was based on the number of students within the walking and cycling catchments of the MEC site, however, it is acknowledged that while this number is desirable, it may not be immediately achievable. Therefore, an average peak hour trip rate was adopted as a conservative value.

Other factors of consideration include high school students opting to drive once obtaining their licenses. The volume of high school students that will drive themselves to school was estimated to be 66 to 90 for the entire MEC high school population.

In addition, an average car share factor has been applied to the proposed MEC enrolments to represent families with more than one child attending the MEC or students carpooling with each other.

The number of trips generated by MEC associated with the above considerations is summarised in Table 7.3 and Table 7.3.

Table 7.2: MEC Development Traffic – Initial Increase (2024 to 2025)

Component	Quantity	Type	Driving Mode Share	Resultant Trips
Primary School Students Trips	461	KnD	45%	207
High School Student Trips	769	KnD	27%	208
High School Student Trips ^a	66	Self-Drive	100%	66
Total students				481
Total students w/ car share correction factor				297
School Staff Trips ^c (Within on-site parking provision)	129	staff	100%	129
School Staff Trips ^a (Off-site parking)	74	staff	100%	74
DoE Staff ^c	25	staff	100%	25
DoE company vehicles	7	staff	100%	7

a. High School Student Trips and off-site/overflow staff trips assumed to use existing public parking

b. School Staff trips to the site is capped/limited by on-site parking supply, with remaining trips being off-site based on maximum 203 staff on any given day during the initial period until end of term-4 2025

c. Maximum DoE staff, unlikely all staff travel to the site every day with flexible working arrangements likely to continue. Trips have however been conservatively assessed as unused parking may be used for MEC staff.

Table 7.3: MEC Development Traffic – Ultimate Design Increase (2026 onwards)

Component	Quantity	Type	Driving Mode Share	Resultant Trips
Primary School Students Trips	582	KnD	45%	262
High School Student Trips	1,050	KnD	27%	284
High School Student Trips ^a	90	Self-Drive	100%	90
Total students				612
Total students w/ car share correction factor				378
School Staff Trips ^b (Within on-site parking)	129	staff	100%	129
School Staff Trips ^a (off-site parking)	~39	staff	100%	39
DoE Staff ^c	25	staff	100%	25
DoE company vehicles	7	staff	100%	7

a. High School Student Trips and off-site/overflow staff trips assumed to use existing public parking

b. School Staff trips to the site is capped/limited by on-site parking supply, with remaining trips being off-site based on maximum 168 staff on any given day

c. Maximum DoE staff, unlikely all staff travel to the site every day with flexible working arrangements likely to continue. Trips have however been conservatively assessed as unused parking may be used for MEC staff.

Of the initial MEC enrolments, it is anticipated that 297 students will generate a car-based trip, which will increase to 378 students at the time of full enrolment capacity.

7.5.2 Development Splits

To determine the overall number of peak hour trips generated by the MEC, the following assumptions were made:

- Each student dropped off at school will generate two trips, being one IN and one OUT trip
- Students that drive themselves to school will generate one IN trip during the AM peak, and one OUT trip during the PM peak.
 - These trips would however be to surrounding areas rather than trips to site accesses as their parking would occur off-site to other parking within the precinct
- Staff will generate one IN trip during the AM peak, and one OUT trip during the PM peak
 - Based on previous traffic surveys and observations 50% of staff trips are assumed to occur after the PM peak
 - 129 trips would be to/from site based on available on-site parking
 - 74 to 39 trips (in initial vs ultimate scenarios) would be trips assumed to go to/from off-site parking within the precinct.
- DoE will generate a further seven trips as staff leave to other school campuses (in fleet vehicles) and as such, will generate one OUT trip during the AM peak, and one IN trip during the PM Peak.

Development traffic splits are presented in Table 7.4 to Table 7.7

Table 7.4: MEC Initial Traffic Splits (AM Peak)

Component	IN	OUT	IN Trips	OUT Trips
Primary School	100%	100%	207	207
High School (drop off)	100%	100%	208	208
High School (self-drive)	100%	0%	66	0
School Staff (on-site parking)	100%	0%	129	0
School Staff (off-site parking)	100%	0%	74	0
DoE Staff	100%	0%	25	0
DoE Vehicle	0%	100%	0	7
Student trips			481	415
Student trips w/ car share correction factor			297	256
On-site Staff trips			191	7
Total MEC Trips			488	263

Table 7.5: MEC Initial Traffic Splits (PM Peak)

Component	IN	OUT	IN Trips	OUT Trips
Primary School	100%	100%	207	207
High School (drop off)	100%	100%	208	208
High School (self-drive)	0%	100%	0	66
School Staff (on-site parking)	0%	100%	0	129
School Staff (off-site parking)	0%	100%	0	37
DoE Staff	0%	100%	0	25
DoE Vehicle	100%	0%	7	0
Student trips			415	481

Component	IN	OUT	IN Trips	OUT Trips
Student trips w/ car share correction factor			256	297
Staff trips			7	191
Total MEC Trips			263	488

Table 7.6: MEC Ultimate Traffic Splits (AM Peak)

Component	IN	OUT	IN Trips	OUT Trips
Primary School	100%	100%	262	262
High School (drop off)	100%	100%	284	284
High School (self-drive)	100%	0%	90	0
School Staff (on-site parking)	100%	0%	129	0
School Staff (off-site parking)	100%	0%	39	0
DoE Staff	100%	0%	25	0
DoE Vehicle	0%	100%	0	7
Student trips			635	545
Student trips w/ car share correction factor			392	337
Staff trips			193	7
Total MEC Trips			585	344

Table 7.7: MEC Ultimate Traffic Splits (PM Peak)

Component	IN	OUT	IN Trips	OUT Trips
Primary School	100%	100%	262	262
High School (drop off)	100%	100%	284	284
High School (self-drive)	0%	100%	0	90
School Staff (on-site parking)	0%	100%	0	129
School Staff (off-site parking)	0%	100%	0	20
DoE Staff	0%	100%	0	25
DoE Vehicle	100%	0%	7	0
Student trips			545	635
Student trips w/ car share correction factor			337	392
Staff trips			170	171
Total MEC Trips			344	563

7.5.3 Development Traffic Distributions and Assignment

Development traffic distributions are based on existing turning movements at each intersection and with consideration to the surrounding road network and land uses. The existing traffic volumes indicate that a large portion of KnD trips are stop-by trips for parents or guardians who continue north into the Murwillumbah town centre and beyond after dropping students off.

Traffic distributions are provided in **Appendix C**.

Network diagrams showing the design traffic volumes (i.e. background traffic plus traffic generation) on the network at the anticipated year of opening and 10-year design horizon are provided in **Appendix C**.

7.6 Intersection Assessment

7.6.1 Overview

The key intersections were assessed using SIDRA Intersection (Version 8) to determine development traffic impacts by comparing 'without development' (background traffic) and 'with development' (design traffic) for the anticipated year of opening (2024) and 10-year design horizon (2034). The impacts were assessed during the morning and afternoon peak hours.

Given the wide distribution of staff locations and potential precinct parking areas the staff trips to off-site parking locations haven't been included in intersection assessment assumptions but their potential influence on traffic in the initial (to end of term-4 of 2025) is discussed in Section 7.6.8.

Each intersection is assessed in the following sections with a full copy of the SIDRA Intersection 8 outputs provided in **Appendix F**.

7.6.2 Riverview Street / Western Access Intersection

The layout adopted for the Riverview Street / Western Access intersection is shown in Figure 7.3 to represent the left-in only and the left / right out movement. The western school access is required to give way to traffic on Riverview Street.

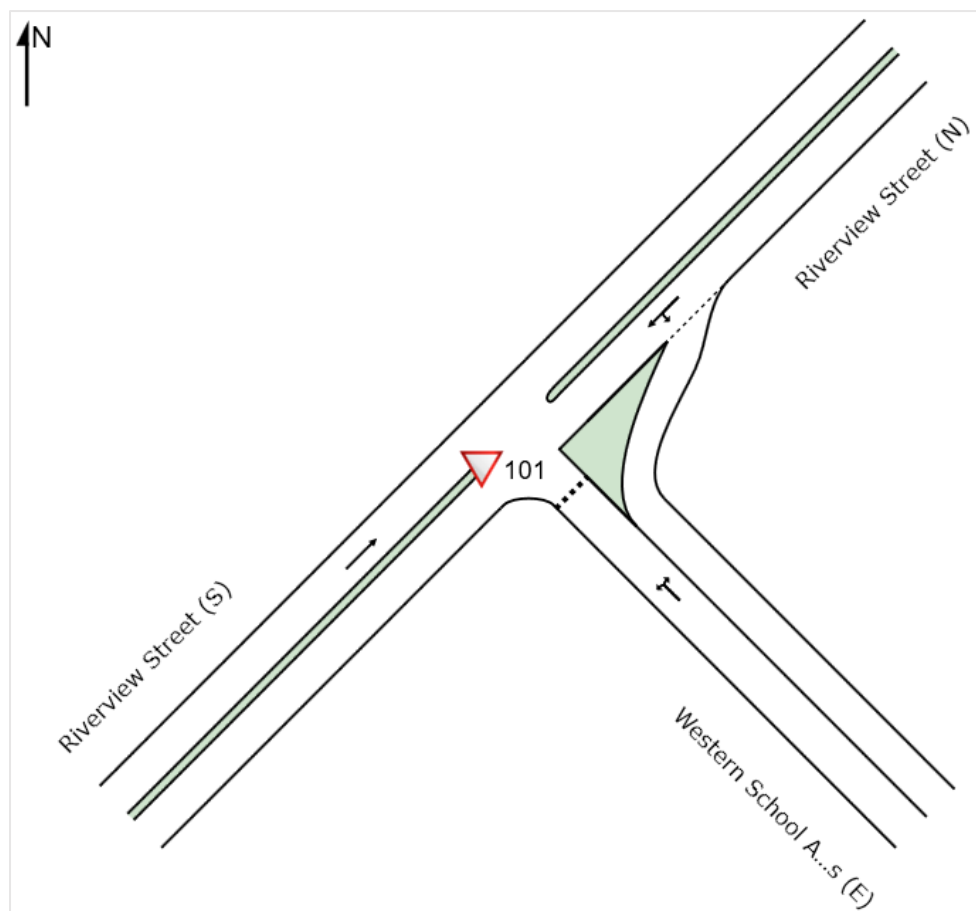


Figure 7.3: SIDRA Layout Riverview Street / Western Access Intersection

For this intersection, it is important to note the net change in traffic generated by the proposal. Specifically, the existing situation includes the High School KnD facility. This facility is being removed from Riverview Street which previously provided 40 parking spaces. This access will now facilitate 103 staff parking spaces and the DoE offices. In regard to staff ingress and egress at this location, the limited left in from Riverview Street is not anticipated to introduce any adverse issues considering:

- The travel model surveys for staff demonstrated that only a minor proportion of staff (~10%) live west of MEC and would be seeking to turn right into the staff parking area off Riverview Street. This would account for a total of 10 vehicles entering the western access off Riverview Street
- The existing situation provides approximately 40 parking spaces used by staff in this location. No notable safety or operational issues exist as a result of the current right turn restriction of associated diversion routes currently used for the site
- The established configuration of the road network and grid layout provides a series of turn-around options to the north of Riverview Street. Alternatively, entering Murwillumbah from the west via North Arm Road and Byangum Road for the outer urban catchment provides the opportunity to turn right into Riverview Street.

Figure 7.4 demonstrates the changes in traffic demands on Riverview Street and Figure 7.5 demonstrates the diversion routes.

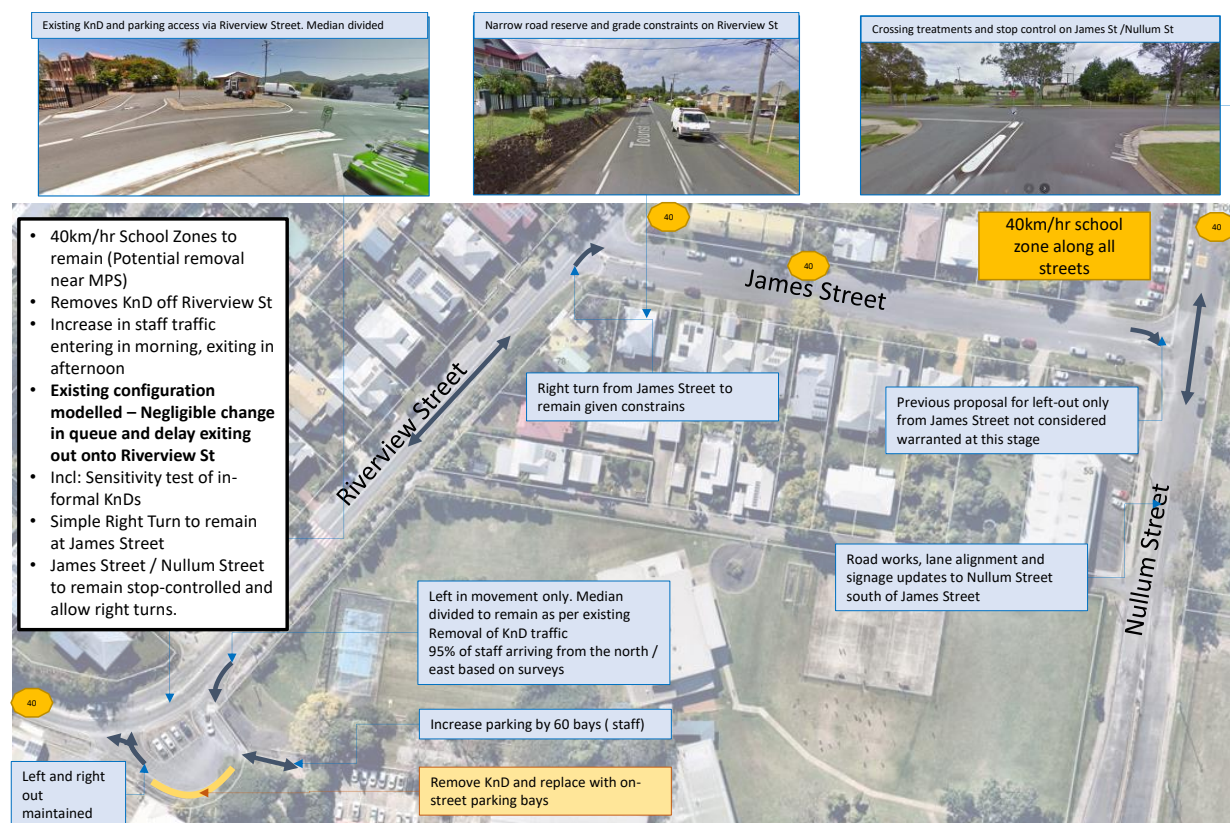


Figure 7.4: Changes to Riverview Street Traffic Demands

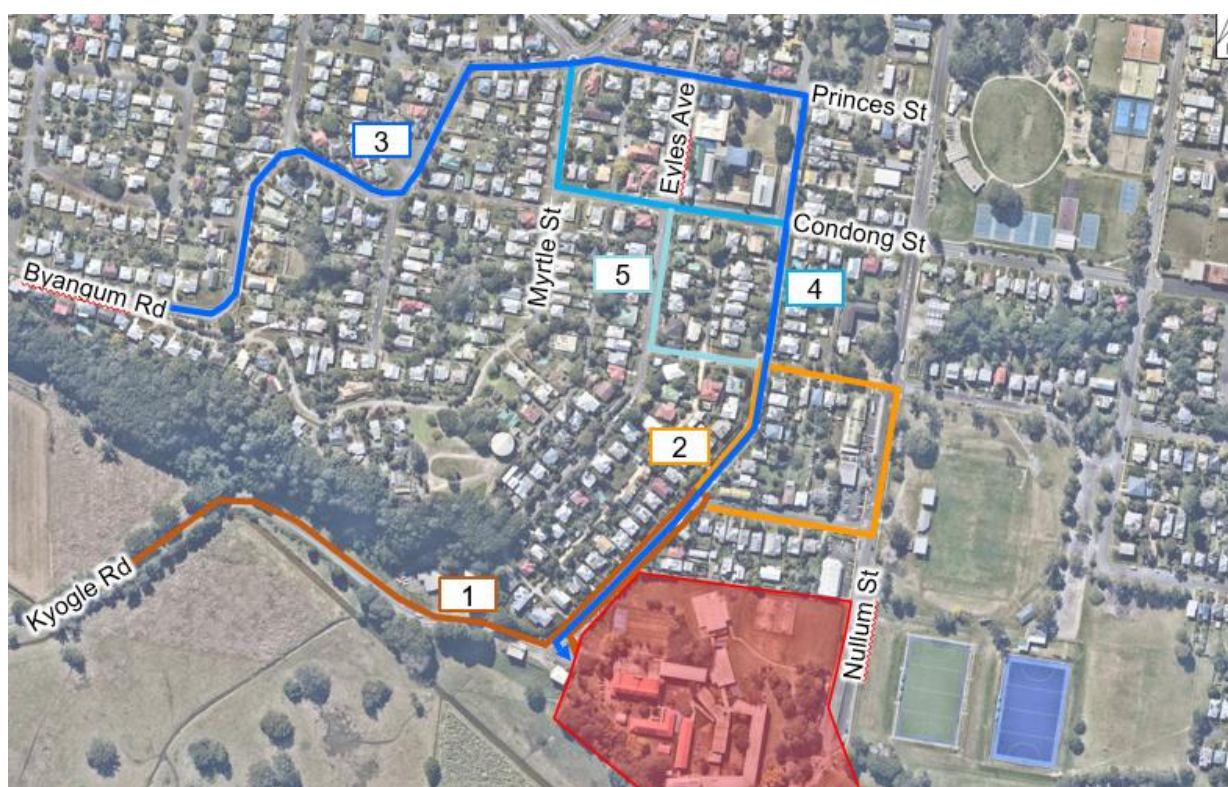


Figure 7.5: Diversion Routes due to Riverview Street Existing Right Turn Restriction

Table 7.8 summarises the SIDRA outputs for the Riverview Street / Western Access intersection.

Table 7.8: Riverview Street / Western Access Intersection SIDRA Results

Year	Time Period	Scenario	DOS (v/c)	Average Delay (s)	Queue (m)
2024	AM (07:45 – 08:45)	Background	0.303	0.7	1.9
		Design	0.302	0.7	0.8
	PM (14:30 – 15:30)	Background	0.268	0.5	1.8
		Design	0.266	1.2	5.8
2034	AM (07:45 – 08:45)	Background	0.369	0.7	2.6
		Design	0.367	0.8	1.6
	PM (14:30 – 15:30)	Background	0.001	2.1	0
		Design	0.332	1.5	8.5

The SIDRA results indicate the Riverview Street / Western Access intersection operates within typical performance limits (in terms of DOS, delays, and queues) for a priority-controlled intersection. The results are generally consistent with site observations. The addition of the development traffic is shown to have a minor impact on the intersection performance with an increase in queues from one vehicle to two vehicles. Therefore, the results demonstrate that the existing intersection configuration can accommodate the proposed changes to traffic demands associated with the proposal.

7.6.3 Riverview Street / Prince Street Intersection

The layout adopted for the Riverview Street / Prince Street intersection is shown in Figure 7.6.

The demands associated with the MEC do not consider the removal of traffic associated with the existing MPS which is located adjacent to this intersection. The intersection analysis is therefore considered to be conservative.

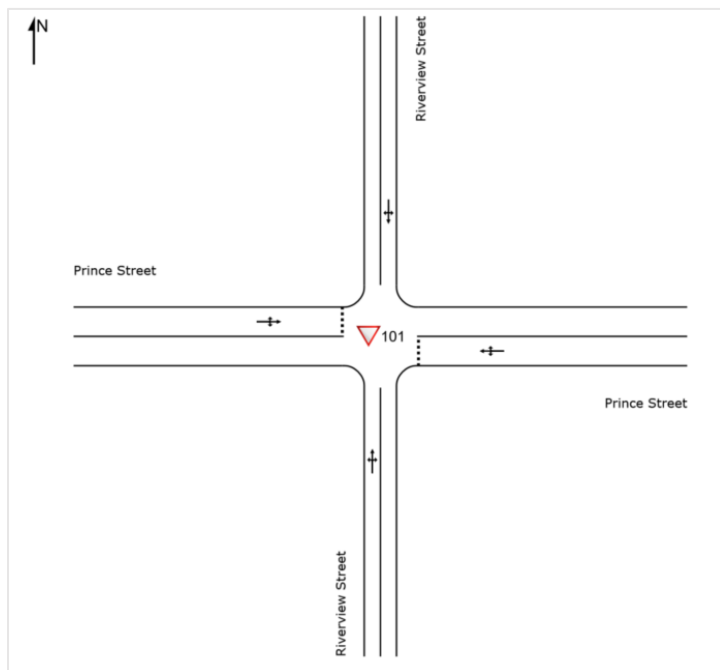


Figure 7.6: SIDRA Layout Riverview Street / Prince Street Intersection

Table 7.9 summarises the SIDRA outputs for the Riverview Street / Prince Street intersection.

Table 7.9: Riverview Street / Prince Street Intersection SIDRA Results

Approach	AM Peak				PM Peak			
	LOS	DOS	Ave Delay (s)	95%ile Queue (m)	LOS	DOS	Ave Delay (s)	95%ile Queue (m)
2024 Background Traffic Volumes								
Riverview Street (S)	A	0.26	2	4	A	0.18	1	2
Prince Street (E)	A	0.06	10	2	A	0.06	8	2
Riverview Street (N)	A	0.014	1	2	A	0.18	1	2
Princes Street (W)	A	0.04	9	1	A	0.03	8	1
2034 Background Traffic Volumes								
Riverview Street (S)	A	0.32	2	5	A	0.21	2	3
Prince Street (E)	A	0.09	12	3	A	0.08	9	2
Riverview Street (N)	A	0.18	1	3	A	0.21	1	2
Princes Street (W)	A	0.05	11	1	A	0.05	9	1

Approach	AM Peak				PM Peak			
	LOS	DOS	Ave Delay (s)	95%ile Queue (m)	LOS	DOS	Ave Delay (s)	95%ile Queue (m)
2024 Design Traffic Volumes								
Riverview Street (S)	A	0.27	2	4	A	0.17	1	2
Prince Street (E)	A	0.06	10	2	A	0.06	8	2
Riverview Street (N)	A	0.15	1	2	A	0.18	1	2
Princes Street (W)	A	0.04	9	1	A	0.03	8	1
2034 Design Traffic Volumes								
Riverview Street (S)	A	0.32	2	5	A	0.21	2	3
Prince Street (E)	B	0.09	12	3	A	0.08	9	2
Riverview Street (N)	A	0.18	1	3	A	0.21	1	2
Princes Street (W)	B	0.05	11	1	A	0.05	9	1

The SIDRA results indicate the Riverview Street / Prince Street intersection operates within typical performance limits (in terms of DOS, delays, and queues) for a priority-controlled intersection. The results are generally consistent with site observations.

The addition of the development traffic is shown to have a minor impact on the intersection performance. Therefore, the results do not warrant the need for any mitigation measures to be imposed on the proposed development.

7.6.4 Riverview Street / James Street

The layout adopted for the Riverview Street / James Street intersection is shown in Figure 7.7.

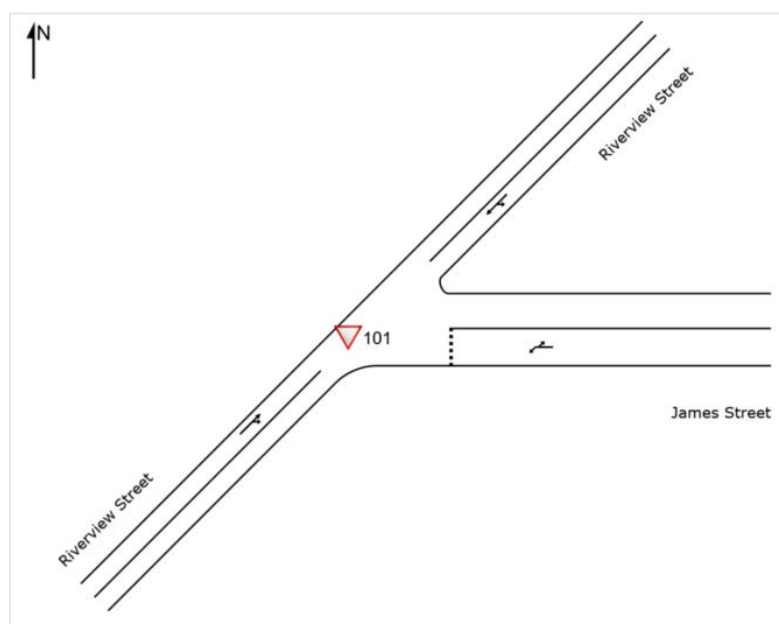


Figure 7.7: SIDRA Layout Riverview Street / James Street Intersection

Table 7.10 summarises the SIDRA output for the Riverview Street / James Street intersection.

Table 7.10: Riverview Street / James Street Intersection SIDRA Results

Approach	AM Peak				PM Peak			
	LOS	DOS	Ave Delay (s)	95%ile Queue (m)	LOS	DOS	Ave Delay (s)	95%ile Queue (m)
2024 Background Traffic Volumes								
James Street (E)	A	0.04	6	1	A	0.10	8	3
Riverview Street (NE)	A	0.01	4	0	A	0.26	0	0
Riverview Street (SW)	A	0.36	1	5	A	0.23	2	4
2034 Background Traffic Volumes								
James Street (E)	A	0.07	5	2	A	0.14	9	4
Riverview Street (NE)	A	0.22	0	0	A	0.32	0	0
Riverview Street (SW)	A	0.47	2	14	A	0.29	2	7
2024 Design Traffic Volumes								
James Street (E)	A	0.10	8	3	A	0.16	8	5
Riverview Street (NE)	A	0.26	1	0	A	0.30	1	0
Riverview Street (SW)	A	0.41	3	15	A	0.35	5	17
2034 Design Traffic Volumes								
James Street (E)	A	0.15	9	5	A	0.24	10	8
Riverview Street (NE)	A	0.30	1	0	A	0.36	1	0
Riverview Street (SW)	B	0.52	4	26	B	0.45	6	27

The SIDRA results indicate the Riverview Street / James Street intersection operates within typical performance limits (in terms of DOS, delays, and queues) for a priority-controlled intersection.

Maximum queues and delays for the intersection occur during the PM peak for the right turn movement from Riverview Street to James Street. This movement is not provided with any right turn pocket or through passing lane. By 2034, the MEC increases the maximum queue for this movement by 2 vehicles (12m) with no substantial change observed in delay. It is noted that under the current background situation in 2034, through traffic with a maximum queue of 3 vehicles and average delay of 5 seconds.

Right turning vehicles at James Street was raised through the TWG process and discussed at length with both Council and TfNSW representatives. Given the current road alignment and available road reserve, the installation of a right turn pocket is unachievable as represented in the site photo within Figure 7.8. Alternatively, Council has raised the option of installing “No Stopping” treatments along the parking lane adjacent to the intersection to allow through traffic to pass right turning vehicles.

While fully compliant widths are unlikely to be achieved, the need for passing is expected to only be required during school periods which is under a 40km/hr speed zone for the intersection.

In response to this option, it is noted that the adjacent rock wall includes pedestrian stairs as well as a landing within the parking lane. In addition, the nearest driveway crossover located approximately 35m to the north includes a bridging driveway crossover which extends into the parking lane.



Figure 7.8: Riverview Street / James Street intersection

Considering the traffic impacts associated with the MEC, the changes in intersection performance are minor when compared to the existing operations associated with the MHS and MPS. SINSW is therefore willing to continue working with TfNSW and Council on the detailed planning and improvements where necessary and practical to support the MEC.

7.6.5 Nullum Street / James Street

The layout adopted for the Nullum Street / James Street intersection is shown in Figure 7.9. During school pick-up and drop-off periods this intersection operates under a 40km/hr speed zone.

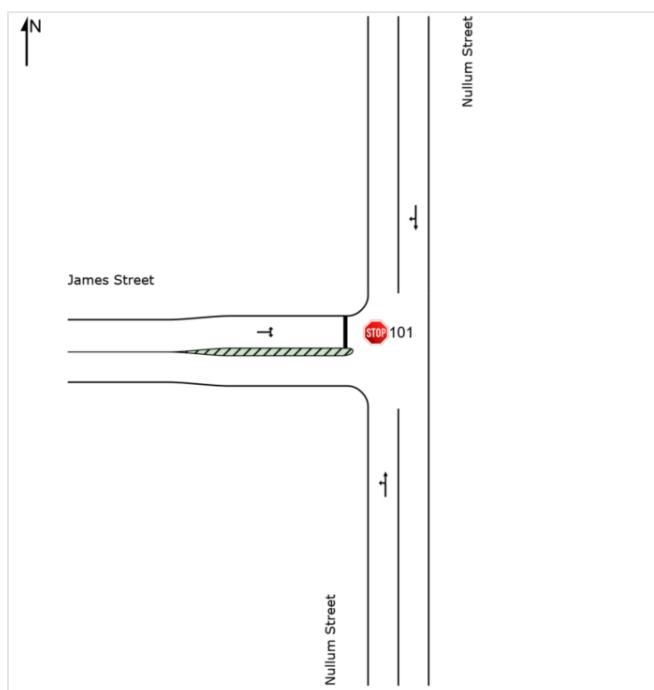


Figure 7.9: SIDRA Layout Nullum Street / James Street Intersection

Table 7.11 summarises the SIDRA outputs for the Nullum Street / James Street intersection.

Table 7.11: Nullum Street / James Street Intersection SIDRA Results

Approach	AM Peak				PM Peak			
	LOS	DOS	Ave Delay (s)	95%ile Queue (m)	LOS	DOS	Ave Delay (s)	95%ile Queue (m)
2024 Background Traffic Volumes								
Nullum Street (S)	A	0.06	2	0	A	0.06	2	0
Nullum Street (N)	A	0.07	1	2	A	0.08	3	3
James Street (W)	A	0.08	9	2	A	0.05	9	2
2034 Background Traffic Volumes								
Nullum Street (S)	A	0.07	2	0	A	0.08	2	0
Nullum Street (N)	A	0.09	1	2	A	0.10	3	4
James Street (W)	A	0.10	9	3	A	0.06	9	2
2024 Design Traffic Volumes								
Nullum Street (S)	A	0.14	2	0	A	0.19	1	0
Nullum Street (N)	A	0.18	1	2	A	0.16	2	5
James Street (W)	B	0.15	10	4	B	0.13	11	3
2034 Design Traffic Volumes								
Nullum Street (S)	A	0.18	2	0	A	0.24	1	0
Nullum Street (N)	A	0.22	1	3	A	0.21	3	7
James Street (W)	B	0.22	11	6	B	0.19	13	5

The SIDRA results indicate the Nullum Street / James Street intersection operates within typical performance limits (in terms of DOS, delays, and queues) for a priority-controlled intersection.

The results are generally consistent with site observations. The addition of the development traffic is shown to have a minor impact on the intersection performance. Therefore, the results do not warrant the need for any mitigation measures to be imposed on the proposed development.

7.6.6 Nullum Street / Condong Street

The layout adopted for the Nullum Street / Condong Street intersection is shown in Figure 7.10. During school pick-up and drop-off periods this intersection operates under a 40km/hr speed zone. It is noted that this intersection is located in proximity to MPS to the north, which will see a reduction in background traffic as a result of the MEC project. On this basis, the traffic analysis for this intersection is considered conservative.

