

28 – Traffic Impact Assessment

28



NSW Department Of Education

Waitara Public School Expansion Traffic Impact Assessment

August 2017

Table of contents

1.	Introduction	1
1.1	Overview	1
1.2	Site Location	1
1.3	Study Limitations and Assumptions	2
1.4	Study Scope	3
1.5	Secretary's Environmental Assessment Requirements	3
2.	Existing Conditions	1
2.1	Land Uses	1
2.2	Existing Road Network Characteristics	2
2.3	Crash Data Review	7
2.4	Public Transport	8
2.5	Active Transport	10
2.6	Emergency Vehicles	12
2.7	Surveys	12
2.8	Current Network Operation	23
2.9	On Street Parking	25
3.	The Proposed Development	27
3.1	Site Access Arrangements	28
3.2	Parking	28
3.3	Travel Demand Measures	30
4.	Traffic Impact Assessment	33
4.1	Traffic Distribution	33
4.2	Background Traffic Growth	33
4.3	Traffic Generation	33
4.4	Intersection Performance	34
4.5	Mitigation Measures	37
5.	Construction Traffic Management	38
6.	Summary and Conclusion	40
6.1	Public Transport	40
6.2	Active Transport	40
6.3	Mode of Travel	40
6.4	Parking	41
6.5	Traffic Generation	41

6.6 Traffic Impact.....	41
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Table index

Table 1-1 – SEARs Transport and Accessibility.....	3
Table 2-1 – Bus Routes and Frequencies	9
Table 2-2 – Mode of Travel Survey (Manual Travel Model Surveys)	21
Table 2-3 – Updated Mode of Travel Data.....	22
Table 2-4 – Intersection Level of Service Criteria.....	23
Table 2-5 – Intersection Performance - 2017	24
Table 2-6 – Urban Road Mid-Block Capacities	25
Table 4-1 – Intersection Performance (2021)	36
Table 4-2 – Intersection Performance (2031)	36
Table 6-1 – Waitara Public School Mode Split Data.....	41

Figure index

Figure 1-1 – Subject Site Location	2
Figure 2-1 – Waitara Public School Transport and Access Arrangements	1
Figure 2-2 – Land Zoning in Proximity to the Waitara Public School	2
Figure 2-3 – Edgeworth David Avenue looking east from Myra Street	4
Figure 2-4 – Permanent Count Station Location on Edgeworth David Avenue	4
Figure 2-5 – Daily Traffic Profiles (per month) at Edgeworth David Avenue	5
Figure 2-6 – Daily Traffic Profile at Edgeworth David Avenue	6
Figure 2-7 – Myra Street looking south from Edgeworth David Avenue	7
Figure 2-8 – Crash Locations near Waitara Public School	7
Figure 2-9 – Existing Cycling Infrastructure.....	10
Figure 2-10 – Pedestrian Facilities in Proximity to Waitara Public School.....	11
Figure 2-11 – Proposed Traffic Calming Measures	12
Figure 2-12 – Traffic Survey Locations	13
Figure 2-13 – Number of Children (per Family) Enrolled at Waitara Public School	14
Figure 2-14 – Ages of children at Waitara Public School	15
Figure 2-15 – Distance Travelled by Students to Waitara Public School	16
Figure 2-16 – Mode of transport to Waitara Public School	16
Figure 2-17 – Student Accompanied to Waitara Public School	17

Figure 2-18 – Portion of Trips to Waitara Public School that are part of another Journey	18
Figure 2-19 – Mode of transport from Waitara Public School	19
Figure 2-20 – Students Accompanied from Waitara Public School	19
Figure 2-21 – Portion of trips from Waitara Public School that are part of another journey.....	20
Figure 2-22 – Manual School Activity Surveys	21
Figure 2-23 – Existing Intersection Geometry.....	24
Figure 2-24 – Parking in Proximity to Waitara Public School	25
Figure 3-1 – Waitara School Site Demolition Plan	27
Figure 3-2 – Proposed Waitara School Expansion	28
Figure 4-1 – Edgeworth David Avenue, Average Daily Traffic Profile by Year (Count Station 74077)	33

Appendices

Appendix A – Traffic Survey Outputs
Appendix B – Existing and forecast traffic volumes
Appendix C – Internet Questionnaire
Appendix D – School Activity Surveys
Appendix E – SIDRA Outputs

1. Introduction

1.1 Overview

GHD has been engaged by the NSW Department of Education (DoE) to undertake a Traffic Impact Assessment to support the development application for the proposed expansion of Waitara Public School.

According to the project brief, about 29 percent of the demand for the future year 2031 will not be met should the current school assets conditions remain unchanged. The DoE are planning to maximise the functionality of the existing school assets by improving their performance to cater for the future demand.

The proposed scope of works includes the demolition of 15 “demountable” structures and five Modular Design Range (MDR) buildings and the current permanent buildings (except Building M).

A total of 37 new teaching spaces will be provided, predominantly in a new four storey building which will be constructed in the north western corner of the school.

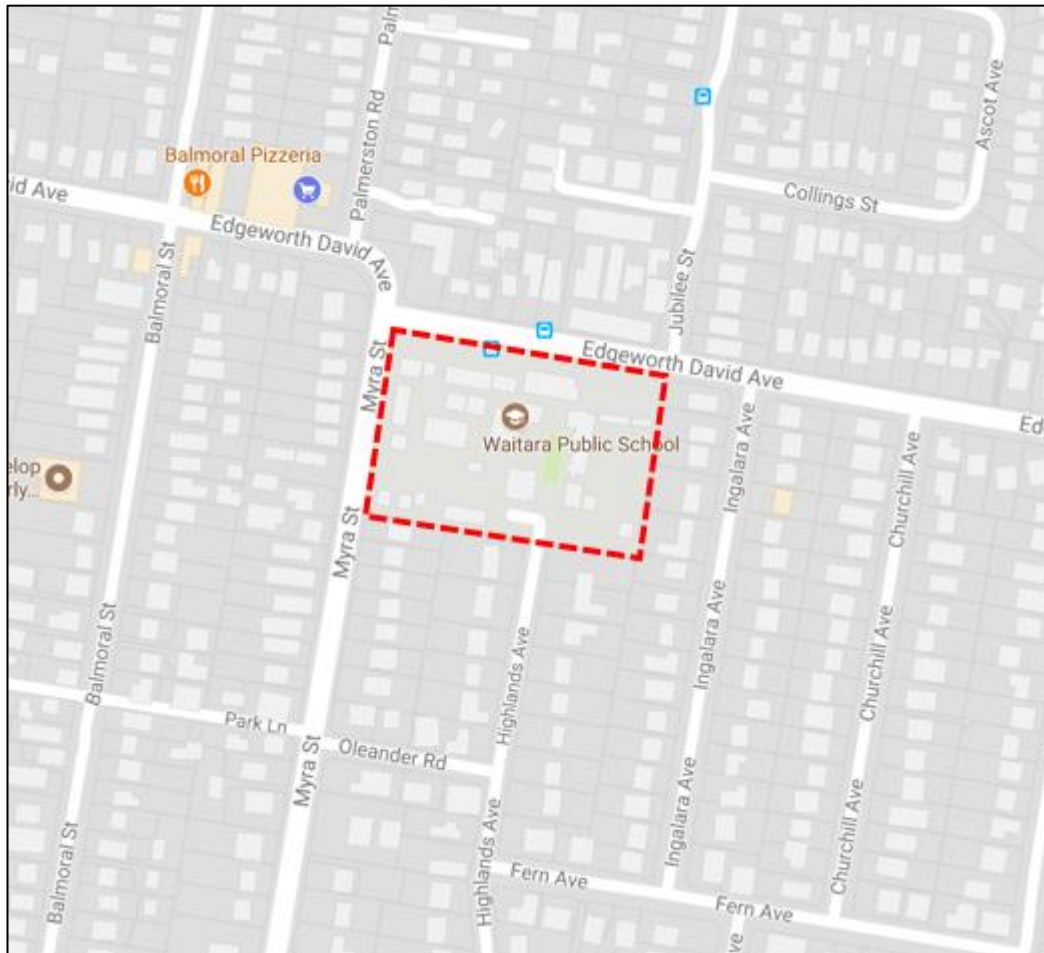
The capacity of the school is expected to increase from 760 students and 32 teachers to 1,000 students and 42 teachers

The proposed expansion is expected to be completed in 2021.

1.2 Site Location

Waitara Public School is located at 68 Edgeworth David Avenue in Wahroonga, NSW as shown in Figure 1-1. The site is located within the Hornsby Shire Council Local Government Area (LGA).

Figure 1-1 – Subject Site Location



Source: Google maps

Pedestrian access gates to the school are provided on Edgeworth David Avenue, Myra Street and Highlands Avenue. The vehicle pick up/drop off zone (of approximately 40 m) is provided on the eastern kerb of Myra Street, vehicular access to the staff car park is provided from Highlands Avenue and bus stops are provided on Edgeworth David Avenue at the frontage to the school.

1.3 Study Limitations and Assumptions

This study has been limited by the following:

- No site inspection was undertaken, the study involved a desktop assessment only.
- The conditions of the surrounding network are based on information either supplied by the traffic surveys and Google Maps / Street View.
- Intersection modelling using SIDRA 7, was undertaken for the following intersections only:
 - Edgeworth David Avenue and Palmerston Road.
 - Myra Street and Edgeworth David Avenue.
 - Edgeworth David Avenue and Jubilee Street.
 - Edgeworth David Avenue and Ingalara Avenue.

The following assumptions were made as part of this study:

- The expansion of the school is expected to be completed in 2021.

- A background traffic growth rate of two percent per annum has been applied to the 2017 traffic surveys as agreed with Council.
- Traffic generation assumptions for the proposal were based on survey information from online travel surveys and manual travel mode surveys conducted at Waitara Public School.

1.4 Study Scope

This TIA report addresses the following:

- Existing Conditions – a review of existing road and transport conditions, adjacent developments, traffic volumes and crash data.
- Trip Generation – an assessment of the trip generation characteristics of the proposed school expansion.
- Development Impacts – an assessment of the performance of the existing intersections (delays, and level of service) following the development of the proposed school expansion.
- Construction – A high-level assessment recommendation of construction traffic management activities.

1.5 Secretary's Environmental Assessment Requirements

The Department of Planning (DoP) issued the following Secretary's Environmental Assessment Requirements (SEARs) for the proposed expansion of Waitara Public School dated 12th July 2017.

Table 1-1 – SEARs Transport and Accessibility

Comment	Response
Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.	As no specific trip generating guides are associated for schools, extensive survey data were collected on the mode share of students traveling to and from Waitara Public School to determine peak hour traffic generation (see Section 4.3). Existing public transport, pedestrian and cycling infrastructure is described in Section 2.4 and Section 2.6.
An assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development.	Waitara Train Station is located approximately 1 km (walking distance) to the south of Waitara Public School. There are currently a number of school bus services that act as feeder services to Waitara Public School from key train stations such as Waitara Station and Hornsby Station. Data from the mode of travel surveys indicates that 13 percent of students take the bus to school in the morning and 20 percent take the bus in the afternoon when leaving school. This data indicates that an additional 32 students are likely to use the bus in the morning peak and 47 students in the afternoon peak. This would be equivalent to an additional bus service

Comment	Response
	during the peak periods. See 2.4.1 for current bus services.
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing and similar schools within the local area.	The trip generation for Waitara Public School has been undertaken on a first principles basis accounting for: • The current and proposed student populations. • The modes of transport currently used by the student population. See section 2.7.3 for model of travel survey. During the weekday AM and PM peak hours, the proposed school expansion is expected to generate: • 104 inbound and 104 outbound vehicle trips in the AM peak hour (8:00 am – 9:00 am) • 79 inbound and 79 outbound vehicle trips in PM peak hour (3:00 pm – 4:00 pm).
The adequacy of public transport, pedestrian and bicycle networks and infrastructure to meet the likely future demand of the proposed development having regard to the identified school catchment area.	Currently, the public transport services in proximity to the school consist of the school bus routes 8029, 8091 and 8020 that operate during the morning peak that act as feeder services to the school from Wahroonga Station and Hornsby Interchange. Route 9091 and 9099 bus services operate during the afternoon that are feeder services to Hornsby Interchange from the school. As mentioned above, an additional bus service during the peak period may be required to cater for additional students. There are adequate footpaths in proximity to the school. Signalised pedestrian crossings exist only at nearby intersections. The school could benefit from pedestrian crossings that exist outside school entrance/ exits, on Myra Street and Edgeworth David Avenue. The walking route between the school and Waitara Station is along Myra Street and Alexandria parade with a traffic signal controlled pedestrian crossing provided at the intersection of Myra Street and Alexandria Parade. A raised pedestrian crossing is also provided on Alexandria Parade adjacent to the station entrance. There are currently no dedicated cycleways or bicycle facilities in the vicinity of Waitara Public School.

Comment	Response
The impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site in consultation with Roads and Maritime Services and Transport for NSW and identify measures to integrate the development with the transport network.	As described above the impacts of the proposed school expansion on the public transport facilities is expected to be negligible. Emails were sent to TfNSW 8th June 2017, 19th June 2017 and 26th June 2017 seeking feedback / input into the study. Emails were sent to Roads and Maritime on the 19th June 2017 and 26th June 2017. No feedback has been received from either organisation. Multiple communications (phone calls and emails) were undertaken with Hornsby Shire Council to identify any proposed traffic management schemes and agree on an annual growth rate to identify the horizon year background traffic volumes. See section 4 on background traffic growth and traffic distribution assumptions.
Details of any upgrading or road improvement works required to accommodate the proposed development;	No mitigation measures are put forth as part of this assessment.
Details of travel demand management measures to minimise the impact on general traffic and bus operations and to encourage sustainable travel choices and details programs for implementation.	Green Travel Plans (GTP) are particularly important in a schools context as schools are often located in residential areas where surrounding residents are negatively impacted by the significant peaks of traffic at school pick-up and drop-off time. Furthermore, there has been a trend towards increasing the size of schools, which puts pressure on the space at schools. On-site car parking is often a luxury which schools cannot afford to apportion limited land resources. The scope of this assessment does not include a GTP, but it is recommended that one is developed for Waitara Public School.
The impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works if required.	As discussed and agreed with Council SIDRA analysis has been undertaken for the intersection of Edgeworth David Avenue with Palmerston Road, Myra Street, Jubilee Street and Ingalaria Avenue. Analysis has been undertaken for the 2021 and 2031 horizon years. An annual growth rate of two percent has been applied to the existing traffic volumes to identify the background horizon year traffic volumes. See section 4.

Comment	Response
	No mitigation measures are put forth as part of this assessment.
The proposed active transport access arrangements and connections to public transport services	Signalised pedestrian crossings to enable the safe pedestrian movement to from the bus stops on Edgeworth David Avenue. It is recommended that a pedestrian crossing be implemented on Myra Street at the frontage to the school.
Details of any proposed school bus routes along bus capable roads (i.e. travel lanes of 3.5 m minimum) and infrastructure (bus stops, bus layovers etc.);	No additional school bus routes are put forth as a part of this assessment.
The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.	The current site access arrangement to Waitara Public School is not expected to change, namely: Pedestrian access to Waitara Public School will be provided on Edgeworth David Avenue, Myra Street and Highlands Avenue. The vehicle pick up/drop off zone is provided on Myra Street with vehicular access to the staff car park provided from Highlands Avenue. 40 km/h school zones are currently in operation on Myra Street and Edgeworth David Avenue in proximity to Waitara Public School. It is recommended that a pedestrian crossing be implemented on Myra Street at the frontage to the school.
Measures to maintain road and personal safety in line with CPTED principles.	It is assumed Waitara Public School it will be designed/constructed in accordance with CPTED Principles.
Proposed bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance.	It is proposed to maintain the 23 bicycle racks within the school. These are located adjacent to school library.
Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on-site.	The existing staff car park (which is accessed from Highlands Avenue) provides 12 parking bays. It is proposed to maintain this parking supply for the proposed expansion and not provide any additional parking. The provision of no additional parking within Waitara Public School is consistent with DoE Guidelines. A travel plan may be required to reduce car travel, particularly single occupant trips undertaken by

Comment	Response
	teachers. This could include allocating parking spaces to teachers that car share.
Details of emergency vehicle access arrangements.	Emergency vehicles (if required) are expected to access the proposed school from Highlands Avenue. The proposed school layout will continue to provide internal road network for emergency vehicles. Upon completion of the school master plan, a swept path analysis will be undertaken to ensure the design emergency vehicle can enter the school, manoeuvre internally and exit in a forward direction.
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures.	A crash data review has been carried out (section 2.3). Crash data shows there has been a single accident involving pedestrians (which resulted in moderate injuries) in proximity to the school in the last five years. This suggests that pedestrian network in proximity to the school operates safely. As described previously it is recommended that a pedestrian crossing is implemented on Myra Street at the frontage to the school.
Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);	Service vehicle access is proposed from Highlands Avenue. Details of the type and frequency of vehicles expected to access/egress the school is not currently available. However it is assumed it will occur outside of peak school activity. Upon completion of the school master plan a swept path analysis will be undertaken to ensure the design service vehicle can enter the school, manoeuvre internally and exit in a forward direction.

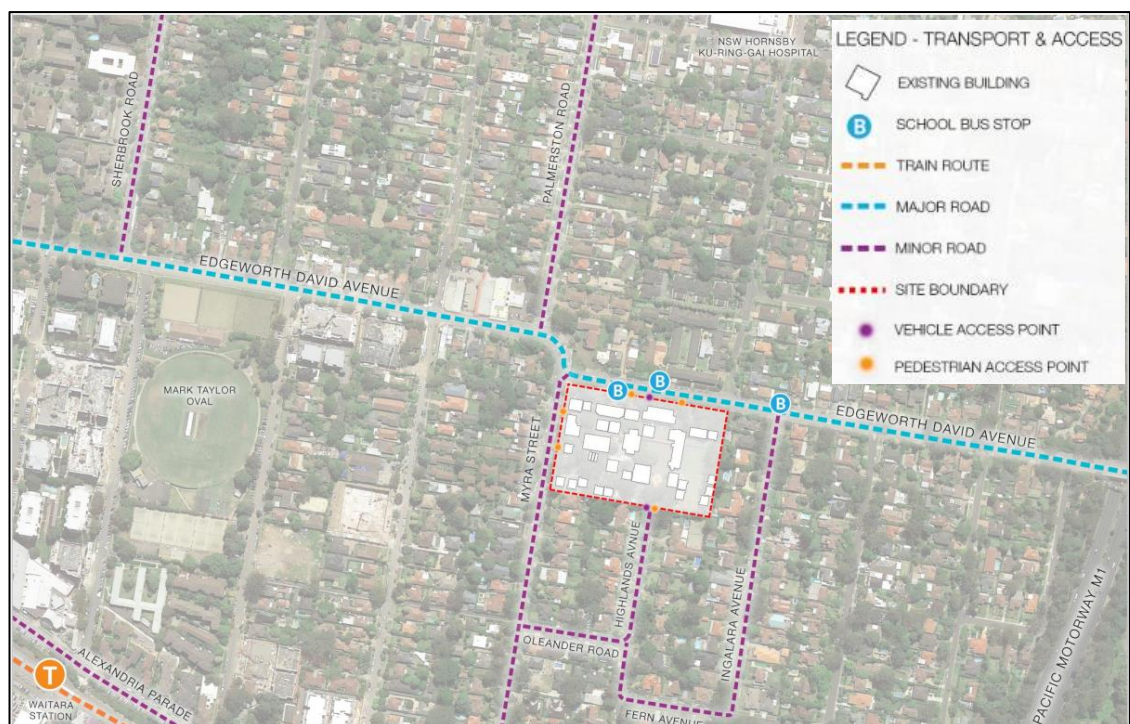
2. Existing Conditions

Pedestrian access gates to Waitara Public School are provided on Edgeworth David Avenue, Myra Street and Highlands Avenue. The vehicle pick up/drop off zone (of approximately 40 m) is provided on Myra Street with vehicular access to the staff car park provided from Highlands Avenue. The staff car park can accommodate 12 vehicles.