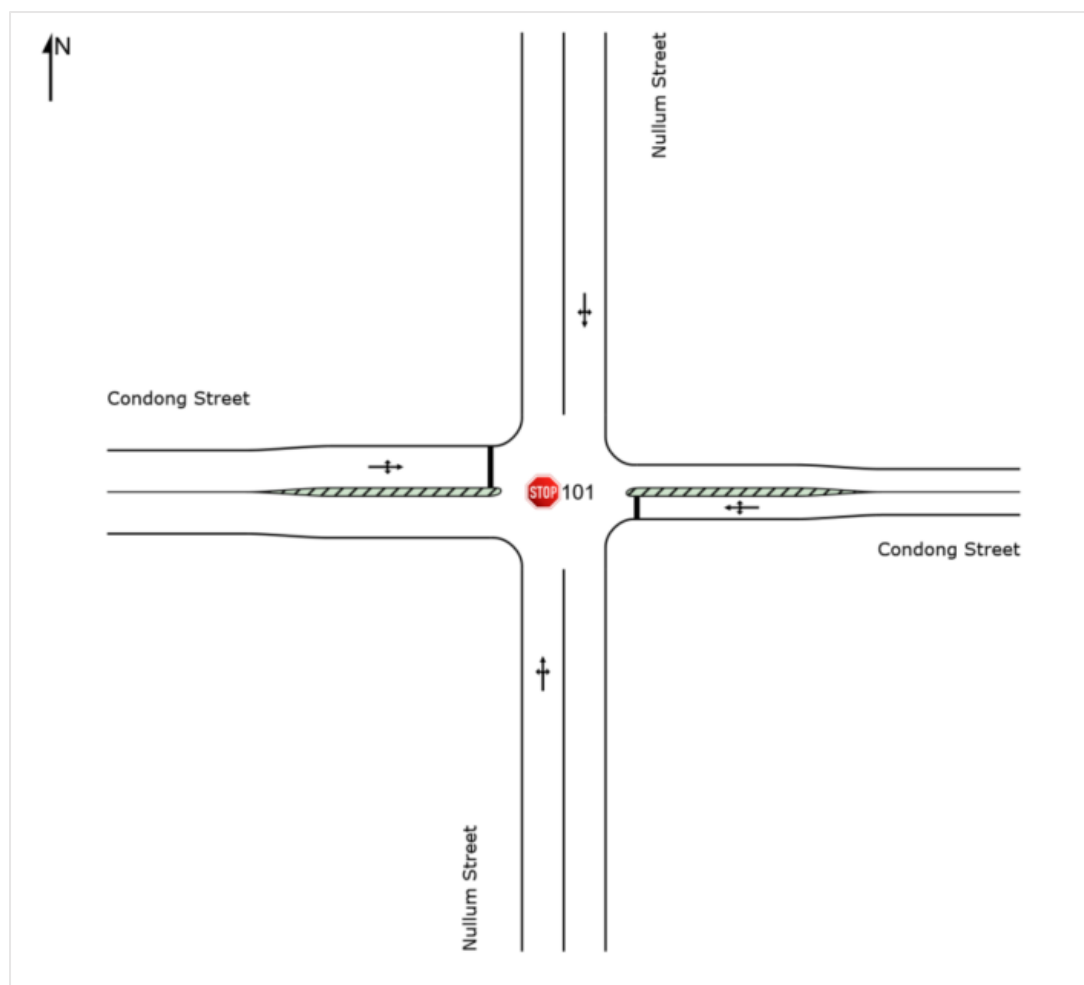


Figure 7.10: SIDRA Layout Nullum Street / Condong Street Intersection

Table 7.12 summarises the SIDRA outputs for the Nullum Street / Condong Street intersection.

Table 7.12: Nullum Street / Condong Street Intersection SIDRA Results

Approach	AM Peak				PM Peak			
	LOS	DOS	Ave Delay (s)	95%ile Queue (m)	LOS	DOS	Ave Delay (s)	95%ile Queue (m)
2024 Background Traffic Volumes								
Nullum Street (S)	A	0.09	4	4	A	0.09	4	4
Condong Street (E)	A	0.18	10	5	B	0.31	10	10
Nullum Street (N)	A	0.07	3	1	A	0.09	4	2
Condong Street (W)	A	0.21	10	6	B	0.17	11	5
2034 Background Traffic Volumes								
Nullum Street (S)	A	0.11	4	4	A	0.12	4	5
Condong Street (E)	B	0.23	11	7	B	0.41	12	17
Nullum Street (N)	A	0.08	3	1	A	0.11	4	2
Condong Street (W)	B	0.28	11	9	B	0.22	12	7
2024 Design Traffic Volumes								
Nullum Street (S)	A	0.17	5	7	A	0.22	5	10
Condong Street (E)	B	0.29	11	9	B	0.46	14	20
Nullum Street (N)	A	0.12	2	1	A	0.12	3	2
Condong Street (W)	B	0.33	13	12	B	0.29	15	10
2034 Design Traffic Volumes								
Nullum Street (S)	A	0.22	5	10	A	0.28	5	13
Condong Street (E)	B	0.41	14	17	C	0.68	19	41
Nullum Street (N)	A	0.15	2	1	A	0.15	3	3
Condong Street (W)	C	0.49	17	20	C	0.48	21	17

The SIDRA results indicate the Nullum Street / Condong Street intersection operates within typical performance limits (in terms of DOS, delays, and queues) for a four-way priority-controlled intersection.

The worst performing movement of the intersection is the eastbound approach on Condong Street which combines left, through and right turning movements at a stop-controlled approach. The maximum delay relates to the right turn at 20.7 seconds. It is noted that this approach provides the opportunity for through and left turning vehicles to bypass a stored vehicle at the stop-line, therefore reducing the net impact to queues and delays on this approach. The results therefore do not warrant the need for any mitigation measures to be imposed on MEC at this location.

7.6.7 Nullum Street / Wollumbin Street intersection

As part of the TWG process, Council identified the existing traffic congestion at the northern extent of Nullum Street at the Wollumbin Street intersection which remains priority controlled. Council noted that during peak school periods, vehicle queues on Nullum Street have historically been high which is due to a mix of right turning traffic volumes as well as bus movements at the intersection.

As part of the MEC traffic distribution assessment we have reviewed the potential for exacerbation of this traffic issue. Several key factors relate to the MEC's influence on this intersection including:

- A review of traffic movements on Nullum Street shows a significant trend for northbound vehicles to divert onto Condong Street instead of continuing along Nullum Street. This alternate route allows traffic to use Brisbane Road / Wollumbin Street roundabout
- Located at the northern extent of Nullum Street is the Sathya Sai School and associated bus and KnD facilities opposite Knox Park. The presence of this school at this particular location reduces the attractiveness of utilising Nullum Street / Wollumbin Street intersection to access the MEC
- It is acknowledged that existing established bus routes to/from MHS currently travel the full length of Nullum Street and use Wollumbin Street intersection. Any changes to the bus route planning associated with MEC will consider notable traffic pinch points across the Murwillumbah CBD in consultation with Council.

7.6.8 Influence of Additional Staff Trips to end of Term-4 2025

As noted in Section 4.1 and Section 7.5 the MEC will have higher staff numbers for a period until the end of Term-4, 2025. This has the potential to generate in the order of 74 additional trips that would be spread across the surrounding road network.

Based on results of the 2024 intersection assessments the surrounding road network and key intersections generally have sufficient capacity to accommodate these additional trips for this initial period of time (i.e. first 2 years of operations). The nature of these staff trips are likely to be outside of the key school peak times and typically associated with earlier arrival and later departing staff. In addition, the nominated location for staff parking (overflow) to the east via Brisbane Road / Hartigan Street is located away from the school entries and exhibits low traffic volumes.

The interim proposal to accommodate higher staff numbers is therefore not expected to result in any adverse traffic impacts that would warrant the needs for infrastructure upgrades to be imposed.

8. PARKING ASSESSMENT

8.1 Overview and Methodology

The purpose of this parking assessment is to determine the impacts of the proposed upgrade on the off-street and on-street facilities. Parking impacts have been assessed based on the increase in staff and students' numbers detailed in Section 4. Car parking has been raised within the TWG process and was a critical item to address as part of the master planning process. Key aspects relating to parking for the MEC include:

- Council have identified that parking around schools remains a key issue across the shire
- The site is located at an existing school (MHS). While no adverse parking has been reported to Council, the proposal to expand and introduce Primary school students will increase demands for parking
- The provision of a KnD facility on the site seeks to reduce impacts associated with parking demands for the site as well as improve traffic efficiency and safety during peak periods
- Murwillumbah is historically a car driven town with limited public transport options, however the existing established bus operations demonstrate significant mode share, particularly for high school students
- Emphasis for parking should be geared towards staff given the existing high private vehicle usage and limitations in utilising alternate travel modes including walking, cycling or public transport. In addition, initiatives to support car-pooling and reduce car reliance for work related travel are to be incorporated through the School Travel Plan (STP) and in consultation with TfNSW.

For the purposes of a parking provisions assessment yields, have been prepared based on the ultimate (post-2025) arrangements for staffing numbers and is contained in Sections 8.2 and 8.4. Commentary on the initial parking demands based on a higher staffing commitments until the end of 2025 is provided in section 8.4.2.

8.2 Council Car Parking Requirements

Standard car parking rates for MEC were sourced from *Council's Development Control Plan (DCP) Section A2 – Site Access and Parking Code* (2014). The relevant car parking rates and requirements are outlined in Table 8.1.

Table 8.1: Car Parking Requirements

Land Use	Quantity	Parking Rate	Spaces Required
Educational Establishments Schools - Primary	48 staff*	0.5 spaces per staff	24 spaces
	582 students	1 space per 14 students	42 spaces
Education Establishment - Secondary	120 staff*	0.5 spaces per staff	60 spaces
	1140 students	1 space per 12 students	95 spaces
Office	340m ² GFA	1 space per 50m ² of GFA	7 spaces
Total			228 spaces

* Note: Staff numbers is the ultimate staff population based off 150 FTE with average daily ratio factor increase of +12.15%. Not all staff are expected to require parking for a full day

As shown above, Council's on-site car parking requirements are high compared to the existing on-site car parking provision. In addition, the balance of parking allocation within the DCP is not considered proportionate to the travel mode share results for the various four schools.

Specifically, the allocation of spaces to staff within the DCP at a rate of 0.5 spaces/staff is considered low, conversely the parking for students is high as it does not consider efficiencies associated with a KnD facility or policies regarding student parking provisions at school sites

8.3 Parking Provision Scenarios and Approach

Through development of the MEC masterplan as well as part of the TWG, three separate parking provision scenarios were reviewed. This included:

- **Scenario 1 Off-site Hockey Fields Parking:** Minimal parking provided on the MEC site and reliance on the nearby hockey field parking area. This would include provision of an improved pathway connection to the Hockey Fields as well as maintenance updates to the facility given the proposed reliance to support staff and student parking. This scenario was not adopted
- **Scenario 2 Off-site New Parking Area on Council Land:** Minimal parking on-site and construction of an additional parking area on the eastern side of Nullum Street adjacent to the hockey fields. This scenario was not adopted
- **Scenario 3 Maximise Parking on site to meet Demands:** Maximise the parking on the site via both Riverview Street and Nullum Street to support staff parking as well as KnD and administrative needs. This **scenario was adopted** to manage parking demands on site and limit the reliance on Council parking facilities surrounding the MEC.

8.4 Parking Demands and Provision

8.4.1 Ultimate Parking Demands and Provision

An important consideration when planning for the car parking provision is to achieve a balance between parking demand and providing an oversupply. It is widely acknowledged that provision of parking relates directly to car parking occupancy and traffic generation. Providing additional parking will unnecessarily increase parking demand and private vehicle use on the surrounding road network. Managing parking demands also is an important measure in promoting active transport modes including walking and cycling.

Car parking on-site is proposed to be prioritised for staff. Based on the mode share survey results discussed in Section 3.8, existing staff travel from outside the local area and therefore rely on private vehicle. However to ensure parking is not overprovided and support TfNSW Regional Mode Share targets a ratio of parking to reflect close to an 82% staff drive-mode share has been proposed. In addition, given the overall average staffing includes part-time, specialists staff and non-teaching staff the expected staff parking demands for this component is not expected to be required for the entire school day and/or during the peak period.

An additional 25 DoE staff members as well as storage for seven (7) fleet vehicles are also included in the staff parking demands. Based on flexible working arrangements of DoE staff that are understood as being likely continue not all 25 staff will be on-site meaning they will not generate a full parking demand per staff member. These 25 spaces when not in fully use by DoE staff and contained within the general staff parking area and could be available for use, reducing an off-site parking demands.

Staff parking provision is summarised in Table 8.2.

Table 8.2: Staff Car Parking Requirements

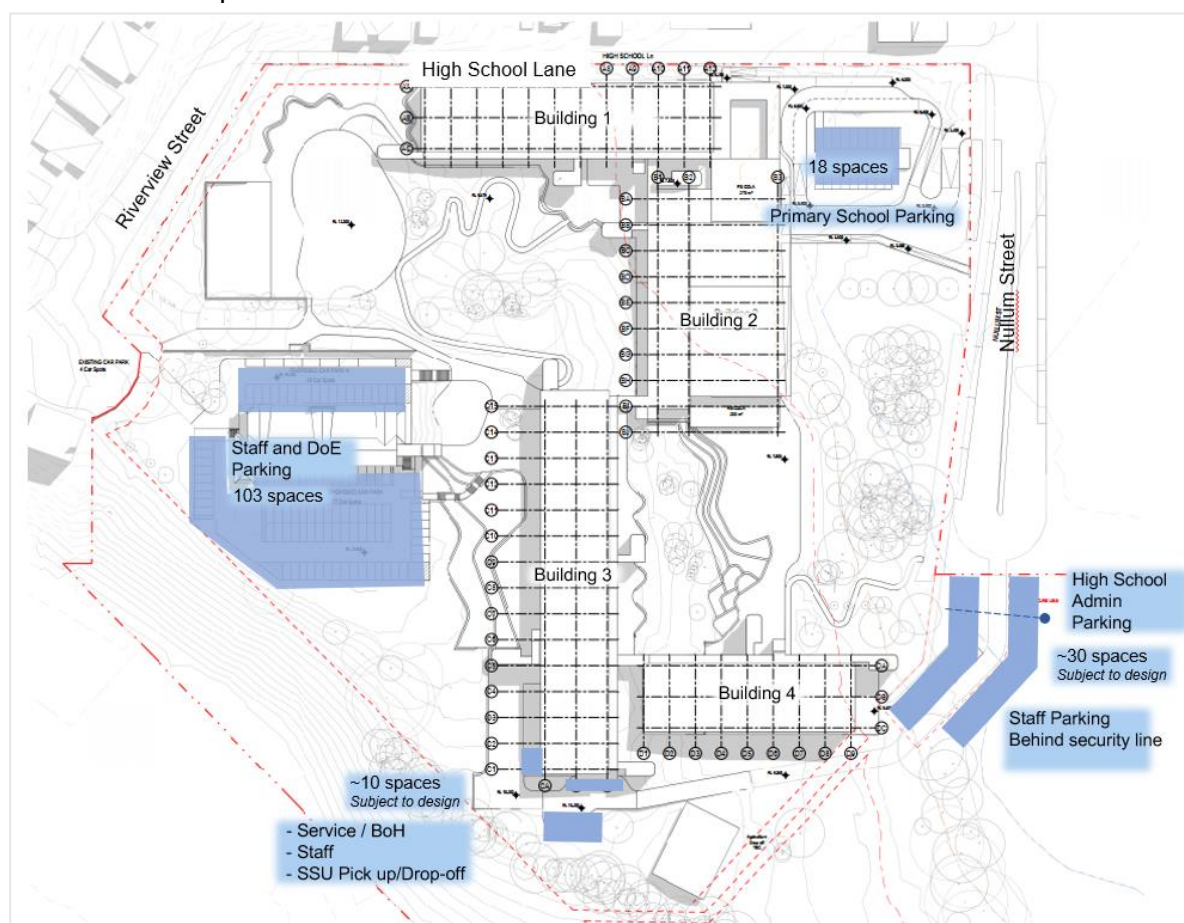
Type	Quantity	Parking Rate	Spaces Required	Spaces Provided
Staff	168 staff*	0.82 space per staff	138 spaces	154 spaces
	25 DoE staff		20 spaces	
	DoE Fleet Vehicles	1 space per vehicle	7 spaces	7 spaces
Total			165 spaces	161 spaces

* Note: Staff numbers represents 150 FTE with daily ratio factor increase of +12.15% for part-time workers. Not all staff are expected to require parking for a full day

The provided 161 spaces is a practical maximum on-site parking supply based on available space, while balancing the need for other school facilities and adequate separation of student areas from on-site vehicle traffic.

The proposed site plans comply with both Council's DCP requirement for staff parking of 84 spaces as well as the mode share targets within the MEC. Staff parking allocation will be distributed across the site as shown in Figure 8.1 and itemised as follows:

- 103 spaces accessed via Riverview Street
- 18 spaces central to the KnD facility fronting the primary school
- 30 spaces along the southern access driveway of Nullum Street as well as an additional 10 spaces at the rear of building 3B within the Back-of House service area.
- TOTAL: 161 spaces

**Figure 8.1: Staff Parking Locations – Total 161 Spaces**

There are a further 10 precinct parking spaces located just outside the site boundary on Riverview Street. While likely to service a range of parking demands (i.e. school visitors, some residential visitor parking) this supply would be available for use by staff with these spaces proposed to be unrestricted.

8.4.2 Initial Parking Demands and Management (up to end of 2025)

As previously noted there will be a period from school opening (in 2024) until the end of Term-4, 2025 when the MEC may have up to 203 staff on-site on any given day. Providing additional parking on-site is not achievable to service this interim period demand.

Alternative to on-site parking, SINSW seeks to utilise available existing on and off-street parking facilities within the surrounding area.

Surrounding public parking capacity is generally available to accommodate for this demand without having a significant impacting on local amenity or street parking for surrounding residents, businesses, and their visitors.

Other peak parking demands in the surrounding typically occur on weekends and after the schools PM peak period based on activities at the adjacent sporting precinct. Therefore this cross-utilisation of existing public parking is not expected to impact on the operations or amenity of the sporting precinct

8.4.3 KnD Facility

A KnD facility is proposed to offset the need to provide dedicated parking spaces for student pick-up/drop-off purposes and is accessed via Nullum Street. The KnD facility provides six (6) collection bays and estimated to be able to service 360 vehicles over a 30-minute period. The combined KnD demand for both primary and secondary based on mode share targets is approximately 307 vehicles (116 for primary and 191 vehicles for secondary).

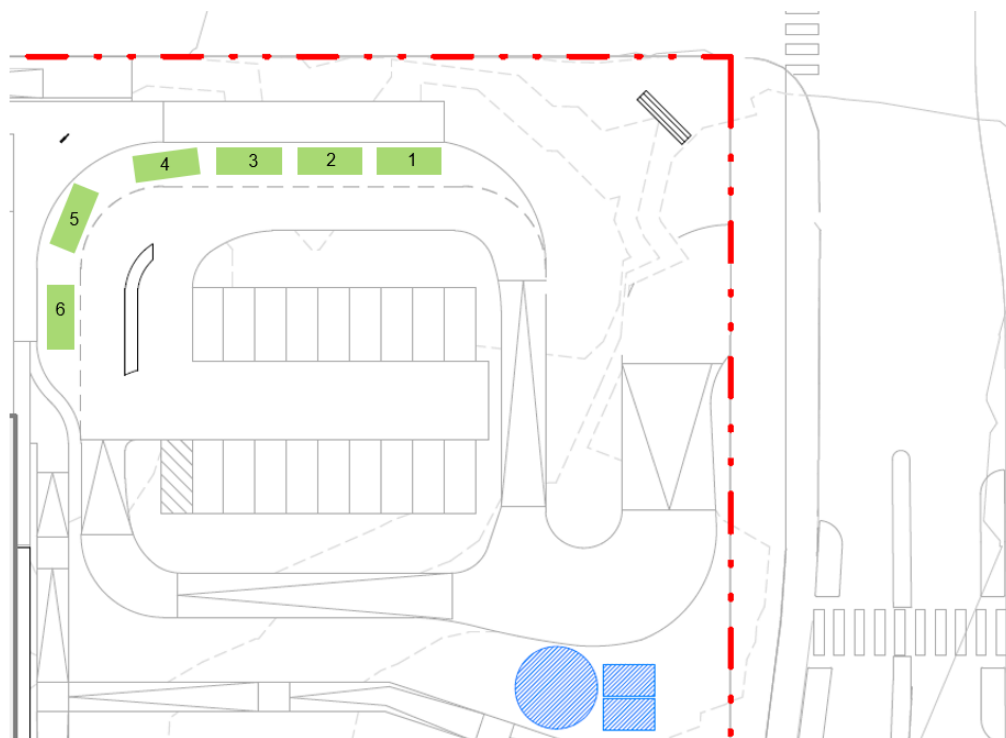


Figure 8.2: KnD Facility capacity

The facility is also designed to allow for internal circulation and remove the need for vehicles to turn-around on Nullum Street. In addition to the 6 to 7 vehicles able to be accommodate within the

'collection' area there is approximately 100m of internal queuing area to accommodate approximately 14 vehicles and a further 5 to 6 vehicles are able to be queued within the proposed right turn pocket on Nullum Street.

It is important to note that this southern extent of Nullum Street is a cul-de-sac and closed catchment associated with the school operations. Therefore the proposed layout will not result in any adverse queuing impacts to major roads.

The KnD facility also provides time-limited parking on site which is located directly adjacent to the primary school's administration building. Therefore, the KnD facility constitutes an additional six (6) parking spaces on site.

Consistent with the existing operations of primary schools and high schools across Murwillumbah, it is recommended that staggered bell times be adopted for MEC. This operational feature allows for the peak pick-up-drop-off periods to be staggered and reduces the concentrated traffic and parking impacts. Specific bell time discussions and consultation between SINSW and DoE remains on-going.

8.4.4 Senior Student Parking

Based on the travel mode surveys at MHS and WHS, approximately 45 students currently or intend to drive to school when they get their license, however this is expected to increase throughout the school year and may result in approximately 66 to 90 students driving by the end of the school year (Term 3 for Year 12).

Consistent with SINSW policies to reduce private vehicle utilisation and not promote or encourage students to drive to the site, on-site parking will not be prioritised for student use. In addition, any further parking provision on-site would impact available space for educational purposes as well as introduce additional traffic movements within high pedestrian activity areas on the school grounds.

Alternative to on-site parking, SINSW seeks to utilise available existing publicly available parking facilities within the surrounding precinct which has observed spare capacity to accommodate for these demands which would only experience these peak demands towards the end of the school year.

8.4.5 Visitor and Time-Limited Parking

Visitor parking demands are proposed to be accommodated in the following areas:

- Six parallel parking spaces within the KnD facility fronting the primary school administration building. These spaces will be time limited allowing utilisation outside drop-off and pick-up periods (i.e 9:30am-2:30pm)
- Six administrative parking spaces located immediately within the driveway off Nullum Street (south) fronting the high school administration office
- Time limited parking provision within the bus interchange facility which remains consistent with the existing kerbside allocation along Nullum Street and provides a total of 32 on-street parking spaces immediately adjacent to the MEC
- A total of 10 spaces on Riverview Street immediately adjacent to the DoE office. This comprises of four existing parking spaces as well as six new spaces which are currently designated as the KnD facility.

Overall a total of 54 parking spaces are provided either within or immediately adjacent to the site to facilitate visitor parking needs associated with the MEC.

8.4.6 Student Support Unit (SSU) and Persons with a Disability (PWD) Parking

The MEC will incorporate a SSU which will service up to 90 students with varying needs. As part of the SSU, a key outcome is to provide inclusive services and not to segregate SSU students from the remaining students. This also relates to student pick-up and drop-off, where SSU students will be encouraged to utilise the common transport options available to all students.

In addition to this, the MEC will facilitate specialise pick-up/drop-off areas to accommodate persons with a disability (PWD) or special needs. This will include PWD parking located within all designated on-site parking areas as well as a defined pick-up/drop-off area located at the southern extent of Building 3B to support larger passenger support vehicles.

8.5 Site Parking Summary

Overall there are 209 precinct parking spaces to meet the needs of the MEC development, while managing the use of private vehicle utilisation and supporting the use of alternate transport modes including buses, walking, cycling, scooting, and skating. Figure 8.3 details the location of the MEC parking breakdown, which includes

- Total of 161 parking spaces provided on-site to support staff and operational parking needs
- 10 unrestricted on-street parking spaces on Riverview Street immediately fronting the MEC
- 6 additional time-limited parking spaces on site as part of the KnD facility
- 32 time-limited parking spaces on Nullum Street as part of the bus interchange facility and kerbside allocation

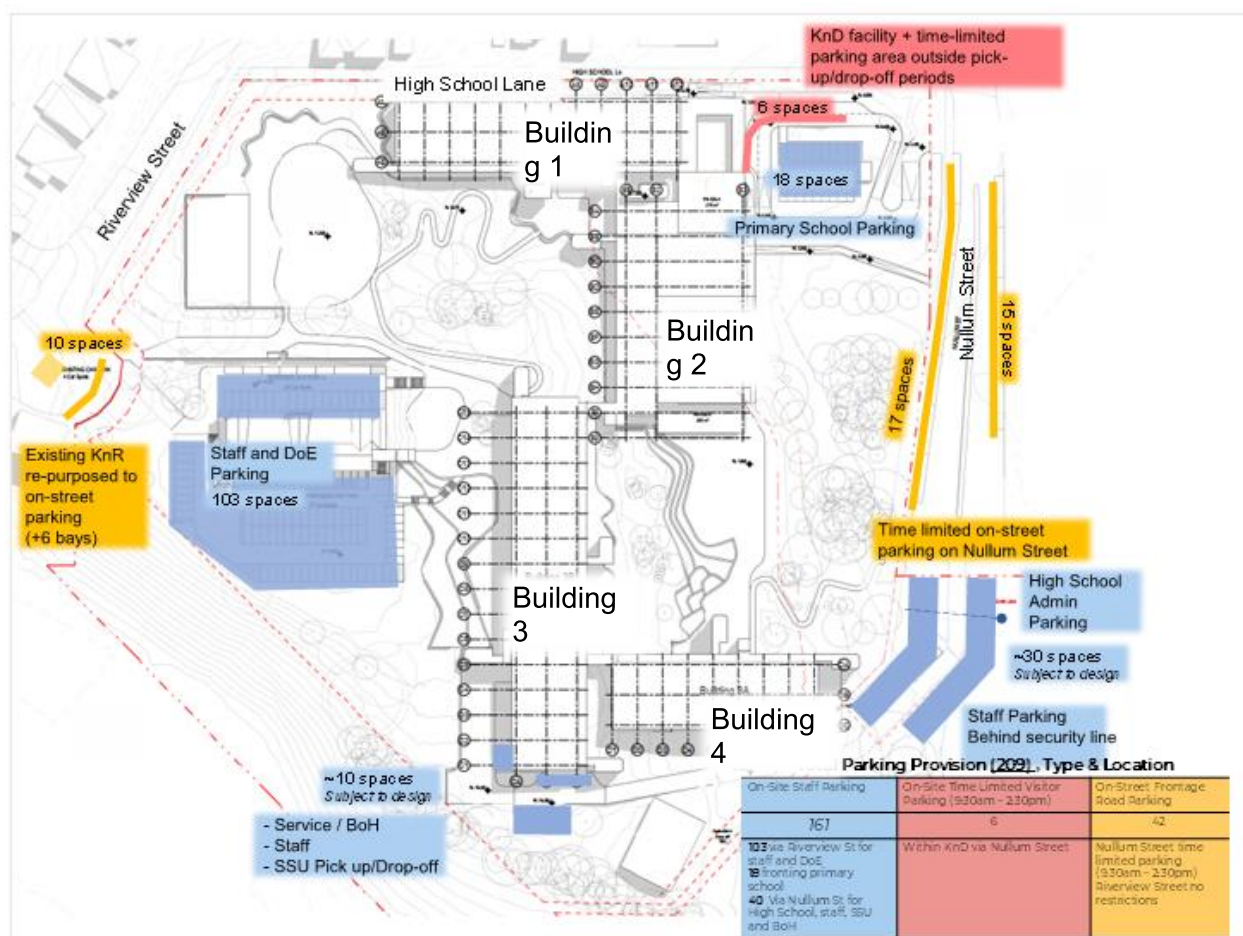


Figure 8.3: MEC Precinct Parking Provision

8.6 Bicycle Parking Requirements and Provision

Council's DCP Section A2 – Site Access and Parking Code (2014) stipulates a bicycle parking rate of “1 bicycle space per 5 students over Year 4” and based on the future enrolments of 1,306 this would equate to 228 bicycle parking spaces for Year 4 – Year 12.

Based on the travel mode surveys, Council's rate does not accurately reflect the current bicycle parking demand as students travelling by bicycle is linked to:

- The age of the student and therefore competence and confidence
- The quality infrastructure to provide a high level of service
- The quantity and quality of end of trips facilities provided at the destination.

It is noted that other wheeled devices including skateboards and scooters are also included in bicycle parking and specific storage devices can be provided. The bicycle parking demands consider the travel mode surveys discussed in Section 3.7 and the active transport catchment discussed in Section 3.5.1. A summary of the bicycle parking demands, and provision is provided in Table 8.3.

Table 8.3: Bicycle Parking Demands and Provision

Land Use	No. Students	DCP Requirements	Future Demand based on Travel Mode Surveys	No. Students within Catchment	Cycle Storage Provision
Student – Primary (Year 5 – 6)	166 (yr. 5-6) 582 total	34	15 spaces	130 students within 1.2km 348 Students within 2.4km	34 for Primary School
Student – High School	1,140	228	78 spaces		114 for High School
Total			93 spaces	172 spaces	148 students

It is recommended to provide 34 storage spaces in proximity to the primary school and a total of 114 storage spaces for the high school, with 57 spaces located off Riverview Street and 57 spaces off Nullum Street. Figure 8.5 illustrates the indicative location of bicycle parking with further information contained in architectural plans.