Public bus stops are located on Edgeworth David Avenue on both sides of the road, east of the intersection with Myra Street.

The existing vehicle and pedestrian access arrangements at Waitara Public School are Street as displayed below in Figure 2-1.

Figure 2-1 – Waitara Public School Transport and Access Arrangements



2.1 Land Uses

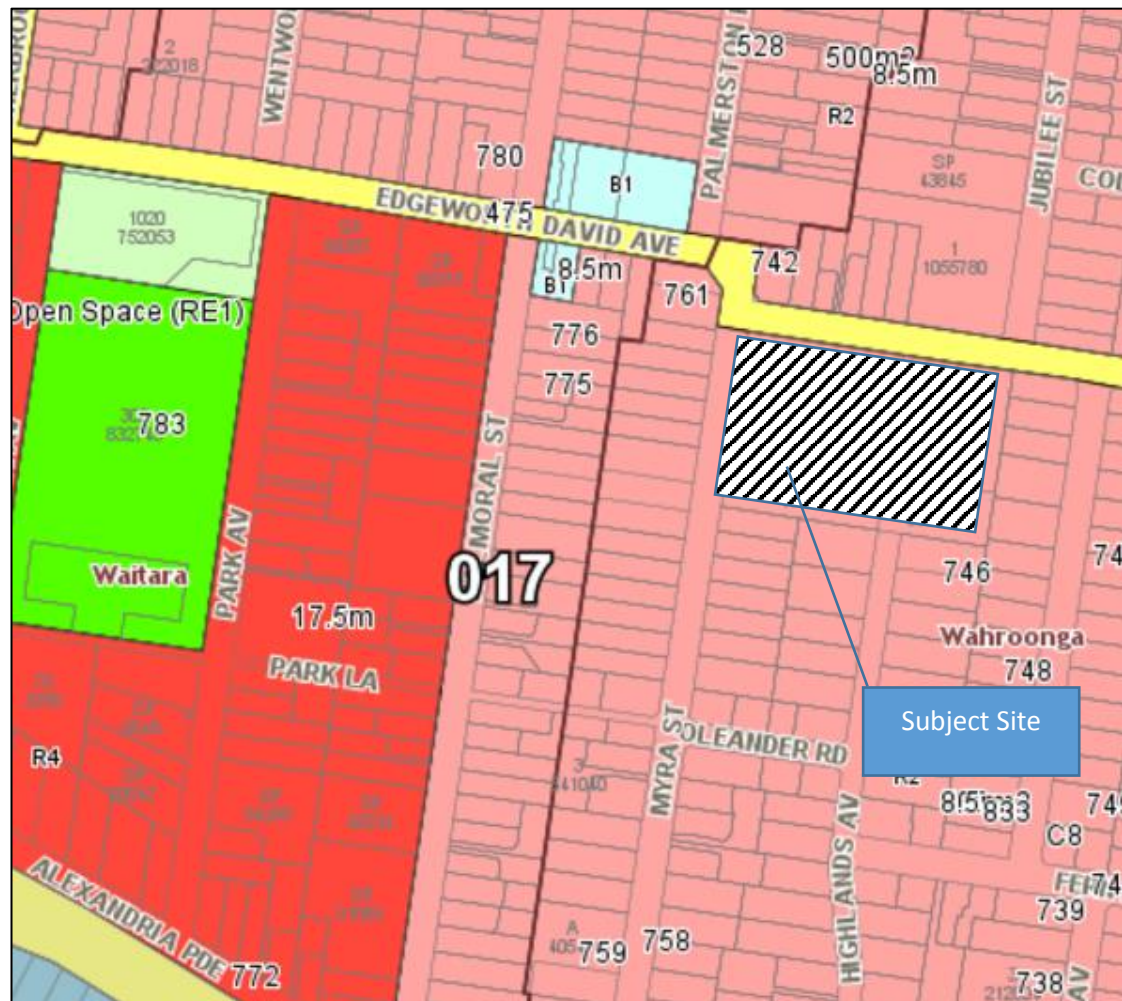
Hornsby Town Centre and Hornsby Station are located approximately 1.4 km (walking distance) to the west of Waitara Public School, while Waitara Station is located approximately 1 km (walking distance) south-west of Waitara Public School.

The existing land uses in the vicinity of to the school is predominantly residential.

The Hornsby Local Environmental Plan, shown in Figure 2-2, indicates that land located in the vicinity of Waitara Public School is zoned as R2 – Low Density Residential. However, to the west of Balmoral Street the land is zoned R4 – High Density Residential. There have been increases in residential densities that are consistent with this zoning.

The school's expansion is intended to accommodate the expected increases in the nearby population associated with this zoning.

Figure 2-2 – Land Zoning in Proximity to the Waitara Public School



Source: Hornsby Local Environmental Plan (2013)

2.2 Existing Road Network Characteristics

2.2.1 Road Hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership)
- By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (Roads and Maritime) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Roads and Maritime has three administrative classes of roads. These are:

- **State Roads** – Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Roads and Maritime with maintenance

fully funded by Roads and Maritime. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.

- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Roads and Maritime funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Roads and Maritime. Regional Roads may or all part of all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Roads and Maritime.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Roads and Maritime may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Roads and Maritime.

Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Roads and Maritime or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).
- **Collector Roads** – provide connectivity between local roads and the-arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

A summary of the key roads in proximity to the subject site is provided below.

2.2.2 Edgeworth David Avenue

Edgeworth David Avenue is an east-west collector road that (with Junction Street) links the Pacific Highway (at Hornsby) with Eastern Road (at Wahroonga). In addition to Waitara Public School, Edgeworth David Avenue provides access to Westfield Hornsby, Waitara Town Centre and low-medium density residential dwellings.

In proximity to the subject site, Edgeworth David Avenue has the following characteristics:

- A sealed two way street, with two travel lanes in either direction.
- A (approximately) 12 m wide carriageway.
- Concrete footpaths to facilitate pedestrian mobility.
- Signalised pedestrian crossings at its intersection with Myra Street.
- A 60 km/h posted speed limit, with 40 km/h zone on school days (8:00 am - 9:30 am, 2:30 pm – 4:00 pm) in proximity to the school.

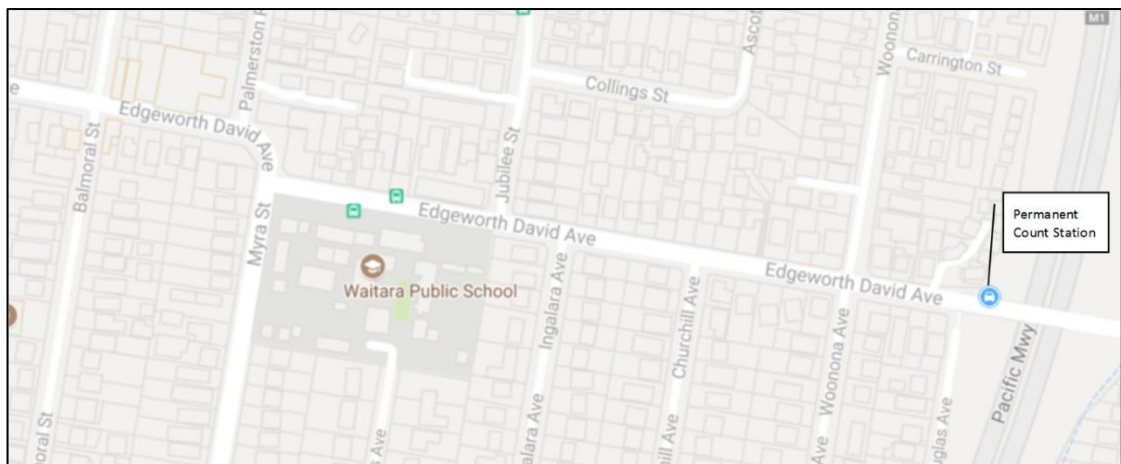
Figure 2-3 – Edgeworth David Avenue looking east from Myra Street



Source: Google Maps

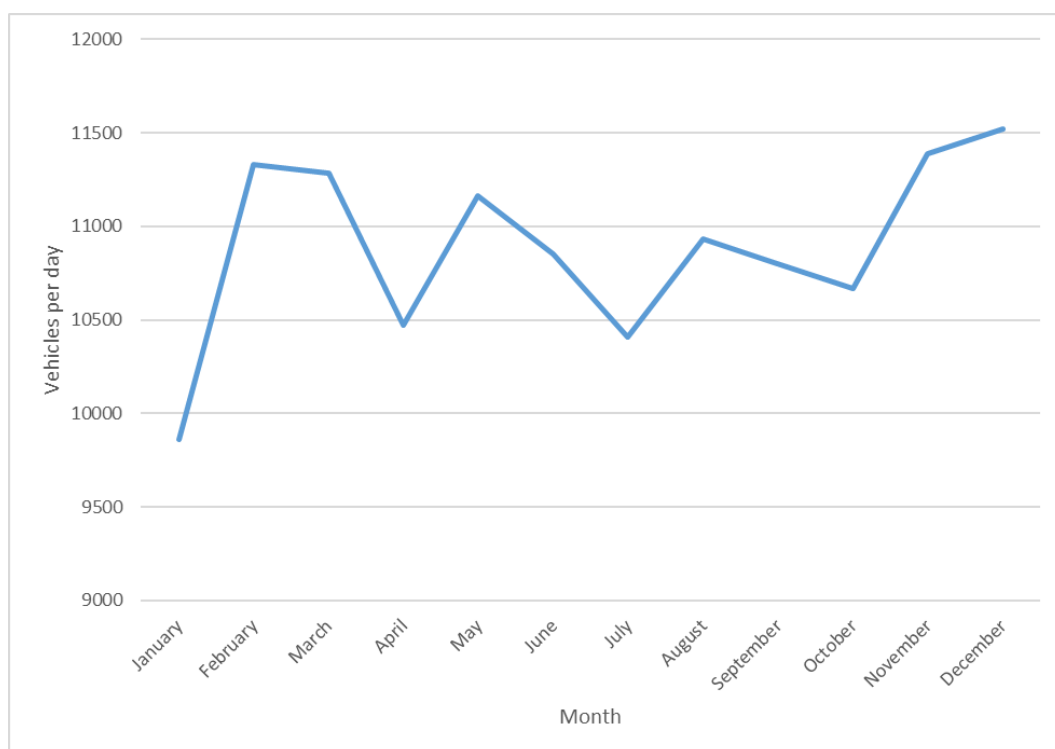
A monthly profile of average daily traffic volumes was obtained from the Roads and Maritime online traffic volume viewer for the permanent count station 74077, located at Edgeworth David Avenue west of Pacific Motorway Bridge (Junction Road) as displayed in Figure 2-4.

Figure 2-4 – Permanent Count Station Location on Edgeworth David Avenue



The daily traffic volume profile (by month) is shown in Figure 2-5.

Figure 2-5 – Daily Traffic Profiles (per month) at Edgeworth David Avenue

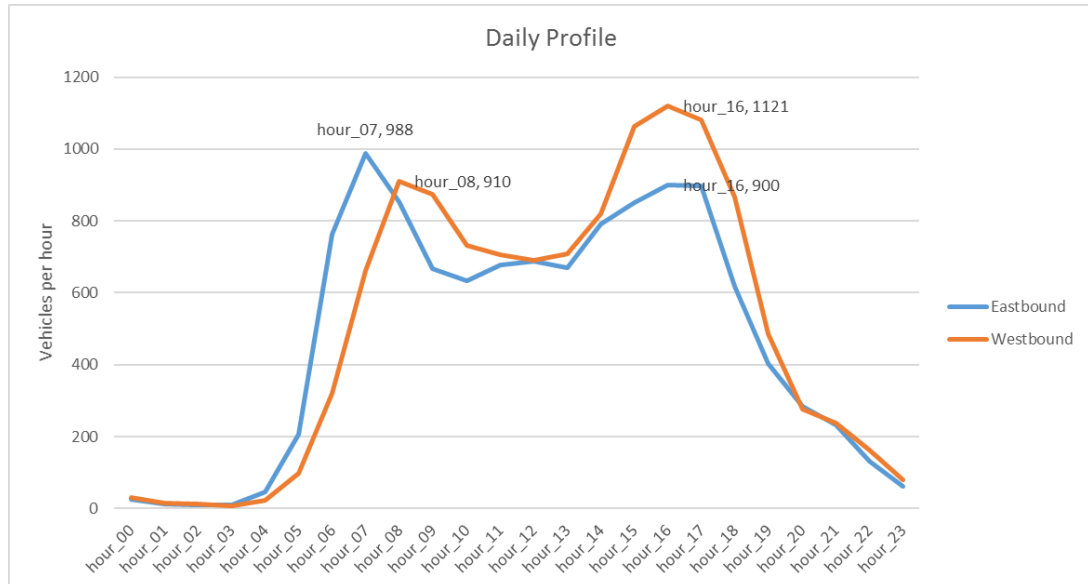


The data indicates that Edgeworth David Avenue carries approximately 9,800 – 11,500 vehicles per day.

The reduction in traffic volumes for the months of April, July and October is consistent with reduced demand during school holiday periods.

The annual average daily traffic profile is shown in Figure 2-6. The morning peak hour of approximately 8 00 am to 9:00 am is consistent with school drop-off activity, however school pick up activity typically occurs at approximately 3:00 pm – 4:00 pm prior to the road network peak period of operation (4:00 pm – 5:00 pm).

Figure 2-6 – Daily Traffic Profile at Edgeworth David Avenue



2.2.3 Myra Street

Myra Street is a north-south local road that (with Ingram Road) links the Pacific Highway (at Wahroonga) with Edgeworth David Avenue. In addition to the Waitara Public School, Myra Street provides access to a number of low density residential dwellings.

In proximity to the school subject site Myra Street has the following characteristics:

- A sealed two way street, with a travel lane and parking lane in either direction.
- Approximately 12 m wide carriageway.
- Concrete footpaths to facilitate pedestrian mobility.
- Signalised pedestrian crossings at its intersection with Edgeworth David Avenue
- A 60 km/h posted speed limit, with 40 km/h zone on school days (8:00 am - 9:30 am, 2:30 pm – 4:00 pm) in proximity to the school.

Figure 2-7 – Myra Street looking south from Edgeworth David Avenue

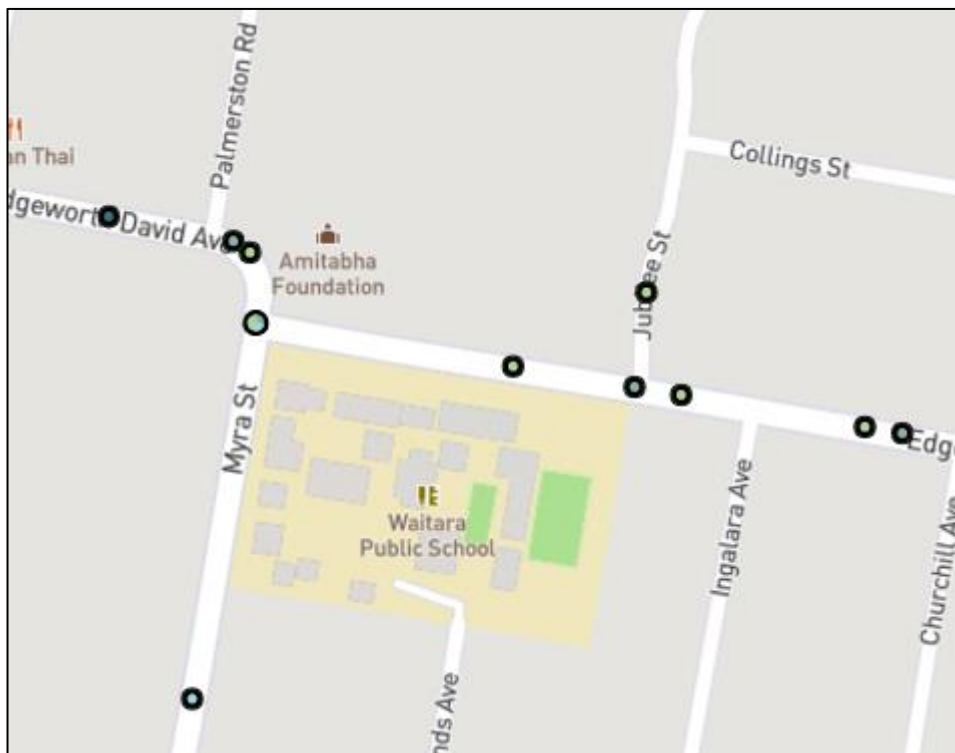


Source: Google Maps

2.3 Crash Data Review

Crash data was obtained from the Centre for Road Safety (for a four-year period between 2012 and 2015, (with data for 2016 yet to be finalised) for the roads in the vicinity of Waitara Public School. The locations of the recorded crashes are shown in Figure 2-8.

Figure 2-8 – Crash Locations near Waitara Public School



Source: http://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tblga=1

A review of the available crash data is provided below.

There was one crash recorded on Myra Street in proximity to the school. The crash was a result of a vehicle travelling straight and deviating off the carriageway and hitting an object, one person suffered a minor injury as a result of this crash

Three crashes were recorded at the intersection of Myra Street and Edgeworth David Avenue, as follows:

- One crash was a result of a vehicle travelling straight and deviating off the path, one person suffered a minor injury.
- One crash involved a vehicle turning right at the intersection and being struck by a vehicle travelling in the opposite direction – no injuries were reported.
- One crash was between a vehicle turning right and being struck on the right by another vehicle – two people suffered moderate injuries as a result of the crash.

Eight crashes recorded on Edgeworth David Avenue in proximity to the school:

- Three of the crashes resulted in moderate injuries with:
 - One crash was a result of a vehicle colliding with a pedestrian.
 - One crash involved a collision between two vehicles where a vehicle changing lanes collided with another vehicle.
 - One crash was a result of a vehicle travelling straight and deviating off the carriageway to the left and hitting an object.
- One crash was a result of a vehicle travelling straight and deviating off the carriageway to the right and hitting an object, one person suffered a serious injury as a result of the crash.
- Four crashes resulted in no reported injuries, as follows:
 - One crash involved a vehicle turning on a bend and deviating off the carriageway to the left and colliding with an object.
 - Two crashes involved rear end collisions.
 - One crash was a result of a vehicle travelling straight and deviating off the carriageway to the left and hitting an object.

There was one crash recorded on Jubilee Street within proximity to the school. The crash was a result of a vehicle travelling straight and deviating off the carriageway to the left and hitting an object, no injuries were reported as a result of the crash

A summary of the crash data review, reveals the following:

- One of the crashes recorded involved pedestrians or bicycle riders.
- None of the crashes resulted in a fatality.
- One of the crashes resulted in a serious injury.
- Two of the crashes resulted in minor injuries.
- Five of the crashes resulted in five moderate injuries.
- Six of the crashes resulted in no reported injuries.
- In general, a decreasing trend is observed in the number of crashes recorded over the previous five years.

2.4 Public Transport

2.4.1 Bus Services

A summary of the bus routes operating in proximity to Waitara Public School and their approximate frequency is provided in Table 2-1.

Waitara Public School is served by a number of school buses operated by Transdev that provide transfers from nearby train stations such as Hornsby Station and Wahroonga Station.

School bus services include 596, 8029, 8091 and 8020 operate in the morning peak period between 7:00 am – 9:00 am. Afternoon school services, operating between 3:00 pm – 4:00 pm include bus 9091, 9099 and 596.

Table 2-1 – Bus Routes and Frequencies

Bus Route	Origin – Destination	Frequency (minutes)	
		Peak	Off-peak
575	Macquarie University to Hornsby	20	40
594H	Hornsby to City	30	60
596	Hornsby Heights to Hornsby Interchange	20	30
8029	Duffy & Chivers to Waitara Public School via Wahroonga Station	Morning School Bus	
8091	Hornsby Interchange to Waitara Public School	Morning School Bus	
8020	Wahroonga Station to Waitara Public School	Morning School Bus	
9091	Hornsby Interchange to Waitara Public School	Afternoon School Bus	
9099	Hornsby Interchange to Waitara Public School	Afternoon School Bus	

The nearest bus stops to the school are located at Edgeworth Drive Avenue approximately 85 m east of the intersection with Myra Street, as shown in Figure 2-1.

2.4.2 Train Services

Waitara Train Station is located approximately 1 km (walking distance) to the south of Waitara Public School. The walking route between the school and Waitara Station is along Myra Street and Alexandria parade with a traffic signal controlled pedestrian crossing provided at the intersection of Myra Street and Alexandria Parade. A raised pedestrian crossing is also provided on Alexandria Parade adjacent to the station entrance.

Transport planning principles suggest individuals are typically willing to walk up to 800 m (NSW Planning Guidelines for Walking and Cycling, 2004) to access rail services. Waitara Public School is considered to be outside this acceptable range. However, as the walking distance only slightly exceeds this distance, it can be assumed that some of the existing and future student / teacher populations, may choose to utilise train services as a mode of travel to and from school, particularly as the school bus services operate as feeder routes.

Waitara Train Station is served by the T1 North Shore, Northern and Western Line. During peak periods of operation, trains on the T1 Line operate with 10 to 15 minute frequencies. Waitara Station is also wheelchair accessible and provides bicycle parking facilities.

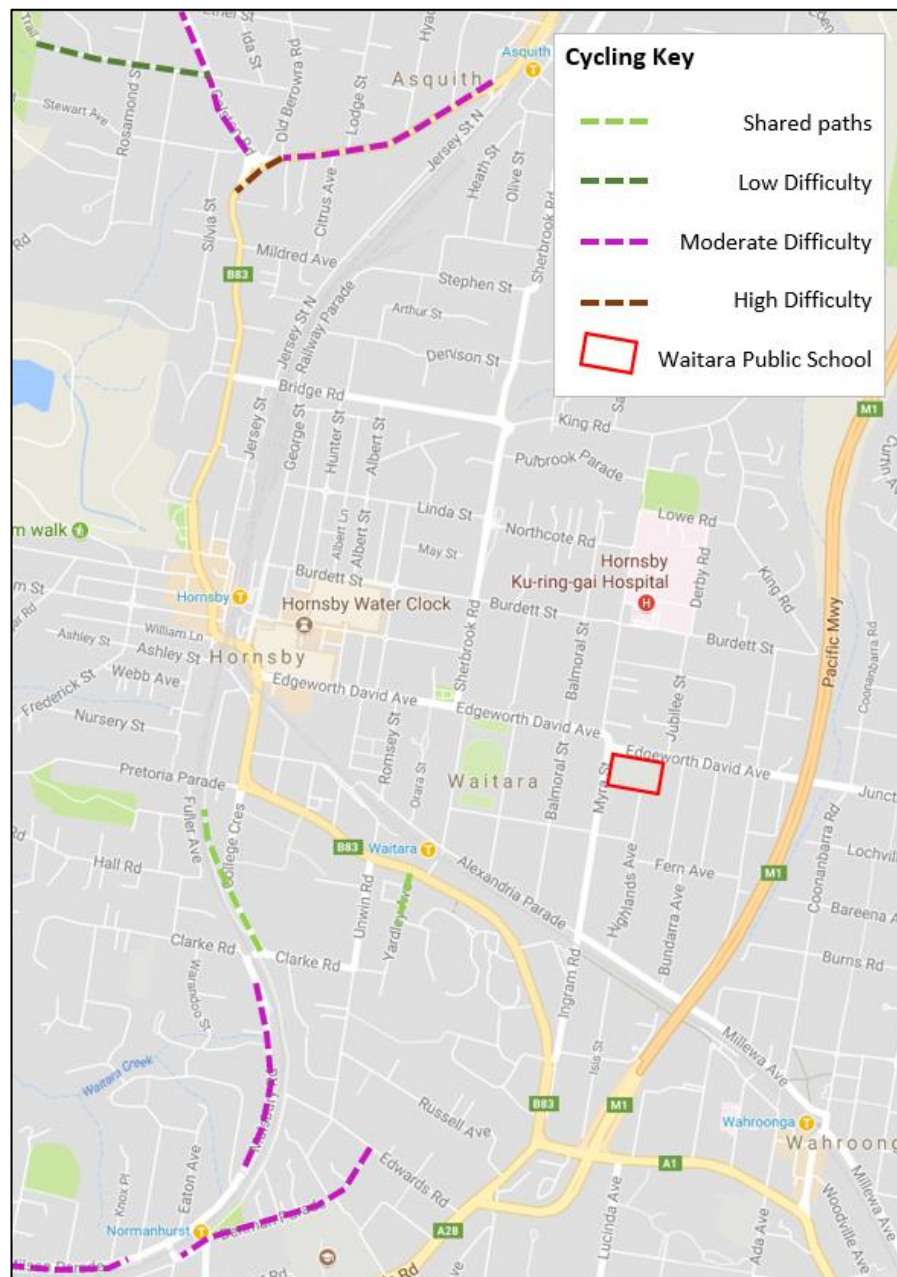
2.5 Active Transport

2.5.1 Bicycle Facilities

There are currently no dedicated cycleways or bicycle facilities in the vicinity of Waitara Public School as identified using the Roads and Maritime Cycleway Finder (www.rms.nsw.gov.au/roads/bicycles/cyclewayfinder/index.html).

There are some identified paths of low to moderate difficulty close to Normanhurst Station and Asquith Station, and sections of shared path on College Crescent and Yardley Avenue. However, these paths would not benefit students significantly as there is limited connectivity between the school and nearby train stations.

Figure 2-9 – Existing Cycling Infrastructure



The Hornsby Shire Council Cycling Map 2008, identifies a medium difficulty bicycle riding route along Alexandria Parade. The route connects to Pacific Highway and Railway Parade in the north providing access to the suburbs of Hornsby and Asquith.

2.5.2 Pedestrian Facilities

The existing pedestrian facilities in the vicinity of Waitara Public School as shown in Figure 2-10 indicate that

- To the east of the school, concrete paths are generally on one side of the road and grassed verges on the other. Concrete paths are typically provided on both sides of the road to the west of the school, and on key roads such as Edgeworth David Avenue and Myra Street.
- Signalised pedestrian crossings are provided at the intersections of Myra Street / Edgeworth Avenue Palmerston Road/ Edgeworth David Avenue and Balmoral Street / Edgeworth David Avenue.
- A pedestrian crossing (Zebra) is provided at the entrance to Waitara Train Station at the Alexandria Parade / Waitara Avenue intersection.

Figure 2-10 – Pedestrian Facilities in Proximity to Waitara Public School



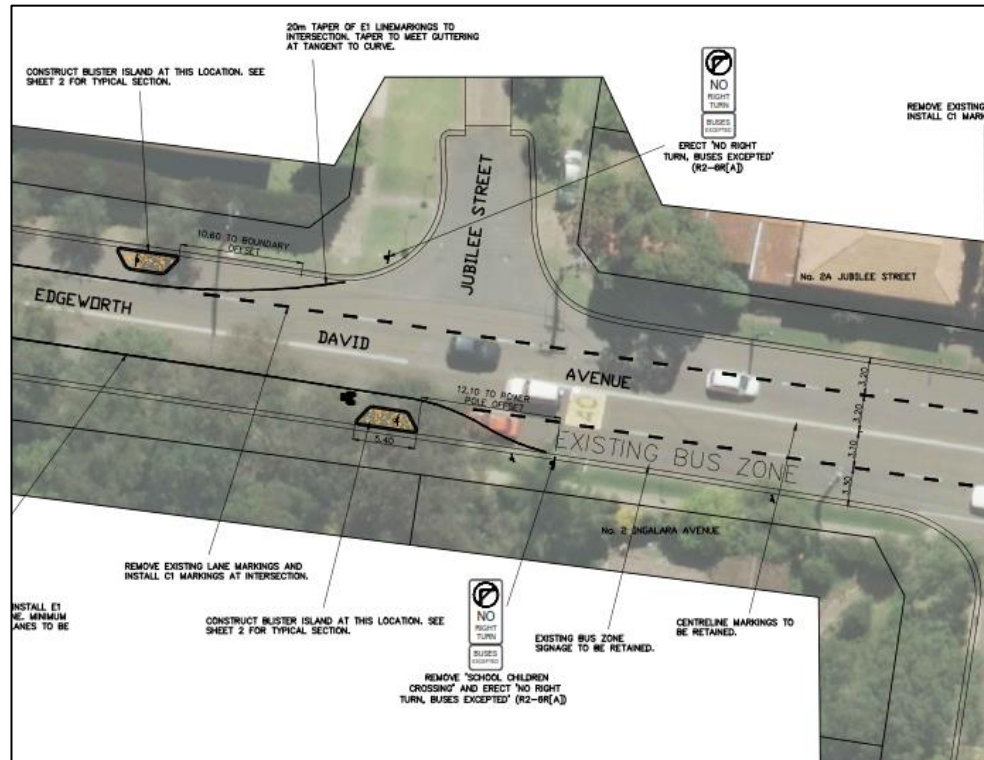
While signalised pedestrian crossings exist are provided at intersections proximity to the school, no formal dedicated school crossings exist at the front entrance to the school on Edgeworth David Avenue or on Myra Street.

Accordingly, it is recommended that a pedestrian crossing is installed on Myra Street, adjacent to the main pedestrian entry to the school.

Information provided by Hornsby Shire Council indicates that they have submitted traffic calming proposals on Edgeworth David Avenue to Roads and Maritime for funding that includes:

- The construction of blister islands.
- The provision of on-road cycle paths.
- The reduction of Edgeworth David Avenue to a single lane in either direction.

Figure 2-11 – Proposed Traffic Calming Measures



The timing of this work is unknown as it is dependent on the approval and funding of Roads and Maritime.

2.6 Emergency Vehicles

Emergency vehicles (if required) can access the proposed school from Highlands Avenue. The proposed school layout will continue to provide internal road network for emergency vehicles.

Discussions with the school principal indicate that on the rare occasion an ambulance is called to the school, it typically parks on the Edgeworth David Avenue and Myra Street.

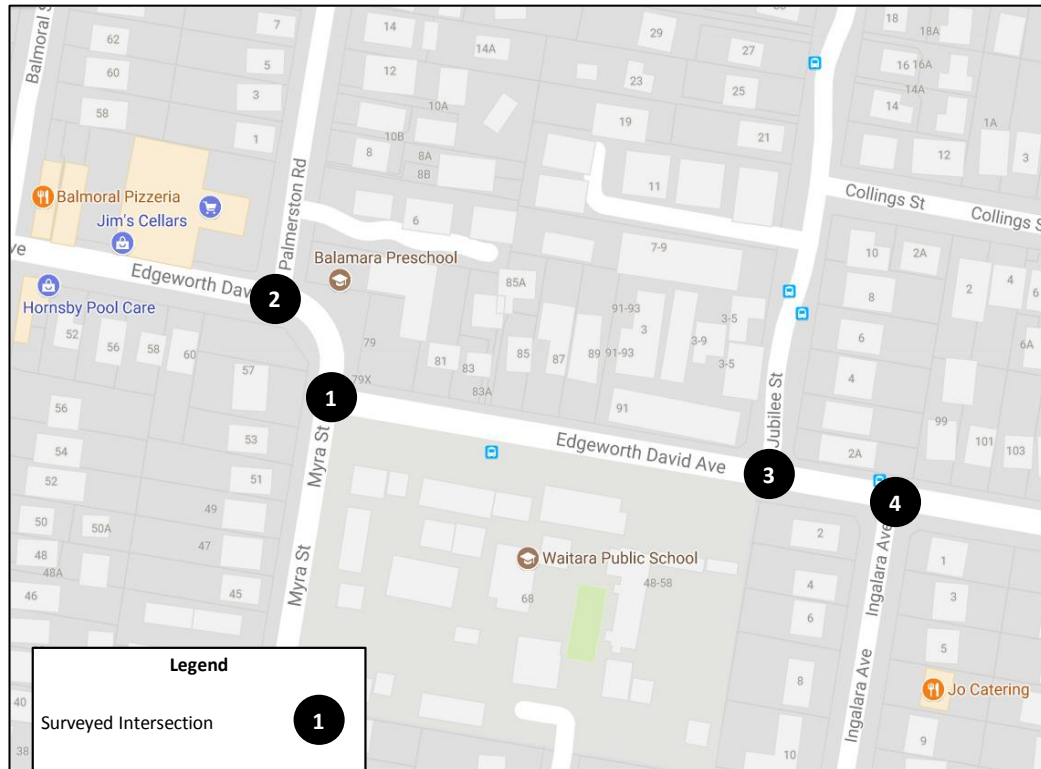
2.7 Surveys

2.7.1 Intersection Surveys

In order to identify the existing traffic conditions in proximity to the subject site, intersection counts were undertaken at the following intersections on Monday 26th June 2017:

- Edgeworth David Avenue and Palmerston Road.
- Myra Street and Edgeworth David Avenue.
- Edgeworth David Avenue and Jubilee Street.
- Edgeworth David Avenue and Ingalaria Avenue.

Figure 2-12 – Traffic Survey Locations



The counts were undertaken in 15 minute intervals, for the following times (in order to coincide with peak periods of school activity):

- 8:00 am – 9:30 am
- 2:30 pm – 4:00 pm.

The network peak hours of activity were identified at the following times:

- 8:30 to 9:30 am
- 3:00 to 4:00 pm.

The peak hour volumes identified in the traffic surveys are displayed in Appendix A.

The intersection survey outputs are included in Appendix B.

2.7.2 Online Survey Questionnaire

In order to identify additional data about the mode of transport used by students to access and egress Waitara Public School, an online questionnaire was sent out by the school for parents to complete. A total of 217 responses to the survey were received and a summary of the results is provided below. A copy of the survey is displayed in Appendix C.

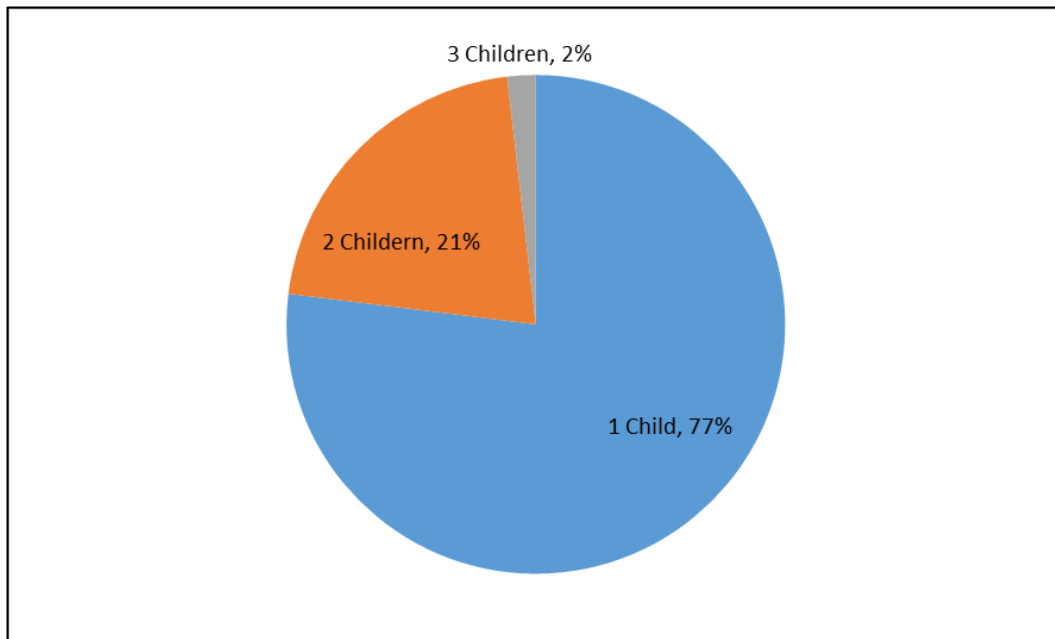
Question 1 – How many of your children attend Waitara Public School?

The responses to question one indicate the following:

- 77 percent of parents have a single child enrolled at Waitara Public School.
- 21 percent of parents have two children enrolled at Waitara Public School
- Two percent of parents have three children enrolled at Waitara Public School.

Based on above data, 23 percent of the families have more than one child that are dropped off or picked up at the same time (as part of the same trip).

Figure 2-13 – Number of Children (per Family) Enrolled at Waitara Public School

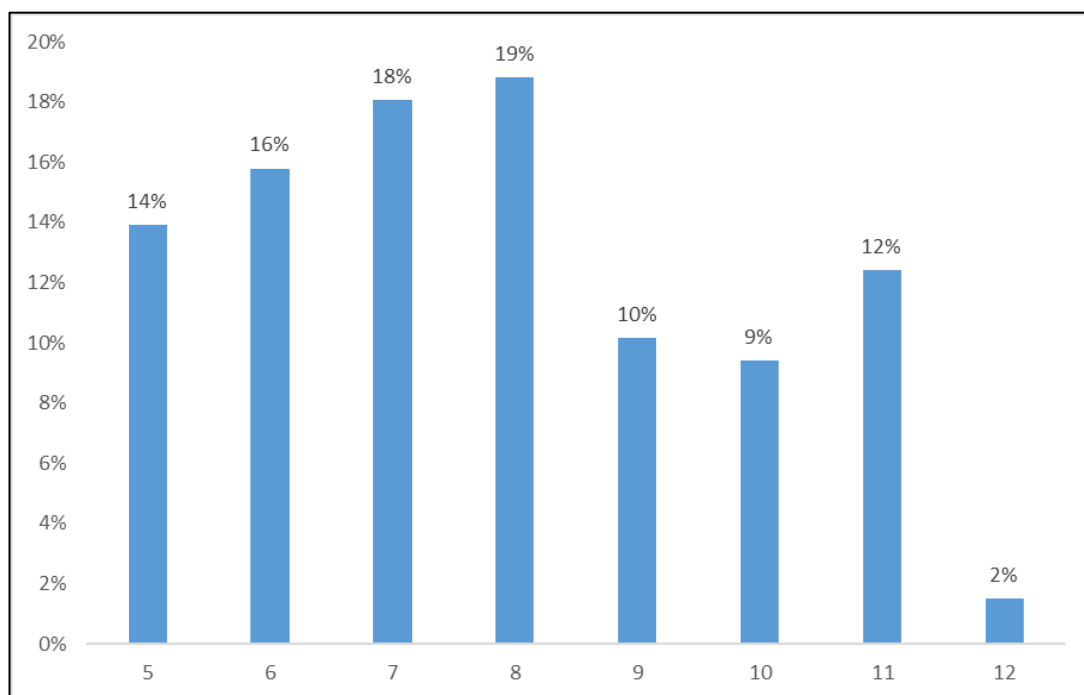


Question 2 – What are the ages of your children?