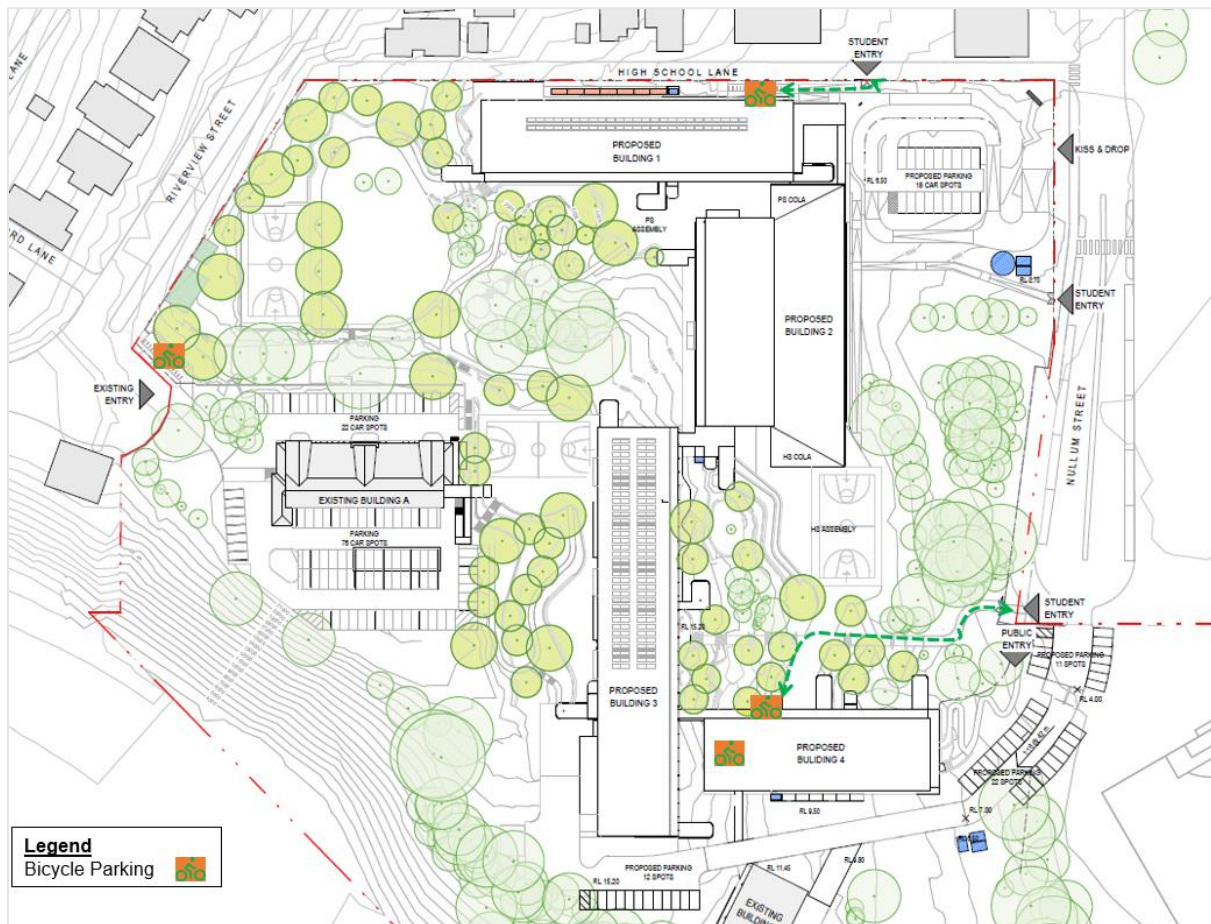


Figure 8.4: Bicycle Parking Locations

Consistent with contemporary mode types used by students to access school it is recommended that facilities include a mix of cycle, scooter, and skate board parking as per examples presented in Figure 8.6.



Figure 8.5: Example School Storage Facilities

To further encourage a modal shift for staff whilst support those existing and future potential staff residing within the cycling catchment of MEC, it is recommended to provide 13 staff bicycle parking spaces based on the mode share target of 10%. The staff bicycle parking is to be supplemented with end of trip facilities (e.g. showers, lockers, change areas, etc).

8.7 Car Parking Layout Review

On-site car parking facilities provided have been assessed against the relevant requirements of Council's DCP and Australian Standards AS2890.1, AS2890.2 and AS2890.6. The assessment is documented in Table 8.4

Table 8.4: Car Parking Geometrical Assessment

Design Element	Requirement	Proposed	Compliant
90° Staff Parking Bays (User Class 1A)	2.4m x 5.4m (min.)	2.5m x 5.4m	Yes
90° Visitor Parking Bays (User Class 2)	2.5m x 5.4m (min.)	2.5m x 5.4m	Yes
PWD Bay (User Class 4)	2.4m x 5.4m with shared area of the same dimension	4.0m x 8.3m with shared area of 2.4m x 5.4m	Yes
Parallel Parking Bays (User Class 1A)	2.1m x 6.2m (min.)	2.1m x 6.6m	Yes
90° Parking Aisle Width	5.8m (min.) + 0.3m clearance where bounded by solid wall	5.8m (min.)	Yes
Circulating Aisle	5.5m (min.) + 0.3m clearance where bounded by solid wall	6.1m (min.)	Yes
Clearance adjacent to vertical obstructions	0.3m (min.)	0.3m (min.)	Yes
Bicycle Parking (Horizontal)	0.5m x 1.8m (min.) with 1.5m aisle	0.5m x 1.8m (min.) with 1.5m aisle	Yes

Swept paths of critical car parking and circulation manoeuvres have been undertaken and are provided in **Appendix H**.

The architectural plans provided for SSD are considered preliminary and subject to further detailed design. It is therefore recommended that appropriate conditions be imposed regarding design compliance to Australian Standards.

9. HEAVY VEHICLE ASSESSMENT

9.1 Servicing and Refuse Collection

The MEC will be serviced by a range of heavy vehicles including:

- Small delivery vehicles (Vans) to administration buildings - Will use designated administration parking areas including the KnD facility outside peak pick-up and drop-off periods
- Small and Medium Rigid Vehicles (SRV and MRV)– Will use the southern driveway crossover on Nullum Street and service road access to the BoH Area. A dedicated MRV loading bay is provided as part of Building 3B
- Heavy Rigid Vehicles (HRV) - Will use the southern driveway crossover on Nullum Street and service road access to the BoH Area. The BoH Area allows a HRV to store on site and perform a series of movements to turn around and exit the site in a forward gear
- Maxi-Taxi or Community Transport Vehicle – Can use either the KnD facility or the designated SSU pick-up / drop-off facility located at the southern side of Build 3B.

Swept paths of service vehicle manoeuvres have been undertaken and are provided in **Appendix H**. It is noted amendments to fencing required to accommodate HRV turnaround near Building 3 but can be resolved through plan amendments and as part of further detailed design.

10. SUMMARY

10.1 Assessment Summary

The key findings of the MEC traffic and transport impact assessment are as follows:

- The MEC will see an amalgamation of four schools onto the MHS Campus at Nullum Street, with an enrolment capacity to 1,722 students comprising of 582 primary and 1,140 high school students. The MEC will incorporate a Student Support Unit (SSU) with a capacity of 90 students. Total staffing numbers for the MEC, inclusive of the SSU are estimated at 150 FTE which could equate to 168 staff on any given day based on benchmarking against existing Murwillumbah schools. A proportion of these staff however will not be on school grounds for the full school day or travelling during peak morning or afternoon periods
- A Department of Education (DoE) regional office will also be located on MEC and consists of office space (340 m² GFA) to support 25 staff and 7 fleet vehicles. Parking provision to support the DoE office and fleet vehicles has been incorporated into the MEC
- New pathway upgrades will be provided along the frontage to the school including High School Lane. In addition, a new pedestrian crossing facility will be constructed on Nullum Street that will connect to the existing pathway network
- The MEC will incorporate a total of 148 student cycle/scooter/skate storage racks across the campus as well as 13 cycle storage racks for staff
- The MEC will incorporate three vehicular access points, including two existing driveway crossovers to be retained on Nullum Street and Riverview Street as well as a new crossover to facilitate the proposed KnD facility
- Parking will be maximised on site to provide a total of 161 staff parking spaces. This provision is practical maximum on-site parking supply based on available space, while balancing the need for other school facilities and adequate separation of student areas from on-site vehicle traffic. This will be accompanied by a series of other parking facilities including within the KnD facility and the adjacent on-street parking on Nullum Street and Riverview Street parking areas fronting the school. Therefore the total precinct parking provision equates to 209 parking spaces
- The traffic analysis demonstrates that the net increase in traffic movements associated with the MEC can be adequately accommodated by the surrounding road network and its intersections
- Bus services will continue to be the major transport mode servicing the MEC. A series of improvements to the existing bus interchange facility are proposed as part of the MEC. In addition, TfNSW in consultation with SINSW and bus operators will continue to progress the Bus Operational Plan in preparation for the MEC opening in 2024
- The site's transport elements including internal road network, parking modules and service areas have been reviewed against Australian Standards and Council's Guidelines. While the architectural plans are considered generally compliant for the purpose of SSD, they are subject to further detailed design. It is therefore recommended that appropriate conditions be imposed regarding design compliance to Australian Standards.

Appendix A: Development Plans



Nominated Architect
Ray Brown, NSWARB 6359

[illegible]

Do not scale drawings. Verify all dimensions on site

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drawn	Author	project no	200400

project

MURWILLUMBAH EDUCATION CAMPUS

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SITE PLAN PROPOSED

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Appendix B: Transport Working Group Register



Project Number P4992
Project Name Murwillumbah Educational Campus Traffic Impact Assessment
Date 28/03/2022
Table Title Traffic and Transport Component Register
Version No. 4.00

Item No.	Date Raised	Raised by?	Item Description	Discipline	Action Description	By Whom?	Outcome	Status	Comment
1	18/02/2021	TfNSW (Bus Planning)	Existing school bus routes, timetables and patronage is not fully available. Contract information and operator details needed for consultation and analysis	Bus	TfNSW to provide existing bus service contract information to SI / design team	TfNSW (Bus Planning)	TfNSW to lead contract updates in consultation with SI-NSW and operators. Bitzios engaged to prepare initial bus planning scope including baseline establishment of existing routes/timetables. Separate Bus Planning Working Group established as part of seperate project.	Active	Detailed bus operational information not provided. Bitzios Consulting is progressing bus planning scope over coming months. TfNSW (Bus Contracts) advised that they will be responsible for managing contract updates to support the new school.
2	18/02/2021	TfNSW (Bus Planning)	Bus Contracts due for renewal in 2024. Recommendation to update existing routes and contracts instead of new (open tender contracts)	Bus	Provide update on 2024 contract planning and aspects relating to MEC	TfNSW (Bus Planning)	TfNSW (Bus Contracts) advised that they will be responsible for managing contract updates to support the new school. Separate Bus Planning Working Group has been established as part of separate MEC bus planning project.	Active	Matter is in progress.
3	18/02/2021	Bitzios	Impacts of bus fleet upgrades (seatbelts, etc) on capacity	Bus	TfNSW to provide contractor details and any updates to fleet standards or features that may impact the bus planning for MEC	TfNSW (Bus Planning)	Separate Bus Planning Working Group established as part of MEC Bus Planning project.	Active	TfNSW Bus Planning advised that fleet improvements are progressively being rolled on out public services only at this stage.
4	18/02/2021	TfNSW (Roads)	Managing school operations during construction	Traffic	TIA to include CTMP proposals. SI to inform TfNSW on proposed process during construction	NSW SI	BUILT (lead contractor) and SI to inform stakeholders of interim school operations (2022-2023)	Active	Schooling strategy work is in progress and will inform further detailed CTMP
5	23/02/2021	School Rep	Parents following designated routes and road rules when accessing KnD	Traffic	To be considered in design	Bitzios	School Travel Plan to include site specific information and guidance regarding safe access to schools	Closed Out	Observation considered in Transport Option development. Appropriate signage and line marking recommended and to be outlined in STP
6	23/02/2021	School Rep	Existing KnD very small on Riverview Street and instances of queuing extending out from KnD and impacting through traffic	Traffic	Ensure KnD queuing space and overflow impacts are considered in design	Bitzios	New KnD facility incorporated into the design (on-site and accessed off Nullum Street).	Closed Out	Options analysis undertaken on KnD. Revised solution to reduce impacts to High School Lane and accommodate internal circulation.
7	23/02/2021	School Rep	Storage of students at KnD to be sufficient size and not on public road space	Traffic	To be considered in design	Architect	New KnD facility incorporated into the design (on-site_ and accessed off Nullum Street	Closed Out	Observation considered in Transport Option development. Storage of students at KnD is designed to be within schools grounds.
8	23/02/2021	School Rep	Existing bus layover located on public roadway on Nullum Street. Difficult to organise students to board buses	Bus	Storage of students at Bus Area to be sufficient size and not on public road space to allow adequate management	Architect	Bus facility improvements incorporated into the design. Operational requirements to be set out in STP as well as Bus Operations Plan	Closed Out	Bus shelter and facilities upgrades to be incorporated into site works including site fencing
9	23/02/2021	School Rep	Bus Layover Area not efficiently used by numerous operators	Bus	Updates to bus layover operations to be proposed in TIA and discussed with Bus Planning / Operator	Bitzios	Changes to bus layover locations as well as boarding and alighting procedures to be outlined in Bus Operations Plan	Active	Ongoing consultation with TfNSW Bus Planning and operators required
10	23/02/2021	School Rep	Students from multiple schools using public roadway on Nullum Street to move between buses.	Bus	Updates to bus layover operations to be proposed in TIA and discussed with Bus Planning / Operator	Bitzios	Bus facility improvements incorporated into the design. Operational requirements to be set out in STP as well as Bus Operations Plan	Closed Out	Bus shelter and facilities upgrades to be incorporated into site works including site fencing
11	23/02/2021	School Rep	Existing bus services do not have a common ID system	Bus	Updates to bus layover operations to be proposed in TIA and discussed with Bus Planning / Operator	Bitzios	Bus facility and operational improvements to be incorporated into Bus Operations Plan. Separate Bus Planning Working Group recommended as part of TWG	Active	Fleet, contracts and operational procedures to be in updated as part of Bus Operations Plan
12	23/02/2021	School Rep	SSU vehicles / taxis require larger space and time to board / alight students (PWD)	SSU	To be considered in design	Architect	Separated pick-up/drop-off area provided via southern entry to site off Nullum Street	Closed Out	Separate facilities provided. In addition, PWD bays provided as part of each parking module for PS and HS
13	23/02/2021	School Rep	PWD spaces needed to parents and visitors - currently no designated PWD spaces	Visitor Parking	To be considered in design	Architect	PWD spaces incorporated into design and located at various locations across site in each parking module	Closed Out	included in Architectural plans
14	23/02/2021	School Rep	SSU students have periods of need and back-of-house area required to support safe and confined movement of students in times of need / distress	SSU	To be considered in design	Architect	Separated pick-up/drop-off area provided via southern entry to site off Nullum Street	Closed Out	SSU drop off is provided on site in separate location
15	23/02/2021	School Rep	Parking for visitors, emergency, police, administration required in proximity to office	Visitor Parking	To be considered in design	Architect	Plans includes separate parking modules fronting both PS and HS. BoH parking located off the southern end of Nullum Street. Additional time-limited parking available within KnD as well as along Nullum Street	Closed Out	Parking demand and operational needs assessment undertaken to inform site plans. Additional parking provision on site above Q100 off Riverview Street. Overflow parking available to the north-east within Hockey parking area and accessed by new pathway
16	23/02/2021	School Rep	Parking areas across site to cater for different precinct / uses. Overflow opportunities nearby (cleaners, trade contractors, NDIS, volunteers, Junior and senior school)	Visitor Parking	To be considered in design	Architect	Plans includes separate parking modules fronting both PS and HS. BoH parking located off the southern end of Nullum Street. Additional time-limited parking available within KnD as well as along Nullum Street	Closed Out	Parking demand and operational needs assessment undertaken to inform site plans. Additional parking provision on site above Q100 off Riverview Street. Overflow parking available to the north-east within Hockey parking area and accessed by new pathway
17	23/02/2021	School Rep	Minimise impacts of parking areas and student movement spaces. Secure parking away from student areas.	Staff Parking	To be considered in design	Architect	Plans include various parking areas and design to consider student spaces, high pedestrian activity and safety implication. Schematic design plans to be refined as part of safety-in-design phase.	Active	plans design with consideration to high pedestrian activity areas and subject to further refinement through detailed design, including safety review
18	24/03/2021	School Rep	Cycle and scooter parking needed. Shelter and racks near entry, not located too far within ground that promotes riding on grounds	Walk / Cycle	To be considered in design	Architect	A combined total of 148 cycle / skate / scooter spaces recommended to be incorporated on site	Active	mode share, catchment and benchmarking reviews undertaken to inform quantum of cycle facilities. Detailed locations and shelters to be incorporated into landscaping
19	24/03/2021	School Rep	Concentrated peak periods with K-12. Staggered starting times will assist with KnD and bus impacts. May provide option for double bus runs on local services.	Bus	To be considered in site operations planning. Will impact TIA if required to provide traffic solution	NSW SI	Understood that staggered times will be adopted. To be confirmed	Active	
20	24/03/2021	School Rep	Site has limited space for parking on the site. Opportunity to provide off-site parking improvements (near Hockey Fields) as a shared community precinct use.	Staff Parking	To be considered in design and in consultation with SI and TSC	NSW SI	Parking maximised on site to reduce external impacts.	Active	Hockey fields parking area retained as a potential overflow parking opportunity to be promoted for senior students as part of STP
21	24/03/2021	School Rep	Health Hub service needs	Service Vehicles	To be considered in design	Architect		Active	Operational requirements not yet defined
22	24/03/2021	TCS	Review existing KnD at MHS and impacts to Riverview Street	Traffic	Site operations reviewed by Bitzios. Considered in KnD design options	Bitzios	KnD removed from Riverview Street and to be replaced with on-street parking.	Closed Out	KnD relocated onto the site and accessed off Nullum Street
23	24/03/2021	TCS	Review existing issues at Nullum St / Wollumbin St intersection	Traffic	Investigate bus route options to minimise impacts on Nullum / Wollumbin St	Bitzios	No works proposed at this intersection. Buses proposed to utilise Brisbane Street to access roundabout intersection.	Closed Out	Intersection located some distance from school. Traffic volumes demonstrate traffic diverts to Brisbane Street instead of passing other school (40km/hr zone) to use intersection.
24	24/03/2021	TCS	Review parking impacts around MHS	Staff Parking	Parking observation and assessments as part of design process and TIA	Bitzios	Plans includes separate parking modules fronting both PS and HS. BoH parking located off the southern end of Nullum Street. Additional time-limited parking available within KnD as well as along Nullum Street	Closed Out	Parking demand and operational needs assessment undertaken to inform site plans. Additional parking provision on site above Q100 off Riverview Street. Overflow parking available to the north-east within Hockey parking area and accessed by new pathway
25	24/03/2021	TCS	Use of High School Lane could be considered - Narrow and services dwellings at west extent	Traffic	Bitzios to investigate transport options for workshopping	Bitzios	High School Lane not used for site access	Closed Out	KnD relocated to Nullum Street - No impacts on High School Lane
26	24/03/2021	TCS	Staff parking generally insufficient for schools.	Staff Parking	Parking demand analysis and opportunities for precinct parking treatments were investigated. On-site parking adopted in lieu of off-site options. Overflow opportunities using Hockey Fields parking	Bitzios	Additional site parking provided on site to accommodate staff	Closed Out	Additional site parking provided on site to accommodate staff
27	24/03/2021	TCS	Riverview Street ok for now, but moving primary school will increase traffic. Queuing on Riverview street will be unacceptable	Traffic	Bitzios to investigate transport options for workshopping	Bitzios	KnD facility removed from Riverview Street. Intersection analysis demonstrates acceptable performance with MEC site traffic	Closed Out	Staff parking only accessed via Riverview Street. Minor net increase in traffic and reduced concentration of traffic during afternoon peak periods
28	24/03/2021	TCS	Traffic and parking scenarios required to inform the masterplan development and traffic solution	Traffic	Bitzios to investigate transport options for workshopping	Bitzios	traffic and parking scenarios undertaken to inform masterplan	Closed Out	Actioned
29	24/03/2021	TCS	Project must protect the functionality of Riverview Street as a through road	Traffic	Bitzios to investigate transport options for workshopping	Bitzios	KnD facility removed form Riverview Street. Additional staff parking accessed. Through traffic operations remain acceptable	Closed Out	Main front door of school is via Nullum Street. Riverview Street is maintained in current form as turn-limited priority controlled intersection

30	22/03/2021	Bitzios	Driver sight lines and queuing issues on existing masterplan (identified by Bitzios, agreed by TCS)	Traffic	Refine masterplan option based on Bitzios assessment and investigate access off Highschool Lane	Architect	Initial proposal for Riverview KnD removed from plans	Closed Out	Design development removed KnD option from Riverview Street
31	22/03/2021	MACE	Grade constraints on south-western side near building H restricts the extent of roadway and service vehicle area	Service Vehicles	Refine masterplan to define usable area based on site constraints	Architect	Staff parking maximised around buildings. Service vehicle access provided at southern end of Nullum Street	Closed Out	Considered in design
32	22/03/2021	Bitzios	KnD on Riverview Street will require intersection upgrades (likely a roundabout) to manage traffic flows and exit capacity	Traffic	Refine masterplan option based on Bitzios assessment and investigate access off Highschool Lane	Architect	KnD removed from Riverview Street. Intersection remains in current form and assessed as acceptable	Closed Out	KnD relocated to Nullum Street
33	22/03/2021	Bitzios	KnD access off High School Lane will require road widening and intersection turn treatments on Nullum Street	Traffic	Refine masterplan option based on Bitzios assessment and investigate access off Highschool Lane	Architect	KnD positioned to gain access off Nullum Street and includes internal circulation	Closed Out	KnD relocated to Nullum Street with intersection treatments
34	22/03/2021	TCS	KnD on High School Lane needs to consider residential dwellings	Traffic	Refine masterplan option based on Bitzios assessment and investigate access off Highschool Lane	Architect	KnD positioned to gain access off Nullum Street and includes internal circulation	Closed Out	KnD relocated to Nullum Street
35	22/03/2021	NSW SI	KnD orientated north-south off High School Lane dissects play space from buildings	Traffic	Consider Bitzios Option 7 with KnD east-west orientation to High School Lane	Architect	KnD positioned to gain access off Nullum Street and includes internal circulation	Closed Out	KnD relocated to Nullum Street
36	22/03/2021	MACE	Grade changes from KnD and buildings will impact operations	Traffic	Investigate use of site fill to raise KnD along High School Lane	Architect	KnD positioned to gain access off Nullum Street. Grade changes considered in design	Closed Out	KnD positioned to gain access off Nullum Street. Grade changes considered in design
37	22/03/2021	TCS	Queuing space on-site needs to be maximised in order to minimise impacts on public roads	Traffic	Consider Bitzios Option 7 with KnD east-west orientation to High School Lane	Architect	Total 210m queueing area including dedicated right turn lane which enables	Closed Out	KnD relocated & re designed to include circulation to minimise queuing onto Nullum Street
38	22/03/2021	TCS	Council's DCP requires parking on-site for staff and visitors. This is in a 50:50 split but surveys have shown staff are higher proportion. Site Plan needs to consider parking on-site based on demands and Council's requirements	Staff Parking	Undertake parking assessment based on DCP as well as travel mode data and available e parking provision on and around the site	Bitzios	Total of 161 parking on site based on demands and allocated towards staff. Additional KnD facility provided to supplement parking provision	Closed Out	Considered in design
39	22/03/2021	TCS	Senior School student parking on site is not considered in masterplan or options	Student Parking	Undertake parking assessment based on DCP as well as travel mode data and available e parking provision on and around the site	Bitzios	Additional precinct parking utilising the nearby hockey fields parking area to be promoted as overflow parking location for senior students	Closed Out	Student parking is not accommodated on-site and is encouraged in the hockey fields with active transport / access upgrades & STP
40	22/03/2021	TCS	Use of public sports field space for parking facility is subject to Parks and Recreation Branch in Council	Staff Parking	Liaise with TCS's Parks Branch on opportunities for shared parking facilities	MACE	Proposal includes additional parking on site to accommodate for demands while balancing mode share targets. Public on-street parking exists and as capacity to accommodate for demands. While Hockey fields parking may be an option for overflow parking it does not current form part of the proposal as would be subject to agreements and land arrangements.	Active	Use of hockey fields parking not part of the current proposal, at this time.
41	20/04/2021	TfNSW (Bus Planning)	Staggered bell times for primary and high school are negotiable however have impacts and opportunities	Bus	TWG to confirm bell times	NSW SI		Active	Proposal at this stage is to stagger bell times in line with existing operations for schools as well as other similar PS/HS operations across Tweed Shire
42	20/04/2021	NSW SI	Staff yield to be confirmed	Staff Parking	NSW SI to confirm average staff per day	NSW SI	SI confirmed 129 staff on site per day. Additional DoE parking demands included in analysis	Closed Out	SI confirmed 129 staff on site per day as well as DoE parking needs
43	12/10/2021	TfNSW (Roads)	Quantify staff traffic approaching from the west and required to circulate to access left-in off Riverview Street	Traffic	Item added to TTIA to address this topics	Bitzios	Diversion routes noted within the traffic report, represent minimal trips and do not have a noticable impact on intersection operations.	Closed Out	
44	12/10/2021	TCS	Bus Planning needs to also consider outer area interchange locations, facilities and operations as part of Bus Operations Plan	Bus	Bus Planning project in-progress	Bitzios		Active	

Appendix C: School Travel Plan

Murwillumbah Education Campus

School Transport Plan



NSW School Infrastructure

14 March 2022

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P5410.002R MEC - School Transport Plan	S. Seeney / J. Brook	A. Eke	J. Brook	2/12/2021	Paul Nelson – Built paulnelson@built.com.au
P5410.002R MEC - School Transport Plan	S. Seeney / J. Brook	A. Eke	J. Brook	11/03/2022	Keira Mears – Mace Group Keira.Mears@macegroup.com

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Appendix A: Transport Access Guide

1. INTRODUCTION

1.1 Background

The NSW Department of Education is planning for a new primary school and a new high school which will be located on the same campus at the current Murwillumbah High School site.

The Murwillumbah Education Campus (MEC) will enhance public education in Murwillumbah by supporting contemporary teaching approaches and providing students with access to new, modern, flexible learning environments and facilities.

Purpose of a School Transport Plan

The School Transport Plan (STP) is a live document that is managed by a school travel coordinator which identifies strategies to increase safe travel to school. The aim being to deliver efficient, safe, and sustainable access to school during the planning, delivery, and operation of school assets. The school travel coordinator will be appointed based on an 18-month period.

1.2 About the School Transport Plan

This STP is a document that focusses on details for sustainable travel options to and from the school and proposes strategies to encourage the wider use of alternative transport.

This plan covers:

- MEC's transport facilities and conditions
- Current student and staff travel patterns
- Proposed green travel targets
- Proposed actions to achieve travel mode share targets.

This STP should be reviewed and updated annually to monitor progress towards targets and strategy successes. The proposed methodology is outlined in Figure 1.1.

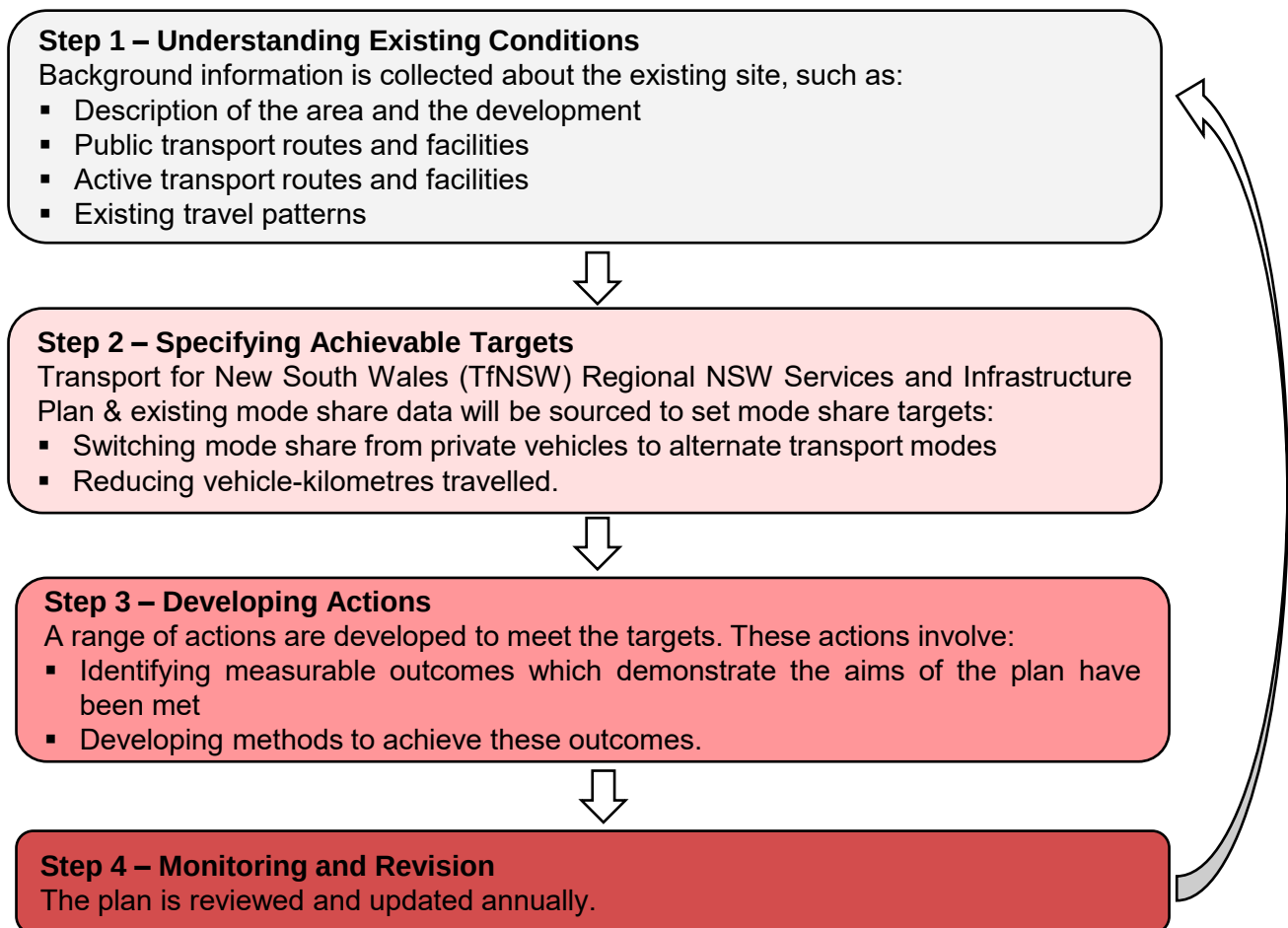


Figure 1.1: STP Methodology

2. MEC TRANSPORT INCLUSIONS

2.1 MEC Transport Facilities

The MEC will be located at 86 Riverview Street, Murwillumbah on the existing MHS site. The existing school site currently operates with around 434 student enrolments and 84 staff.

The MEC will include facilities to support:

- A maximum of 1,722 students in total
 - 582 primary school students
 - 1140 secondary school students
- A total of 129 staff for the school
 - 40 primary school staff
 - 89 secondary school staff
- A total Department of Education (DoE) regional office consisting of:
 - 340 m² of GFA office space
 - 25 staff and 7 fleet vehicles.

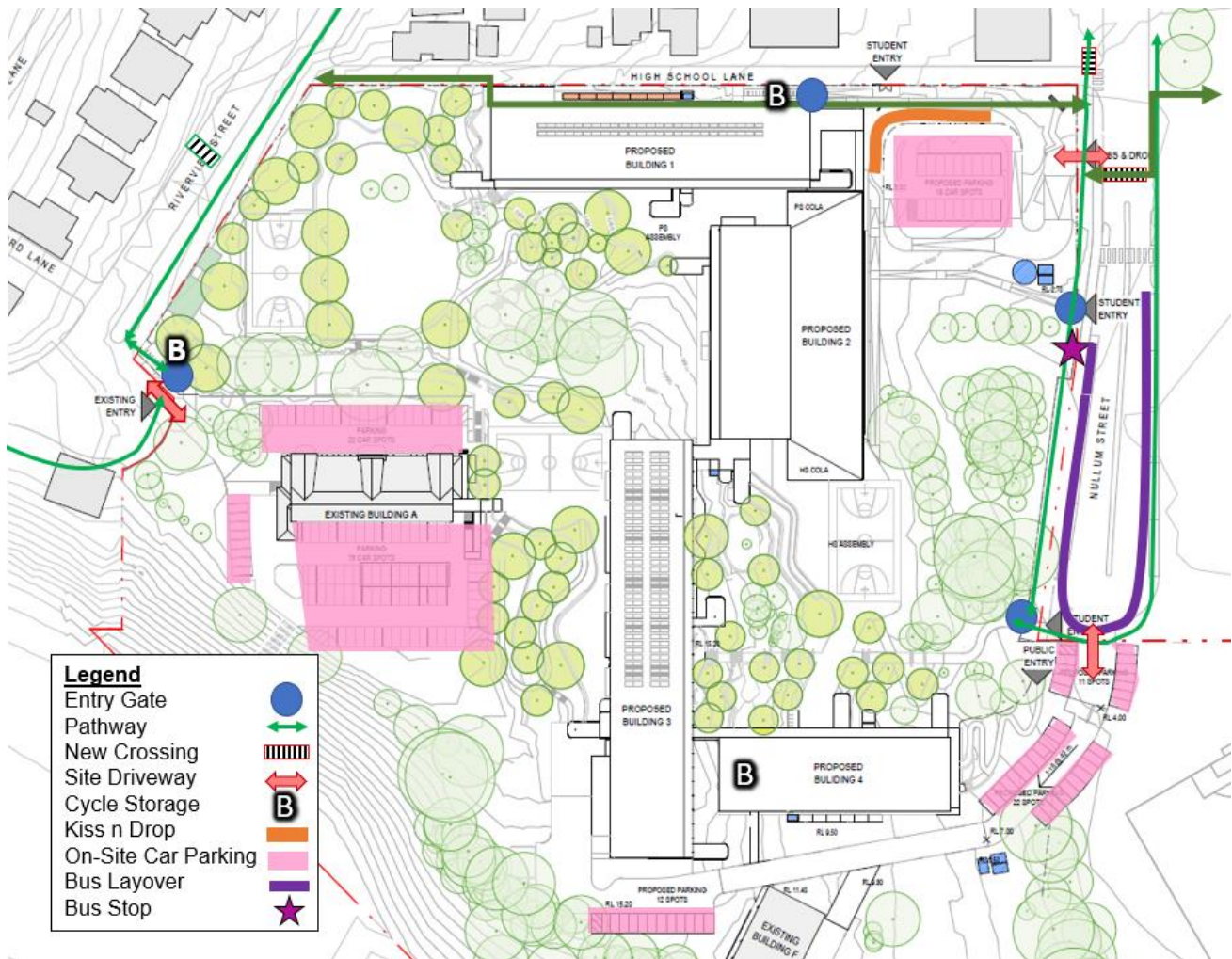
It is noted that while the DoE office is on the campus its staff are understood to not form part of this STP or initiatives.

The MEC will include three separate vehicular crossovers as follows:

- One via Riverview Street to off-street staff car parking areas
- One via the southern end of Nullum Street to off-street staff car parking and servicing areas
- One via the north eastern corner of the site via Nullum Street to the off-street kiss'n'drop facility.

Pedestrian access to the subject site is provided at two locations on Riverview Street and Nullum Street.

The MEC transport facilities is shown in Figure 2.1.



Source: Architectus

Figure 2.1: MEC Transport Facilities

As shown, the network of pathways and crossings provide connections to the Murwillumbah town centre in the north and surrounding residential areas.

Students can receive free or subsidised public transport travel to and from school through the School Student Transport Scheme (SSTS). The scheme is managed in the form of a paper bus pass and eligibility is dependent on the age and distance the student lives from school.

The site is serviced by both public and school bus services. These services are operated by Surfside Bus Lines as well as local services provided by Murwillumbah Bus Co, Gosels, Parsons and Singh's which service other primary and high schools within the Murwillumbah and Tweed Heads region.

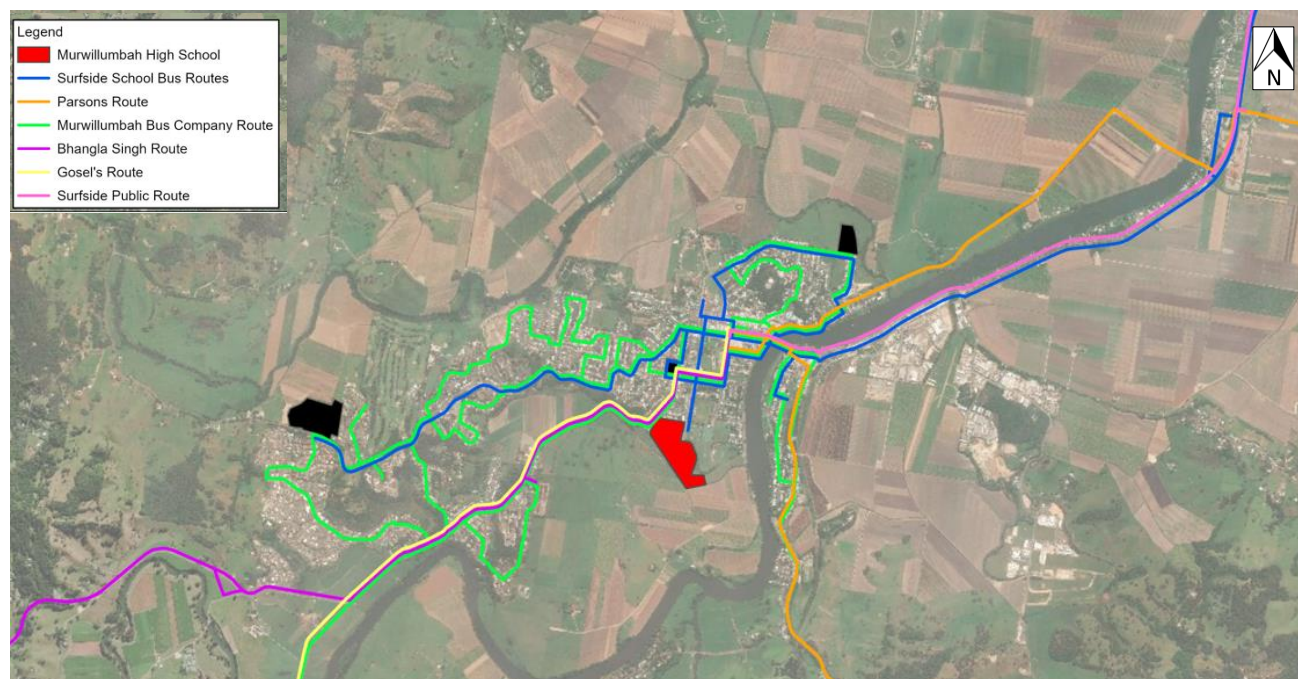
A substantial bus interchange facility and road space allocation on Nullum Street currently exists which allows various bus services from across the various Murwillumbah schools to interchange (see Figure 2.1)

The primary schools within the region have staggered start and finish times which allows bus services to collect students prior to high schools. These bus services provide short, localised routes as well as connecting to other services at the Nullum Street interchange (MHS).

The current bus network and operation results in buses passing through Murwillumbah town centre's road network and traffic pinch points during morning and afternoon periods. It was observed that buses would undertake numerous journeys between schools during these periods.

There is limited information regarding bus timetables and routes from all service providers and given a number of routes overlap, the bus services will benefit from a holistic review of all service providers that will service the MEC as well as connect to other neighbouring schools.

Figure 2.2 shows the public and school bus routes for the existing four schools. It is noted that not all school bus providers currently have documented bus routes and timetables.



Source: Based on available current route data, Additional services may be available through operators. Further changes to the bus routes servicing MEC under development.

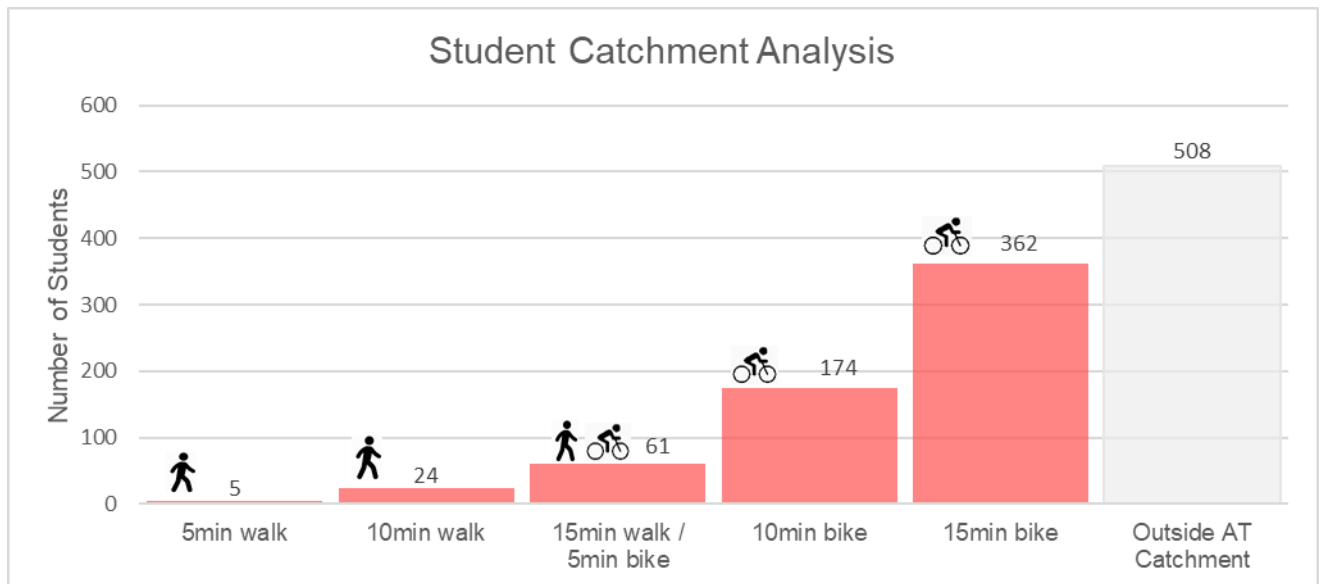
Figure 2.2: Existing Public and School Bus Routes

The school bus services operate as hail 'n' ride so students are able to get on the bus at any location on the route in lieu of bus stop infrastructure. Based on the information provided, the following is noted regarding the bus services:

- 308 students (23%) live within 400m of a bus stop
- 881 students (88%) live within a 400m of a bus route.

2.2 Catchment Analysis

Depersonalised student data provided by SINSW was used to determine the number of existing students within key walk and ride catchments and is shown in Figure 2.3.



Note: Existing students data for Wollumbin High School, Murwillumbah High School, Murwillumbah Public School and Murwillumbah East Public School

Figure 2.3: Student Catchment Analysis

Approximately 7% of students currently live within a 15-minute walking catchment and 42% live with a 15-minute ride catchment to MEC. This demonstrates there is the potential to increase active transport mode share specifically riding.

2.3 Transport Mode Share

A student and staff travel mode share survey was undertaken to determine the existing travel behaviours. The mode share split of students is provided in Figure 2.4.

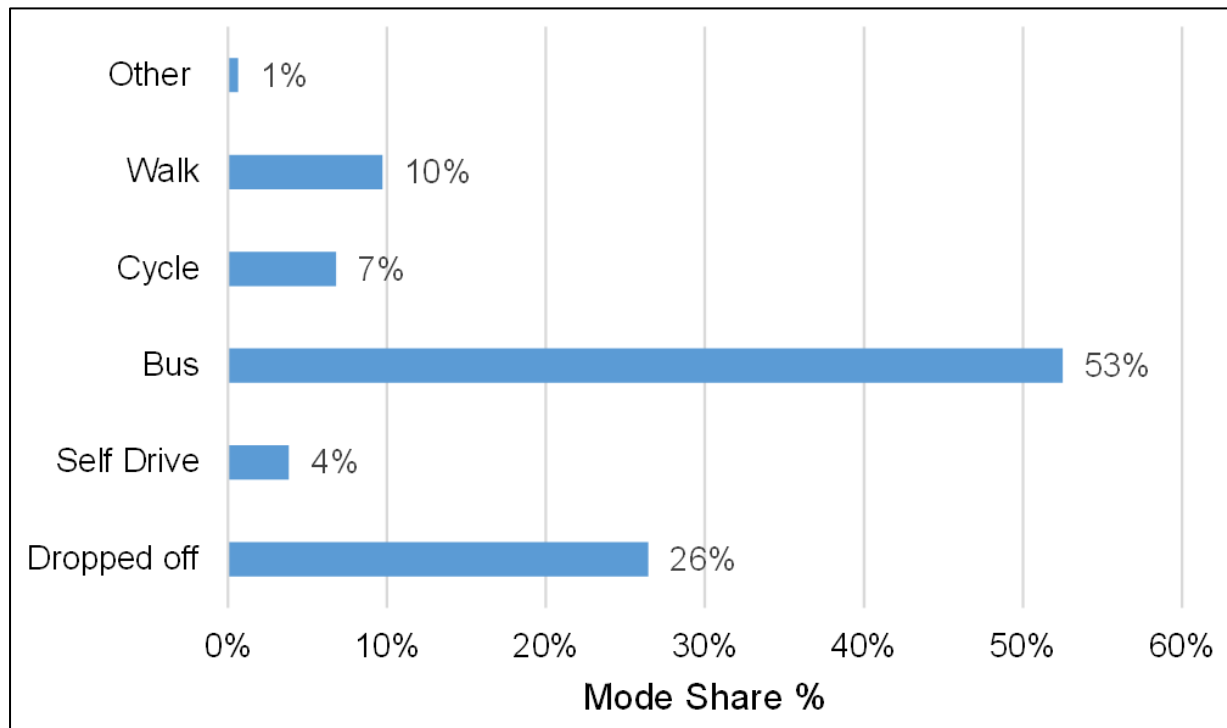


Figure 2.4: Student Travel Mode Share

As shown, buses are generally well used by students and with the amalgamation of the existing schools, bus routes could be consolidated and provide the opportunity for new routes, service efficiency improvements and/or additional services.

The improvements would need to be facilitated through a Bus Operational Plan. Active transport participation, particularly cycling, could be increased given there is approximately 7% of students living within 1.2km walking catchment (i.e. 15-minute walk) and 42% of students within a 3.6km cycling catchment (i.e. 15-minute ride) to the school.

It is noted currently 4% of high school students drive to school however this is expected to increase throughout the year as senior students obtain a drivers license. Approximately 55% of year 12 students intend to drive to school by the end of each school year.

The mode share spilt of staff is provided in Figure 2.5.

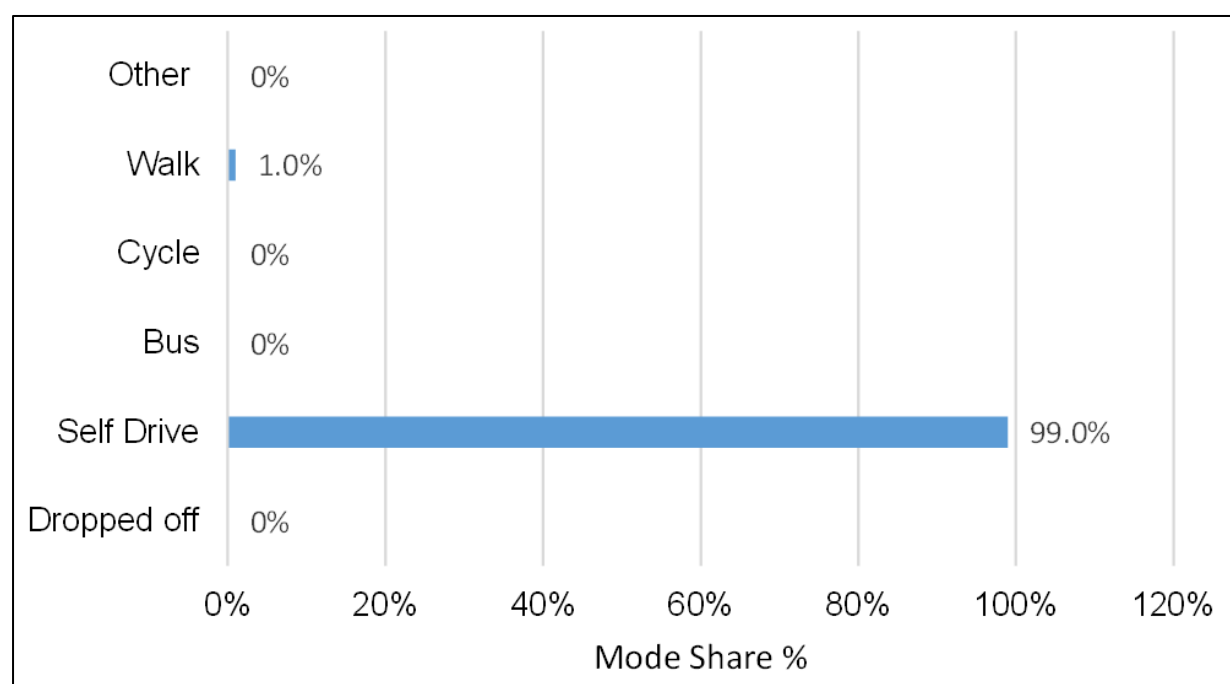


Figure 2.5: Staff Travel Mode Share

As shown, most staff currently drive to school, and there is limited alternate transport participation. It was identified in the survey that staff who drive to school typically participate in before and/or after work events for which there is no convenient and available transport option aside from private vehicle.

Further, unlike students, staff are not employed based on their place of residence and do not have to live within the school's enrolment catchment. In turn, there may be no other transport options available for the entire trip from home to work and alternate modes of transport are not convenient.

It is important to note, the current mode share of students and staff is consistent with other regional areas.

3. TRANSPORT POLICIES, OBJECTIVES AND ACTIONS

3.1 Policy and Objectives

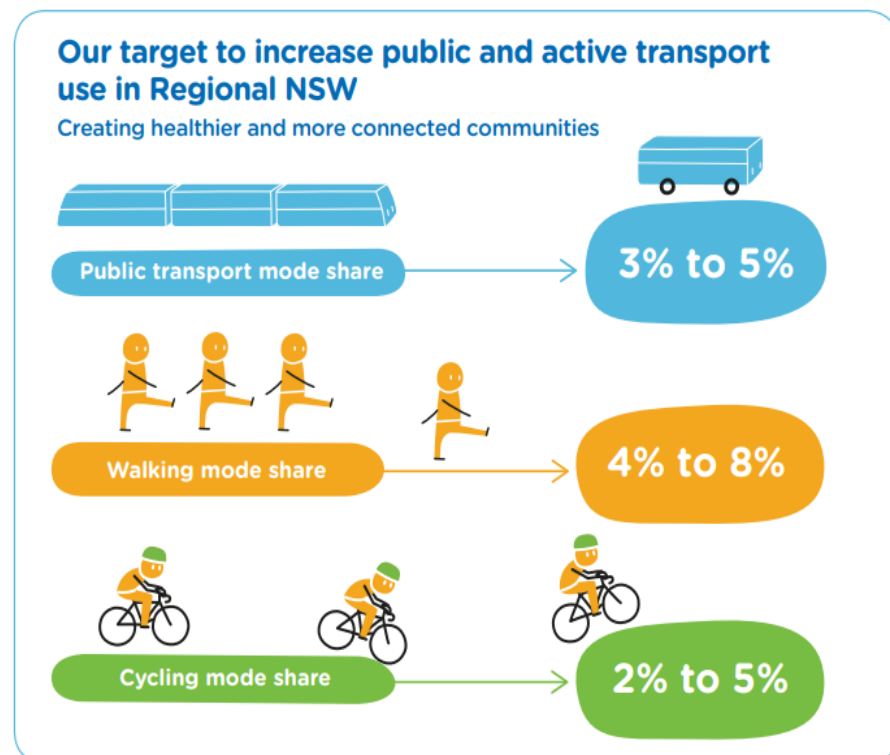
The overarching transport policy for MEC is to “*improve pedestrian and student safety*”. This will seek to increase participation in alternate transport modes, namely public and active transport, and increase daily physical activity which has a strong correlation to improved education results.

The SINSW STP *Practice Note* was used to adopt objectives specifically relevant for MEC and will drive the direction of the STP.

The 4 key pillars and objectives for school travel is summarised in Table 3.1.

Table 3.1: Transport Objectives

Safe	Efficient	Sustainable	Collaborative
To minimise pedestrian and vehicle conflict	To reduce local traffic congestion and parking impacts	To increase sustainable transport mode share to school	To identify opportunities to work with state and local government transport agencies
To identify and implement new transport and safety measures as required	To ensure required infrastructure and operations are delivered prior to occupancy	To minimise car parking and kiss'n'drop provision on site To integrate the school transport facilities within the nearby community	To share identified travel demand and transport opportunities early in the process



Source: Regional NSW Services and Infrastructure Plan

Figure 3.1: Regional NSW Mode Share Targets

3.2 Targets

The mode share targets for MEC have been developed considering the transport targets from the *Regional NSW Services and Infrastructure Plan* (2018), the existing staff and student travel mode surveys and the catchment analysis. It is noted the staff mode share targets directly relate to the regional targets and the student mode share targets have been derived from the catchment analysis. Importantly, students live within multiple transport catchments and have multiple transport options available. That is, students live within a walking catchment and within the cycling and bus catchments.

Table 3.2 and Table 3.3 details the future mode share targets for MEC.

Table 3.2: MEC Primary School Mode Share Targets

Travel Mode	Existing Mode Share	Regional Mode Share Targets / Catchment Analysis*	STP Mode Share Targets	Change
Staff				
Private Vehicle	99%	82%	82%	-17%
Walking	1%	8%	8%	+7%
Cycling	0%	5%	5%	+5%
Bus	0%	5%	5%	+5%
Student				
Private Vehicle	60%	21%**	35%	-25%
Walking	4%	14%	5%	+1%
Cycling	2%	69%	10%***	+8%
Bus	34%	76%***	50%	+16%

* Catchment analysis proportions do not add to 100% for students due to overlapping catchments

** The proportion of students do not live within 400m of a bus route

*** The proportion of bicycle parking facilities at the school

Table 3.3: MEC High School Mode Share Targets

Travel Mode	Existing Mode Share	Regional Mode Share Targets / Catchment Analysis *	STP Mode Share Targets	Change
Staff				
Private Vehicle	99%	82%	82%	-17%
Walking	1%	8%	8%	+7%
Cycling	0%	5%	5%	+5%
Bus	0%	5%	5%	+5%
Student				
Private Vehicle	30%	40%**	24%	-6%
Walking	10%	7%	7%	-3%
Cycling	7%	42%	10%***	+3%
Bus	53%	59%***	59%	+6%

* Catchment analysis proportions do not add to 100% for students due to overlapping catchments

** The proportion of students do not live within 400m of a bus route

*** The proportion of bicycle parking facilities at the school

3.3 Actions

3.3.1 Overview

Several actions proposed to achieve the transport objectives and mode share targets are provided below. There is likely to be other actions not mentioned in this document to achieve the transport objective.

As this document is intended to be 'live' and updated regularly, it is recommended that these actions be introduced at any time.

3.3.2 Staff Carpooling

Staff carpooling can reduce the number of private vehicle trips by reducing the number of drivers and increasing the number of passengers. This could be undertaken informally (i.e. co-workers) or formally by online registers. Historically, the Northern Rivers Carpool supported carpooling initiatives within the Northern Rivers area. However, the service is now administered by the Community Carpooling Association Incorporated (CCAI) which support a number of online carpooling registers.

The School Travel Coordinator will monitor and assess the opportunity to introduce staff carpooling which will be implemented if feasible and if there is sufficient interest. A school-based carpooling register could assist in arranging staff carpooling initiatives. It is also recommended that dedicated car parking spaces for carpooling vehicles only are provided in a convenient location to further encourage staff to carpool. Pavement stamps are typically used to show the dedicated spaces, as shown in Figure 3.2.

Monitor and Review

Review the uptake of carpooling annually by monitoring staff car park occupancy and staff travel surveys.



Figure 3.2: Staff Car Pooling Example

3.3.3 Walking Bus

A School Travel Coordinator will monitor and assess the opportunity to introduce a walking bus which will be implemented if feasible and if there is sufficient interest. This will allow a group of students to walk safely to school whilst been supervised. Multiple walking buses could be arranged for different directions (i.e. north, south, etc.). Typically, students are accompanied by a parent. The walking bus provides an efficient way for students to participate in active transport while having the safety of a group. Once walking bus groups are created, it is recommended to be advertised to students and parents and a register be developed to assist in managing number of students and available parent leaders.

Monitor and Review

A survey could be extended to the parents to monitor uptake, feedback, and identify any organisational issues with implementing a walking bus. A review is proposed to be undertaken at the end of each school term.



Figure 3.3: Walking School Bus

3.3.4 Student and Staff Bicycle Parking

Bicycle/scooter/skateboard parking infrastructure for students is required to further encourage a modal shift away from private vehicle. In aiming to achieve the mode share targets outlined in Section 3.2 it is recommended to provide 34 storage spaces in proximity to the primary school and a total of 114 storage spaces for the high school, with 57 spaces located off Riverview Street and 57 spaces off Nullum Street.

In addition to student bicycle parking it is recommended that 13 staff bicycle parking spaces and end of trip facilities be implemented to cater for the potential cycle demand. Cycling routes and information should also be provided to staff, students, and parents to promote the use of additional bicycle parking facilities. The staff and student bicycle parking facilities should be provided in separate locations.

Monitor and Review

Monitor the usage of the additional bicycle parking facilities to understand the increase in cycling as a mode share. Gain student and staff feedback on cycling and its facilities in an annual travel mode survey.



Figure 3.4: Example of Skateboard Parking Facilities

3.3.5 Active Transport Infrastructure Upgrades

A number of active transport infrastructure upgrades have been identified as part of the Traffic Impact Assessment for MEC. This additional infrastructure will provide a continuous and safe network for students and staff. The following upgrades proposed as part of the masterplan include:

- New pedestrian crossing on Nullum Street south of High School Lane
- Improved pedestrian crossing on High School Lane
- 148 student bicycle/scooter/skateboard parking
- 13 staff bicycle/scooter/skateboard parking
- Pathway upgrades on High School Lane.

These upgrades are shown in Figure 3.5 and Figure 3.6.

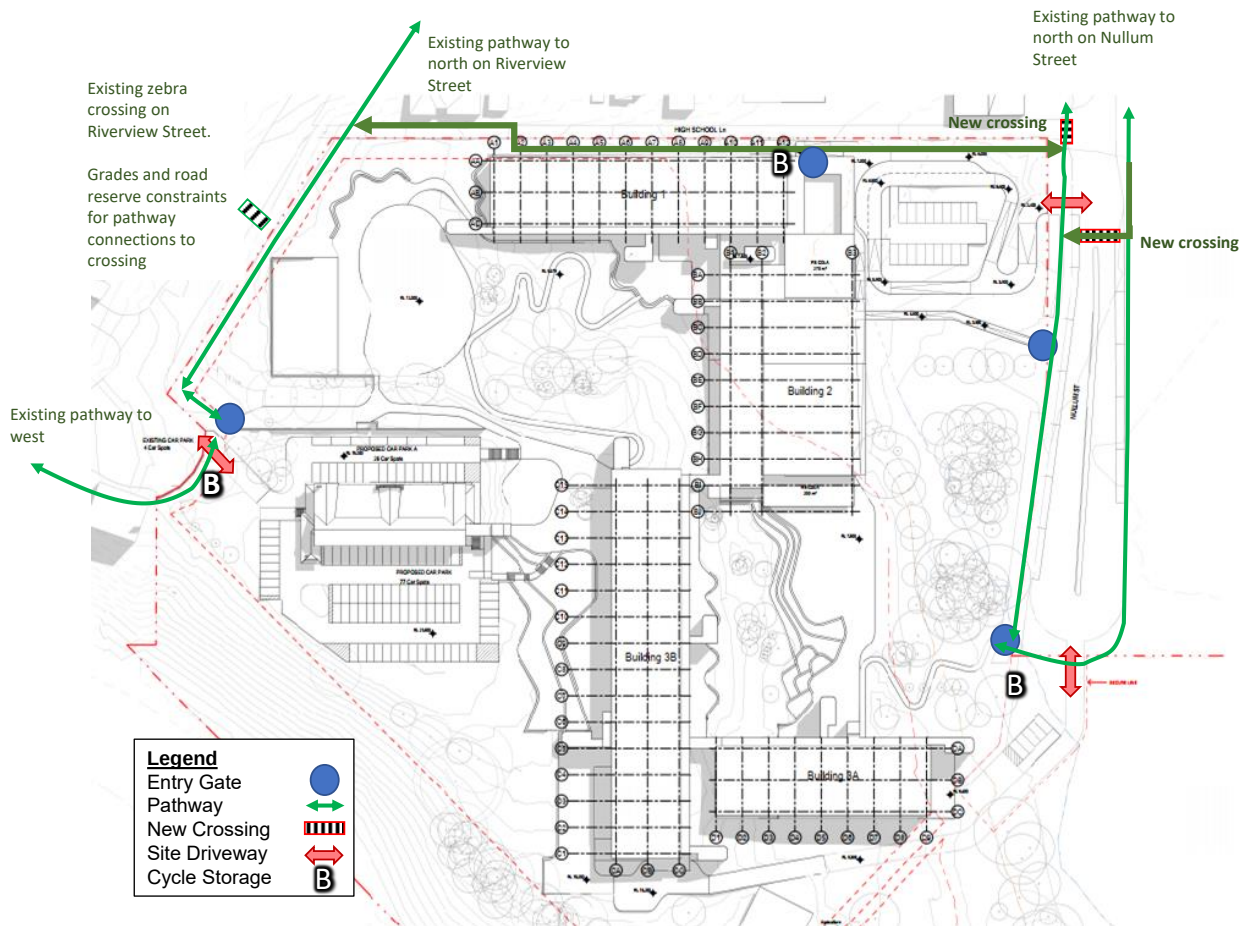


Figure 3.5: Active Transport Infrastructure Upgrades

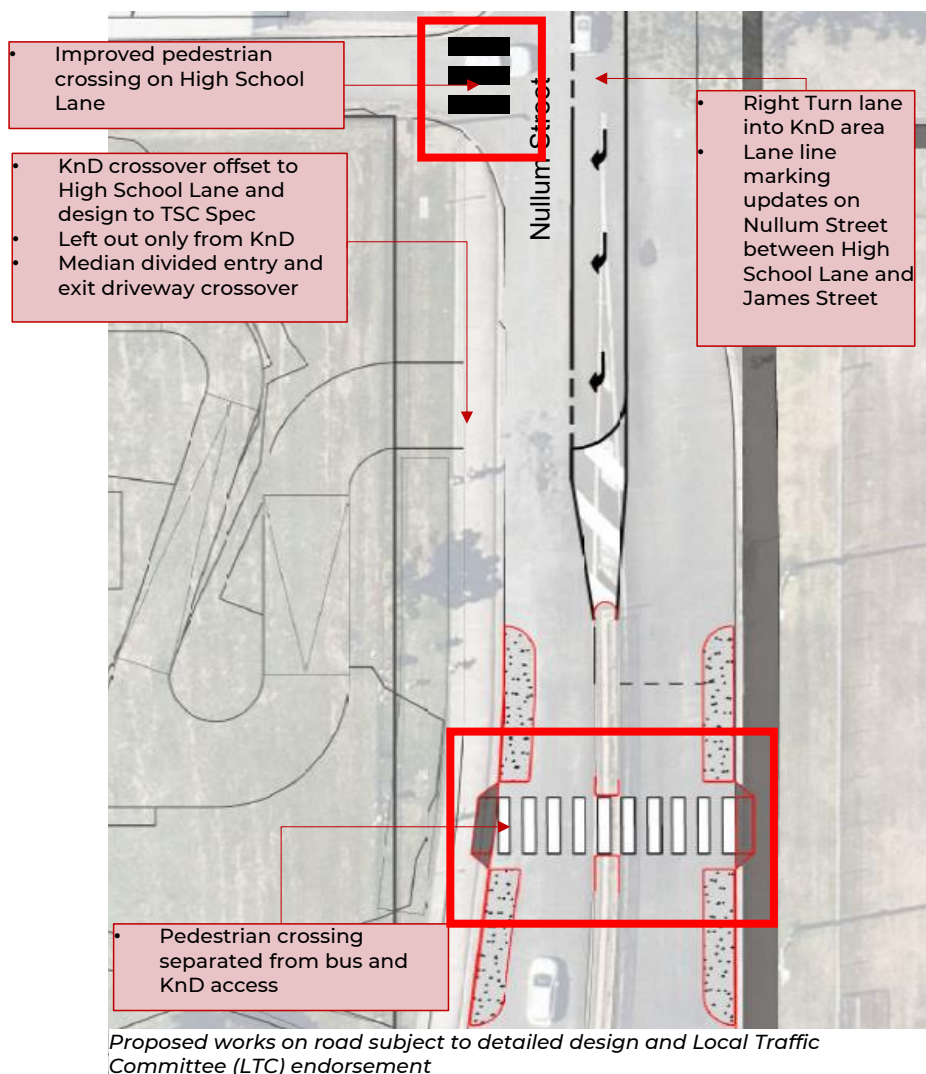


Figure 3.6: Pedestrian Crossing Facility on Nullum Street

Monitor and Review

It is recommended that the usage of these additional facilities and any other key desire line are monitored by supervising staff and in an annual mode share survey as discussed in Section 5.