A summary of responses to question two is shown in Figure 2-14. The following can be concluded:

- 30 percent of the total children are enrolled in year one (ages five and six).
- 18 percent and 19 percent of total children are enrolled in year two and year three respectively (ages seven and eight).
- Ten percent and nine percent of total children are enrolled in year four and year five respectively (ages nine and ten).
- 14 percent of total children are enrolled in year six (ages 11 and 12).

Figure 2-14 – Ages of children at Waitara Public School



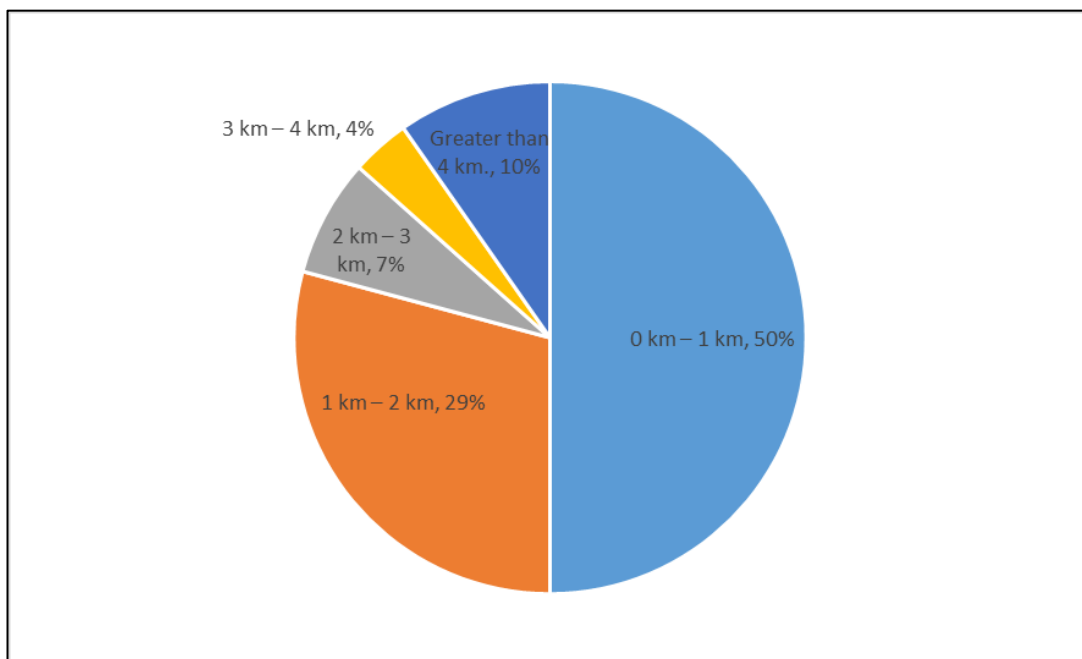
Question 3 – How far did your child/children travel to school today?

A summary of responses to question three is shown in Figure 2-15. The results of the responses found the following:

- 50 percent of children travel less than 1 km to access the school.
- 29 percent of children travel 1 km – 2 km to access the school.
- Seven percent of children travel 2 km – 3 km to access the school.
- Four percent of children travel 3 km - 4 km to access the school.
- Ten percent of children travel more than 4 km to access the school.

The survey identifies that approximately half students live within one kilometre of the school, with approximately 80 percent of students living within two kilometres. This indicates that a significant proportion of students are within an easy two-kilometre walking or bicycle riding catchment to/from the school.

Figure 2-15 – Distance Travelled by Students to Waitara Public School

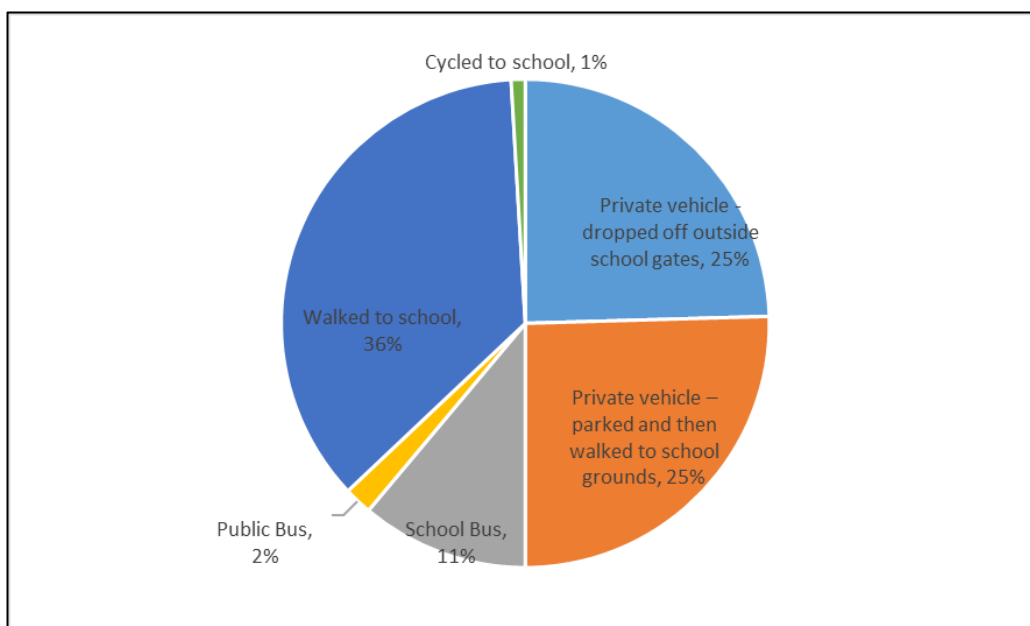


Question 4 - Which mode of transport did your child/children use to travel to school this morning?

A summary of the responses to Question 4 are provided in Figure 2-16. The results of the responses indicate the following:

- 25 percent of parents drop-off their children (by car) at the front of the school
- 25 percent of parents parked their vehicles nearby and walked their children to school.
- 36 percent of children walked to the school (either on their own or accompanied by a parent / guardian).
- 13 percent of students took the bus to school.
- One percent of students cycled to school.

Figure 2-16 – Mode of transport to Waitara Public School

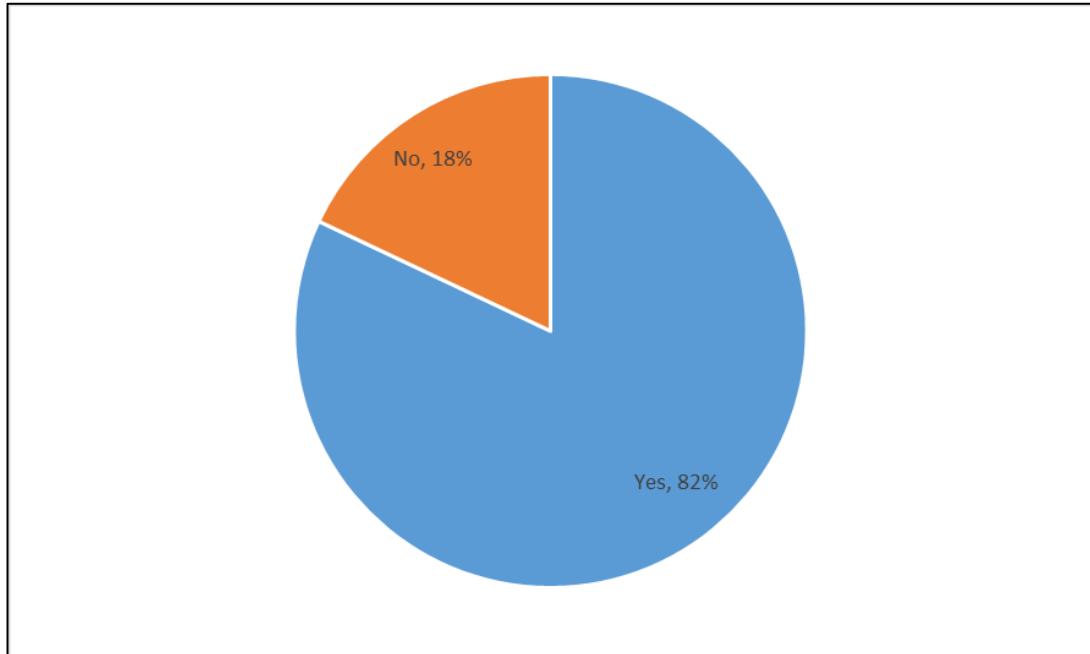


Question 5 – Did you accompany your child/children to school today?

A summary of the responses to Question 5 are provided in Figure 2-17. The results of the responses indicate the following:

- 82 percent of parent accompanied their child/children to school.
- 18 percent of parents did not accompany their children to school. This is consistent with the proportion of older children attending the school.

Figure 2-17 – Student Accompanied to Waitara Public School



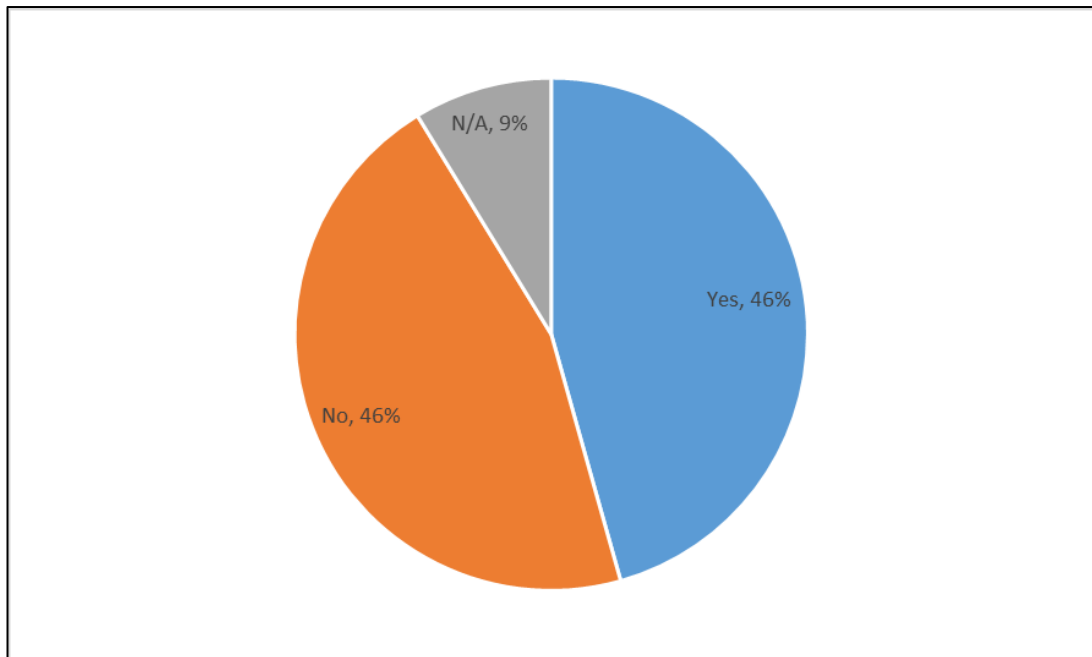
Question 6 – If yes, is your child's/children's trip to school part of another journey i.e. work or shopping?

A summary of the responses to Question 6 is provided in **Error! Reference source not found.** The results of the responses indicate the following:

- 46 percent of parents' trips to school were part of another journey.
- 46 percent of parents' trips to school were not part of another journey.
- The question was not applicable to 8 percent of parents.

The above data indicates that 46 percent of trips to the school (during the AM peak period) are undertaken as part of a journey to another destination, such as work or shopping. As such, these trips to the school would already occur and may involve a parent passing by or diverting to the school to drop their child / children off when travelling to another destination.

Figure 2-18 – Portion of Trips to Waitara Public School that are part of another Journey



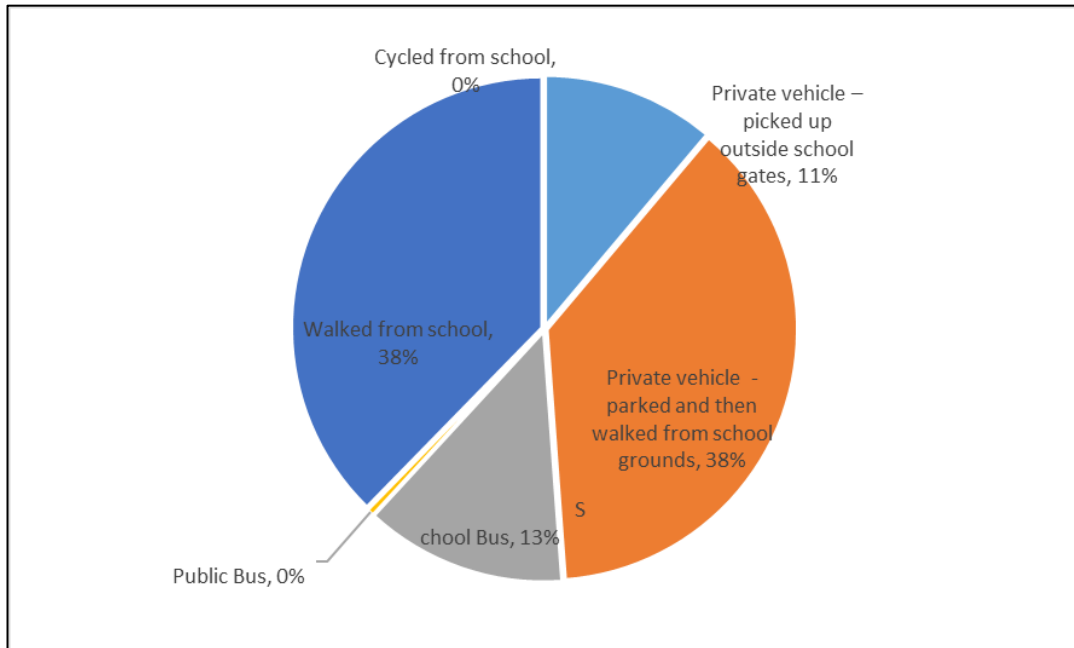
Question 7 – Which mode of transport did your child/children use to travel from school this afternoon?

A summary of responses to question seven is provided in Figure 2-19. The results of the responses indicate the following:

- 11 percent of parents picked up their children (by car) at the frontage to the school.
- 38 percent of parents parked their vehicles and walked their children from the school.
- 38 percent of children walked from the school (either on their own or accompanied by their parent / guardian).
- 13 percent of students took the bus from school.

The data indicates that use of the school's pick up / drop off facility is significantly lower during afternoon peak than compared to the morning peak period 25 percent in the morning compared with 11 percent in the afternoon. However, the overall travel mode split is similar to the morning peak, with 49 percent of trips using private vehicles and 38 percent of trips being "walk only".

Figure 2-19 – Mode of transport from Waitara Public School



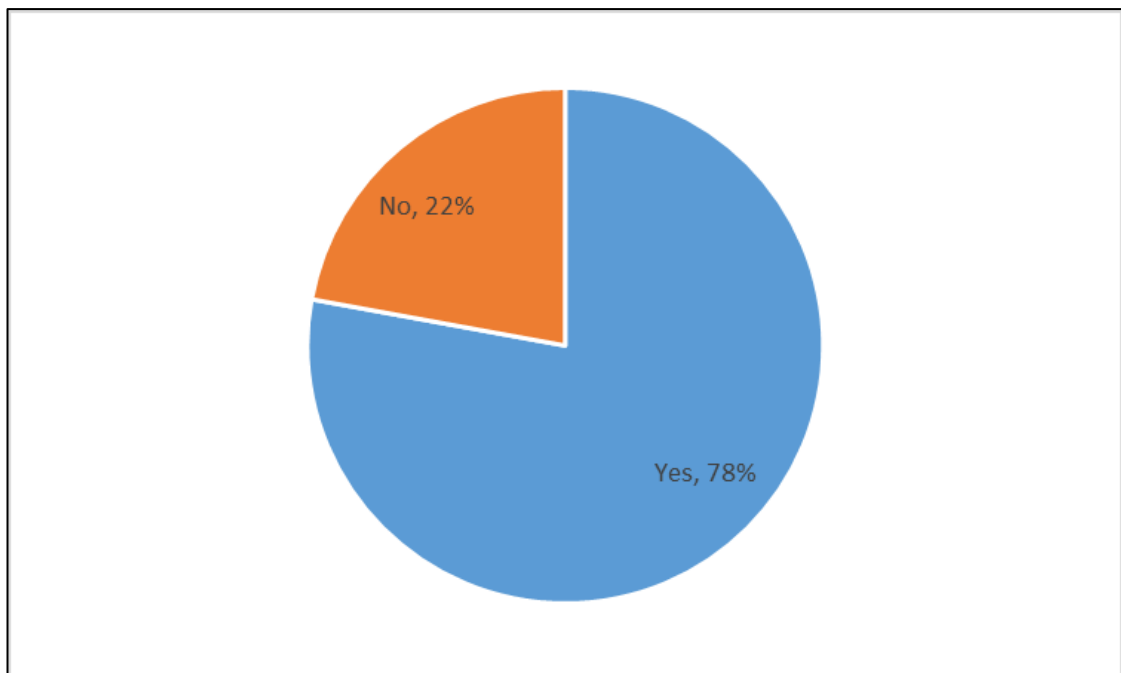
Question 8 – Did you accompany your child/children from school today?

A summary of the responses to Question 8 is provided in Figure 2-20. The results of the responses found the following:

- 78 percent of parent accompanied their child/children from school.
- 22 percent of parents did not accompany their child/children from school.

This is consistent with the proportion of older children attending the school.

Figure 2-20 – Students Accompanied from Waitara Public School



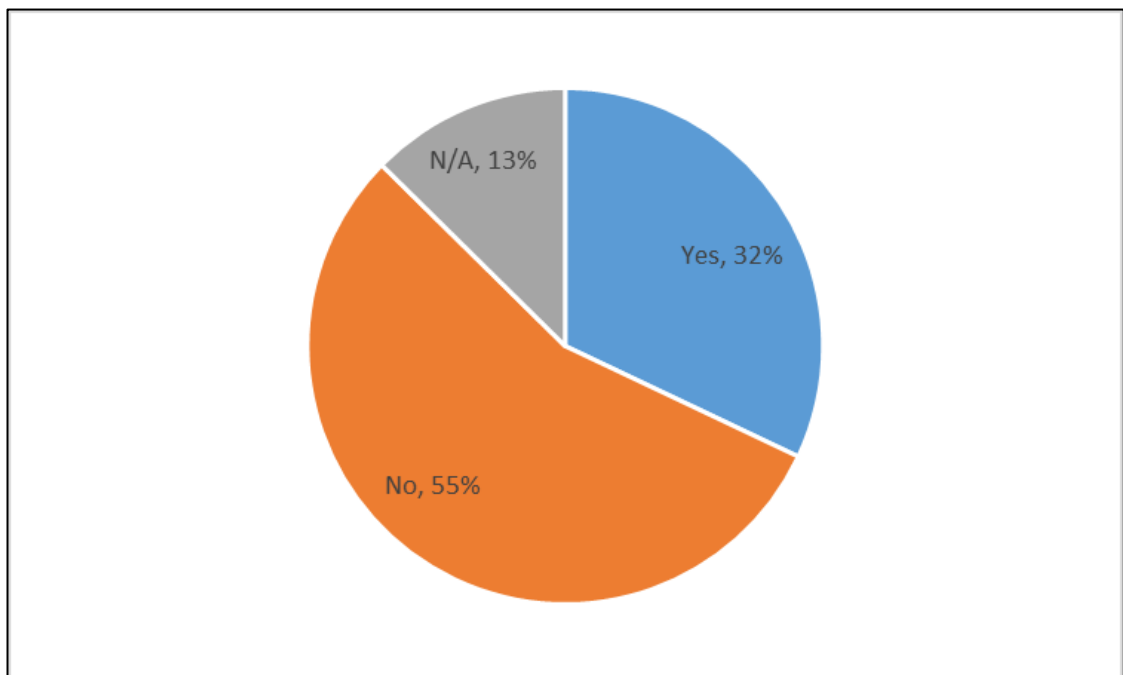
Question 9 – If yes, is your child’s/children’s trip from school part of another journey i.e. work or shopping?