3.3.6 High School Students Park and Stride

Although students will be encouraged to utilise alternative transport modes, a number of senior (year 11 and 12) students would be expected to school based on the travel mode surveys outlined in Section 2.3.

SINSW generally does not provide parking for senior students on site, which is consistent with their policies to reduce private vehicle utilisation and discourage existing students to park on site. In addition, any further parking provision on site would impact available space for educational and recreational purposes as well as introduce additional traffic movements within high pedestrian activity areas on and around the school grounds.

Alternative to on-site parking, SINSW seeks to use available existing public parking facilities within the surrounding precinct.

This action also supports a park and stride mode share with students required to park further away and walk the last 400m to school.

It is recommended an education program regarding safe driving to school is implemented in conjunction with the proposed upgrades.

Monitor and Review

Monitor the usage of the high school student park and stride in an annual travel mode share survey to determine demand. Review traffic operations around the school in consultation with the Local Traffic Committee (LTC). Monitor the efficiency of safe driving to school programs.

3.3.7 Kiss'n'drop Facility Management

A KnD facility is proposed on site to be accessed via a new dedicated right turn facility. The KnD includes a median divided driveway crossover accommodating right-in/left-out movements only.

The facility will include seven (7) KnD bays positioned adjacent to the primary school forecourt and can accommodate a total of 210m of queueing including the bays and storage lane on Nullum Street. The facility also includes 18 car parking spaces that will be used by primary school staff. The kiss'n'drop bays will also allow for visitor parking use between 9:30am – 2:30pm.

The proposed KnD facility is shown in Figure 3.7.

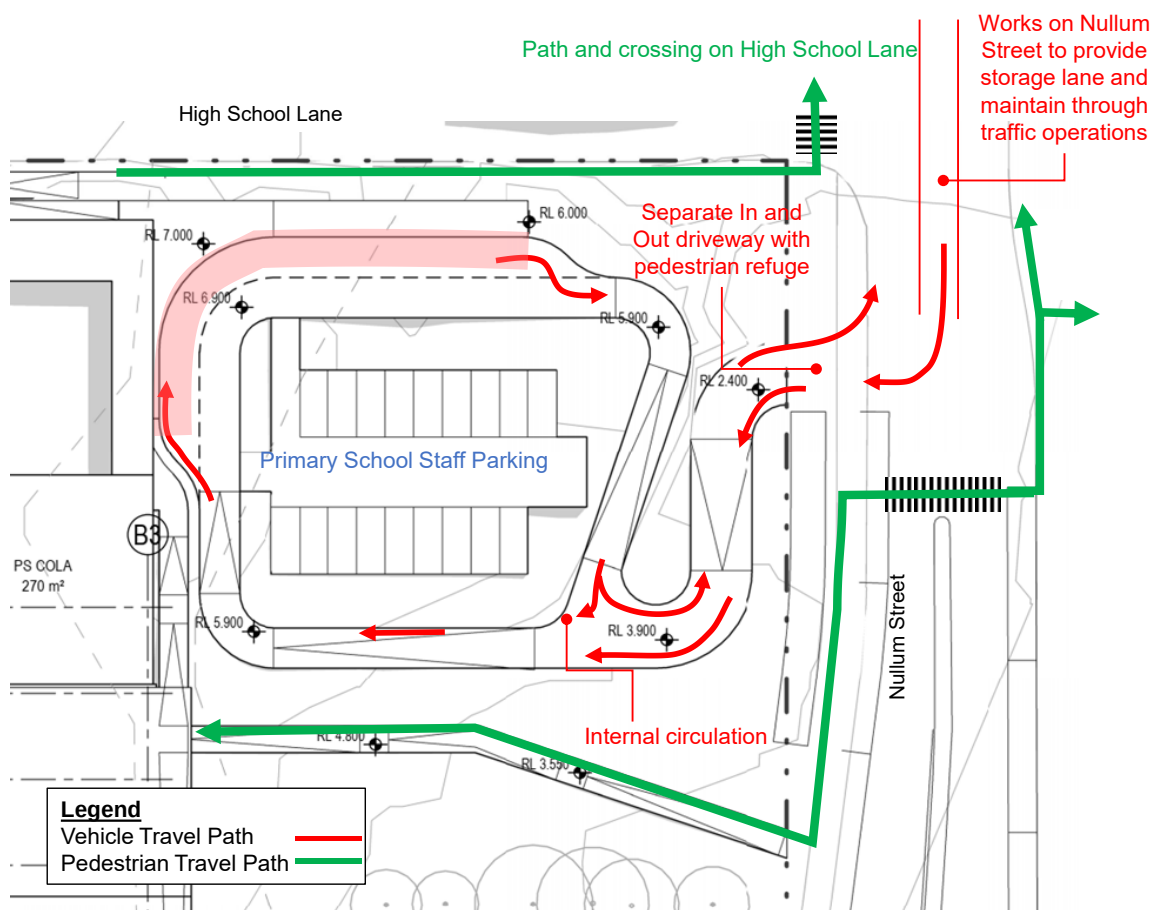


Figure 3.7: Kiss'n'drop Facility

The KnD facility should be managed during peak periods to facilitate safe and efficient use. Typical management of a KnD facility would include:

- Provision of a name card (student surname) to parents / carers to be displayed on the dashboard or passenger sun visor of cars
- Staff located along the pedestrian area of the kiss'n'drop

- The first staff member's role would be to direct vehicles through to vacant bays (with a traffic controller baton or similar)
- Other staff members' role would be to communicate with the students and direct them to their parents / carers as they arrived.

Monitor and Review

Monitor the usage and efficiency of the KnD facility and gain student, parent and staff feedback in an annual travel mode survey.

3.3.8 Bus Operational Plan

Bus planning for the MEC will be critical to the operational success of the new school. TfNSW has agreed with SINSW that a Bus Operational Plan and working group will be formed and will be responsible for the facilities and operational planning ready for day-of-opening. This will also include detailed consultation with transport operators on the existing operations and required improvements to support the MEC.

The combination of the four schools provides the opportunity to consolidate bus routes which is expected to increase the efficiency of the public transport travel mode and allows for the potential to provide new routes.

While this process will be undertaken following SSD approval, preliminary work by SINSW and TfNSW is beneficial to the bus planning process.

The bus operational plan is expected to include, but not be limited to the following:

- Develop a Nullum Street Bus Interchange Operations Plan and Reference Guide
- Common Service Route maps and integrated timetabling across all service providers (MEC and other schools)
- Bus Service updates based on new 'combined' student catchments
- Bus Service information to be included on TfNSW's Journey Planner for all service providers
- MEC as well as public interface improvements via the School's and TfNSW's website
- Contract updates and journey planning information ready for day-of-opening
- External bus interchange locations identification and facilities
- Investigations in consultations with TfNSW and Council.

Monitor and Review

The working group should review the Bus Operational Plan to assess the bus route capacity, efficiency and service times including access and availability of information.

4. TRAVEL ACCESS GUIDE

4.1 Overview

A Travel Access Guide (TAG) should be provided to students upon enrolment and before the start of the school year to inform the available transport modes. The TAG summarises the school's location, access locations, transport facilities and the most direct transport options. This document also provides links to other external information as required (i.e. bus route and timetable information). A preliminary TAG has been prepared for MEC and is provided in **Appendix A**.

5. MONITOR AND MANAGE TRAVEL DEMAND

5.1 Monitor School Travel Plan

An annual student and staff travel mode share survey undertaken by the School Travel Coordinator should be implemented to collect current data and assist in decision making. This data can be compared against the mode share targets identified in Section 3.2. The STP can be updated to align with the results of the mode share survey and potentially include additional actions. The annual student and staff travel mode share survey aims to gain feedback and provide realistic actions targeted specifically for MEC staff and students.

Communication between state and local government agencies will be required to collaborate policies where possible. Tweed Shire Council's (Council's) policies including the Pedestrian Access and Mobility Plan (PAMP) and Bike Plan could include the STP's actions to better integrate MEC's transport facilities within the nearby community.

It is noted Council does not currently have a Bike Plan and could be beneficial in implementing strategies for the region and the school. The School Travel Coordinator will be required to submit progress reports to the Department of Planning, Infrastructure and Environment.

The following template can be used to accurately monitor and review actions annually.

Action Name (i.e. Staff Carpooling)	
Target Date	
Current Status	
Updates Required	
Revised Target	
Date for Review	

6. FUNDING ARRANGEMENTS

6.1 Potential Funding Options

The available funding for active and public transport projects is reliant on Council's budget allocations and successful grant applications through State and Federal Government programs. Potential funding options include:

- SINSW Infrastructure Programs
- Collaborations with other State Government departments (e.g. TfNSW)
- Section 94 Contributions
- Council Rates
- Planning Agreements
- Reallocation of existing funds within Council's budget
- Cycleway grants
- Commonwealth Government grants.

Appendix A: Transport Access Guide



Murwillumbah Education Campus

Walk and Cycle Travel Access Guide

11 March 2022

Project Overview

We encourage Murwillumbah Education Campus staff, students and parents to use active and public transport options to travel to and from school. Many options are convenient, safe and stress free – it also helps you get your daily physical activity!

Use this guide to plan your travel each day to Murwillumbah Education Campus.

Active ways to get to school



Walking is an active and healthy way to get to school

- Always cross at a designated crossing
- Look left and right when crossing



Ride your bike

- Be careful of other people using the path



Ride your scooter

- Be careful of other people using the path

Kiss'n'drop expectations

- Do not arrive prior to the school bell time and park in the kiss'n'drop
- Drive all the way to the front of the kiss'n'drop to pick up / drop off
- Turn left out onto Nullum Street
- Do not queue on Nullum Street blocking through traffic whilst waiting to enter
- Do not store in kiss'n'drop if your child is not present

Message from your Principal (To be completed)

- 
- 

Message from your P&C President (To be completed)

- 
- 

For more information contact:

School Infrastructure NSW

Email: schoolinfrastructure@det.nsw.edu.au

Phone: 1300 482 651



Murwillumbah Educational Campus

Bus Travel Access Guide

2nd November 2021

NSW Department of Education – School Infrastructure

Project Overview

We encourage Murwillumbah Education Campus staff, students and parents to use active and public transport options to travel to and from school. Many options are convenient, safe and stress free – it also helps you get your daily physical activity!

Use this guide to plan your travel each day to Murwillumbah Education Campus.

Using public transport to get to school



School bus services to get to school include:

-
-
- There are 7 public routes (616, 622, 623, 625, 626, 630 & 621) that service the school
- There are 27 bus stops surrounding the school

Kiss'n'drop Code of Conduct

- Do not arrive prior to the school bell time and park in the kiss'n'drop
- Drive all the way to the front of the kiss'n'drop to pick up / drop off
- Turn left out onto Nullum Street
- Do not queue on Nullum Street blocking through traffic whilst waiting to enter
- Do not store in kiss'n'drop if your child is not present

Apply for a School Term Bus Pass

School Student Transport Scheme

Students can receive a free school travel pass to be used on school or public bus services operated by Surfside Bus Lines.

Visit: <https://www.service.nsw.gov.au/transaction/apply-school-travel-pass> for more information.

Visit www.transportnsw.info or call 131500 to plan your trip and access up to date timetables and maps.

Message from your Principal (To be completed)

-
-
-

Message from your P&C President (To be completed)

-
-

For more information contact:

School Infrastructure NSW

Email: schoolinfrastructure@det.nsw.edu.au

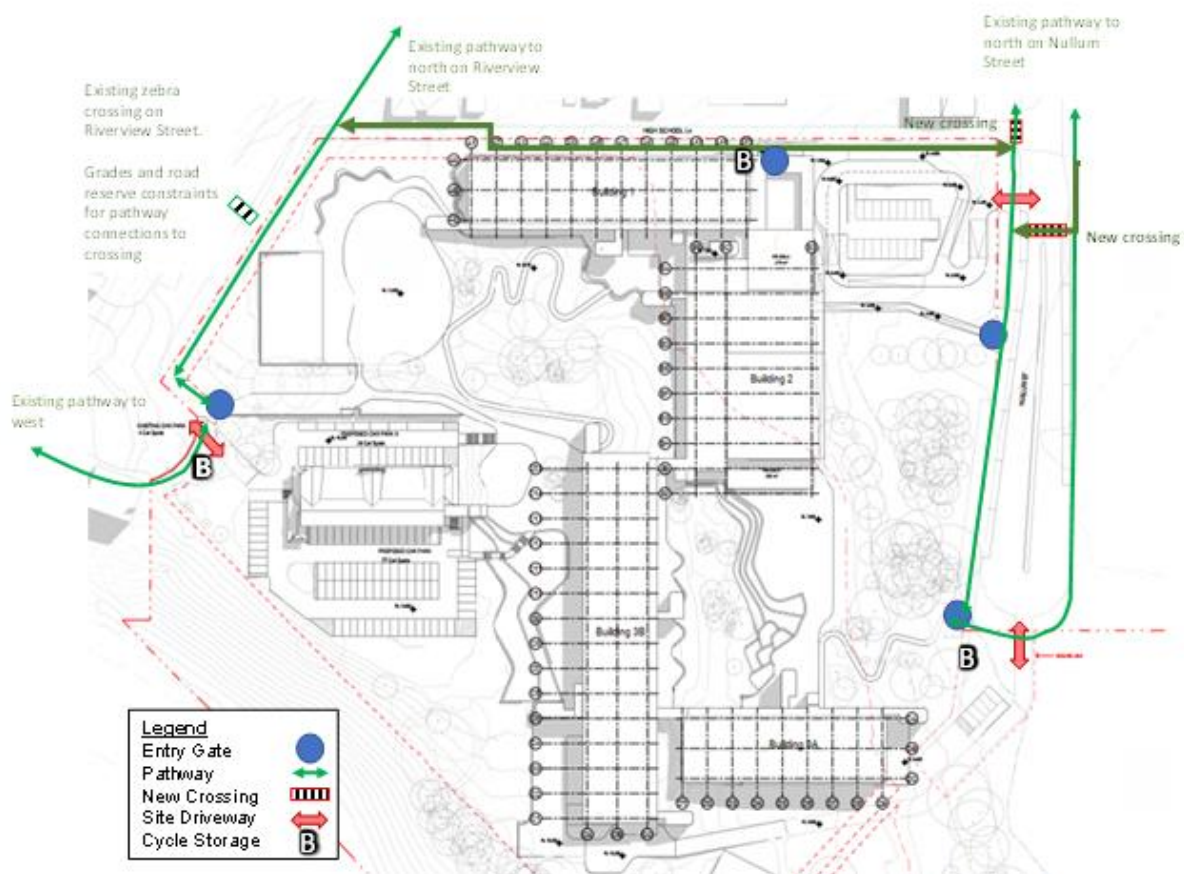
Phone: 1300 482 651



NSW Department of Education – School Infrastructure

Local Map: Public Transport

Add map of bus routes once updated



For more information contact:

School Infrastructure NSW

Email: schoolinfrastructure@det.nsw.edu.au

Phone: 1300 482 651



Appendix D: Preliminary Construction Traffic Management Plan



MURWILLUMBAH EDUCATIONAL CAMPUS

Construction Traffic Management Plan

Schools Infrastructure NSW

4 March 2022

Gold Coast

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Brisbane

Level 2, 428 Upper Edward Street
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P5410.002R MEC Construction Traffic Management Plan	F. Irony	A. Eke	F. Irony	9/12/2021	Paul Nelson paulnelson@built.com.au Keira Mears Keira.Mears@macegroup.com
P5410.003R MEC Construction Traffic Management Plan	F. Irony	A. Eke	F. Irony	27/01/2022	Paul Nelson paulnelson@built.com.au Keira Mears Keira.Mears@macegroup.com
P5410.003R MEC Construction Traffic Management Plan	J. Brook	A. Eke	J. Brook	04/03/2022	Keira Mears Keira.Mears@macegroup.com

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1. INTRODUCTION

1.1 Background

Bitzios Consulting has been engaged to prepare a Construction Traffic Management Plan (CTMP) and a Construction Traffic Pedestrian Management Plan (CTPMP) for the redevelopment of the Murwillumbah High School (MHS) into the Murwillumbah Educational Campus (MEC) located at 86 Riverview Street, Murwillumbah (subject site) (formally described as Lot 2 DP 578679).

The school location is shown in Figure 1.1.



SOURCE: Nearmap

Figure 1.1: Subject Site Location

1.2 Purpose

The purpose of this CTMP is to assess the impacts associated with construction activities and maintain an accessible and efficient road network for all users. This document has been prepared to assist the Principal Contractor (i.e. Built) to implement vehicle and pedestrian management measures when carrying out the works phase of the development.

The purpose of this report is to also inform the state significant development (SSD) applicants and respond to NSW Department of Planning, Industry, and Environmental (DPIE) and the Planning Secretary's Environmental Assessment Requirements (SEARs)

2. EXISTING CONDITIONS

2.1 Road Network

Table 2.1 provides a summary of the key roads within the surrounding road network.

Table 2.1: Key Roads

Road Name	Jurisdiction	Hierarchy	Lanes	Divided	Posted Speed
Riverview Street / Kyogle Road	Council*	Sub-arterial	2	No	50km/h 40km/h (school peaks)
Nullum Street	Council	Collector	2	No	50km/h 40km/h (school peaks)
High School Lane	Council	Local	1	No	50km/h**
James Street	Council	Collector	2	Yes	60km/h 40km/h (school peaks)

* Riverview Street / Kyogle Road is a regional road of state significance to TfNSW

** Default speed limit for built-up urban areas

The surrounding roads are generally sign posted with kerbside 'No Stopping' or 'Bus Zone' with exceptions of James Street and sections of Riverview Street. Bus zones are located on Nullum Street from the south of Hartigan Street to the school frontage.

Two staff parking areas are provided within the subject site, as follows

- Parking Area 1- Accessed via the Riverview Street / Kyogle Road along with a small KnD facility and four central parking spaces
- Parking Area 2 - Accessed via the southern end of Nullum Street.

Nearby on-street parking restrictions and school parking facilities are shown in Figure 2.1.



SOURCE: Nearmap

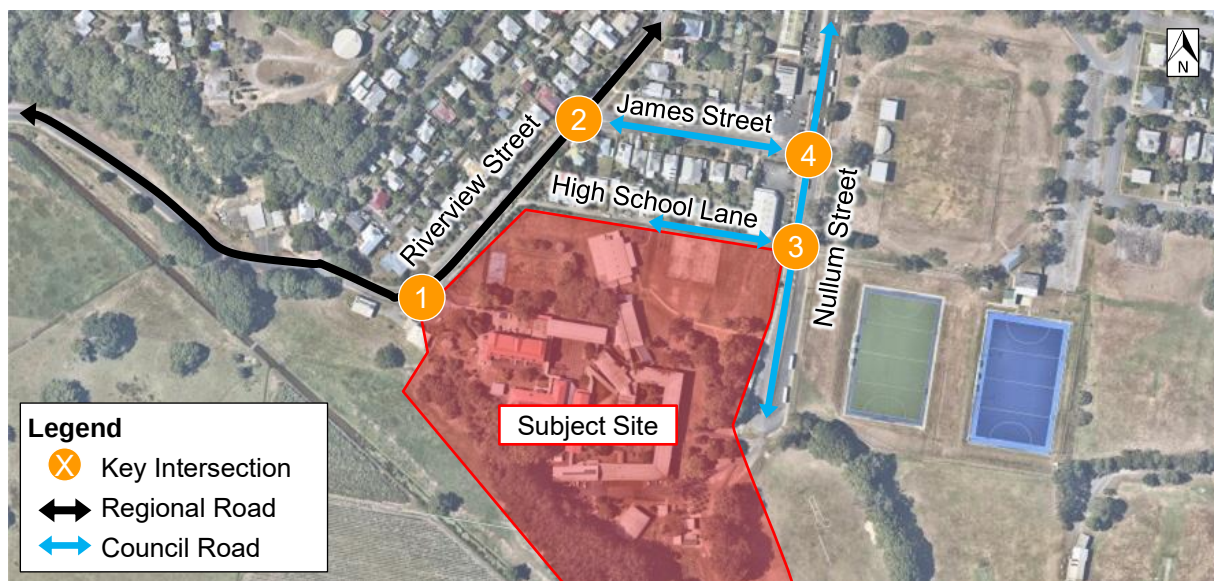
Figure 2.1: Nearby On-street Car Parking Restrictions

The surrounding key intersections in proximity to the subject site are detailed in Table 2.2.

Table 2.2: Surrounding Key Intersection Details

No.	Major Road	Minor Road	Jurisdiction	Control
1	Riverview Street	Kyogle Road	Council	Priority
2	Riverview Street	James Street	Council	Priority
3	Nullum Street	High School Lane	Council	Priority
4	Nullum Street	James Street	Council	Priority

The location of the key intersections with respect to the school is shown in Figure 2.2.



Source: Nearmap

Figure 2.2: Key Intersections

2.2 Alternate Transport

2.2.1 Public Transport

The subject site is currently serviced by school bus services which interchange on Nullum Street, at the bus layover area. The bus interchange allows for buses to bring students into Murwillumbah before being distributed to the surrounding schools. During the interchange process students generally wait on the buses or are corralled on the pathway. No management of students outside the buses is currently undertaken with several different bus operators undertaking a well-established morning and afternoon operation.

The bus interchange area extends for approximately 300m on the western side of Nullum Street (i.e. between Hartigan Street and the cul-de-sac fronting the school). The MHS student bus drop off /pick up zone extends from the cul-de-sac fronting the school to High School Lane, on the eastern side of Nullum Street (extending for approximately 100m), as shown in Figure 2.3.



Figure 2.3: Existing Bus Interchange Facility on Nullum Street

2.2.2 Active Transport

Footpaths are provided along Nullum Street and Riverview Street fronting the subject site. Nullum Street footpaths provide connections between the school and the adjacent hockey and sporting fields as well as the residential catchment and Murwillumbah CBD to the north. The Riverview Street footpaths form part of the greater network, connecting MHS and the western residential catchments.

No bicycle lanes and off-road cycle/shared paths are provided surrounding the subject site.

The surrounding active transport network is shown in Figure 2.4.



Figure 2.4: Surrounding Active Transport Network

3. CONSTRUCTION ACTIVITIES

3.1 Overview

The proposed site construction works will be contained wholly within the subject site boundaries. No works will be undertaken at or adjacent to public road. A separate CTMP will be prepared for any external road or infrastructure works as part of works applications with the relevant local authorities.

The proposed site construction works have been divided as follows:

- **Work Phase 1:** Demolition of building E
- **Work Phase 2:** Construction of proposed buildings 1, 2, 3 and 4, refurbishment building F and refurbishment of building A.

3.1.1 Work Phase 1

As advised by the principal contractor, work phase 1 will require approximately 20 workers daily.

During Work Phase 1 workers and deliveries will access the subject site via two access points at Nullum Street and via one access point at Riverview Street.

3.1.2 Work Phase 2

As advised by the principal contractor, work phase 2 will require approximately 120 workers daily.

During Work Phase 1 workers and deliveries will access the subject site via two access points at Nullum Street and via one access point at Riverview Street.

3.2 Construction Hours

The hours of construction including delivery of materials to and from the site will occur within the following periods:

- Monday to Friday 7:00am-6:00pm (inclusive)
- Saturday 7:00am-6:00pm (inclusive)
- No works to be undertaken on Sundays or public holidays.

3.3 Schedule of Works

Table 3.1 outlines the proposed schedule of works.

Table 3.1: Schedule of Works

Activity	Schedule Order	
	October 2022 to November 2022	November 2023 to May 2024
Phase 1	1 month	
Phase 2		18 months

3.4 Delivery, Loading and Unloading of Plant, Equipment and Materials

During the construction period, all deliveries, loading and unloading of all plant, equipment and/or materials are restricted to occur wholly within the subject site grounds. It is understood that a 20.0m Articulated Vehicle (AV) will be used to float plant to and from the construction site as needed.

Irrespective of the above, if required, a specific Work Zone permit should be made to the relevant road authority.

3.5 Construction Workers Parking

During weekdays it is proposed that all construction workers will park on-site with there be sufficient areas being capable to accommodate for demands. This construction worker parking is expected to be catered for within MHS oval, south of the construction zone and at the bus zone area fronting the subject site at Nullum Street.

3.6 Construction Worker Induction

All workers and subcontractors engaged on-site should be required to undergo a site induction. The induction should address elements related to traffic and transport management, including:

- Existence and requirements of the CTMP
- Relevant legislation, regulations and conditions (e.g. Workplace Health & Safety procedures)
- Roles and responsibilities
- Incident response, management and reporting procedures
- Construction hours
- Access routes and preferred parking locations
- Road safety and occupancy
- Temporary and interim traffic arrangements.

Informal training on traffic management (including monitoring and reviewing traffic control devices and mitigation measures) should be undertaken during toolbox meetings with site personnel.

3.6.1 Safe Work Requirements

To protect the safety of workers and the public, the work site should be adequately secured (i.e. security fence) to prevent access by unauthorised personnel. Additionally, all works must be conducted in accordance with the relevant SafeWork requirements.

3.6.2 SafeWork Method Statements

A Safe Work Method Statement (SWMS) should be complied whenever any person is undertaking high risk construction work as defined by SafeWork NSW. Generally, the SWMS should include:

- The task/s

- All known hazards and risks
- Any control measures including their implementation, monitoring and review.

If a control measure is changed, the SMWS are to be reviewed and updated accordingly.

3.7 Assumptions

At this stage the exact school operations and surrounding schools bus operations is not yet confirmed. The following assumptions have been made, based on consultation with relevant stakeholders:

- All existing MHS students will be relocated to the Wollumbin High School, as such no students or staff will be in the MHS grounds during the entire construction period
- The school bus stop area on the western side of Nullum Street will be closed
- Bus interchange operations will continue to operate as normal, using the bus interchange facility on the eastern side of Nullum Street. Students enrolled in the surrounding schools will continue to use the interchange between buses as per existing operations. Additional details regarding the students interchange between buses is provided in Section 4.

4. TRAFFIC MANAGEMENT PLAN

4.1 Work Phase 1

Key elements for Works Phase 1 are as follows:

- All plant and workers will be contained wholly within the subject site
- Existing Building E will be demolished
- Vehicle access will occur via the Nullum Street and Riverview Street construction access in accordance with the Swept Path assessment provided in **Appendix B**
- The largest vehicle during Phase 1 is anticipated to be a 20m AV
- AVs exiting the construction site via the Riverview Street access will require a contra-flow arrangement
- Outside of work hours, temporary infrastructure is to be installed to restrict vehicular and pedestrian access within the construction zone
- Traffic Management will need to be set up and removed outside of the works window.

4.1.1 Traffic Management Options

The detailed traffic management option analysis has been provided in **Appendix B**.

4.1.1.1 General Traffic

Although the works from Phase 1 will occur outside the existing carriageway, the southbound carriageway at Riverview Street will require to be closed to allow for the 20m AV trucks to egress from the construction zone. Traffic controllers will be required to undertake a contra-flow arrangement fronting the construction access, around the raised median for larger construction vehicle egressing the subject site.

Traffic controllers will stop traffic in both directions, allowing construction vehicles to use the southbound carriageway to travel north before merging into the northbound traffic lane past the raised median.

No impacts to general traffic movements are expected at the two access points at Nullum Street, as such current arrangements are to be retained during Work Phase 1.

4.1.1.2 Public Transport Stops and Public Transport Operations

As per the assumptions described in Section 3.7, no students will be on the MHS grounds during the entire construction period. As such the existing 'MHS bus stop' on the western side of Nullum Street will be closed.

The bus interchange area will remain open to allow the current school bus interchange operations to continue as per existing (i.e. students interchanging between buses at the eastern side of Nullum Street). Given the increase of heavy vehicle movements in the area and the increase in student numbers using the bus interchange area, it is recommended that a 'traffic controller / marshal' assist students interchanging between buses and that temporary shelters are installed on the eastern side of Nullum Street.

All student interchange movements between buses are restricted to the eastern side of Nullum Street out of the road carriageway. As part of the interchange, shelter facilities should be installed to accommodate students on the eastern side of Nullum Street.

4.1.1.3 On-road Cyclists

It is noted there are no on-road cycle lanes fronting the subject site. On-road cyclists are to follow the same traffic management as general traffic, as described in Section 4.1.1.1. This includes the contra-flow arrangement in which cyclists will be directed to wait for the passing 20m AV.

4.1.1.4 Pedestrians

The works from Work Phase 1 will not impact the existing footpath network. Current arrangements for pedestrians are to be retained during the Work Phase 1.

4.1.1.5 Driveway Access

The works from Work Phase 1 will not impact driveway access. Current arrangements for driveway access are to be retained during Work Phase 1.

4.1.1.6 On-Street Parking

The works from Work Phase 1 will not impact on-street parking. Current arrangements for on-street parking are to be retained during Work Phase 1.

4.1.1.7 Refuse Collection

General refuse collection at the school grounds will cease during the construction period. Current arrangements for refuse collection are to be retained during Work Phase 1 for surrounding developments.

4.1.1.8 State Emergency Services (SES)

It is acknowledged a SES facility is provided approximately 150m northwest of the construction access point at Riverview Street. The construction works will not impact SES access. Current arrangements for SES are to be retained during Work Phase 1.

4.1.2 Preferred Traffic Management Arrangement for Work Phase 1

Based on the above, the traffic management arrangements for Work Phase 1 are as follows:

- Contra-flow for arrangement for general traffic to allow construction vehicles to exit the subject site at Riverview Street
- Retain current arrangements for general traffic at Nullum Street
- Close the existing MHS bus stops on the western side of Nullum Street
- Retain existing arrangements for the bus layover area on the eastern side of Nullum Street – Traffic controllers / marshals to assist students during interchange between buses
- Contra-flow arrangement for on-road cyclists to allow construction vehicles to exit the subject site at Riverview Street
- Retain current arrangements for on-street cyclists at Nullum Street
- Retain current arrangements for pedestrians
- Retain current arrangements for driveway access
- Retain current arrangements for on-street parking
- Retain current arrangements for refuse collection
- Retain current arrangements for SES access.

4.2 Work Phase 2

Key elements for Work Phase 2 are as follows:

- All plant and workers will be contained wholly within the subject site
- Construction of proposed buildings 1, 2, 3 and 4, refurbishment building F and refurbishment of building A.
- Vehicle access will occur via the Nullum Street and Riverview Street construction access in accordance with the Swept Path assessment provided in **Appendix B**
- The largest vehicle during Phase 2 is anticipated to be a 20m AV
- AVs exiting the construction site via the Riverview Street access will require a contra-flow arrangement
- Outside of work hours, temporary infrastructure is to be installed to restrict vehicular and pedestrian access within the school grounds
- Traffic Management will need to be set up and removed outside of the works window.

4.2.1 Traffic Management Options

The detailed traffic management option analysis has been provided in **Appendix C**.

4.2.1.1 General Traffic

As per Phase 1, the southbound carriageway at Riverview Street will require to be closed to allow for the 20m AV trucks to egress from the construction zone. Traffic controllers will be required to undertake a contra-flow arrangement fronting the construction access, around the raised median just for construction vehicle egressing the subject site.

Traffic controllers will stop traffic on both directions, allowing constructions vehicles to use the southbound carriageway to travel north before merging into the northbound traffic lane past the raised median.

No impacts to general traffic movements are expected at the two access points at Nullum Street, as such current arrangements are to be retained during Work Phase 2.

4.2.1.2 Public Transport Stops and Public Transport Operations

No students will be on the MHS grounds during the entire construction period. As such the existing 'MHS bus stop' on the western side of Nullum Street will be closed.

The bus interchange area will remain open to allow the current school bus interchange operations to continue as per existing (i.e. students interchanging between buses at the eastern side of Nullum Street). Given the increase of heavy vehicles movements in the area and the increase in student numbers using the bus interchange area, it is recommended that a 'traffic controller / marshal' assist students interchanging between buses and that temporary shelters are installed on the eastern side of Nullum Street.

All student interchange movements between buses are restricted to the eastern side of Nullum Street out of the road carriageway. As part of the interchange, shelter facilities should be installed to accommodate students on the eastern side of Nullum Street.

4.2.1.3 On-road Cyclists

It is noted there are no on-road cycle lanes fronting the subject site. On road cyclists are to follow the same traffic management as general traffic, as described in Section 4.2.1.1. This includes the contra-flow arrangement in which cyclists will be directed to wait for the passing 20m AV.

4.2.1.4 Pedestrians

The works from Work Phase 2 will not impact the existing footpath network. Current arrangements for pedestrians are to be retained during the Work Phase 2.

4.2.1.5 Driveway Access

The works from Work Phase 2 will not impact driveway access. Current arrangements for driveway access are to be retained during Work Phase 2.

4.2.1.6 On-Street Parking

The works from Work Phase 2 will not impact on-street parking. Current arrangements for on-street parking are to be retained during Work Phase 2.

4.2.1.7 Refuse Collection

General refuse collection at school grounds will cease during the construction period. Current arrangements for refuse collection are to be retained during Work Phase 2 for surrounding developments.

4.2.1.8 State Emergency Services (SES)

It is acknowledged a SES facility is provided approximately 150m northwest of the construction access point at Riverview Street. The construction works will not impact SES access. Current arrangements for SES are to be retained during Work Phase 2.

4.2.2 Preferred Traffic Management Arrangement for Work Phase 2

Based on the above, the traffic management arrangements for Work Phase 2 are as follows:

- Contra-flow for arrangement for general traffic to allow construction vehicles to exit the subject site at Riverview Street
- Retain current arrangements for general traffic at Nullum Street
- Close the existing MHS bus stops on the western side of Nullum Street
- Retain existing arrangements for the bus layover area on the eastern side of Nullum Street – Traffic controllers / marshals to assist students during interchange between buses
- Contra-flow arrangement for on-road cyclists to allow construction vehicles to exit the subject site at Riverview Street
- Retain current arrangements for on-street cyclists at Nullum Street
- Retain current arrangements for pedestrians
- Retain current arrangements for driveway access
- Retain current arrangements for on-street parking
- Retain current arrangements for refuse collection
- Retain current arrangements for SES access.

5. CONSTRUCTION TRAFFIC IMPACTS

5.1 Construction Traffic Generating Activities

An increase in traffic volumes is expected during the construction of the project as the result of commuting workers, deliveries of equipment and haulage of materials to and from the subject site. It is anticipated that the primary traffic generation of construction will comprise of:

- The delivery and removal of construction machinery and materials, spoil and waste
- The movement of construction personnel, including contractors, workers and management staff.

5.2 Construction Vehicle Routes

5.2.1 Access Routes

All construction traffic will come from the north-east of Murwillumbah, using Tweed Valley Way. The main access / haulage construction traffic will use the following routes to / from the site:

- Ingress construction traffic travelling from Tweed Valley Way entering the site via the Nullum Street access:
 - Turn right from Tweed Valley Way onto Wollumbin Street
 - Turn left from Wollumbin Street onto Brisbane Street
 - Turn right from Brisbane Street onto Condong Street
 - Turn left from Condong Street onto Nullum Street
 - Enter the construction site from the Nullum Street access.
- Ingress construction traffic travelling from Tweed Valley Way entering the site via Riverview Street access:
 - Turn right from Tweed Valley Way onto Wollumbin Street
 - Turn left from Wollumbin Street onto Brisbane Street
 - Turn right from Brisbane Street onto Condong Street
 - Turn left from Condong Street onto Riverview Street
 - Enter the construction site from the Riverview Street access.
- Egress construction traffic exiting the site via Nullum Street access:
 - Turn left out of the Nullum Street Access
 - Turn Right from Nullum Street onto Condong Street
 - Turn left from Condong Street onto Brisbane Street
 - Turn right from Brisbane Street onto Wollumbin Street
 - Turn left from Wollumbin Street onto Tweed valley way.
- Egress construction traffic exiting the site via Riverview Street access:
 - Turn right out of the Riverview Street Access onto Riverview Street
 - Turn right from Riverview Street onto Condong Street
 - Turn left from Condong Street onto Brisbane Street
 - Turn right from Brisbane Street onto Wollumbin Street
 - Turn left from Wollumbin Street onto Tweed valley way.

The construction vehicle routes are shown in Figure 5.1.



SOURCE: Google Maps

Figure 5.1: Construction Vehicle Routes

5.3 Construction Traffic Impacts

5.3.1 Surrounding Road Network

No detailed analysis of the wider transport network has been undertaken as it is expected that the surrounding road network will have sufficient capacity to accommodate the low levels of additional construction traffic coupled with the temporary closure of school activities at the subject site. Buses and other heavy vehicles currently operate on all streets proposed to be used by construction vehicles

5.3.2 Pedestrians and Cyclists

There is expected to be minimal impacts to pedestrians and cyclists in the area during construction due to the extent of works being internal. Any impacts to pedestrian pathways or cycle routes will be managed under the CTMP.

5.3.3 Bus Zones and Services

The school bus interchange is not expected to be impacted by the construction traffic due to the works being internal. It is recommended that a traffic marshal be present during the morning and afternoon peak hours during the bus interchange times to minimise risks to students on the eastern side of Nullum Street.

5.3.4 Property Access

It is not expected that construction works will have any adverse impacts on existing property accesses of nearby lots with access to all properties maintained during construction unless otherwise agreed to by the relevant business owner, property owner or occupier.

5.3.5 Emergency Services

The proposed construction activities are not expected to impact emergency services. Emergency services will continue to have access to the site and surrounding roads.

5.3.6 Refuse Collection

The proposed construction activities are not expected to impact refuse collection vehicles. Refuse collection will continue to have access to the surrounding properties.

6. TRAFFIC GUIDANCE SCHEMES

6.1 Traffic Guidance Schemes Implementation

Prior to implementation, construction traffic management measures will require the preparation of an approved Traffic Guidance Scheme (TGS) indicating the road worksite arrangements to ensure the safety of all road users as well as workers at the site.'

Given the level of uncertainty at this stage, regarding the existing MHS school and bus layover operations, TGSs will be completed at this stage. TGSs are recommended to be developed once the above assumptions are confirmed.

TCPs will be developed as per Australian Standards AS1742.3 and the RMS *Traffic Control at Work Sites Technical Manual (version 6)*.

6.2 Risk Assessment

Similarly, the risk assessment for the subject site construction works will be developed once the above assumptions are confirmed.

7. MONITORING AND EVALUATION

7.1 Inspection and Monitoring

In addition to traffic control safety inspections, formal and documented daily (short-term) and weekly (long-term) inspections shall be undertaken at work sites by suitably qualified persons (i.e. holding the Prepare Work Zone Traffic Management Plan qualification).

It is also important for any near miss incidents to be recorded and documented then reviewed as part of any inspection.

7.2 Signage Device List

When TGSs are completed, all signage and devices are to be provided as per the TGS. If signage nominated is not available like for like replacement is acceptable where the principal contractor has been notified and the proposed change has been certified by the Nominated Traffic Officer (NTO).

7.3 Site Access

All site work areas and access / egress to and from the site are to be negotiated by the Principal Contractor. On-site work areas are to be put in place by the Principal Contractor.

7.4 Site Delivery Timeframes

All deliveries are to be arranged 24 hours prior to the delivery date. Deliveries may be scheduled within the following time frames:

- Work Phase 1: Monday to Saturday 7:00am-6:00pm
- Work Phase 2: Monday to Saturday 7:00am-6:00pm.

7.5 Coordination Meetings

Coordination meetings are to be coordinated as follows:

- Principal Contractor prestart meeting: two weeks prior to initial commencement of works
- Traffic Management prestart meeting: two weeks prior to initial commencement of works
- Daily onsite prestart: 30 minutes before works start for Traffic Control.

7.6 TGS On-Site Implementation

When the TGS's are produces, Traffic Controllers are to set up TGS's as follows:

- Work Phase 1: Set up from 6:00am and remove on completion of works (no later than 7:00pm). Aftercare signage to be in place after 6:00pm.
- Work Phase 2: Set up from 6:00am and remove on completion of works (no later than 7:00pm). Aftercare signage to be in place after 6:00pm.

7.7 Communication

Relevant information regarding communications and public notifications is as follows:

- All issues to be communicated to site supervisor who will escalate as appropriate
- The relevant traffic manager to be contacted prior to TGS implementation and upon removal of TGS (when these are completed)
- Principal contractor to designate Site Wide General UHF Channel (e.g.. channel 30)
- Principal contractor name to display site UHF Channel/s in advance or work area

- All Subcontractor vehicles to be fitted with UHF radios
- Work area access / egress at Principal Contractor Supervisor's approval
- Emergencies to be reported to the Principal Contractor Supervisor or Team Leader onsite
- Principal Contractor Supervisor or Team Leader onsite to contact emergency services and WHS.

7.8 Contingency Plan

Relevant information regarding the contingency plan is as follows:

- Traffic Management Company to have Contingency Plan demonstrating ability to Supply Continuity of Service as negotiated by the Principal Contractor
- Principal Contractor to:
 - Designate onsite Emergency Contact
 - Ensure Emergency Response Team (ERT) readiness
 - Provide emergency procedures
 - Liaise with Emergency Services
 - Provide emergency evacuation training, equipment, plans, designated assembly points, signage, support.

7.9 Incident Response

In an emergency:

- Emergency Services to have full site access
- Affected site works to cease
- Principal Contractor Emergency Response Team (ERT) to enact ERT Plan
- In the event of an emergency, Emergency Services are to be contacted at 000.

7.10 Key Personnel

7.10.1 Project Manager Role

The Project Manager, as the representative of the Principal Contractor is responsible for the overall management and safety of the project. The Project Manager shall:

- Ensure that a traffic control safety inspection is carried out at least once per month by a qualified person and that the date, time and deficiencies are recorded
- Ensure that a traffic control safety inspection or road safety audit is carried out prior to the implementation of any changes in traffic control or a TGS
- Provide the TMP and TGS to the relevant personnel
- Ensure that TMP and TGS's have been understood
- Ensure risk is managed and that high-risk work is performed safely
- Ensure that near miss incidents are being reported and recorded then reviewed
- Ensure that any corrective action specified is taken and recorded
- Develop and implement the Work Health and Safety (WHS) Plan
- Ensure a copy of the safe work method statement (SWMS) for high risk works has been completed before the high-risk works start
- Ensure only registered Traffic Management companies are used, and that the traffic controllers are accredited to required level
- Liaise with stakeholders
- Manage all the complaints.

This information may be critical, should legal proceedings follow an accident.

7.10.2 Works Supervisor Role

For all long-term work sites, the Works Supervisor who is appropriately qualified shall:

- Hold current Traffic Management qualification
- Ensure all equipment and plant is fit for purpose
- Ensure all personnel are adequately qualified and competent
- Ensure all traffic controllers have the capacity to implement, monitor and close the TGS's as per MUTCD Risk Assessment requirements
- Perform toolboxes meetings daily
- Report any incidents or near miss incidents as soon as possible
- Provide TMP and TGS to workers as required
- Ensure risk is managed and that compliance has been met by reviewing and monitoring the risk
- Inspect the traffic control layout on the day before the work begins and at least once per week during the duration of the work
- Inspect the traffic control layout between shifts at least once during the first week and at least once every two months for the duration of work
- Provide after-hours contact to local police for the duration of the work
- Inspect the site on the final day to ensure that unnecessary signs and devices are removed
- Record results of these inspections noting date, time, deficiencies and any corrective action taken or specified Plan arrangements for vehicles associated with the works
- Ensure that any specified corrective action is taken.

7.10.3 Traffic Controllers

The services of a qualified Traffic Control subcontractor must be used to provide traffic control services for the construction of the project. Traffic controllers will be trained and inducted in accordance with the Traffic Controller Accreditation and Implementation Traffic Control Plans qualifications as well as comply with the requirements of the *Traffic Control at Work Sites Technical Manual* (Version 5.0).

It is also the responsibility of a Traffic Controllers employed on-site to record any issues relating to the implemented traffic management measures and report them to the Site Manager so that any issues are recorded within a site register then reviewed.

7.11 Notifications

All traffic management notifications to be submitted and authorised before implementation, as per MRTS02 requirements.

7.12 Records and Reporting

Records and reporting are the undertaken in accordance with MRTS02, as follows:

- Signage records to be completed daily as per MUTCD Appendix A
- Bitzios Consulting will monitor effectiveness and amend TGS as required by the Principal Contractor
- All WHS incidents to be reported to Principal Contractor as soon 'as it is safe to do so' and not later than 'end of shift'
- Traffic incident to be reported to Principal Contractor within 24 hours

- Non-conformities to be reported to affected parties and remedied within required timeframe or extension sort prior to timeframe expiry
- Principal Contractor to advise Bitzios Consulting and Traffic Management Company/s of specific records and reporting requirements.

Appendix A: Construction Zone Plan

Appendix B: Swept Path Diagrams

Appendix C: Detailed Traffic Management Options Analysis

Appendix E: Traffic Survey Data

AM PM	PM 4	AM 6	L	11	268	4	PM AM						
	8	6	T	14	208	6	Prince Street						
	6	7	R	R	T	L	Nullum Street						
	L	T	R	R	5	10							
	42	363	33	T	15	16							
	19	233	23	L	6	10							
					AM	PM							
Riverview Street							PM 12	AM 23	L	21	56	62	PM AM
							90	136	T	4	58	36	
							14	10	R	R	T	L	
							L	T	R	R	22	24	
							AM 8	54	72	T	85	186	
							PM 4	51	73	L	29	36	
											AM	PM	
							PM	AM					PM AM
									L				
									T				
Hartigan Street									R	R	T	L	
							L	T	R	R			
										T			
James Street													
Western Access													
Subject Site													
High School Lane													

Appendix F: Traffic Network Diagrams

P4992	Murwillumbah Education Campus Transport Assessment	Notes: Survey Date 3/03/2021 Peak Hours AM 8:15 9:15 PM 2:45 3:45	Growth Rate: 2.0% Survey Year: 2021 Design Year: 2034	Sheet 3
MEC Ultimate Trips				

Appendix G: SIDRA Outputs

MOVEMENT SUMMARY

**Site: 101 [Riverview Street / Western School Access - PM
Peak - DES_2033 (Site Folder: DES_2034_PM)]**

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
SouthEast: Western School Access (E)														
4	L2	14	0.0	15	0.0	0.348	7.6	LOS A	1.3	8.9	0.79	0.96	0.99	36.7
6	R2	106	0.0	112	0.0	0.348	14.3	LOS B	1.3	8.9	0.79	0.96	0.99	36.6
Approach		120	0.0	126	0.0	0.348	13.5	LOS B	1.3	8.9	0.79	0.96	0.99	36.6
NorthEast: Riverview Street (N)														
7	L2	24	0.0	25	0.0	0.334	4.5	LOS A	0.0	0.0	0.00	0.02	0.00	48.3
8	T1	613	5.0	645	5.0	0.334	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach		637	4.8	671	4.8	0.334	0.3	NA	0.0	0.0	0.00	0.02	0.00	49.7
SouthWest: Riverview Street (S)														
2	T1	437	6.0	460	6.0	0.231	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		437	6.0	460	6.0	0.231	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		1194	4.8	1257	4.8	0.348	1.5	NA	1.3	8.9	0.08	0.11	0.10	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - AM Peak - BG_2023
(Site Folder: BG_2024_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	20	32.0	21	32.0	0.055	5.9	LOS A	0.0	0.0	0.00	0.13	0.00	47.7
2	T1	69	36.0	73	36.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	56.5
Approach		89	35.1	94	35.1	0.055	1.3	NA	0.0	0.0	0.00	0.13	0.00	54.1
North: Nullum Street														
8	T1	95	34.0	100	34.0	0.071	0.1	LOS A	0.1	1.3	0.09	0.11	0.09	55.3
9	R2	22	5.0	23	5.0	0.071	6.0	LOS A	0.1	1.3	0.09	0.11	0.09	50.4
Approach		117	28.5	123	28.5	0.071	1.2	NA	0.1	1.3	0.09	0.11	0.09	54.4
West: James Street														
10	L2	79	1.0	83	1.0	0.079	8.4	LOS A	0.3	2.2	0.19	0.90	0.19	39.2
12	R2	14	0.0	15	0.0	0.079	9.4	LOS A	0.3	2.2	0.19	0.90	0.19	42.8
Approach		93	0.8	98	0.8	0.079	8.5	LOS A	0.3	2.2	0.19	0.90	0.19	39.8
All Vehicles		299	21.9	315	21.9	0.079	3.5	NA	0.3	2.2	0.09	0.36	0.09	49.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / James Street - AM Peak - BG_2023 (Site Folder: BG_2024_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	45	16.0	47	16.0	0.037	5.5	LOS A	0.1	1.1	0.02	0.59	0.02	40.7
6b	R3	3	0.0	3	0.0	0.037	10.1	LOS B	0.1	1.1	0.02	0.59	0.02	42.8
Approach		48	15.0	51	15.0	0.037	5.8	LOS A	0.1	1.1	0.02	0.59	0.02	40.8
NorthEast: Riverview Street														
24b	L3	7	0.0	7	0.0	0.008	6.5	LOS A	0.0	0.0	0.00	0.36	0.00	48.1
8	T1	6	0.0	6	0.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	50.6
Approach		13	0.0	14	0.0	0.008	3.5	NA	0.0	0.0	0.00	0.36	0.00	49.2
SouthWest: Riverview Street														
2	T1	550	3.0	579	3.0	0.355	0.0	LOS A	0.7	5.2	0.03	0.07	0.03	57.7
32a	R1	87	2.0	92	2.0	0.355	4.5	LOS A	0.7	5.2	0.03	0.07	0.03	54.1
Approach		637	2.9	671	2.9	0.355	0.6	NA	0.7	5.2	0.03	0.07	0.03	57.1
All Vehicles		698	3.6	735	3.6	0.355	1.0	NA	0.7	5.2	0.02	0.11	0.02	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - AM Peak - BG_2023 (Site Folder: BG_2024_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	9	13.0	9	13.0	0.088	6.1	LOS A	0.4	3.3	0.22	0.33	0.22	41.5
2	T1	57	26.0	60	26.0	0.088	0.3	LOS A	0.4	3.3	0.22	0.33	0.22	46.4
3	R2	75	8.0	79	8.0	0.088	6.0	LOS A	0.4	3.3	0.22	0.33	0.22	44.7
Approach		141	15.6	148	15.6	0.088	3.7	NA	0.4	3.3	0.22	0.33	0.22	45.1
East: Condong Street														
4	L2	31	10.0	33	10.0	0.174	8.8	LOS A	0.7	5.0	0.31	0.92	0.31	39.1
5	T1	89	5.0	94	5.0	0.174	9.8	LOS A	0.7	5.0	0.31	0.92	0.31	39.3
6	R2	23	9.0	24	9.0	0.174	12.1	LOS B	0.7	5.0	0.31	0.92	0.31	38.8
Approach		143	6.7	151	6.7	0.174	10.0	LOS A	0.7	5.0	0.31	0.92	0.31	39.2
North: Nullum Street														
7	L2	38	8.0	40	8.0	0.063	5.6	LOS A	0.0	0.4	0.03	0.24	0.03	46.6
8	T1	61	48.0	64	48.0	0.063	0.0	LOS A	0.0	0.4	0.03	0.24	0.03	49.6
9	R2	5	0.0	5	0.0	0.063	5.8	LOS A	0.0	0.4	0.03	0.24	0.03	46.1
Approach		104	31.1	109	31.1	0.063	2.4	NA	0.0	0.4	0.03	0.24	0.03	48.1
West: Condong Street														
10	L2	24	0.0	25	0.0	0.210	8.3	LOS A	0.8	6.2	0.33	0.92	0.33	35.0
11	T1	142	4.0	149	4.0	0.210	9.9	LOS A	0.8	6.2	0.33	0.92	0.33	39.1
12	R2	11	20.0	12	20.0	0.210	12.7	LOS B	0.8	6.2	0.33	0.92	0.33	34.5
Approach		177	4.5	186	4.5	0.210	9.9	LOS A	0.8	6.2	0.33	0.92	0.33	38.4
All Vehicles		565	12.7	595	12.7	0.210	7.0	NA	0.8	6.2	0.24	0.65	0.24	41.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - AM Peak - BG_2023 (Site Folder: BG_2024_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / Prince Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	44	10.0	46	10.0	0.263	6.2	LOS A	0.5	3.3	0.10	0.10	0.10	49.4
2	T1	378	2.0	398	2.0	0.263	0.2	LOS A	0.5	3.3	0.10	0.10	0.10	56.7
3	R2	35	12.0	37	12.0	0.263	6.8	LOS A	0.5	3.3	0.10	0.10	0.10	47.9
Approach		457	3.5	481	3.5	0.263	1.3	NA	0.5	3.3	0.10	0.10	0.10	55.4
East: Prince Street														
4	L2	7	0.0	7	0.0	0.056	6.3	LOS A	0.2	1.5	0.50	0.71	0.50	34.3
5	T1	16	27.0	17	27.0	0.056	10.4	LOS B	0.2	1.5	0.50	0.71	0.50	35.3
6	R2	6	0.0	6	0.0	0.056	10.6	LOS B	0.2	1.5	0.50	0.71	0.50	40.3
Approach		29	14.9	31	14.9	0.056	9.5	LOS A	0.2	1.5	0.50	0.71	0.50	36.2
North: Riverview Street														
7	L2	7	17.0	7	17.0	0.144	7.6	LOS A	0.2	1.6	0.10	0.05	0.10	51.8
8	T1	217	8.0	228	8.0	0.144	0.3	LOS A	0.2	1.6	0.10	0.05	0.10	57.6
9	R2	15	14.0	16	14.0	0.144	8.0	LOS A	0.2	1.6	0.10	0.05	0.10	51.8
Approach		239	8.6	252	8.6	0.144	1.0	NA	0.2	1.6	0.10	0.05	0.10	56.9
West: Prince Street														
10	L2	7	0.0	7	0.0	0.037	6.9	LOS A	0.1	0.9	0.52	0.71	0.52	43.6
11	T1	7	0.0	7	0.0	0.037	8.2	LOS A	0.1	0.9	0.52	0.71	0.52	39.6
12	R2	8	0.0	8	0.0	0.037	10.9	LOS B	0.1	0.9	0.52	0.71	0.52	39.1
Approach		22	0.0	23	0.0	0.037	8.8	LOS A	0.1	0.9	0.52	0.71	0.52	40.9
All Vehicles		747	5.5	786	5.5	0.263	1.7	NA	0.5	3.3	0.13	0.12	0.13	54.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - AM
Peak - BG_2023 (Site Folder: BG_2024_AM)]

P4992
Murwillumbah Education Campus Upgrade
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	6	33.0	6	33.0	0.096	4.4	LOS A	0.3	2.2	0.63	0.80	0.63	39.3
6	R2	35	3.0	37	3.0	0.096	9.9	LOS A	0.3	2.2	0.63	0.80	0.63	39.7
Approach		41	7.4	43	7.4	0.096	9.1	LOS A	0.3	2.2	0.63	0.80	0.63	39.7
NorthEast: Riverview Street (N)														
7	L2	64	3.0	67	3.0	0.188	4.5	LOS A	0.0	0.0	0.00	0.09	0.00	47.6
8	T1	287	8.0	302	8.0	0.188	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	49.4
Approach		351	7.1	369	7.1	0.188	0.9	NA	0.0	0.0	0.00	0.09	0.00	49.2
SouthWest: Riverview Street (S)														
2	T1	597	3.0	628	3.0	0.309	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		597	3.0	628	3.0	0.309	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		989	4.6	1041	4.6	0.309	0.7	NA	0.3	2.2	0.03	0.06	0.03	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - PM Peak - BG_2023**
(Site Folder: BG_2024_PM)]

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	22	29.0	23	29.0	0.059	5.9	LOS A	0.0	0.0	0.00	0.13	0.00	48.3
2	T1	77	30.0	81	30.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	56.7
Approach		99	29.8	104	29.8	0.059	1.3	NA	0.0	0.0	0.00	0.13	0.00	54.4
North: Nullum Street														
8	T1	65	44.0	68	44.0	0.076	0.3	LOS A	0.3	2.6	0.19	0.27	0.19	50.2
9	R2	57	4.0	60	4.0	0.076	6.0	LOS A	0.3	2.6	0.19	0.27	0.19	45.7
Approach		122	25.3	128	25.3	0.076	2.9	NA	0.3	2.6	0.19	0.27	0.19	48.2
West: James Street														
10	L2	41	3.0	43	3.0	0.047	8.5	LOS A	0.2	1.3	0.20	0.90	0.20	39.0
12	R2	12	0.0	13	0.0	0.047	9.4	LOS A	0.2	1.3	0.20	0.90	0.20	42.7
Approach		53	2.3	56	2.3	0.047	8.7	LOS A	0.2	1.3	0.20	0.90	0.20	39.9
All Vehicles		274	22.5	288	22.5	0.076	3.5	NA	0.3	2.6	0.12	0.34	0.12	48.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / James Street - PM Peak - BG_2023 (Site Folder: BG_2024_PM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	77	12.0	81	12.0	0.098	7.8	LOS A	0.4	2.8	0.50	0.73	0.50	38.4
6b	R3	4	0.0	4	0.0	0.098	12.0	LOS B	0.4	2.8	0.50	0.73	0.50	39.4
Approach		81	11.4	85	11.4	0.098	8.0	LOS A	0.4	2.8	0.50	0.73	0.50	38.4
NorthEast: Riverview Street														
24b	L3	6	0.0	6	0.0	0.262	6.5	LOS A	0.0	0.0	0.00	0.01	0.00	56.0
8	T1	472	2.0	497	2.0	0.262	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		478	2.0	503	2.0	0.262	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
SouthWest: Riverview Street														
2	T1	336	5.0	354	5.0	0.232	0.5	LOS A	0.6	4.1	0.18	0.07	0.18	55.9
32a	R1	45	2.0	47	2.0	0.232	7.1	LOS A	0.6	4.1	0.18	0.07	0.18	52.6
Approach		381	4.6	401	4.6	0.232	1.3	NA	0.6	4.1	0.18	0.07	0.18	55.4
All Vehicles		940	3.9	989	3.9	0.262	1.3	NA	0.6	4.1	0.12	0.10	0.12	55.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - PM Peak - BG_2023 (Site Folder: BG_2024_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	5	0.0	5	0.0	0.091	6.1	LOS A	0.4	3.6	0.26	0.33	0.26	43.1
2	T1	54	22.0	57	22.0	0.091	0.5	LOS A	0.4	3.6	0.26	0.33	0.26	46.5
3	R2	76	21.0	80	21.0	0.091	6.3	LOS A	0.4	3.6	0.26	0.33	0.26	42.3
Approach		135	20.6	142	20.6	0.091	4.0	NA	0.4	3.6	0.26	0.33	0.26	43.6
East: Condong Street														
4	L2	38	0.0	40	0.0	0.308	8.4	LOS A	1.3	9.6	0.36	0.92	0.36	39.7
5	T1	194	3.0	204	3.0	0.308	10.1	LOS B	1.3	9.6	0.36	0.92	0.36	39.3
6	R2	25	4.0	26	4.0	0.308	11.8	LOS B	1.3	9.6	0.36	0.92	0.36	39.0
Approach		257	2.7	271	2.7	0.308	10.0	LOS B	1.3	9.6	0.36	0.92	0.36	39.3
North: Nullum Street														
7	L2	65	2.0	68	2.0	0.086	5.6	LOS A	0.2	1.5	0.07	0.33	0.07	46.1
8	T1	59	46.0	62	46.0	0.086	0.1	LOS A	0.2	1.5	0.07	0.33	0.07	46.8
9	R2	22	5.0	23	5.0	0.086	5.8	LOS A	0.2	1.5	0.07	0.33	0.07	43.0
Approach		146	20.2	154	20.2	0.086	3.4	NA	0.2	1.5	0.07	0.33	0.07	45.9
West: Condong Street														
10	L2	13	8.0	14	8.0	0.164	8.6	LOS A	0.6	4.6	0.35	0.93	0.35	33.8
11	T1	94	1.0	99	1.0	0.164	9.9	LOS A	0.6	4.6	0.35	0.93	0.35	38.9
12	R2	15	36.0	16	36.0	0.164	15.9	LOS C	0.6	4.6	0.35	0.93	0.35	32.7
Approach		122	6.0	128	6.0	0.164	10.5	LOS B	0.6	4.6	0.35	0.93	0.35	37.8
All Vehicles		660	10.8	695	10.8	0.308	7.4	NA	1.3	9.6	0.28	0.67	0.28	41.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - PM Peak - BG_2023 (Site Folder: BG_2024_PM)]

P4992
Murwillumbah Education Campus
Riverview Street / Prince Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	20	26.0	21	26.0	0.173	6.6	LOS A	0.3	2.2	0.11	0.09	0.11	46.0
2	T1	246	6.0	259	6.0	0.173	0.2	LOS A	0.3	2.2	0.11	0.09	0.11	56.9
3	R2	24	13.0	25	13.0	0.173	7.0	LOS A	0.3	2.2	0.11	0.09	0.11	48.0
Approach		290	8.0	305	8.0	0.173	1.2	NA	0.3	2.2	0.11	0.09	0.11	55.5
East: Prince Street														
4	L2	11	0.0	12	0.0	0.057	6.5	LOS A	0.2	1.4	0.47	0.68	0.47	36.5
5	T1	17	6.0	18	6.0	0.057	7.7	LOS A	0.2	1.4	0.47	0.68	0.47	39.9
6	R2	11	0.0	12	0.0	0.057	9.6	LOS A	0.2	1.4	0.47	0.68	0.47	42.2
Approach		39	2.6	41	2.6	0.057	7.9	LOS A	0.2	1.4	0.47	0.68	0.47	39.8
North: Riverview Street														
7	L2	5	0.0	5	0.0	0.173	7.2	LOS A	0.2	1.4	0.06	0.03	0.06	54.8
8	T1	279	4.0	294	4.0	0.173	0.1	LOS A	0.2	1.4	0.06	0.03	0.06	58.7
9	R2	12	55.0	13	55.0	0.173	8.1	LOS A	0.2	1.4	0.06	0.03	0.06	45.5
Approach		296	6.0	312	6.0	0.173	0.6	NA	0.2	1.4	0.06	0.03	0.06	57.8
West: Prince Street														
10	L2	5	0.0	5	0.0	0.031	6.4	LOS A	0.1	0.7	0.46	0.66	0.46	44.6
11	T1	9	0.0	9	0.0	0.031	7.3	LOS A	0.1	0.7	0.46	0.66	0.46	40.9
12	R2	7	0.0	7	0.0	0.031	9.7	LOS A	0.1	0.7	0.46	0.66	0.46	40.3
Approach		21	0.0	22	0.0	0.031	7.9	LOS A	0.1	0.7	0.46	0.66	0.46	41.8
All Vehicles		646	6.5	680	6.5	0.173	1.5	NA	0.3	2.2	0.12	0.12	0.12	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - PM
Peak - BG_2023 (Site Folder: BG_2024_PM)]