A summary of the responses to Question 9 is provided in Figure 2-21. The results of the responses indicate the following:

- 32 percent of parents’ trips to school were part of another journey.
- 55 percent of parents’ trips to school were not part of another journey.
- The question was not applicable to 13 percent of parents.

The surveyed identified that a higher portion of the parent’s / guardian’s trips to the school were made as part of a journey to another destination during the AM peak (46 percent), compared to the PM peak (32 percent).

Figure 2-21 – Portion of trips from Waitara Public School that are part of another journey.



2.7.3 Manual Travel Model Survey

In order to quantify the mode choice of students and teachers accessing and egressing Waitara Public School, manual surveys were undertaken on Edgeworth David Avenue, Myra Street and Highlands Avenue on Monday 26th June 2017 (8:00 am – 9:30 am and 2:30 pm – 4:00 pm) to identify.

- The number of students being dropped off and picked up by their parents or guardians and the occupancy of these vehicles.
- The number of students accessing and egressing the school using buses.
- The number of students walking to and from the school.
- The number of vehicles accessing and egressing the school car park.

The location of these surveys is displayed below in Figure 2-22. Due to the limited scope of the survey area, it was not possible to determine the number of students travelling by train to school from Waitara Station.

Figure 2-22 – Manual School Activity Surveys



Source: Google Maps (2017), modified by GHD

A summary of the results of these manual travel mode surveys are shown in Table 2-2.

Table 2-2 – Mode of Travel Survey (Manual Travel Model Surveys)

Mode of Transport	AM Peak Entries (No. Students / %)		PM Peak Exits (No. Students / %)	
Pedestrian	334	55%	429	77%
Vehicle Pick-up/Drop-off	196	32%	19	3%
Bus	81	13%	110	20%
Total	611	100%	558*	100%

*Note: It was observed that students were still present at the school past the PM survey time of 2:30 pm – 4:00 pm.

The results shown in Table 2-2 indicate that:

- In the AM peak, 32 percent of trips to the school used the drop-off facility on Myra Street, with the majority of the remaining trips (55 percent) were identified as walking trips.
- In the PM peak, three percent of trips to the school used the pick-up facility on Myra Street, and the majority of the remaining trips (77 percent) were identified as walking trips.
- Approximately 13 to 20 percent of trips to / from the school were by public bus.
- The surveys did not identify any students cycling to / from school.

The outputs of the manual school travel mode surveys indicate that a much lower portion of students are picked up at the front of the school in the afternoon peak than are dropped off in the morning peak.

The survey observed that parents / guardians generally waited for longer periods to pick up their children during the PM peak than during the AM peak. This indicates that a higher portion of parents are required to park their vehicles further away from the school and walk to collect their child / children in the afternoon peak, compared to the morning peak. As vehicle dwell times are generally shorter during the AM peak when parents / guardians drop off their children (by car), more vehicles were observed to utilise the drop-off facility on Myra Street.

The outputs of the Manual Travel Mode Surveys are included in Appendix D.

Analysis

The manual school travel mode surveys did not identify whether students travelled to school by “walking only”, or if they were driven by car and walked from a nearby street (as shown in Figure 2-22). However, the online school travel survey indicates the following:

- In the AM peak, 36 percent of children walked to school and 25 percent “parked then walked”.
- In the PM peak, 38 percent of children walked from school and 38 percent “parked then walked”.

These portions have been applied to “pedestrian” ¹volumes in Table 2-2 to separate the “walk only” trips from “park and walk” trips. The resulting school travel mode proportions are shown in Table 2-3.

Table 2-3 – Updated Mode of Travel Data

Mode of Transport	AM Peak Entries (No. Students / %)		PM Peak Exits (No. Students / %)	
Walk Only	197	32%	215	38%
Park and Walk	137	23%	215	38%
Vehicle Pick-up/Drop-off	196	32%	19	4%
Bus	81	13%	110	20%
Total	611	100 %	558*	100 %

*Note: It was observed that students were still present at the school past the PM survey time of 2:30 pm – 4:00 pm.

The data in Table 2-3 indicates:

- 32 percent – 38 percent of students walk to school (walk only).
- 42 percent – 55 percent of students are driven to school.
- 13 percent - 20 percent of students utilise public transport.

The survey at the teachers’ car park identified six inbound trips in the AM period and five outbound trips in the PM period.

¹ ¹ As an example of this in the AM peak, the volume of walk only students was identified as $36/61 \times 334 = 197$

2.8 Current Network Operation

2.8.1 Intersection Analysis

The operation of the three intersections of interest has been assessed using SIDRA 7.0.

SIDRA calculates the amount of delay to vehicles using an intersection and, amongst other performance measures, gives a Level of Service (LoS) rating which indicates the relative performance of traffic movements within the intersection.

Table 2-4 presents the criteria generally applied to intersection performance. The Level of Service is determined from the calculated delay to traffic movements, which is a representation of driver frustration, fuel consumption and increased travel time. There are six LoS measures ranging from A (very low delay and very good operating conditions) to F (over saturation where arrival rates exceed intersection capacity) Typically a level of service (LoS) D or better is considered to be acceptable, however a LoS E may be acceptable if it also operates with a low degree of saturation.

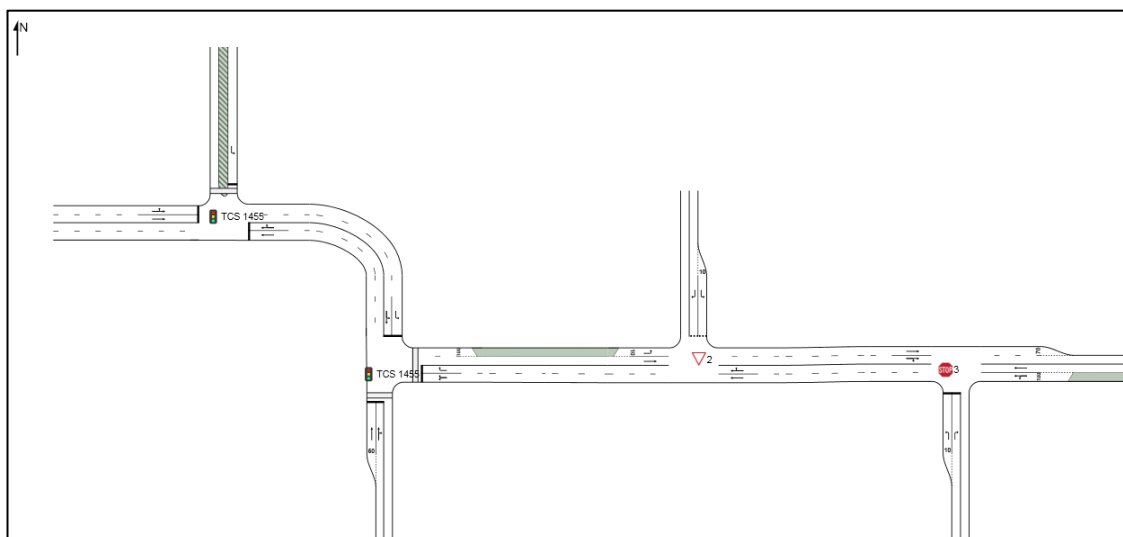
Table 2-4 – Intersection Level of Service Criteria

LoS	Average Delay/ Vehicle (sec)	Traffic Signals & Roundabouts	Give-way & Stop signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory, but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays; roundabout requires other control mode	At capacity; requires other control mode
F	exceeding 70	Unsatisfactory; requires additional capacity	Unsatisfactory, requires other control mode.

Signal Plans for the intersection of Edgeworth David Avenue / Palmerston Road and Edgeworth David Avenue and Myra Street was provided by Roads and Maritime.

The layout of the intersections of interest (as modelled in SIDRA) are displayed below in Figure 2-23.

Figure 2-23 – Existing Intersection Geometry



The results of the SIDRA analysis based on the existing traffic volumes and road geometry is displayed in Table 2-5.

Table 2-5 – Intersection Performance - 2017

Intersection	AM Peak			PM Peak		
	Delay	LoS	95% Queue	Delay	LoS	95% Queue
Edgeworth David Avenue and Palmerston Road	14	B	130	14	B	129
Edgeworth David Avenue and Myra Street	31	C	150	29	C	150
Edgeworth David Avenue and Jubilee Street	2	A	15	2	A	23
Edgeworth David Avenue and Ingalaria Avenue	1	A	9	1	A	14

The results in Table 2-5 indicate that:

- The intersections of interest typically operate with a Good LoS.
- Analysis indicates that the right turning vehicles from Jubilee Street and Ingalaria Avenue experience delays consistent with a LoS F. The reason for this due to the heavy traffic volumes on Edgeworth David Avenue there are insufficient gaps for right turning vehicles from the minor roads. All the other movements at these two intersections operate with LoS A and LoS B.
- Very few vehicles on Jubilee Street (six vehicles in peak periods) and Ingalaria Avenue (one vehicle) undertake this right turn manoeuvre, which is consistent with the long delays.

2.8.2 Mid-Block Analysis

Table 2-6 (from the Roads and Maritime Guide to Traffic Generating Developments) indicates the mid-block capacities for urban roads.

Table 2-6 – Urban Road Mid-Block Capacities

Level of Service	One Lane veh/h	Two Lanes veh/h
A	200	900
B	380	1,400
C	600	1,800
D	900	2,200
E	1,400	2,800

In accordance with the above criteria (corresponding to a LoS D) Palmerston Road and Myra Street have mid-block capacities of 900 vehicles per hour per lane and Edgeworth David Avenue of 2,200 per hour per lane.

The traffic survey outputs (see Appendix A) and data from the Roads indicate that the roads in this vicinity of the school currently operate within the acceptable limits of their mid-block capacities.

2.9 On Street Parking

The on-street parking arrangements in the vicinity of Waitara Public School are shown in Figure 2-24, which includes:

- Un-restricted parking.
- No-parking.
- Time restricted no-parking.
- Bus zones.
- Drop off zones.

Figure 2-24 – Parking in Proximity to Waitara Public School



- Parking on Edgeworth David Avenue at the front and to the west of the school is typically not permitted.
- The school drop off and pick up facility is located on the eastern side of Myra Street.
- Bus zones are located on Edgeworth David Avenue and Jubilee Street.
- Parking on the road network in proximity to the school is typically unrestricted.

3. The Proposed Development

The proposed scope of works includes the demolition of 15 “demountable” structures and five Modular Design Range (MDR) buildings and the current permanent buildings (except Building M).

A total of 37 new teaching spaces will be provided, (predominantly in a new four storey building which will be constructed in the north western corner of the school) bringing the capacity of the school to 42 teaching spaces.

The capacity of the school is expected to increase from 760 students and 32 teachers to 1,000 students and 42 teachers

The proposed expansion is expected to be completed in 2021.

Figure 3-1 shows the proposed demolitions plan of the school and Figure 3-2 shows the proposed site and elevation plans.

Figure 3-1 – Waitara School Site Demolition Plan

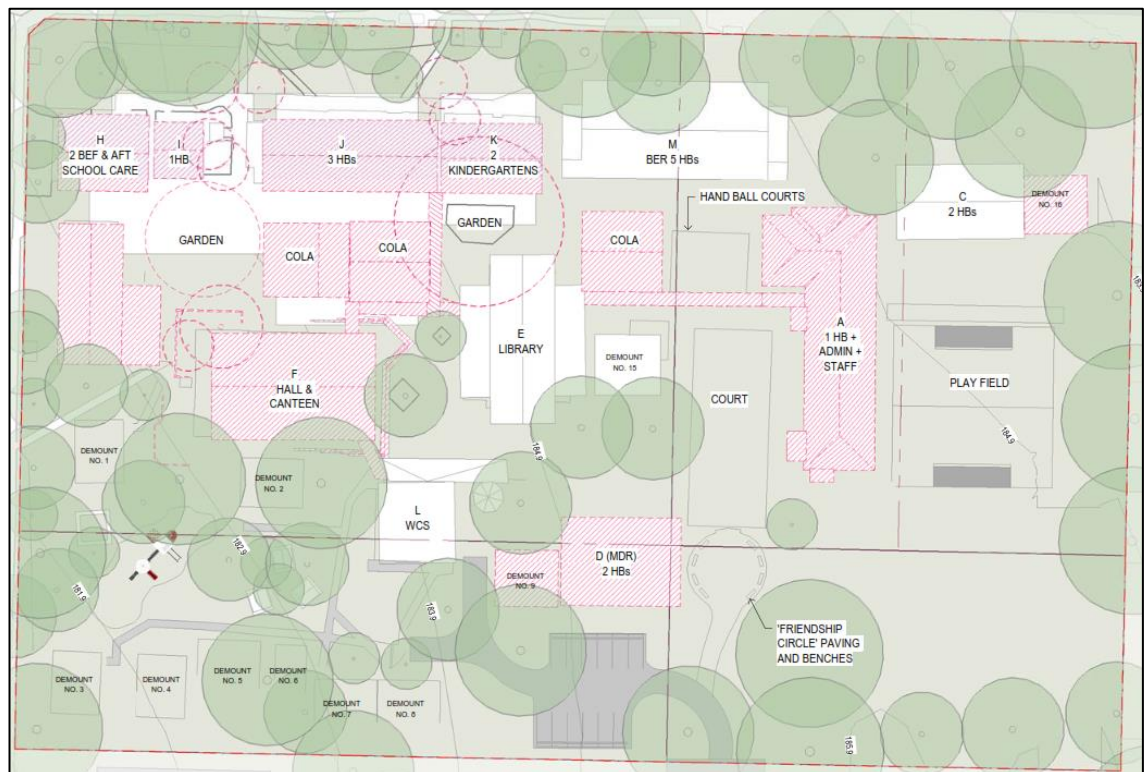
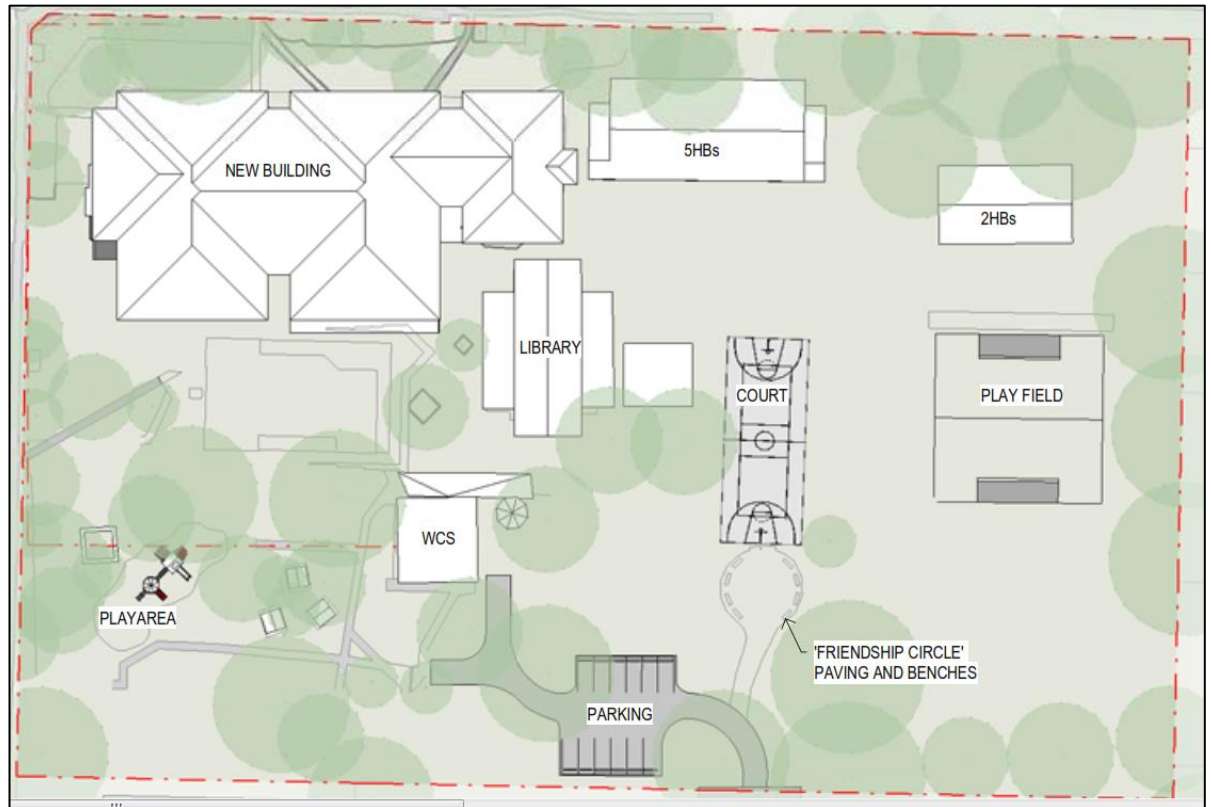


Figure 3-2 – Proposed Waitara School Expansion



3.1 Site Access Arrangements

The current site access arrangement to Waitara Public School is not expected to change, namely:

- Pedestrian access to Waitara Public School will be provided on Edgeworth David Avenue, Myra Street and Highlands Avenue.
- The vehicle pick up/drop off zone (of approximately 40 m) is provided on Myra Street with vehicular access to the staff car park provided from Highlands Avenue.

3.2 Parking

3.2.1 Proposed Parking Supply

The existing staff car park (which is accessed from Highlands Avenue) provides 12 parking bays. It is proposed to maintain this parking supply for the proposed expansion and not provide any additional parking.

3.2.2 Parking Requirements

The Hornsby Development Control Plan (DCP) specified that parking at educational facilities should be provided at the following rate:

One space per full time teacher + 1 space per 2 students of driving age.

The number of teachers employed at Waitara Public school is expected to increase from 32 to 42. Based on this, the ratio of parking spaces for teachers will be provided at a rate of one parking bays per three and a half teachers.

Based on the current parking provision at Waitara Public School and number of staff can be inferred that up to 20 teachers use active/public transport to access the school, car pool or park on the adjoining road network.

As stated previously, Waitara Public School is well served by public transport and travel demand measures, such as car sharing, can be implemented to encourage alternative travel modes than single occupancy vehicle trips generated by the school.

In addition, the DoE provides a set of guidelines with respect to the provision of parking at schools in the Educational Facilities Standards and Guidelines (PS610.17 Service Zone), which states that:

In order to ensure that the available site are for teaching, learning and play is maximised, to enable community use and to encourage sustainable means of transport to and from school, on school parking should be kept to a minimum.

As such, the provision of no additional parking within Waitara Public School is consistent with DoE Guidelines.

3.2.3 Bicycle Parking

The Hornsby DCP specifies that bicycle parking should be provided at the following rates:

- One rack per 20 full time staff or part there of:
- Five racks per class between grades 5 and 12
- End of trip facilities for staff in the form of a shower cubicle and change rooms for every 10 bicycle racks.

There are currently 23 bike racks (which can accommodate 46 bikes) within Waitara Public School. These are located adjacent to the school library.

Assuming that upon completion of the expansion 12 of the teaching spaces will be provided for grades 5 and 6, then the following bicycle parking will be required:

- 2 racks for teachers
- 60 bicycle racks for students

The results of the online survey questionnaire and the manual travel mode surveys indicate very few students (approximately one percent) currently cycle to school, which is consistent with the relatively poor bicycle rider network in proximity to Waitara Public School. Thus the provision of 62 bike racks (which could accommodate 124 bikes) is likely to significantly exceed demand.