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	12	0.0	13	0.0	0.085	5.2	LOS A	0.3	1.9	0.61	0.78	0.61	40.9
6	R2	31	0.0	33	0.0	0.085	9.0	LOS A	0.3	1.9	0.61	0.78	0.61	40.8
Approach		43	0.0	45	0.0	0.085	8.0	LOS A	0.3	1.9	0.61	0.78	0.61	40.8
NorthEast: Riverview Street (N)														
7	L2	23	0.0	24	0.0	0.276	4.5	LOS A	0.0	0.0	0.00	0.02	0.00	48.3
8	T1	503	5.0	529	5.0	0.276	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach		526	4.8	554	4.8	0.276	0.3	NA	0.0	0.0	0.00	0.02	0.00	49.7
SouthWest: Riverview Street (S)														
2	T1	369	6.0	388	6.0	0.195	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		369	6.0	388	6.0	0.195	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		938	5.0	987	5.0	0.276	0.5	NA	0.3	1.9	0.03	0.05	0.03	49.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - AM Peak - BG_2033
(Site Folder: BG_2034_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	25	32.0	26	32.0	0.067	5.9	LOS A	0.0	0.0	0.00	0.13	0.00	47.7
2	T1	84	36.0	88	36.0	0.067	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	56.4
Approach		109	35.1	115	35.1	0.067	1.4	NA	0.0	0.0	0.00	0.13	0.00	54.0
North: Nullum Street														
8	T1	116	34.0	122	34.0	0.087	0.1	LOS A	0.2	1.6	0.10	0.11	0.10	55.2
9	R2	27	5.0	28	5.0	0.087	6.1	LOS A	0.2	1.6	0.10	0.11	0.10	50.2
Approach		143	28.5	151	28.5	0.087	1.2	NA	0.2	1.6	0.10	0.11	0.10	54.3
West: James Street														
10	L2	96	1.0	101	1.0	0.098	8.5	LOS A	0.4	2.8	0.22	0.89	0.22	39.2
12	R2	17	0.0	18	0.0	0.098	9.8	LOS A	0.4	2.8	0.22	0.89	0.22	42.7
Approach		113	0.8	119	0.8	0.098	8.7	LOS A	0.4	2.8	0.22	0.89	0.22	39.8
All Vehicles		365	21.9	384	21.9	0.098	3.6	NA	0.4	2.8	0.11	0.36	0.11	49.0

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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Project: P:\P4992 Murwillumbah Education Campus Transport Assessment\Technical Work\Models\P4992 Intersection Models.sip9

MOVEMENT SUMMARY

▽ Site: 101 [Riverview Street / James Street - AM Peak - BG_2033 (Site Folder: BG_2034_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	55	16.0	58	16.0	0.070	7.3	LOS A	0.3	2.0	0.46	0.68	0.46	38.2
6b	R3	3	0.0	3	0.0	0.070	18.1	LOS C	0.3	2.0	0.46	0.68	0.46	39.7
Approach		58	15.2	61	15.2	0.070	7.8	LOS A	0.3	2.0	0.46	0.68	0.46	38.2
NorthEast: Riverview Street														
24b	L3	8	0.0	8	0.0	0.216	6.5	LOS A	0.0	0.0	0.00	0.01	0.00	55.8
8	T1	375	6.0	395	6.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
Approach		383	5.9	403	5.9	0.216	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.3
SouthWest: Riverview Street														
2	T1	670	3.0	705	3.0	0.464	0.8	LOS A	2.0	14.2	0.23	0.09	0.29	54.8
32a	R1	106	2.0	112	2.0	0.464	7.5	LOS A	2.0	14.2	0.23	0.09	0.29	51.7
Approach		776	2.9	817	2.9	0.464	1.7	NA	2.0	14.2	0.23	0.09	0.29	54.3
All Vehicles		1217	4.4	1281	4.4	0.464	1.5	NA	2.0	14.2	0.17	0.09	0.21	54.6

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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Project: P:\P4992 Murwillumbah Education Campus Transport Assessment\Technical Work\Models\P4992 Intersection Models.sip9

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - AM Peak - BG_2033 (Site Folder: BG_2034_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	11	13.0	12	13.0	0.109	6.2	LOS A	0.5	4.2	0.25	0.34	0.25	41.2
2	T1	69	26.0	73	26.0	0.109	0.4	LOS A	0.5	4.2	0.25	0.34	0.25	46.1
3	R2	92	8.0	97	8.0	0.109	6.1	LOS A	0.5	4.2	0.25	0.34	0.25	44.5
Approach		172	15.5	181	15.5	0.109	3.9	NA	0.5	4.2	0.25	0.34	0.25	44.8
East: Condong Street														
4	L2	37	10.0	39	10.0	0.227	8.9	LOS A	0.9	6.7	0.36	0.93	0.36	38.6
5	T1	108	5.0	114	5.0	0.227	10.3	LOS B	0.9	6.7	0.36	0.93	0.36	38.7
6	R2	28	9.0	29	9.0	0.227	13.5	LOS B	0.9	6.7	0.36	0.93	0.36	38.3
Approach		173	6.7	182	6.7	0.227	10.5	LOS B	0.9	6.7	0.36	0.93	0.36	38.6
North: Nullum Street														
7	L2	46	8.0	48	8.0	0.077	5.6	LOS A	0.1	0.5	0.03	0.24	0.03	46.6
8	T1	74	48.0	78	48.0	0.077	0.0	LOS A	0.1	0.5	0.03	0.24	0.03	49.6
9	R2	6	0.0	6	0.0	0.077	5.9	LOS A	0.1	0.5	0.03	0.24	0.03	46.1
Approach		126	31.1	133	31.1	0.077	2.4	NA	0.1	0.5	0.03	0.24	0.03	48.1
West: Condong Street														
10	L2	30	0.0	32	0.0	0.275	8.4	LOS A	1.1	8.3	0.38	0.93	0.38	34.4
11	T1	173	4.0	182	4.0	0.275	10.5	LOS B	1.1	8.3	0.38	0.93	0.38	38.5
12	R2	13	20.0	14	20.0	0.275	14.0	LOS B	1.1	8.3	0.38	0.93	0.38	33.9
Approach		216	4.4	227	4.4	0.275	10.4	LOS B	1.1	8.3	0.38	0.93	0.38	37.8
All Vehicles		687	12.7	723	12.7	0.275	7.3	NA	1.1	8.3	0.28	0.66	0.28	41.0

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - AM Peak - BG_2033 (Site Folder: BG_2034_AM)]

P4992

Murwillumbah Education Campus

Riverview Street / Prince Street

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	54	10.0	57	10.0	0.322	6.5	LOS A	0.6	4.5	0.12	0.10	0.12	49.3
2	T1	461	2.0	485	2.0	0.322	0.2	LOS A	0.6	4.5	0.12	0.10	0.12	56.5
3	R2	42	12.0	44	12.0	0.322	7.3	LOS A	0.6	4.5	0.12	0.10	0.12	47.6
Approach		557	3.5	586	3.5	0.322	1.4	NA	0.6	4.5	0.12	0.10	0.12	55.2
East: Prince Street														
4	L2	8	0.0	8	0.0	0.087	6.5	LOS A	0.3	2.3	0.60	0.77	0.60	31.6
5	T1	20	27.0	21	27.0	0.087	13.4	LOS B	0.3	2.3	0.60	0.77	0.60	33.1
6	R2	7	0.0	7	0.0	0.087	12.8	LOS B	0.3	2.3	0.60	0.77	0.60	37.9
Approach		35	15.4	37	15.4	0.087	11.7	LOS B	0.3	2.3	0.60	0.77	0.60	33.8
North: Riverview Street														
7	L2	8	17.0	8	17.0	0.177	8.4	LOS A	0.3	2.3	0.12	0.05	0.12	51.6
8	T1	264	8.0	278	8.0	0.177	0.4	LOS A	0.3	2.3	0.12	0.05	0.12	57.3
9	R2	18	14.0	19	14.0	0.177	8.9	LOS A	0.3	2.3	0.12	0.05	0.12	51.6
Approach		290	8.6	305	8.6	0.177	1.1	NA	0.3	2.3	0.12	0.05	0.12	56.6
West: Prince Street														
10	L2	8	0.0	8	0.0	0.052	7.4	LOS A	0.2	1.2	0.60	0.78	0.60	41.9
11	T1	8	0.0	8	0.0	0.052	10.0	LOS B	0.2	1.2	0.60	0.78	0.60	37.7
12	R2	9	0.0	9	0.0	0.052	13.3	LOS B	0.2	1.2	0.60	0.78	0.60	37.2
Approach		25	0.0	26	0.0	0.052	10.4	LOS B	0.2	1.2	0.60	0.78	0.60	39.1
All Vehicles		907	5.5	955	5.5	0.322	1.9	NA	0.6	4.5	0.15	0.13	0.15	53.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Riverview Street / Western School Access - AM
Peak - BG_2033 (Site Folder: BG_2034_AM)]**

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	6	33.0	6	33.0	0.133	4.9	LOS A	0.4	3.0	0.74	0.85	0.74	36.8
6	R2	35	3.0	37	3.0	0.133	13.8	LOS B	0.4	3.0	0.74	0.85	0.74	37.2
Approach		41	7.4	43	7.4	0.133	12.5	LOS B	0.4	3.0	0.74	0.85	0.74	37.1
NorthEast: Riverview Street (N)														
7	L2	64	3.0	67	3.0	0.221	4.5	LOS A	0.0	0.0	0.00	0.08	0.00	47.8
8	T1	349	8.0	367	8.0	0.221	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	49.4
Approach		413	7.2	435	7.2	0.221	0.7	NA	0.0	0.0	0.00	0.08	0.00	49.3
SouthWest: Riverview Street (S)														
2	T1	727	3.0	765	3.0	0.377	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		727	3.0	765	3.0	0.377	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		1181	4.6	1243	4.6	0.377	0.8	NA	0.4	3.0	0.03	0.06	0.03	49.3

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - PM Peak - BG_2033
(Site Folder: BG_2034_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
South: Nullum Street														
1	L2	27	29.0	28	29.0	0.073	5.9	LOS A	0.0	0.0	0.00	0.13	0.00	48.3
2	T1	94	30.0	99	30.0	0.073	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	56.6
Approach		121	29.8	127	29.8	0.073	1.3	NA	0.0	0.0	0.00	0.13	0.00	54.4
North: Nullum Street														
8	T1	79	44.0	83	44.0	0.094	0.3	LOS A	0.4	3.3	0.22	0.27	0.22	50.0
9	R2	69	4.0	73	4.0	0.094	6.1	LOS A	0.4	3.3	0.22	0.27	0.22	45.5
Approach		148	25.4	156	25.4	0.094	3.0	NA	0.4	3.3	0.22	0.27	0.22	48.0
West: James Street														
10	L2	50	3.0	53	3.0	0.059	8.6	LOS A	0.2	1.6	0.23	0.89	0.23	38.9
12	R2	14	0.0	15	0.0	0.059	9.8	LOS A	0.2	1.6	0.23	0.89	0.23	42.6
Approach		64	2.3	67	2.3	0.059	8.8	LOS A	0.2	1.6	0.23	0.89	0.23	39.8
All Vehicles		333	22.5	351	22.5	0.094	3.5	NA	0.4	3.3	0.14	0.34	0.14	48.3

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Riverview Street / James Street - PM Peak - BG_2033 (Site Folder: BG_2034_PM)]

P4992

Murwillumbah Education Campus

Riverview Street / James Street

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
v/csec														
East: James Street														
4a	L1	94	12.0	99	12.0	0.138	8.7	LOS A	0.5	3.9	0.56	0.80	0.56	37.2
6b	R3	4	0.0	4	0.0	0.138	15.1	LOS C	0.5	3.9	0.56	0.80	0.56	38.1
Approach		98	11.5	103	11.5	0.138	9.0	LOS A	0.5	3.9	0.56	0.80	0.56	37.3
NorthEast: Riverview Street														
24b	L3	7	0.0	7	0.0	0.319	6.5	LOS A	0.0	0.0	0.00	0.01	0.00	56.0
8	T1	575	2.0	605	2.0	0.319	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		582	2.0	613	2.0	0.319	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
SouthWest: Riverview Street														
2	T1	409	5.0	431	5.0	0.292	0.9	LOS A	0.9	6.8	0.22	0.08	0.24	54.6
32a	R1	55	2.0	58	2.0	0.292	8.4	LOS A	0.9	6.8	0.22	0.08	0.24	51.6
Approach		464	4.6	488	4.6	0.292	1.8	NA	0.9	6.8	0.22	0.08	0.24	54.2
All Vehicles		1144	3.9	1204	3.9	0.319	1.6	NA	0.9	6.8	0.14	0.10	0.15	54.4

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - PM Peak - BG_2033 (Site Folder: BG_2034_PM)]**

P4992

Murwillumbah Education Campus

Nullum Street / Condong Street

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	6	0.0	6	0.0	0.113	6.3	LOS A	0.6	4.6	0.30	0.34	0.30	42.7
2	T1	65	22.0	68	22.0	0.113	0.6	LOS A	0.6	4.6	0.30	0.34	0.30	46.1
3	R2	93	21.0	98	21.0	0.113	6.5	LOS A	0.6	4.6	0.30	0.34	0.30	42.0
Approach		164	20.6	173	20.6	0.113	4.2	NA	0.6	4.6	0.30	0.34	0.30	43.3
East: Condong Street														
4	L2	46	0.0	48	0.0	0.404	9.0	LOS A	2.3	16.3	0.44	0.97	0.53	38.4
5	T1	236	3.0	248	3.0	0.404	11.4	LOS B	2.3	16.3	0.44	0.97	0.53	38.0
6	R2	31	4.0	33	4.0	0.404	13.8	LOS B	2.3	16.3	0.44	0.97	0.53	37.7
Approach		313	2.7	329	2.7	0.404	11.3	LOS B	2.3	16.3	0.44	0.97	0.53	38.0
North: Nullum Street														
7	L2	79	2.0	83	2.0	0.105	5.6	LOS A	0.2	1.9	0.08	0.33	0.08	46.0
8	T1	72	46.0	76	46.0	0.105	0.1	LOS A	0.2	1.9	0.08	0.33	0.08	46.7
9	R2	27	5.0	28	5.0	0.105	5.9	LOS A	0.2	1.9	0.08	0.33	0.08	42.9
Approach		178	20.3	187	20.3	0.105	3.4	NA	0.2	1.9	0.08	0.33	0.08	45.8
West: Condong Street														
10	L2	16	8.0	17	8.0	0.222	8.7	LOS A	0.9	6.3	0.41	0.94	0.41	33.0
11	T1	115	1.0	121	1.0	0.222	10.6	LOS B	0.9	6.3	0.41	0.94	0.41	38.1
12	R2	18	36.0	19	36.0	0.222	18.3	LOS C	0.9	6.3	0.41	0.94	0.41	31.9
Approach		149	6.0	157	6.0	0.222	11.3	LOS B	0.9	6.3	0.41	0.94	0.41	37.0
All Vehicles		804	10.8	846	10.8	0.404	8.1	NA	2.3	16.3	0.32	0.70	0.36	40.1

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - PM Peak - BG_2033 (Site Folder: BG_2034_PM)]

P4992

Murwillumbah Education Campus

Riverview Street / Prince Street

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
						v/c	sec							km/h
South: Riverview Street														
1	L2	25	26.0	26	26.0	0.212	7.0	LOS A	0.4	3.1	0.13	0.09	0.13	45.7
2	T1	296	6.0	312	6.0	0.212	0.3	LOS A	0.4	3.1	0.13	0.09	0.13	56.6
3	R2	30	13.0	32	13.0	0.212	7.5	LOS A	0.4	3.1	0.13	0.09	0.13	47.6
Approach		351	8.0	369	8.0	0.212	1.4	NA	0.4	3.1	0.13	0.09	0.13	55.1
East: Prince Street														
4	L2	13	0.0	14	0.0	0.081	6.8	LOS A	0.3	2.0	0.53	0.75	0.53	34.9
5	T1	21	6.0	22	6.0	0.081	9.1	LOS A	0.3	2.0	0.53	0.75	0.53	38.5
6	R2	13	0.0	14	0.0	0.081	11.1	LOS B	0.3	2.0	0.53	0.75	0.53	40.8
Approach		47	2.7	49	2.7	0.081	9.0	LOS A	0.3	2.0	0.53	0.75	0.53	38.4
North: Riverview Street														
7	L2	6	0.0	6	0.0	0.211	7.8	LOS A	0.3	1.9	0.07	0.03	0.07	54.7
8	T1	340	4.0	358	4.0	0.211	0.2	LOS A	0.3	1.9	0.07	0.03	0.07	58.6
9	R2	14	55.0	15	55.0	0.211	8.8	LOS A	0.3	1.9	0.07	0.03	0.07	45.5
Approach		360	5.9	379	5.9	0.211	0.7	NA	0.3	1.9	0.07	0.03	0.07	57.8
West: Prince Street														
10	L2	6	0.0	6	0.0	0.044	6.6	LOS A	0.1	1.0	0.52	0.72	0.52	43.4
11	T1	11	0.0	12	0.0	0.044	8.4	LOS A	0.1	1.0	0.52	0.72	0.52	39.5
12	R2	8	0.0	8	0.0	0.044	11.3	LOS B	0.1	1.0	0.52	0.72	0.52	38.9
Approach		25	0.0	26	0.0	0.044	8.9	LOS A	0.1	1.0	0.52	0.72	0.52	40.4
All Vehicles		783	6.5	824	6.5	0.212	1.8	NA	0.4	3.1	0.14	0.12	0.14	54.5

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - PM
Peak - BG_2033 (Site Folder: BG_2034_PM)]

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	12	0.0	13	0.0	0.114	6.0	LOS A	0.4	2.5	0.71	0.85	0.71	38.9
6	R2	31	0.0	33	0.0	0.114	12.2	LOS B	0.4	2.5	0.71	0.85	0.71	38.7
Approach		43	0.0	45	0.0	0.114	10.5	LOS B	0.4	2.5	0.71	0.85	0.71	38.8
NorthEast: Riverview Street (N)														
7	L2	23	0.0	24	0.0	0.334	4.5	LOS A	0.0	0.0	0.00	0.02	0.00	48.4
8	T1	613	5.0	645	5.0	0.334	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach		636	4.8	669	4.8	0.334	0.3	NA	0.0	0.0	0.00	0.02	0.00	49.7
SouthWest: Riverview Street (S)														
2	T1	449	6.0	473	6.0	0.237	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		449	6.0	473	6.0	0.237	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		1128	5.1	1187	5.1	0.334	0.6	NA	0.4	2.5	0.03	0.04	0.03	49.5

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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Project: P:\P4992 Murwillumbah Education Campus Transport Assessment\Technical Work\Models\P4992 Intersection Models.sip9

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - AM Peak - DES_2023
(Site Folder: DES_2024_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	52	32.0	55	32.0	0.139	5.9	LOS A	0.0	0.0	0.00	0.14	0.00	47.6
2	T1	172	36.0	181	36.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	56.4
Approach		224	35.1	236	35.1	0.139	1.4	NA	0.0	0.0	0.00	0.14	0.00	53.9
North: Nullum Street														
8	T1	266	34.0	280	34.0	0.177	0.1	LOS A	0.2	1.8	0.07	0.05	0.07	57.5
9	R2	22	5.0	23	5.0	0.177	6.8	LOS A	0.2	1.8	0.07	0.05	0.07	52.4
Approach		288	31.8	303	31.8	0.177	0.6	NA	0.2	1.8	0.07	0.05	0.07	57.1
West: James Street														
10	L2	79	1.0	83	1.0	0.148	9.0	LOS A	0.6	3.9	0.37	0.91	0.37	37.7
12	R2	44	0.0	46	0.0	0.148	12.2	LOS B	0.6	3.9	0.37	0.91	0.37	41.3
Approach		123	0.6	129	0.6	0.148	10.2	LOS B	0.6	3.9	0.37	0.91	0.37	39.1
All Vehicles		635	26.9	668	26.9	0.177	2.7	NA	0.6	3.9	0.11	0.25	0.11	51.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / James Street - AM Peak - DES_2023 (Site Folder: DES_2024_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	82	16.0	86	16.0	0.102	7.5	LOS A	0.4	3.1	0.48	0.70	0.48	38.1
6b	R3	4	0.0	4	0.0	0.102	15.9	LOS C	0.4	3.1	0.48	0.70	0.48	39.6
Approach		86	15.3	91	15.3	0.102	7.9	LOS A	0.4	3.1	0.48	0.70	0.48	38.1
NorthEast: Riverview Street														
24b	L3	46	0.0	48	0.0	0.255	6.5	LOS A	0.0	0.0	0.00	0.07	0.00	54.3
8	T1	401	6.0	422	6.0	0.255	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	57.7
Approach		447	5.4	471	5.4	0.255	0.7	NA	0.0	0.0	0.00	0.07	0.00	57.3
SouthWest: Riverview Street														
2	T1	529	3.0	557	3.0	0.408	1.2	LOS A	2.1	14.7	0.31	0.12	0.38	53.0
32a	R1	120	2.0	126	2.0	0.408	7.8	LOS A	2.1	14.7	0.31	0.12	0.38	50.3
Approach		649	2.8	683	2.8	0.408	2.4	NA	2.1	14.7	0.31	0.12	0.38	52.5
All Vehicles		1182	4.7	1244	4.7	0.408	2.2	NA	2.1	14.7	0.20	0.15	0.25	52.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - AM Peak - DES_2023 (Site Folder: DES_2024_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	15	13.0	16	13.0	0.163	6.6	LOS A	0.8	6.6	0.34	0.37	0.34	40.3
2	T1	91	26.0	96	26.0	0.163	0.8	LOS A	0.8	6.6	0.34	0.37	0.34	44.9
3	R2	137	8.0	144	8.0	0.163	6.5	LOS A	0.8	6.6	0.34	0.37	0.34	43.7
Approach		243	15.0	256	15.0	0.163	4.4	NA	0.8	6.6	0.34	0.37	0.34	43.9
East: Condong Street														
4	L2	100	10.0	105	10.0	0.288	9.4	LOS A	1.2	9.1	0.43	0.94	0.43	38.1
5	T1	89	5.0	94	5.0	0.288	12.0	LOS B	1.2	9.1	0.43	0.94	0.43	38.2
6	R2	23	9.0	24	9.0	0.288	15.6	LOS C	1.2	9.1	0.43	0.94	0.43	37.7
Approach		212	7.8	223	7.8	0.288	11.2	LOS B	1.2	9.1	0.43	0.94	0.43	38.1
North: Nullum Street														
7	L2	38	8.0	40	8.0	0.115	5.7	LOS A	0.0	0.4	0.02	0.14	0.02	48.7
8	T1	141	48.0	148	48.0	0.115	0.0	LOS A	0.0	0.4	0.02	0.14	0.02	52.9
9	R2	5	0.0	5	0.0	0.115	6.0	LOS A	0.0	0.4	0.02	0.14	0.02	49.0
Approach		184	38.4	194	38.4	0.115	1.3	NA	0.0	0.4	0.02	0.14	0.02	51.7
West: Condong Street														
10	L2	24	0.0	25	0.0	0.332	9.0	LOS A	1.5	11.3	0.49	1.01	0.58	31.7
11	T1	142	4.0	149	4.0	0.332	12.5	LOS B	1.5	11.3	0.49	1.01	0.58	36.1
12	R2	32	20.0	34	20.0	0.332	18.2	LOS C	1.5	11.3	0.49	1.01	0.58	31.4
Approach		198	6.1	208	6.1	0.332	13.0	LOS B	1.5	11.3	0.49	1.01	0.58	34.9
All Vehicles		837	16.2	881	16.2	0.332	7.5	NA	1.5	11.3	0.33	0.61	0.35	40.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - AM Peak - DES_2023 (Site Folder: DES_2024_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / Prince Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	44	10.0	46	10.0	0.263	6.2	LOS A	0.5	3.3	0.10	0.10	0.10	49.4
2	T1	378	2.0	398	2.0	0.263	0.2	LOS A	0.5	3.3	0.10	0.10	0.10	56.7
3	R2	35	12.0	37	12.0	0.263	6.8	LOS A	0.5	3.3	0.10	0.10	0.10	47.9
Approach		457	3.5	481	3.5	0.263	1.3	NA	0.5	3.3	0.10	0.10	0.10	55.4
East: Prince Street														
4	L2	7	0.0	7	0.0	0.056	6.3	LOS A	0.2	1.5	0.50	0.71	0.50	34.3
5	T1	16	27.0	17	27.0	0.056	10.4	LOS B	0.2	1.5	0.50	0.71	0.50	35.3
6	R2	6	0.0	6	0.0	0.056	10.6	LOS B	0.2	1.5	0.50	0.71	0.50	40.3
Approach		29	14.9	31	14.9	0.056	9.5	LOS A	0.2	1.5	0.50	0.71	0.50	36.2
North: Riverview Street														
7	L2	7	17.0	7	17.0	0.144	7.6	LOS A	0.2	1.6	0.10	0.05	0.10	51.8
8	T1	217	8.0	228	8.0	0.144	0.3	LOS A	0.2	1.6	0.10	0.05	0.10	57.6
9	R2	15	14.0	16	14.0	0.144	8.0	LOS A	0.2	1.6	0.10	0.05	0.10	51.8
Approach		239	8.6	252	8.6	0.144	1.0	NA	0.2	1.6	0.10	0.05	0.10	56.9
West: Prince Street														
10	L2	7	0.0	7	0.0	0.037	6.9	LOS A	0.1	0.9	0.52	0.71	0.52	43.6
11	T1	7	0.0	7	0.0	0.037	8.2	LOS A	0.1	0.9	0.52	0.71	0.52	39.6
12	R2	8	0.0	8	0.0	0.037	10.9	LOS B	0.1	0.9	0.52	0.71	0.52	39.1
Approach		22	0.0	23	0.0	0.037	8.8	LOS A	0.1	0.9	0.52	0.71	0.52	40.9
All Vehicles		747	5.5	786	5.5	0.263	1.7	NA	0.5	3.3	0.13	0.12	0.13	54.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - AM
Peak - DES_2023 (Site Folder: DES_2024_AM)]

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	8	33.0	8	33.0	0.053	4.4	LOS A	0.2	1.3	0.55	0.73	0.55	40.0
6	R2	17	3.0	18	3.0	0.053	10.0	LOS B	0.2	1.3	0.55	0.73	0.55	40.5
Approach		25	12.6	26	12.6	0.053	8.2	LOS A	0.2	1.3	0.55	0.73	0.55	40.3
NorthEast: Riverview Street (N)														
7	L2	118	3.0	124	3.0	0.218	4.5	LOS A	0.0	0.0	0.00	0.14	0.00	47.1
8	T1	287	8.0	302	8.0	0.218	0.1	LOS A	0.0	0.0	0.00	0.14	0.00	49.0
Approach		405	6.5	426	6.5	0.218	1.3	NA	0.0	0.0	0.00	0.14	0.00	48.7
SouthWest: Riverview Street (S)														
2	T1	594	3.0	625	3.0	0.308	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		594	3.0	625	3.0	0.308	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		1024	4.6	1078	4.6	0.308	0.8	NA	0.2	1.3	0.01	0.07	0.01	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - PM Peak - DES_2023
(Site Folder: DES_2024_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	61	29.0	64	29.0	0.187	5.9	LOS A	0.0	0.0	0.00	0.11	0.00	48.5
2	T1	250	30.0	263	30.0	0.187	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	57.0
Approach		311	29.8	327	29.8	0.187	1.2	NA	0.0	0.0	0.00	0.11	0.00	54.9
North: Nullum Street														
8	T1	175	44.0	184	44.0	0.156	0.6	LOS A	0.5	4.5	0.25	0.18	0.25	52.3
9	R2	57	4.0	60	4.0	0.156	7.2	LOS A	0.5	4.5	0.25	0.18	0.25	47.7
Approach		232	34.2	244	34.2	0.156	2.2	NA	0.5	4.5	0.25	0.18	0.25	51.2
West: James Street														
10	L2	41	3.0	43	3.0	0.124	9.6	LOS A	0.4	3.1	0.46	0.94	0.46	36.7
12	R2	46	0.0	48	0.0	0.124	12.3	LOS B	0.4	3.1	0.46	0.94	0.46	40.5
Approach		87	1.4	92	1.4	0.124	11.0	LOS B	0.4	3.1	0.46	0.94	0.46	38.9
All Vehicles		630	27.5	663	27.5	0.187	2.9	NA	0.5	4.5	0.16	0.25	0.16	50.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / James Street - PM Peak - DES_2023 (Site Folder: DES_2024_PM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	125	12.0	132	12.0	0.162	8.0	LOS A	0.6	4.8	0.53	0.76	0.53	38.1
6b	R3	6	0.0	6	0.0	0.162	14.1	LOS B	0.6	4.8	0.53	0.76	0.53	39.1
Approach		131	11.5	138	11.5	0.162	8.2	LOS A	0.6	4.8	0.53	0.76	0.53	38.1
NorthEast: Riverview Street														
24b	L3	51	0.0	54	0.0	0.295	6.5	LOS A	0.0	0.0	0.00	0.07	0.00	54.5
8	T1	479	2.0	504	2.0	0.295	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	57.9
Approach		530	1.8	558	1.8	0.295	0.6	NA	0.0	0.0	0.00	0.07	0.00	57.5
SouthWest: Riverview Street														
2	T1	312	5.0	328	5.0	0.351	2.3	LOS A	2.3	16.7	0.50	0.27	0.60	48.5
32a	R1	165	2.0	174	2.0	0.351	8.1	LOS A	2.3	16.7	0.50	0.27	0.60	46.6
Approach		477	4.0	502	4.0	0.351	4.3	NA	2.3	16.7	0.50	0.27	0.60	47.8
All Vehicles		1138	3.8	1198	3.8	0.351	3.1	NA	2.3	16.7	0.27	0.23	0.31	50.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - PM Peak - DES_2023 (Site Folder: DES_2024_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	12	0.0	13	0.0	0.215	6.5	LOS A	1.2	9.7	0.35	0.35	0.35	42.3
2	T1	121	22.0	127	22.0	0.215	0.8	LOS A	1.2	9.7	0.35	0.35	0.35	45.6
3	R2	174	21.0	183	21.0	0.215	6.7	LOS A	1.2	9.7	0.35	0.35	0.35	41.7
Approach		307	20.6	323	20.6	0.215	4.4	NA	1.2	9.7	0.35	0.35	0.35	42.9
East: Condong Street														
4	L2	90	0.0	95	0.0	0.462	9.9	LOS A	2.8	20.0	0.47	1.01	0.66	36.3
5	T1	194	3.0	204	3.0	0.462	14.3	LOS B	2.8	20.0	0.47	1.01	0.66	35.9
6	R2	25	4.0	26	4.0	0.462	17.3	LOS C	2.8	20.0	0.47	1.01	0.66	35.6
Approach		309	2.2	325	2.2	0.462	13.3	LOS B	2.8	20.0	0.47	1.01	0.66	36.0
North: Nullum Street														
7	L2	65	2.0	68	2.0	0.114	5.7	LOS A	0.2	1.8	0.10	0.25	0.10	47.0
8	T1	102	46.0	107	46.0	0.114	0.1	LOS A	0.2	1.8	0.10	0.25	0.10	48.2
9	R2	22	5.0	23	5.0	0.114	6.2	LOS A	0.2	1.8	0.10	0.25	0.10	44.2
Approach		189	26.1	199	26.1	0.114	2.7	NA	0.2	1.8	0.10	0.25	0.10	47.3
West: Condong Street														
10	L2	13	8.0	14	8.0	0.292	9.6	LOS A	1.2	9.0	0.56	1.01	0.65	29.5
11	T1	94	1.0	99	1.0	0.292	12.9	LOS B	1.2	9.0	0.56	1.01	0.65	34.8
12	R2	29	36.0	31	36.0	0.292	24.1	LOS C	1.2	9.0	0.56	1.01	0.65	28.8
Approach		136	9.1	143	9.1	0.292	15.0	LOS B	1.2	9.0	0.56	1.01	0.65	33.2
All Vehicles		941	14.0	991	14.0	0.462	8.5	NA	2.8	20.0	0.37	0.64	0.45	39.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - PM Peak - DES_2023 (Site Folder: DES_2024_PM)]