Discussions with the principal of Waitara Public School indicates that there are rarely more than five bicycle parked at the existing facility.

It is therefore recommended that an area be identified for potential increase in bicycle parking provision and the utilisation of the current 23 bicycle racks be monitored and additional bicycle parking be provided if required.

It is proposed to provide shower facilities for staff within the new four storey building.

3.2.4 Pick up and Drop

The pick-up / drop-off facility for Waitara Public School at Myra Street is approximately 40 m. long. Assuming that a parked car requires a length of six metres, this facility can currently accommodate approximately six parked vehicles.

Peak hour site observations indicate that the designated drop-off zone experiences high demand and sometimes operates under congested conditions. As the student population of the

school is expected to increase by around 40 percent compared to the existing number of students, an expansion of the current pick-up / drop-off facility may be required.

As displayed in Figure 2-24, there is a length of unrestricted parking on the east side of Myra Street (adjacent to the north of the existing facility) with a length of approximately 40 m that could potentially be converted into a drop off facility. This would effectively double the capacity of the existing facility to approximately 12 cars.

Any changes to the parking in proximity to the school to provide enhanced pick-up / drop-off functionality will require approval from Hornsby Shire Council.

3.3 Travel Demand Measures

Travel demand management (TDM) is a term for strategies that encourage a shift from single occupant private vehicles trips and provide solutions for improving transport efficiencies while reducing negative impacts associated with the use of private motor vehicles.

The implementation of TDM at Waitara Public School has the potential to provide significant utility to teachers, parents and students.

Green Travel Plan

A key element of TDMs is the development of a School Green Travel Plan (GTP), which is a package of initiatives aimed at reducing car travel, particularly single occupant trips (this is also referred to as a School Travel Management Plan). In the case of GTPs for schools, their intent is to encourage greater use of public transport, walking and cycling by staff, students and visitors to a school, with the aim of reducing traffic and parking impacts within communities.

This is particularly important in a schools context, as schools are often located in residential areas where surrounding residents are negatively impacted by the significant peaks of traffic at school pick-up and drop-off time. Furthermore, there has been a trend towards increasing the size of schools, which puts pressure on the space at schools. On-site car parking is often a luxury which schools cannot afford to apportion limited land resources.

Some of the key tasks associated with the preparation of a GTP for Waitara Public School could include the following:

Stage 1: Baseline understanding of current behaviours:

- Establish a Green Travel Plan Working Group to coordinate specific actions and track the progress of key initiatives (Note this is important- as many initiatives will extend for some time as they will involve engaging with Council on infrastructure upgrades).
- A key component of the travel plan is to identify current patterns of walking, bicycle riding and public transport access to the school to provide a baseline with which to monitor change in travel patterns. The data included in this report includes data that could be utilised for these purposes.
- Collect available data available on similar schools which have transitioned towards sustainable travel and examine the key initiatives which had helped with their transition (note: This is of use as an educational tool amongst the school community to show that sustainable travel to school is possible and attainable with the right support and infrastructure).
- Audit the recommended walking and bicycle riding routes.
- Prepare and undertake a survey to identify current barriers to active transport utilisation. This should also include factors such as parental/carer work commute as it is understood that many parents who work are constrained not by the distance they live from the school

but by their work location or the nature of their work. (Note: This will later feed into the setting of non-car commuting targets).

Stage 2: Catchment Analysis:

- Identify catchment of the school- this should involve the school's official catchment area but also the mapping of students and staff addresses in GIS. It is noted that for privacy only the street name (not a number) of students will be provided.
- Prepare a 'pedshed', 'cycleshed' and 'scootershed' map which shows the number of students and staff who are living within walking, scootering and cycling distance from the school.
- Following on from the above- A route map showing the number of students and staff who live within a 30-minute public transport trip from the school will also be prepared.
- Analysis of all those student and staff living outside a reasonable walk, scoot, cycle or public transport commute to school (Note: This will later feed into the setting of non-car commuting targets).

Stage 3: Develop plan

- Provide information to students and parents / carers of public transport options and services. Ensure the messaging is targeted so that people see the benefits of the program rather than feel threatened.
- Develop an action plan that details strategies to address barriers to active transport utilisation at the Waitara Public School. This will include short term actions as well as longer-term projects which may include engaging with Council on developing safe active transport routes to school that are designed to ensure kids are separated from traffic so parents feel comfortable allowing kids to get to school by walking, scooter and cycling.
- Become involved in activities / programs such as the National Walk Safely to School Day, TravelSmart and Ride2School. Celebrate active transport.
- Run classroom and curriculum activities to promote active and safe transport. This may include programmes such as bike-skills programs aimed at building kids skills and safety for riding in urban environments.
- Prepare a funding strategy to implement the GTP.
- Set SMART targets (specific, measurable, achievable, relevant, and timed) i.e. 50 percent of the new students will walk to school by 2020.
- Undertake regular communication with parents about GTP initiatives using the school's newsletter and app.
- Establish a monitoring and review mechanism i.e. six monthly travel surveys.

Council Involvement

Hornsby Shire Council could assist the implementation of a GTP by:

- Reviewing and implementing infrastructure changes around Waitara Public School (i.e. signage, bicycle paths, footpath and pedestrian crossing infrastructure and bus stop facilities / infrastructure).
- Provide ongoing traffic enforcement to increase student safety.
- Assist with the funding strategies to the NSW Government.
- Assist with the promotion of active transport at Waitara Public School.

Car Sharing

The development of car sharing schemes can be applicable for staff and parents. A database could be developed to enable parents to identify other nearby parents to promote carpooling.

It is considered that staff should be encouraged to car pool with designated parking bays allocated to teachers that car share.

4. Traffic Impact Assessment

4.1 Traffic Distribution

The additional trips expected to be generated by the Waitara Public School expansion have been distributed onto the surrounding road network based on observed traffic flows from the intersections traffic counts, as provided in Appendix A.

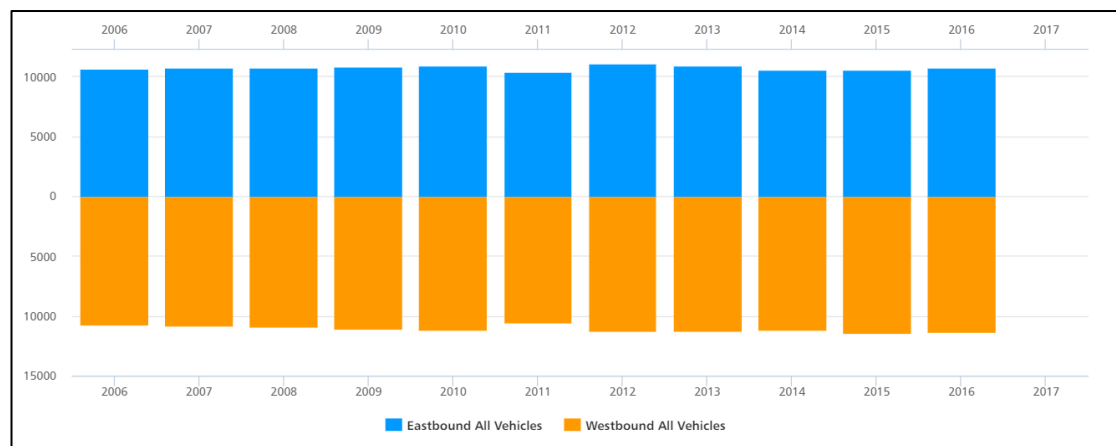
4.2 Background Traffic Growth

In accordance with typical Roads and Maritime requirements, the impact of the additional traffic expected to be generated by the school expansion has been assessed for the opening year (2021) and the 10-year design horizon of 2031.

Average daily traffic volumes from the Roads and Maritime count station on Edgeworth David Avenue, for years between 2006 and 2016, are shown in Figure 4-1. The data in Figure 4-1 indicates that there has been no growth on Edgeworth David Avenue in the last ten years.

However, in order to be conservative, a two percent growth rate ²has been applied to the current traffic volumes (as identified in the traffic surveys) in order to identify the horizon year baseline traffic volumes and account for high-density zoning in proximity to the schools.

Figure 4-1 – Edgeworth David Avenue, Average Daily Traffic Profile by Year (Count Station 74077)



4.3 Traffic Generation

Total Trips

The trip generation for Waitara Public School has been undertaken on a first principles basis accounting for:

- The current and proposed student populations.
- The modes of transport currently used by the student population.

The results of the manual travel mode surveys (Table 2-3) indicate:

- In AM peak period, 333 of 611 student trips were undertaken by private vehicle.
- In the PM peak period, 234 of 558 student trips were undertaken by private vehicle.

Utilising the above data, the current vehicle trip generation rate at Waitara Public School is:

² The application of a two percent growth rate has been discussed and agreed with Council

- 0.54 trips per student in AM peak periods.
- 0.42 trips per student in PM peak periods.

The proposed the school expansion is expected to increase the number of students at Waitara Public School from 760 to 1000 students.

Based on the above rates, the additional 240 students are expected to generate:

- 131 inbound and 131 outbound vehicle trips in AM peak periods (8:00 am – 9:30 am).
- 100 inbound and 100 outbound vehicle trips in PM peak periods (2:30 pm – 4:00 pm).

Peak Hour Trips

Further analysis has been undertaken to identify the expected additional trips at the school during the AM and PM peak hours of activity at the school, which were identified as:

- 8:30 am – 9:30 am.
- 3:00 pm – 4:00 pm.

The manual travel mode surveys indicate:

- Approximately 95 percent of pedestrian activity occurred in the AM peak hour and approximately 99 percent of pedestrian activity occurred in the PM peak hour of school activity (no students were recorded entering the school prior to 8:30 am).
- Approximately 87 percent of vehicle drop off activity occurs in the school AM peak hour and 89 percent of pick up vehicle activity occurs in the school PM peak hour.
- A vehicle occupancy rate of 1.14 in the AM peak period and 1.27 in the PM peak period.

Thus the expansion of Waitara Public School is expected to generate:

- 104 inbound and 104 outbound vehicle trips in the AM peak hour (8:30 am – 9:30 am).
- 79 inbound and 79 outbound vehicle trips in PM peak hour (3:00 pm – 4:00 pm).

The surveys indicate that the teacher's vehicle activity does not coincide with student activity and thus have not been included in trip generation assessment.

4.4 Intersection Performance

Intersection traffic modelling, using the SIDRA 7 modelling software, has been undertaken for the following two scenarios:

- A “no-build” scenario, accounting for the background traffic growth (which includes the current activity at Waitara Public School).
- A “build” scenario accounting for the background traffic volumes and the trips associated with the proposed expansion of Waitara Public School.

A summary of the SIDRA results for the 2021 and 2031 “no-build” and “build” scenarios are displayed in Table 4-1 and

Table 4-2.

The results in Table 4-1 indicate that the intersections of interest are expected to operate with an acceptable level of service in the 2021 horizon year. The SIDRA outputs indicate that right turning vehicles from Jubilee Street and Ingalara Avenue will continue to experience long delays.

The results in Table 4-2 indicate that in the 2031 horizon year that the intersection if Edgeworth David Avenue will operate with a LoS F in both the “build” and “no build” scenarios.

The forecast 2021 and 2031 traffic volumes for both of these scenarios are shown in Appendix B, with SIDRA outputs included in Appendix E.

Table 4-1 – Intersection Performance (2021)

Intersection with Edgeworth David Avenue	2021 – “No Build”						2021 – “Build”					
	AM Peak			PM Peak			AM Peak			PM Peak		
	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue
Palmerston Road	13	B	145	12	B	116	15	B	135	15	B	145
Myra Street	32	C	185	30	C	195	35	D	220	42	D	260
Jubilee Street	2	A	17	3	A	25	2	A	17	3	A	21
Ingalaria Avenue	2	A	12	2	A	19	2	A	13	2	A	19

Table 4-2 – Intersection Performance (2031)

Intersection with Edgeworth David Avenue	2031 – No Build”						2031 - Build					
	AM Peak			PM Peak			AM Peak			PM Peak		
	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue	Delay (s)	LoS	95% Queue
Palmerston Road	19	B	180	30	C	250+	28	C	245	50	D	250+
Myra Street	140+	F	250+	140+	F	250+	140+	F	250+	140+	F	250+
Jubilee Street	4	A	65	14	B	87	5	A	65	14	B	87
Ingalaria Avenue	3	A	250+	4	A	250+	3	A	250+	3	A	250+

4.5 Mitigation Measures

4.5.1 Edgeworth David Avenue and Myra Street

SIDRA outputs indicate that the Edgeworth David Avenue / Myra Street intersection will perform unsatisfactorily for both the “no-build” and “build” cases.

The SIDRA modelling indicates that the traffic associated with the proposed expansion of Waitara Public School would have a negligible impact on the operation of this intersection.

Accordingly, no mitigation measures for the intersection of Pennant Hills Road and Marsden Road are proposed as part of this assessment, as the intersection is expected to operate at an unsatisfactory LoS and would require an upgrade without the proposal.

5. Construction Traffic Management

5.1.1 Introduction

Details about the construction phases of the proposed Waitara Public School and the expected volumes of workers vehicles and heavy vehicles are not available for the purposes of this study. It is assumed that a detailed Construction Traffic Management Plan (CTMP) will be prepared when this data becomes available.

It is expected that (at a minimum) the phases of construction will consist of the following:

- Pre-construction, project preparation including surveys and site preparations.
- Enabling works, including the demolition of existing structures and removal from the site.
- Construction works, including construction of the proposed new structures.

The overall principles of construction traffic management are as follows:

- Minimise effects on pedestrian movements and amenity.
- Manage and control vehicular movement to and from the site.
- Maintain the traffic capacity at nearby intersections (where possible).
- Restrict vehicle activity to designated truck routes.
- Maintain safety for workers.
- Provide appropriate access to the site for excavation and construction traffic.

The CTMP will identify key mechanisms during the construction phase of the project by which the safety of workers and the general public will be maintained, both on site and on the adjoining road network. Given the construction site is within a school, maintaining a safe environment for students and teachers will be of critical importance.

5.1.2 Construction Hours

The NSW Interim Construction Noise Guidelines specified that construction works can take place at the following times:

- Monday to Friday 7:00 am – 6:00 pm;
- Saturday 8:00 am – 1:00 pm; and
- No work on Sundays and Public.

It is recommended that a curfew is put in place to prevent heavy vehicles accessing / egressing the school during peak periods of student activity (i.e. between 8:00 am – 9:30 am and 2:30 pm – 4:00 pm).

5.1.3 Truck Routes

It is recommended that as part of the CTMP, that the prescribed route for service vehicles to and from the subject site include the Pacific Highway and Edgeworth David Road in order to minimise impacts on local residences.

Swept path analysis will be required to ensure the nominated design vehicle can enter the site manoeuvre internally and exit the site in a forward direction.

5.1.4 Construction vehicle types

The construction of the proposed school expansion is expected to involve the use of a number of different vehicle types. The project involves the demolition of existing buildings and construction of new teaching spaces which will require removal and delivery of various materials including spoil / waste, steel reinforcement, concrete and fit out equipment. This will require the delivery of building materials that would typically involve medium rigid vehicles (i.e. concrete trucks), heavy rigid vehicles (i.e. spoil removal vehicles) and the use of up to an 'articulated Vehicle' (19 m in length) for such activities as steel reinforcement deliveries.

6. Summary and Conclusion

GHD has been engaged by the NSW Department of Education to undertake a Traffic Impact Assessment to support the proposed expansion of Waitara Public School.

The proposed scope of works includes the demolition of 15 “demountable” structures and five Modular Design Range (MDR) buildings and the current permanent buildings (except Building M).

A total of 37 new teaching spaces will be provided, predominantly in a new four storey building which will be constructed in the north western corner of the school.

The capacity of the school is expected to increase from 760 students and 32 teachers to 1,000 students and 42 teachers

The proposed expansion is expected to be completed in 2021, therefore the design horizon year for traffic analysis purpose, ten years after the opening of the development would be 2031.

6.1 Public Transport

A summary of the bus routes operating in proximity to Waitara Public School and their approximate frequency is provided in Table 2-1. Waitara Public School is served by a number of school buses operated by Transdev that provide transfers from nearby train stations such as Hornsby Station and Wahroonga Station.

The nearest bus stops to the school are located at Edgeworth Drive Avenue approximately 85 m east of the intersection with Myra Street.

Waitara Station is located approximately one km (walking distance) to the south of Waitara Public School.

Waitara Train Station is served by the T1 North Shore, Northern and Western Line. During peak periods of operation, trains on the T1 Line operate with 10 to 15 minute frequencies.

6.2 Active Transport

There are currently no dedicated cycleways or bicycle facilities in the vicinity of Waitara Public School with the exception of a medium difficulty route along Alexandria Parade. The route connects to Pacific Highway and railway Parade in the north providing access to the suburbs of Hornsby and Asquith.

A high-quality pedestrian environment is provided in proximity to Waitara Public School to facilitate the safety and mobility of students, their guardians and teachers. This includes concrete footpaths, signal controlled crossings at signalised intersections and pedestrian crossings.

There has been a single recorded crash involving a pedestrian in the last five years, suggesting that these facilities operate in a safe and efficient manner.

6.3 Mode of Travel

In order to identify data about the mode of transport used by students to access and egress Waitara Public School, an online questionnaire was sent out by the school for parents to complete. A copy of the questionnaire is included in Appendix C.

In order to obtain additional data to quantify the mode choice of students and teachers accessing and egressing Waitara Public School, manual surveys were undertaken on Edgeworth David Avenue and Myra Street on Monday 26th June 2017 (8:00 am – 9:30 am and

2:30 pm – 4:00 pm) to identify pedestrian activity, vehicle activity and public transport activity (bus only).

The mode split data identified in these surveys are presented in Table 6-1.

Table 6-1 – Waitara Public School Mode Split Data

Mode of Transport	AM Peak Entries (No. Students / %)		PM Peak Exits (No. Students / %)	
Walk Only	197	32%	215	38%
Park and Walk	137	23%	215	38%
Vehicle Pick-up/Drop-off	196	32%	19	4%
Bus	81	13%	110	20%
Total	611	100 %	558*	100 %

6.4 Parking

There are currently 12 parking space provided within the school site for the exclusive use of the teaching staff. It is proposed to maintain this parking supply within the school.

The provision of no additional parking within Waitara Public School is consistent with DoE Guidelines.

6.5 Traffic Generation

The trip generation for Waitara Public School has been undertaken on a first principles basis accounting for:

- The current and proposed student populations.
- The modes of transport currently used by the student population.

The additional 240 students are expected to generate:

- 104 inbound and 104 outbound vehicle trips in the AM peak hour (8:30 am – 9:30 am).
- 79 inbound and 79 outbound vehicle trips in PM peak hour (3:00 pm – 4:00 pm).

6.6 Traffic Impact

Intersection traffic modelling, using SIDRA, has been undertaken at the following intersections to analyse the traffic impact of the proposed school expansion:

- Edgeworth David Avenue and Palmerston Road.
- Myra Street and Edgeworth David Avenue.
- Edgeworth David Avenue and Jubilee Street.
- Edgeworth David Avenue and Ingalara Avenue.

The results of the SIDRA modelling indicates that the intersections of interest are typically expected to operate with an acceptable LoS in the 2021 and 2031 horizon years.

The intersection of Edgeworth David Avenue and Myra Street is expected to operate with a poor LoS in the 2031 “build” and “no-build” scenarios.

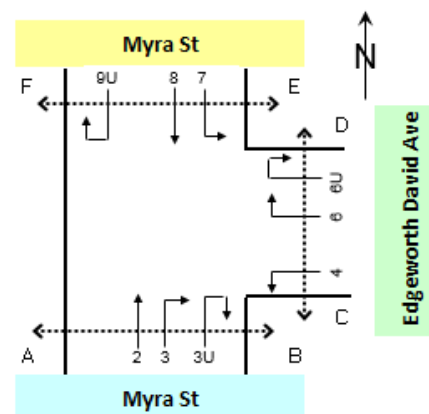
No mitigation measures are put forth as part of this proposal.

Appendices

Appendix A – Traffic Survey Outputs

Job No. : N3320
 Client : GHD
 Suburb : Waitara Public School
 Location : 1. Edgeworth David Ave / Myra St

Day/Date : Mon, 26th June 2017
 Weather : Fine
 Description : Classified Intersection Count
 : Peak Hour Summary

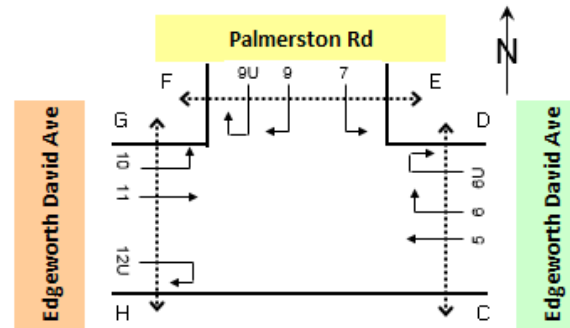


Approach	Myra St			Edgeworth David Ave			Myra St			Grand Total
	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM 8:30 to 9:30	407	14	421	796	26	822	796	23	819	2,062
PM 15:00 to 16:00	323	5	328	935	32	967	874	21	895	2,190

Approach	Myra St			Edgeworth David Ave			Myra St			Grand Total
	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
8:00 to 9:00	361	14	375	756	22	778	811	28	839	1,992
8:15 to 9:15	393	14	407	773	28	801	822	23	845	2,053
8:30 to 9:30	407	14	421	796	26	822	796	23	819	2,062
AM Totals	564	16	580	1,164	37	1,201	1,218	37	1,255	3,036
14:30 to 15:30	336	3	339	811	32	843	906	25	931	2,113
14:45 to 15:45	327	5	332	894	34	928	893	23	916	2,176
15:00 to 16:00	323	5	328	935	32	967	874	21	895	2,190
PM Totals	501	7	508	1,303	52	1,355	1,325	33	1,358	3,221

Job No. : N3320
 Client : GHD
 Suburb : Waitara Public School
 Location : 2. Edgeworth David Ave / Palmerston Rd

Day/Date : Mon, 26th June 2017
 Weather : Fine
 Description : Classified Intersection Count
 : Peak Hour Summary

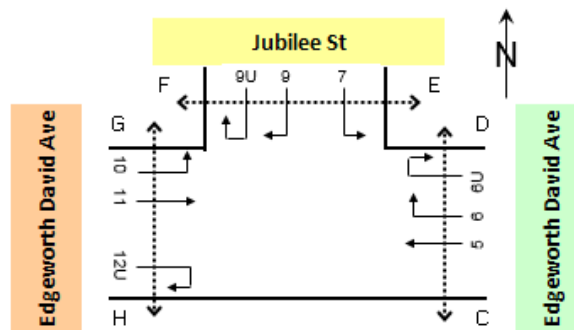


Approach		Edgeworth David Ave			Palmerston Rd			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:30 to 9:30	1,044	37	1,081	153	1	154	675	24	699	1,934
PM	14:45 to 15:45	1,084	33	1,117	166	1	167	762	23	785	2,069

Approach		Edgeworth David Ave			Palmerston Rd			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
8:00 to 9:00		972	30	1,002	166	2	168	682	26	708	1,878
8:15 to 9:15		1,015	36	1,051	177	1	178	676	24	700	1,929
8:30 to 9:30		1,044	37	1,081	153	1	154	675	24	699	1,934
AM Totals		1,496	47	1,543	245	3	248	1,023	36	1,059	2,850
14:30 to 15:30		1,000	30	1,030	158	1	159	777	25	802	1,991
14:45 to 15:45		1,084	33	1,117	166	1	167	762	23	785	2,069
15:00 to 16:00		1,103	34	1,137	156	2	158	744	20	764	2,059
PM Totals		1,563	52	1,615	230	2	232	1,139	32	1,171	3,018

Job No. : N3320
 Client : GHD
 Suburb : Waitara Public School
 Location : 3. Edgeworth David Ave / Jubilee St

Day/Date : Mon, 26th June 2017
 Weather : Fine
 Description : Classified Intersection Count
 : Peak Hour Summary

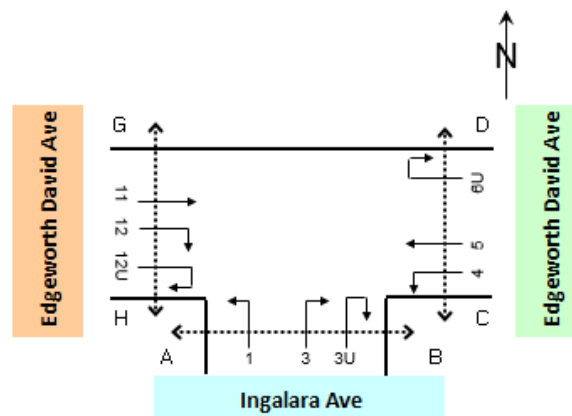


Approach		Edgeworth David Ave			Jubilee St			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM 8:00 to 9:00		871	27	898	200	3	203	623	30	653	
PM 15:00 to 16:00		1,101	36	1,137	186	6	192	676	19	695	2,024

Approach		Edgeworth David Ave			Jubilee St			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
8:00 to 9:00		871	27	898	200	3	203	623	30	653	1,754
8:15 to 9:15		893	31	924	188	4	192	594	23	617	1,733
8:30 to 9:30		925	27	952	178	5	183	582	23	605	1,740
AM Totals		1,337	40	1,377	282	7	289	919	37	956	2,622
14:30 to 15:30		942	32	974	193	9	202	701	22	723	1,899
14:45 to 15:45		1,039	32	1,071	200	9	209	681	22	703	1,983
15:00 to 16:00		1,101	36	1,137	186	6	192	676	19	695	2,024
PM Totals		1,511	57	1,568	277	10	287	1,032	29	1,061	2,916

Job No. : N3320
 Client : GHD
 Suburb : Waitara Public School
 Location : 4. Edgeworth David Ave / Ingalaria Ave

Day/Date : Mon, 26th June 2017
 Weather : Fine
 Description : Classified Intersection Count
 : Peak Hour Summary



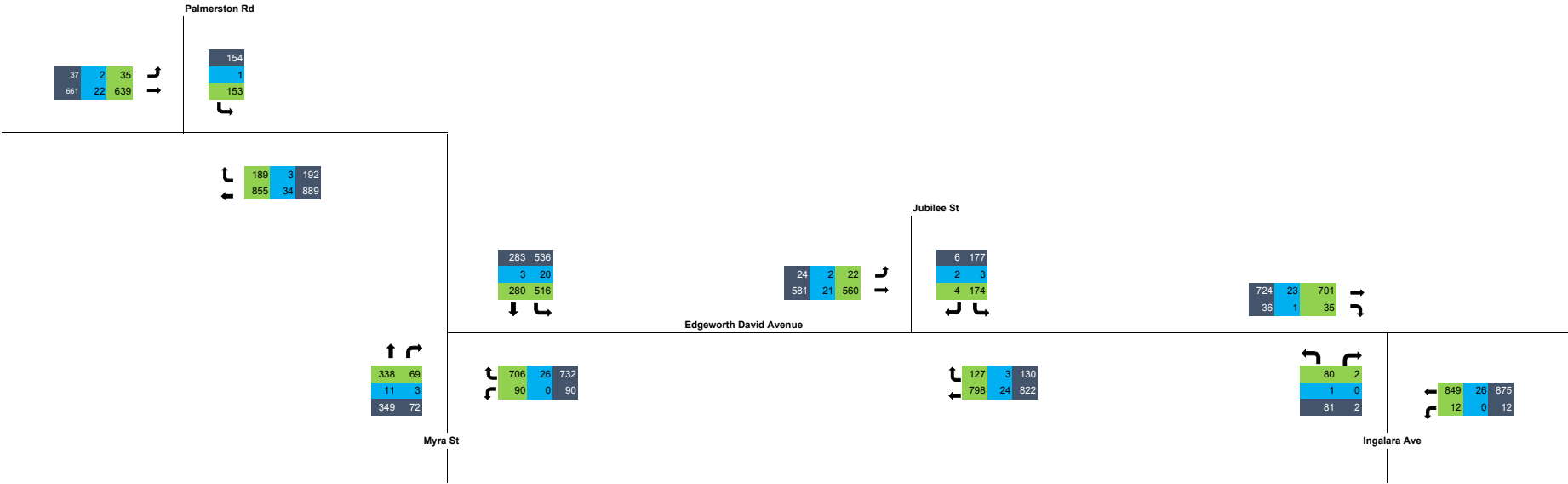
Approach		Ingalaria Ave			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	45	1	46	842	26	868	1,757
PM	15:00 to 16:00	53	0	53	1,056	36	1,092	2,019

Approach		Ingalaria Ave			Edgeworth David Ave			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
8:00 to 9:00		45	1	46	842	26	868	1,757
8:15 to 9:15		67	1	68	839	29	868	1,728
8:30 to 9:30		82	1	83	861	26	887	1,730
AM Totals		100	1	101	1,258	39	1,297	2,611
14:30 to 15:30		48	0	48	908	32	940	1,888
14:45 to 15:45		53	0	53	996	32	1,028	1,973
15:00 to 16:00		53	0	53	1,056	36	1,092	2,019
PM Totals		67	0	67	1,466	57	1,523	2,907