P4992
Murwillumbah Education Campus
Riverview Street / Prince Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	20	26.0	21	26.0	0.171	6.6	LOS A	0.3	2.2	0.11	0.09	0.11	45.9
2	T1	243	6.0	256	6.0	0.171	0.2	LOS A	0.3	2.2	0.11	0.09	0.11	56.9
3	R2	24	13.0	25	13.0	0.171	7.0	LOS A	0.3	2.2	0.11	0.09	0.11	47.9
Approach		287	8.0	302	8.0	0.171	1.2	NA	0.3	2.2	0.11	0.09	0.11	55.5
East: Prince Street														
4	L2	11	0.0	12	0.0	0.057	6.5	LOS A	0.2	1.4	0.47	0.68	0.47	36.5
5	T1	17	6.0	18	6.0	0.057	7.7	LOS A	0.2	1.4	0.47	0.68	0.47	39.9
6	R2	11	0.0	12	0.0	0.057	9.6	LOS A	0.2	1.4	0.47	0.68	0.47	42.3
Approach		39	2.6	41	2.6	0.057	7.9	LOS A	0.2	1.4	0.47	0.68	0.47	39.8
North: Riverview Street														
7	L2	5	0.0	5	0.0	0.173	7.2	LOS A	0.2	1.4	0.06	0.03	0.06	54.8
8	T1	279	4.0	294	4.0	0.173	0.1	LOS A	0.2	1.4	0.06	0.03	0.06	58.7
9	R2	12	55.0	13	55.0	0.173	8.1	LOS A	0.2	1.4	0.06	0.03	0.06	45.5
Approach		296	6.0	312	6.0	0.173	0.6	NA	0.2	1.4	0.06	0.03	0.06	57.8
West: Prince Street														
10	L2	5	0.0	5	0.0	0.031	6.4	LOS A	0.1	0.7	0.46	0.66	0.46	44.7
11	T1	9	0.0	9	0.0	0.031	7.2	LOS A	0.1	0.7	0.46	0.66	0.46	40.9
12	R2	7	0.0	7	0.0	0.031	9.7	LOS A	0.1	0.7	0.46	0.66	0.46	40.3
Approach		21	0.0	22	0.0	0.031	7.8	LOS A	0.1	0.7	0.46	0.66	0.46	41.8
All Vehicles		643	6.5	677	6.5	0.173	1.5	NA	0.3	2.2	0.12	0.12	0.12	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - PM
Peak - DES_2023 (Site Folder: DES_2024_PM)]

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: Western School Access (E)														
4	L2	12	0.0	13	0.0	0.247	5.7	LOS A	0.9	6.1	0.68	0.86	0.75	39.8
6	R2	103	0.0	108	0.0	0.247	9.8	LOS A	0.9	6.1	0.68	0.86	0.75	39.6
Approach		115	0.0	121	0.0	0.247	9.4	LOS A	0.9	6.1	0.68	0.86	0.75	39.6
NorthEast: Riverview Street (N)														
7	L2	20	0.0	21	0.0	0.275	4.5	LOS A	0.0	0.0	0.00	0.02	0.00	48.4
8	T1	503	5.0	529	5.0	0.275	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.8
Approach		523	4.8	551	4.8	0.275	0.3	NA	0.0	0.0	0.00	0.02	0.00	49.7
SouthWest: Riverview Street (S)														
2	T1	358	6.0	377	6.0	0.189	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		358	6.0	377	6.0	0.189	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles		996	4.7	1048	4.7	0.275	1.2	NA	0.9	6.1	0.08	0.11	0.09	49.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - AM Peak - DES_2033
(Site Folder: DES_2034_AM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
South: Nullum Street														
1	L2	68	32.0	72	32.0	0.181	5.9	LOS A	0.0	0.0	0.00	0.14	0.00	47.6
2	T1	224	36.0	236	36.0	0.181	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	56.3
Approach		292	35.1	307	35.1	0.181	1.4	NA	0.0	0.0	0.00	0.14	0.00	53.9
North: Nullum Street														
8	T1	332	34.0	349	34.0	0.222	0.2	LOS A	0.3	2.5	0.09	0.05	0.09	57.3
9	R2	27	5.0	28	5.0	0.222	7.3	LOS A	0.3	2.5	0.09	0.05	0.09	52.2
Approach		359	31.8	378	31.8	0.222	0.7	NA	0.3	2.5	0.09	0.05	0.09	56.9
West: James Street														
10	L2	96	1.0	101	1.0	0.215	9.4	LOS A	0.8	5.7	0.46	0.93	0.46	36.6
12	R2	56	0.0	59	0.0	0.215	14.3	LOS B	0.8	5.7	0.46	0.93	0.46	40.2
Approach		152	0.6	160	0.6	0.215	11.2	LOS B	0.8	5.7	0.46	0.93	0.46	38.1
All Vehicles		803	27.1	845	27.1	0.222	3.0	NA	0.8	5.7	0.13	0.25	0.13	51.2

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Riverview Street / James Street - AM Peak - DES_2033 (Site Folder: DES_2034_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
East: James Street														
4a	L1	103	16.0	108	16.0	0.148	8.1	LOS A	0.6	4.4	0.54	0.76	0.54	37.1
6b	R3	5	0.0	5	0.0	0.148	22.6	LOS C	0.6	4.4	0.54	0.76	0.54	38.5
Approach		108	15.3	114	15.3	0.148	8.7	LOS A	0.6	4.4	0.54	0.76	0.54	37.1
NorthEast: Riverview Street														
24b	L3	59	0.0	62	0.0	0.301	6.5	LOS A	0.0	0.0	0.00	0.08	0.00	54.2
8	T1	469	6.0	494	6.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	57.5
Approach		528	5.3	556	5.3	0.301	0.7	NA	0.0	0.0	0.00	0.08	0.00	57.1
SouthWest: Riverview Street														
2	T1	644	3.0	678	3.0	0.516	2.0	LOS A	3.6	25.5	0.38	0.15	0.57	50.5
32a	R1	148	2.0	156	2.0	0.516	9.5	LOS A	3.6	25.5	0.38	0.15	0.57	48.2
Approach		792	2.8	834	2.8	0.516	3.4	NA	3.6	25.5	0.38	0.15	0.57	50.1
All Vehicles		1428	4.7	1503	4.7	0.516	2.8	NA	3.6	25.5	0.25	0.17	0.36	50.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - AM Peak - DES_2033 (Site Folder: DES_2034_AM)]**

P4992

Murwillumbah Education Campus

Nullum Street / Condong Street

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	19	13.0	20	13.0	0.215	6.9	LOS A	1.2	9.3	0.40	0.39	0.40	39.9
2	T1	115	26.0	121	26.0	0.215	1.0	LOS A	1.2	9.3	0.40	0.39	0.40	44.3
3	R2	176	8.0	185	8.0	0.215	6.8	LOS A	1.2	9.3	0.40	0.39	0.40	43.3
Approach		310	15.0	326	15.0	0.215	4.7	NA	1.2	9.3	0.40	0.39	0.40	43.4
East: Condong Street														
4	L2	125	10.0	132	10.0	0.410	10.7	LOS B	2.2	16.8	0.52	1.00	0.69	35.8
5	T1	108	5.0	114	5.0	0.410	14.8	LOS B	2.2	16.8	0.52	1.00	0.69	35.9
6	R2	28	9.0	29	9.0	0.410	20.4	LOS C	2.2	16.8	0.52	1.00	0.69	35.5
Approach		261	7.8	275	7.8	0.410	13.5	LOS B	2.2	16.8	0.52	1.00	0.69	35.8
North: Nullum Street														
7	L2	46	8.0	48	8.0	0.143	5.7	LOS A	0.1	0.6	0.02	0.13	0.02	48.8
8	T1	175	48.0	184	48.0	0.143	0.0	LOS A	0.1	0.6	0.02	0.13	0.02	53.0
9	R2	6	0.0	6	0.0	0.143	6.1	LOS A	0.1	0.6	0.02	0.13	0.02	49.0
Approach		227	38.6	239	38.6	0.143	1.3	NA	0.1	0.6	0.02	0.13	0.02	51.7
West: Condong Street														
10	L2	30	0.0	32	0.0	0.491	10.7	LOS B	2.7	20.1	0.60	1.08	0.92	28.3
11	T1	173	4.0	182	4.0	0.491	15.9	LOS C	2.7	20.1	0.60	1.08	0.92	32.8
12	R2	39	20.0	41	20.0	0.491	24.5	LOS C	2.7	20.1	0.60	1.08	0.92	28.2
Approach		242	6.1	255	6.1	0.491	16.6	LOS C	2.7	20.1	0.60	1.08	0.92	31.7
All Vehicles		1040	16.3	1095	16.3	0.491	8.9	NA	2.7	20.1	0.39	0.65	0.51	38.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - AM Peak - DES_2033 (Site Folder: DES_2034_AM)]

P4992
Murwillumbah Education Campus
Riverview Street / Prince Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	54	10.0	57	10.0	0.322	6.5	LOS A	0.6	4.5	0.12	0.10	0.12	49.3
2	T1	461	2.0	485	2.0	0.322	0.2	LOS A	0.6	4.5	0.12	0.10	0.12	56.5
3	R2	42	12.0	44	12.0	0.322	7.3	LOS A	0.6	4.5	0.12	0.10	0.12	47.6
Approach		557	3.5	586	3.5	0.322	1.4	NA	0.6	4.5	0.12	0.10	0.12	55.2
East: Prince Street														
4	L2	8	0.0	8	0.0	0.087	6.5	LOS A	0.3	2.3	0.60	0.77	0.60	31.6
5	T1	20	27.0	21	27.0	0.087	13.4	LOS B	0.3	2.3	0.60	0.77	0.60	33.1
6	R2	7	0.0	7	0.0	0.087	12.8	LOS B	0.3	2.3	0.60	0.77	0.60	37.9
Approach		35	15.4	37	15.4	0.087	11.7	LOS B	0.3	2.3	0.60	0.77	0.60	33.8
North: Riverview Street														
7	L2	8	17.0	8	17.0	0.177	8.4	LOS A	0.3	2.3	0.12	0.05	0.12	51.6
8	T1	264	8.0	278	8.0	0.177	0.4	LOS A	0.3	2.3	0.12	0.05	0.12	57.3
9	R2	18	14.0	19	14.0	0.177	8.9	LOS A	0.3	2.3	0.12	0.05	0.12	51.6
Approach		290	8.6	305	8.6	0.177	1.1	NA	0.3	2.3	0.12	0.05	0.12	56.6
West: Prince Street														
10	L2	8	0.0	8	0.0	0.052	7.4	LOS A	0.2	1.2	0.60	0.78	0.60	41.9
11	T1	8	0.0	8	0.0	0.052	10.0	LOS B	0.2	1.2	0.60	0.78	0.60	37.7
12	R2	9	0.0	9	0.0	0.052	13.3	LOS B	0.2	1.2	0.60	0.78	0.60	37.2
Approach		25	0.0	26	0.0	0.052	10.4	LOS B	0.2	1.2	0.60	0.78	0.60	39.1
All Vehicles		907	5.5	955	5.5	0.322	1.9	NA	0.6	4.5	0.15	0.13	0.15	53.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Western School Access - AM
Peak - DES_2033 (Site Folder: DES_2034_AM)]

P4992
Murwillumbah Education Campus
Riverside Street / Western School Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
SouthEast: Western School Access (E)														
4	L2	10	33.0	11	33.0	0.083	4.8	LOS A	0.3	2.0	0.65	0.79	0.65	38.0
6	R2	19	3.0	20	3.0	0.083	14.1	LOS B	0.3	2.0	0.65	0.79	0.65	38.4
Approach		29	13.3	31	13.3	0.083	10.9	LOS B	0.3	2.0	0.65	0.79	0.65	38.2
NorthEast: Riverview Street (N)														
7	L2	123	3.0	129	3.0	0.254	4.5	LOS A	0.0	0.0	0.00	0.13	0.00	47.2
8	T1	349	8.0	367	8.0	0.254	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.1
Approach		472	6.7	497	6.7	0.254	1.2	NA	0.0	0.0	0.00	0.13	0.00	48.8
SouthWest: Riverview Street (S)														
2	T1	722	3.0	760	3.0	0.374	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		722	3.0	760	3.0	0.374	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		1223	4.7	1287	4.7	0.374	0.8	NA	0.3	2.0	0.02	0.07	0.02	49.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / James Street - PM Peak - DES_2033
(Site Folder: DES_2034_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / James Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	78	29.0	82	29.0	0.233	5.9	LOS A	0.0	0.0	0.00	0.12	0.00	48.4
2	T1	310	30.0	326	30.0	0.233	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	56.9
Approach		388	29.8	408	29.8	0.233	1.2	NA	0.0	0.0	0.00	0.12	0.00	54.8
North: Nullum Street														
8	T1	227	44.0	239	44.0	0.206	0.9	LOS A	0.7	6.5	0.29	0.18	0.29	52.1
9	R2	69	4.0	73	4.0	0.206	7.9	LOS A	0.7	6.5	0.29	0.18	0.29	47.5
Approach		296	34.7	312	34.7	0.206	2.5	NA	0.7	6.5	0.29	0.18	0.29	51.1
West: James Street														
10	L2	50	3.0	53	3.0	0.190	10.1	LOS B	0.7	4.7	0.53	0.96	0.53	35.3
12	R2	60	0.0	63	0.0	0.190	14.4	LOS B	0.7	4.7	0.53	0.96	0.53	39.1
Approach		110	1.4	116	1.4	0.190	12.4	LOS B	0.7	4.7	0.53	0.96	0.53	37.5
All Vehicles		794	27.7	836	27.7	0.233	3.2	NA	0.7	6.5	0.18	0.26	0.18	50.3

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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Project: P:\P4992 Murwillumbah Education Campus Transport Assessment\Technical Work\Models\P4992 Intersection Models.sip9

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / James Street - PM Peak - DES_2033 (Site Folder: DES_2034_PM)]

P4992
Murwillumbah Education Campus
Riverview Street / James Street
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: James Street														
4a	L1	157	12.0	165	12.0	0.239	9.1	LOS A	0.9	7.3	0.60	0.84	0.62	36.6
6b	R3	7	0.0	7	0.0	0.239	18.6	LOS C	0.9	7.3	0.60	0.84	0.62	37.5
Approach		164	11.5	173	11.5	0.239	9.5	LOS A	0.9	7.3	0.60	0.84	0.62	36.7
NorthEast: Riverview Street														
24b	L3	66	0.0	69	0.0	0.361	6.5	LOS A	0.0	0.0	0.00	0.07	0.00	54.4
8	T1	582	2.0	613	2.0	0.361	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	57.7
Approach		648	1.8	682	1.8	0.361	0.7	NA	0.0	0.0	0.00	0.07	0.00	57.3
SouthWest: Riverview Street														
2	T1	382	5.0	402	5.0	0.448	3.8	LOS A	3.7	26.7	0.59	0.29	0.85	45.4
32a	R1	183	2.0	193	2.0	0.448	10.3	LOS B	3.7	26.7	0.59	0.29	0.85	43.9
Approach		565	4.0	595	4.0	0.448	5.9	NA	3.7	26.7	0.59	0.29	0.85	44.9
All Vehicles		1377	3.9	1449	3.9	0.448	3.9	NA	3.7	26.7	0.31	0.25	0.42	48.4

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Nullum Street / Condong Street - PM Peak - DES_2033 (Site Folder: DES_2034_PM)]**

P4992
Murwillumbah Education Campus
Nullum Street / Condong Street
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Nullum Street														
1	L2	14	0.0	15	0.0	0.276	6.9	LOS A	1.6	13.2	0.42	0.37	0.42	41.7
2	T1	150	22.0	158	22.0	0.276	1.1	LOS A	1.6	13.2	0.42	0.37	0.42	44.9
3	R2	216	21.0	227	21.0	0.276	7.1	LOS A	1.6	13.2	0.42	0.37	0.42	41.3
Approach		380	20.6	400	20.6	0.276	4.7	NA	1.6	13.2	0.42	0.37	0.42	42.4
East: Condong Street														
4	L2	117	0.0	123	0.0	0.681	13.2	LOS B	5.7	40.7	0.60	1.16	1.24	31.8
5	T1	236	3.0	248	3.0	0.681	20.3	LOS C	5.7	40.7	0.60	1.16	1.24	31.4
6	R2	31	4.0	33	4.0	0.681	25.2	LOS D	5.7	40.7	0.60	1.16	1.24	31.2
Approach		384	2.2	404	2.2	0.681	18.5	LOS C	5.7	40.7	0.60	1.16	1.24	31.5
North: Nullum Street														
7	L2	79	2.0	83	2.0	0.144	5.8	LOS A	0.3	2.4	0.11	0.24	0.11	47.0
8	T1	131	46.0	138	46.0	0.144	0.1	LOS A	0.3	2.4	0.11	0.24	0.11	48.2
9	R2	27	5.0	28	5.0	0.144	6.3	LOS A	0.3	2.4	0.11	0.24	0.11	44.2
Approach		237	26.7	249	26.7	0.144	2.7	NA	0.3	2.4	0.11	0.24	0.11	47.3
West: Condong Street														
10	L2	16	8.0	17	8.0	0.474	12.0	LOS B	2.3	17.1	0.71	1.09	1.06	25.1
11	T1	115	1.0	121	1.0	0.474	17.3	LOS C	2.3	17.1	0.71	1.09	1.06	30.3
12	R2	36	36.0	38	36.0	0.474	35.3	LOS E	2.3	17.1	0.71	1.09	1.06	24.7
Approach		167	9.2	176	9.2	0.474	20.7	LOS C	2.3	17.1	0.71	1.09	1.06	28.7
All Vehicles		1168	14.1	1229	14.1	0.681	11.1	NA	5.7	40.7	0.46	0.71	0.72	36.1

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

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Project: P:\P4992 Murwillumbah Education Campus Transport Assessment\Technical Work\Models\P4992 Intersection Models.sip9

MOVEMENT SUMMARY

▼ Site: 101 [Riverview Street / Prince Street - PM Peak - DES_2033 (Site Folder: DES_2034_PM)]

P4992

Murwillumbah Education Campus

Riverview Street / Prince Street

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Riverview Street														
1	L2	25	26.0	26	26.0	0.212	7.0	LOS A	0.4	3.1	0.13	0.09	0.13	45.7
2	T1	296	6.0	312	6.0	0.212	0.3	LOS A	0.4	3.1	0.13	0.09	0.13	56.6
3	R2	30	13.0	32	13.0	0.212	7.5	LOS A	0.4	3.1	0.13	0.09	0.13	47.6
Approach		351	8.0	369	8.0	0.212	1.4	NA	0.4	3.1	0.13	0.09	0.13	55.1
East: Prince Street														
4	L2	13	0.0	14	0.0	0.081	6.8	LOS A	0.3	2.0	0.53	0.75	0.53	34.9
5	T1	21	6.0	22	6.0	0.081	9.1	LOS A	0.3	2.0	0.53	0.75	0.53	38.5
6	R2	13	0.0	14	0.0	0.081	11.1	LOS B	0.3	2.0	0.53	0.75	0.53	40.8
Approach		47	2.7	49	2.7	0.081	9.0	LOS A	0.3	2.0	0.53	0.75	0.53	38.4
North: Riverview Street														
7	L2	6	0.0	6	0.0	0.211	7.8	LOS A	0.3	1.9	0.07	0.03	0.07	54.7
8	T1	340	4.0	358	4.0	0.211	0.2	LOS A	0.3	1.9	0.07	0.03	0.07	58.6
9	R2	14	55.0	15	55.0	0.211	8.8	LOS A	0.3	1.9	0.07	0.03	0.07	45.5
Approach		360	5.9	379	5.9	0.211	0.7	NA	0.3	1.9	0.07	0.03	0.07	57.8
West: Prince Street														
10	L2	6	0.0	6	0.0	0.044	6.6	LOS A	0.1	1.0	0.52	0.72	0.52	43.4
11	T1	11	0.0	12	0.0	0.044	8.4	LOS A	0.1	1.0	0.52	0.72	0.52	39.5
12	R2	8	0.0	8	0.0	0.044	11.3	LOS B	0.1	1.0	0.52	0.72	0.52	38.9
Approach		25	0.0	26	0.0	0.044	8.9	LOS A	0.1	1.0	0.52	0.72	0.52	40.4
All Vehicles		783	6.5	824	6.5	0.212	1.8	NA	0.4	3.1	0.14	0.12	0.14	54.5

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

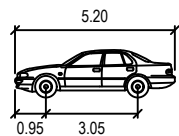
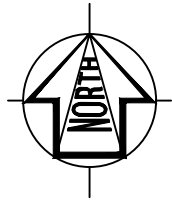
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix H: Swept Paths



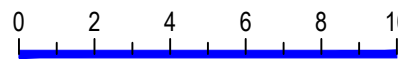
B99 meters
Width : 1.94
Track : 1.84
Lock to Lock Time : 6.0
Steering Angle : 38.0

DESIGN VEHICLE

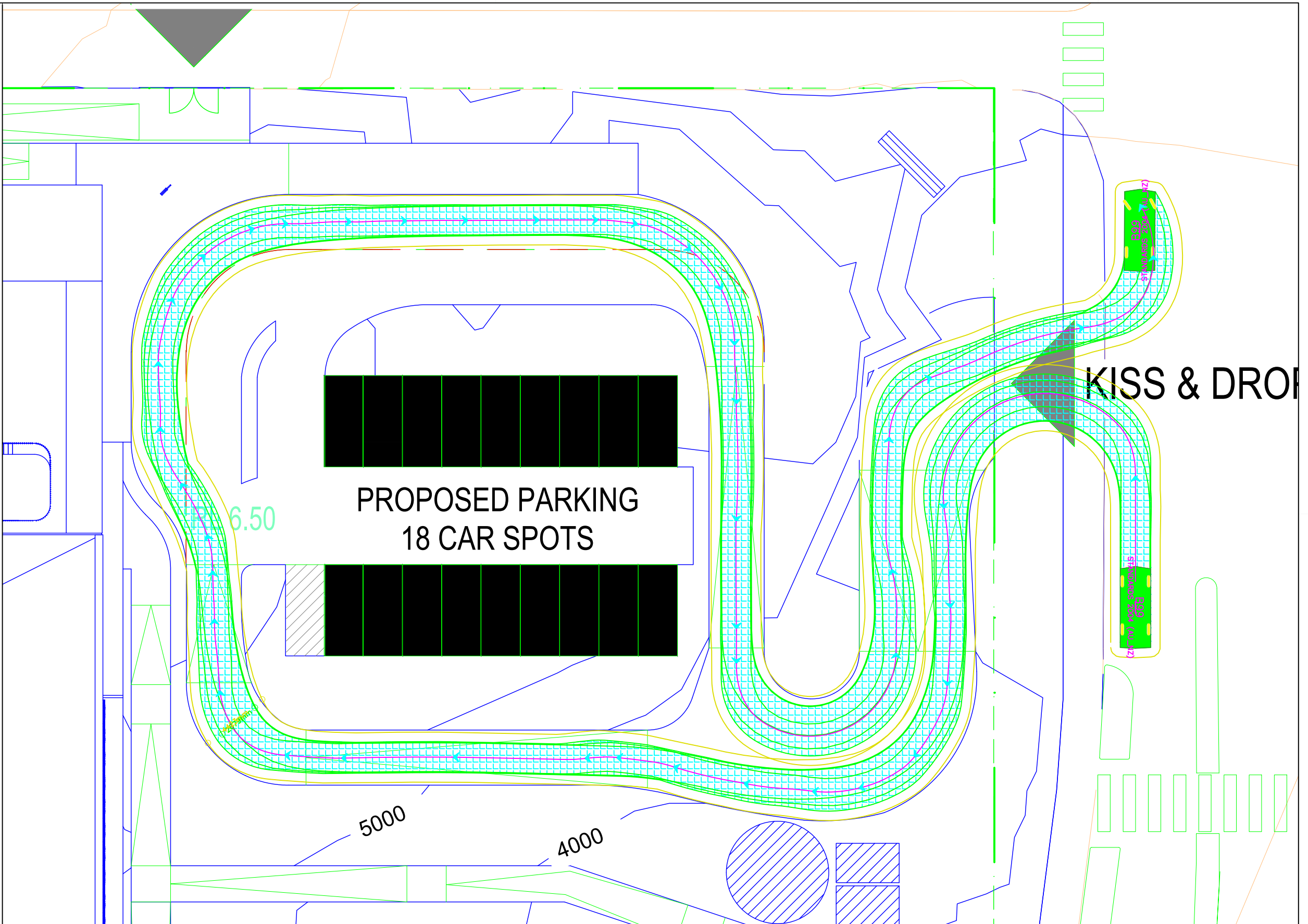


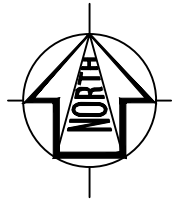
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REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Swept Path Assessment	A.B	29.03.2022

Scale @ A3  1:200

Project Murwillumbah Education Campus Transport Assessment		Design A.B	Drawn A.B	Checked J.B
Title B99 Circulating Swept Path at Kiss & Drop		CONCEPT ONLY		Date 29.03.2022
		Project Number P4992	Sheet Number 1	Issue 001

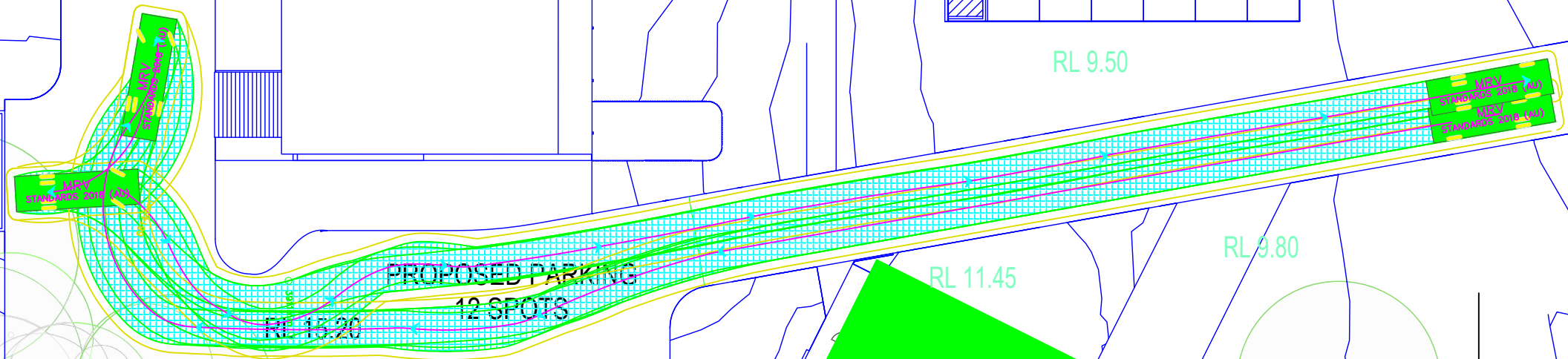




PROPOSED
BUILDING 3

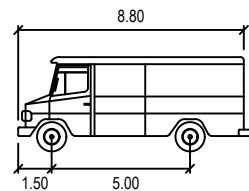
PROPOSED
BULIDING 4

RL 9.50



PROPOSED PARKING
12 SPOTS

EXISTING
BUILDING F



MRV
meters
Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 38.7

DESIGN VEHICLE

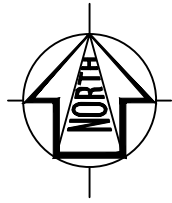


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REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Swept Path Assessment	A.B	29.03.2022

Scale @ A3
0 4 8 12 16 20
1:400

Project Murwillumbah Education Campus Transport Assessment	Design A.B	Drawn A.B	Checked J.B
	CONCEPT ONLY		
Title MRV Turnaround Swept Path	Project Number P4992	Sheet Number 2	Date 29.03.2022
			Issue 001



PROPOSED
BUILDING 3

PROPOSED
BULIDING 4

RL 9.50

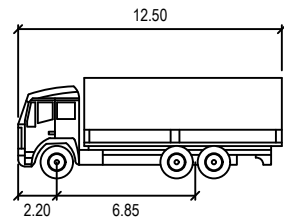
RL 9.80

RL 11.45

RL 15.20

PROPOSED PARKING
12 SPOTS

EXISTING
BUILDING F



HRV
Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 36.6

DESIGN VEHICLE

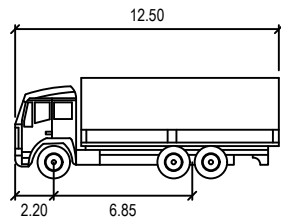
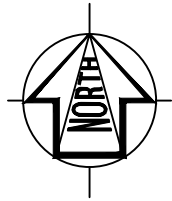


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REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Swept Path Assessment	A.B	29.03.2022

Scale @ A3
0 4 8 12 16 20
1:400

Project Murwillumbah Education Campus Transport Assessment	Design A.B	Drawn A.B	Checked J.B
	CONCEPT ONLY		
Title HRV Turnaround Swept Path	Project Number P4992	Sheet Number 3	Date 29.03.2022
	Issue 001		



HRV meters
Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 36.6

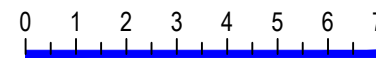
DESIGN VEHICLE



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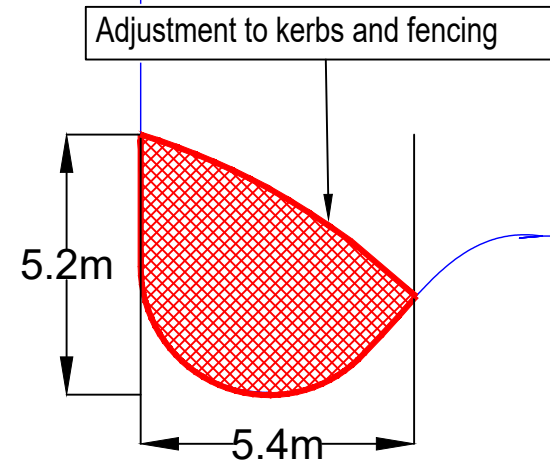
REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Swept Path Assessment	A.B	29.03.2022

Scale @ A3



1:150

Project Murwillumbah Education Campus Transport Assessment	Design A.B	Drawn A.B	Checked J.B
	CONCEPT ONLY		
Title HRV Turnaround Swept Path - With Recommendations	Project Number P4992	Sheet Number 4	Date 29.03.2022
	Issue 001		



RL 15.20

PROPOSED PARKING
12 SPOTS