Appendix B – Existing and forecast traffic volumes

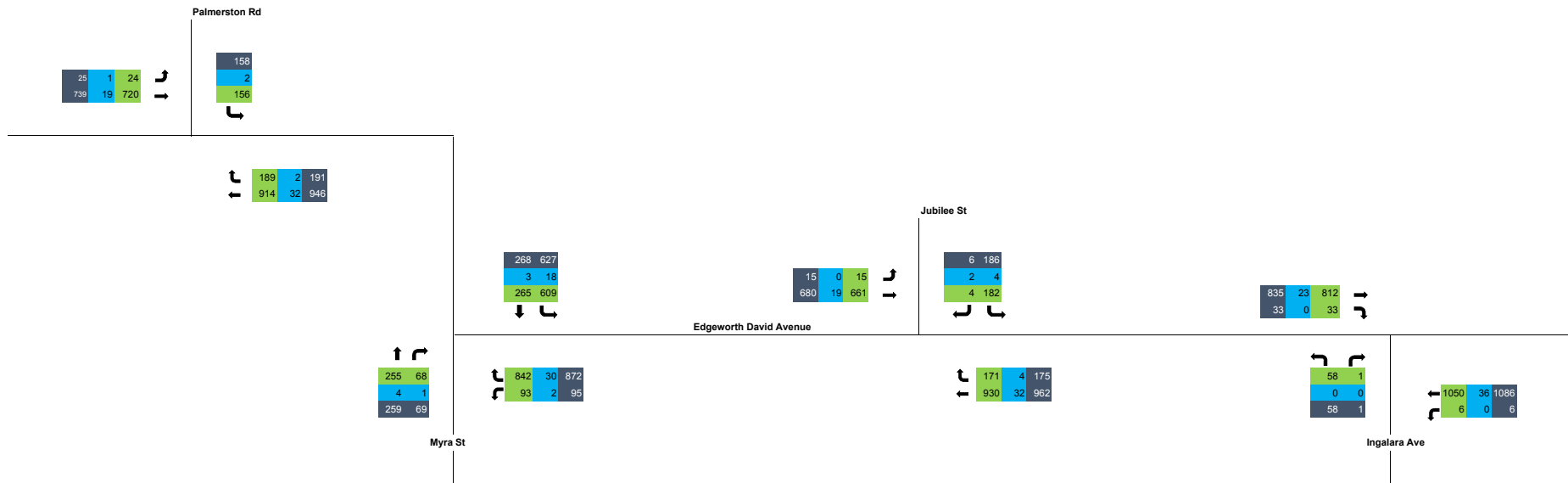
Light Vehicles
Heavy Vehicles
Total

2017 AM PEAK



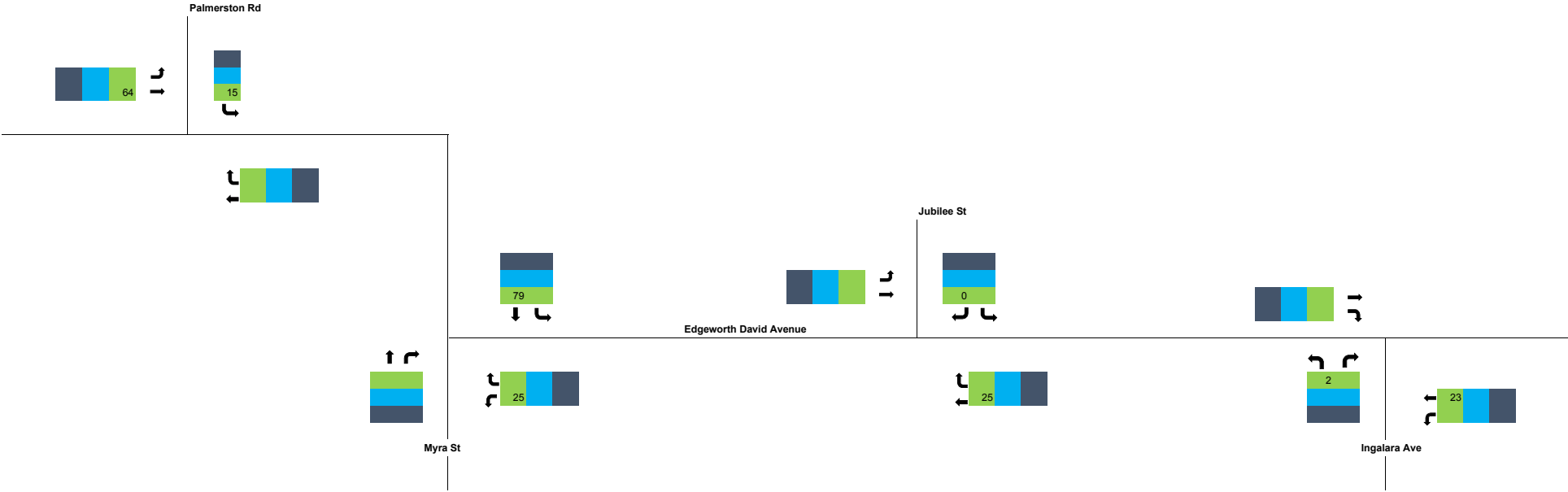
Light Vehicles
Heavy Vehicles
Total

2017 PM PEAK



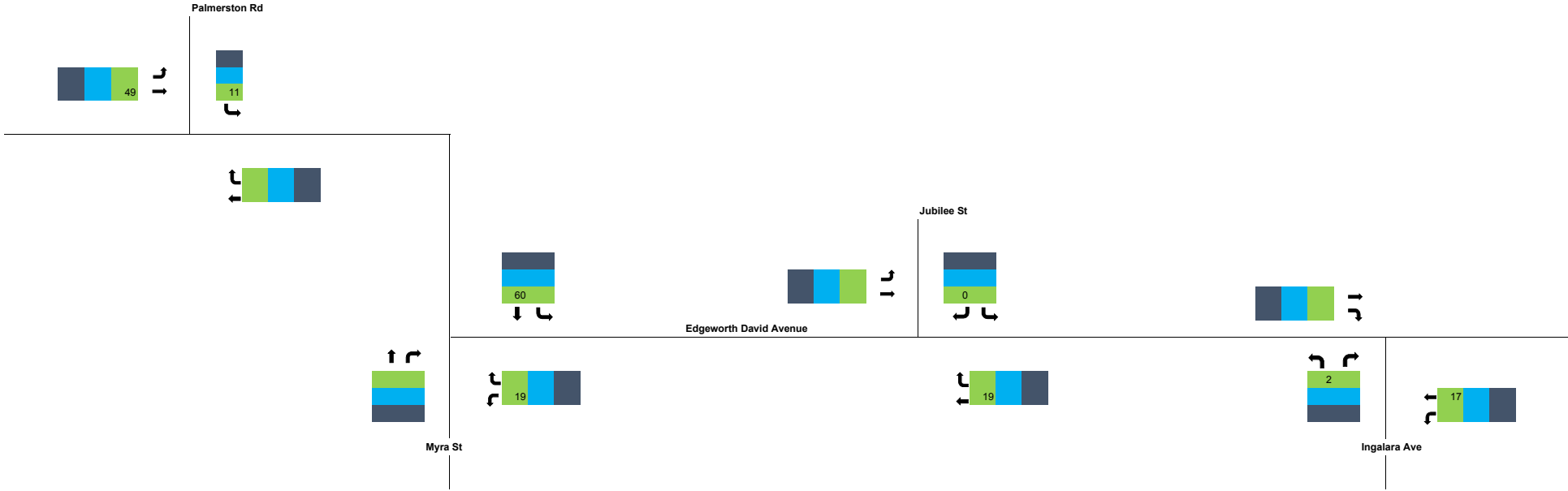
Light Vehicles	
Heavy Vehicles	
Total	

AM TRIP GENERATION



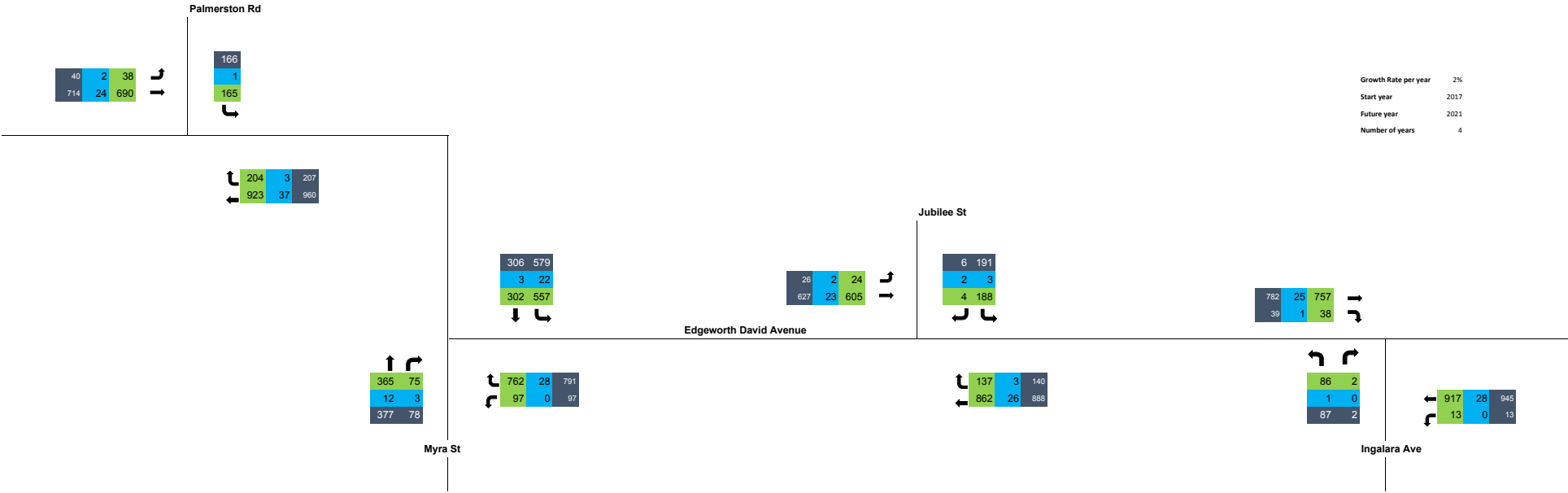
Light Vehicles	
Heavy Vehicles	
Total	

PM TRIP GENERATION



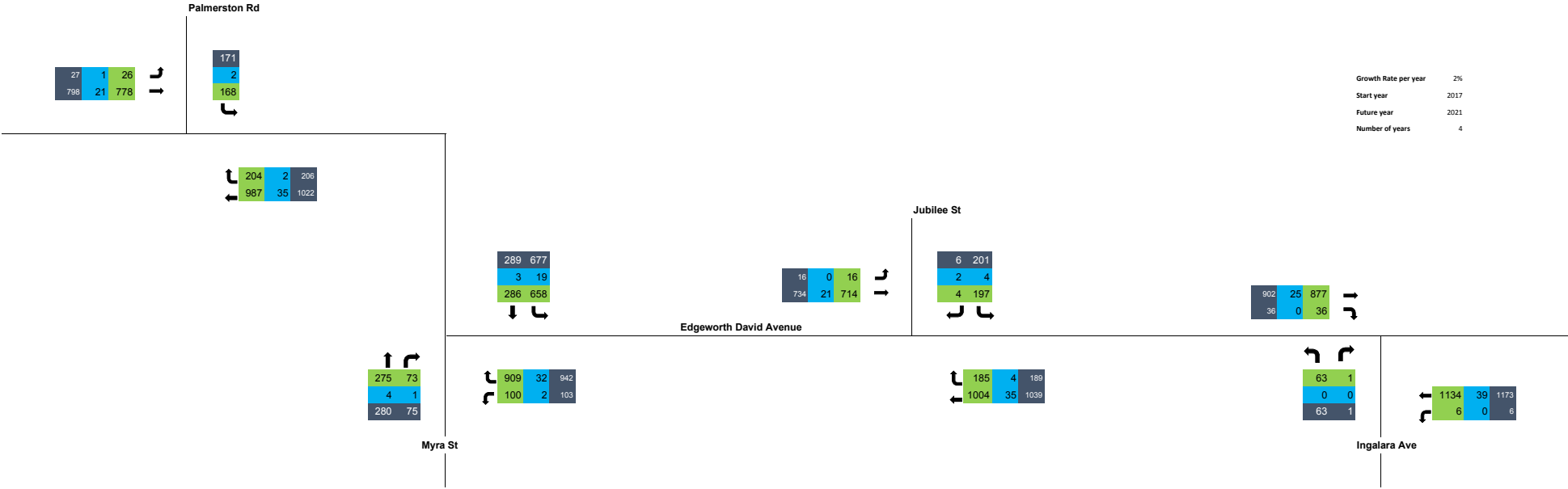
Light Vehicles	
Heavy Vehicles	
Total	

2021 AM PEAK - NO BUILD



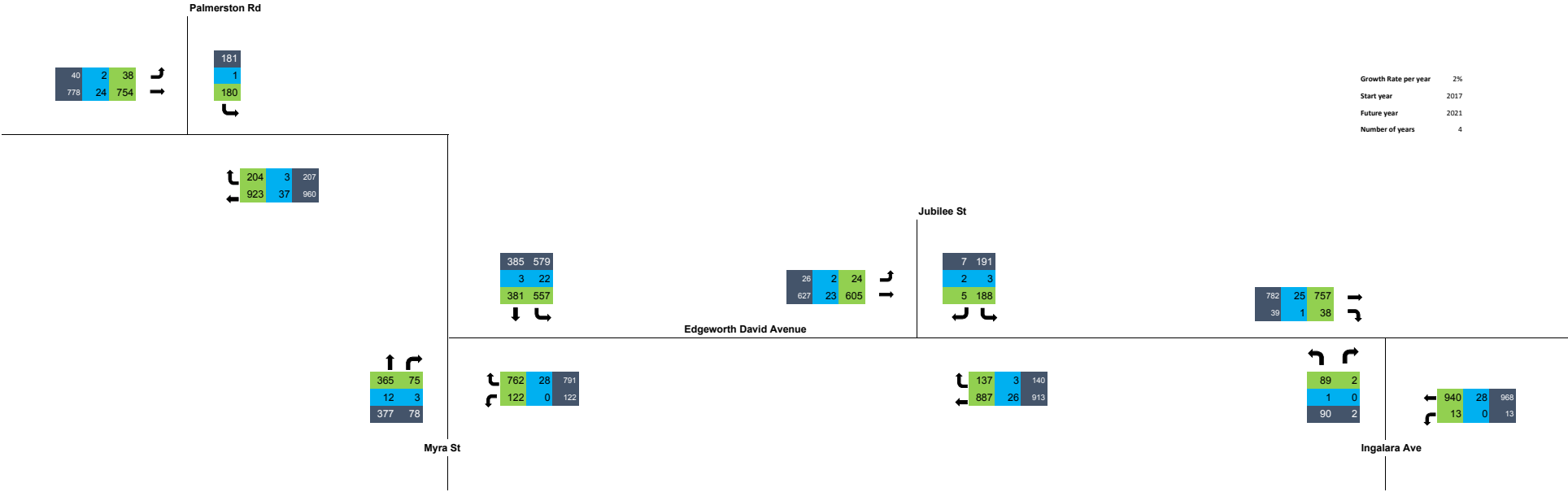
Light Vehicles	
Heavy Vehicles	
Total	

2021 PM PEAK - NO BUILD



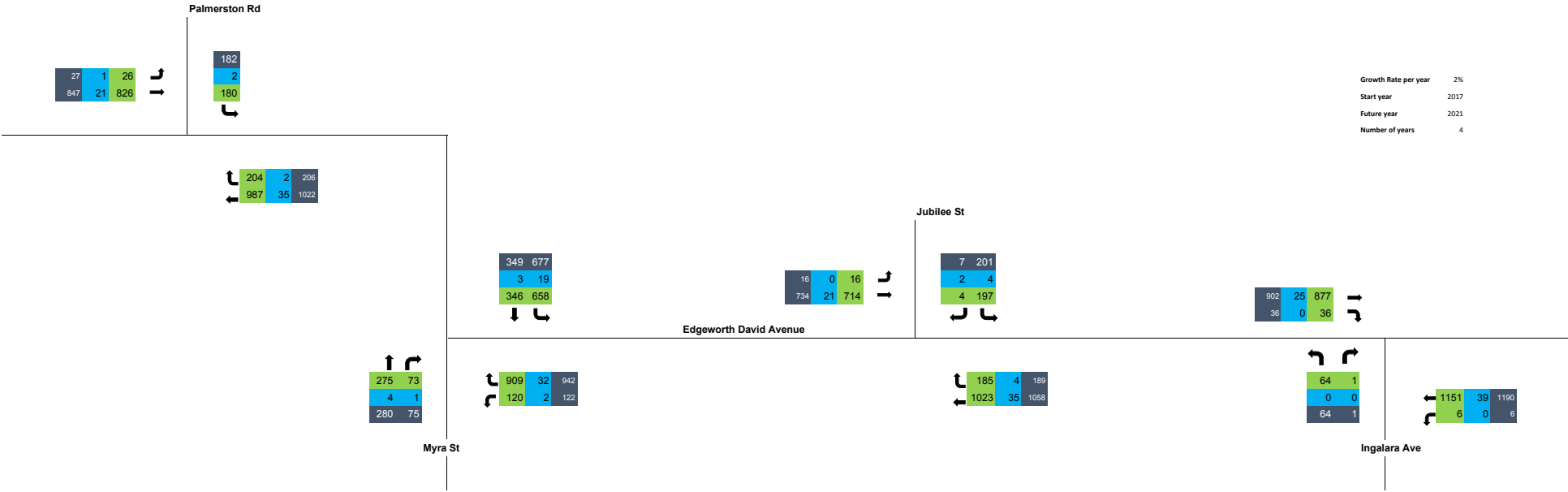
Light Vehicles	
Heavy Vehicles	
Total	

2021 AM PEAK - BUILD



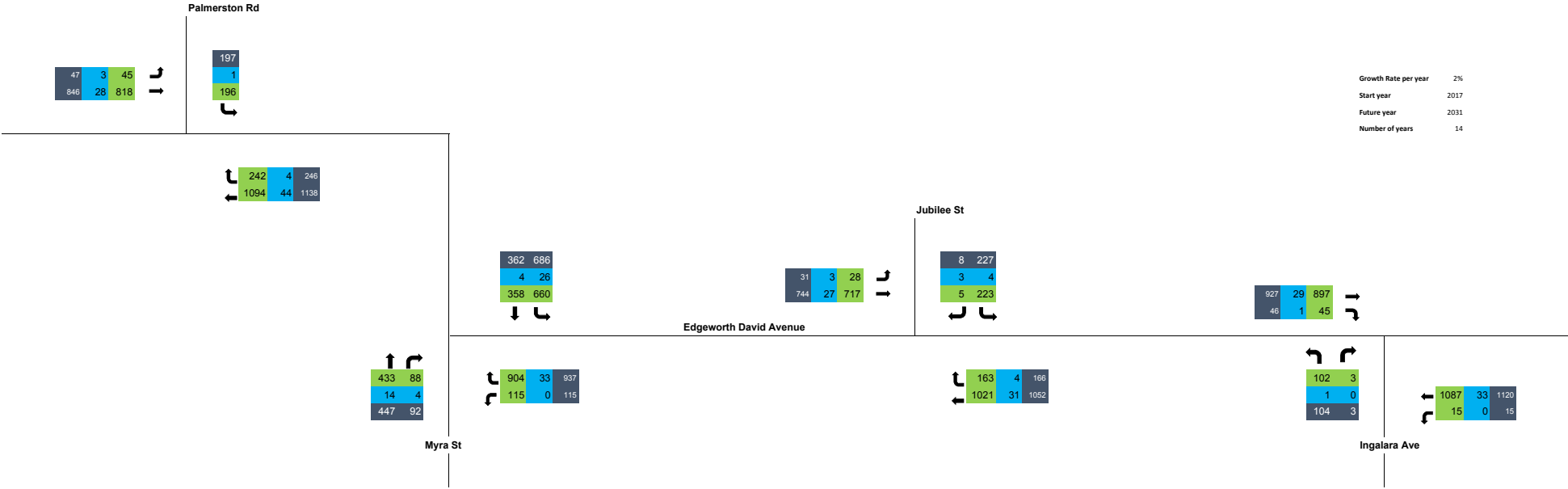
Light Vehicles	
Heavy Vehicles	
Total	

2021 PM PEAK - BUILD



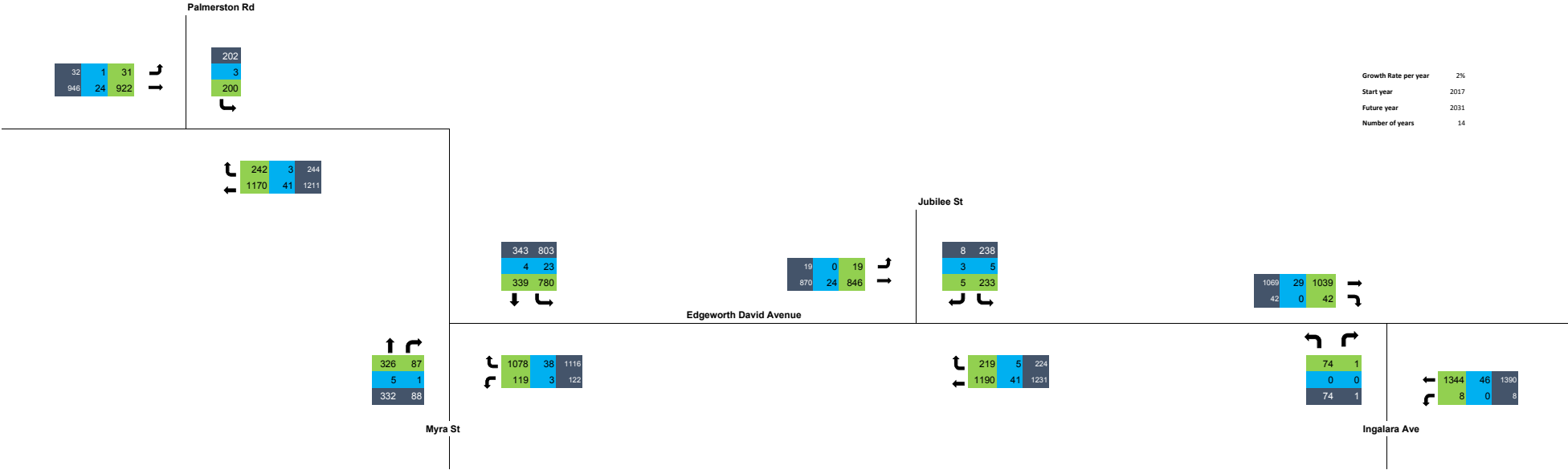
Light Vehicles	
Heavy Vehicles	
Total	

2031 AM PEAK - NO BUILD



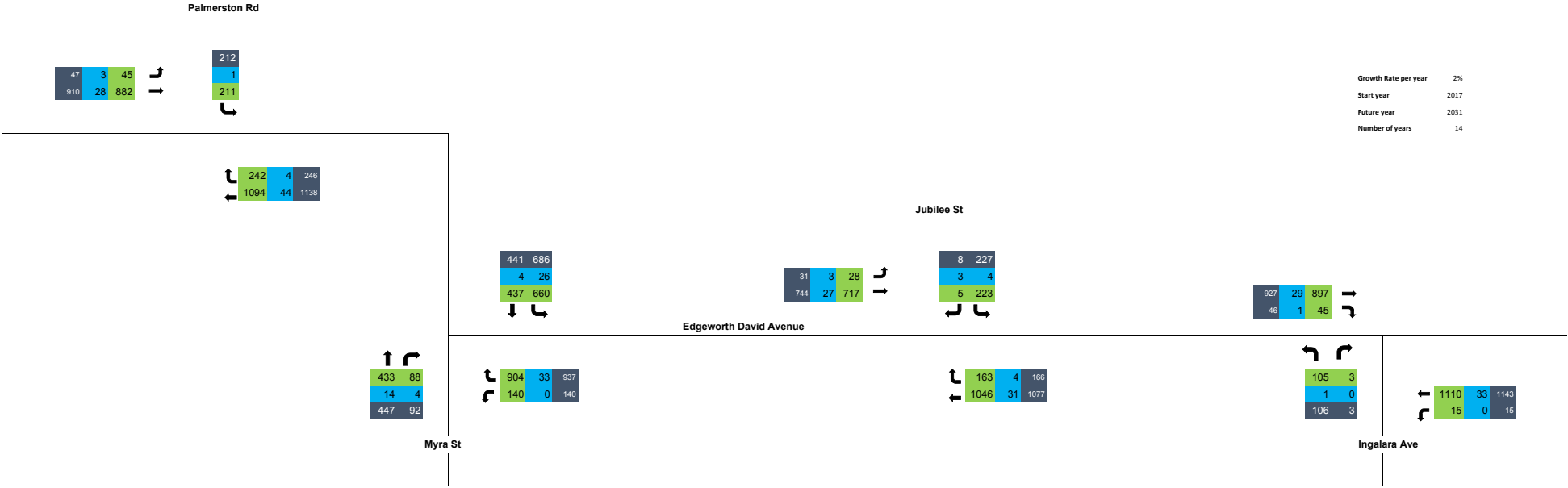
Light Vehicles	
Heavy Vehicles	
Total	

2031 PM PEAK - NO BUILD



Light Vehicles	
Heavy Vehicles	
Total	

2031 AM PEAK - BUILD

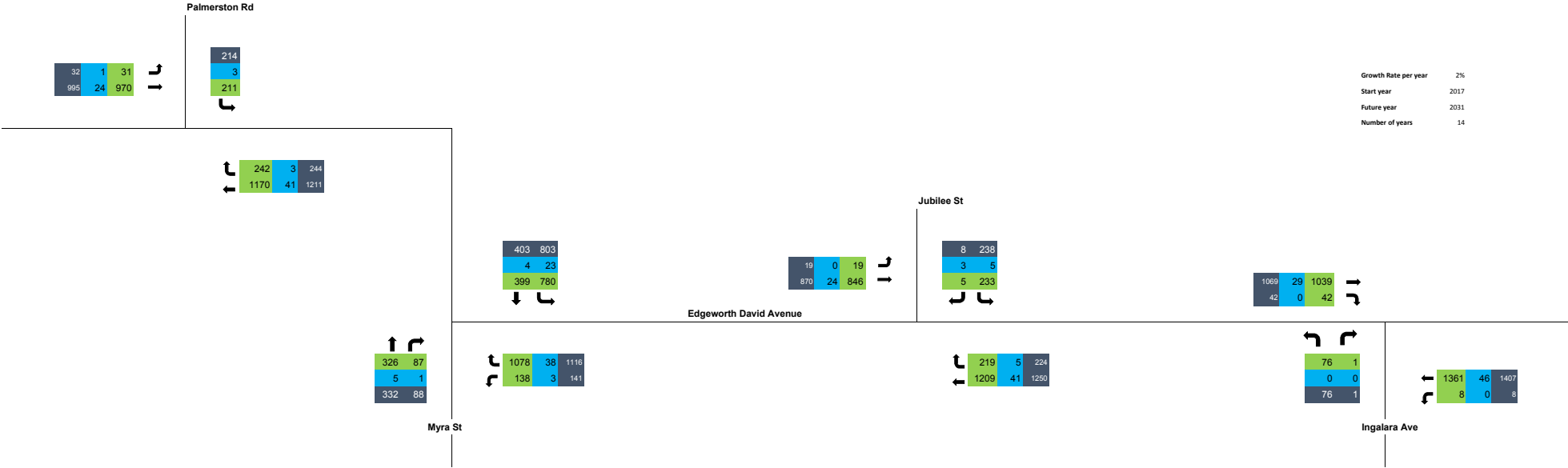


Growth Rate per year	2%
Start year	2017
Future year	2031
Number of years	14

Light Vehicles	
Heavy Vehicles	
Total	

2031 PM PEAK - BUILD

Growth Rate per year	2%
Start year	2017
Future year	2031
Number of years	14



Appendix C – Internet Questionnaire

1. How many of your children attend Waitara Public School

- ☐ 1 Child
- ☐ 2 Children
- ☐ 3 Children
- ☐ 4 or more Children

2. What are the ages of your child/children?

Child 1	
Child 2	
Child 3	
Child 4	

3. How far did your child/children travel to school today?

- ☐ 0 km – 1 km
- ☐ 1 km – 2 km
- ☐ 2 km – 3 km
- ☐ 3 km – 4 km
- ☐ Greater than 4 km.

4. Which mode of transport did your child/children use to travel to school this morning?

- ☐ a.) Private vehicle - dropped off outside school gates
- ☐ b.) Private vehicle – parked and then walked to school grounds
- ☐ c.) School Bus
- ☐ d.) Public Bus
- ☐ e.) Walked to school
- ☐ f.) Cycled to school

Other (please specify)

5. Did you accompany your child/children to school today?

- ☐ a.) Yes
- ☐ b.) No

6. If Yes, is your child's/children's trip to school part of another journey i.e. to work or shopping?

- ☐ a.) Yes
- ☐ b.) No
- ☐ c.) N/A

7. Which mode of transport did your child/children use to travel from school this afternoon?

- ☐ a.) Private vehicle – picked up outside school gates
- ☐ b.) Private vehicle - parked and then walked from school grounds
- ☐ c.) School Bus
- ☐ d.) Public Bus
- ☐ e.) Walked from school
- ☐ f.) Cycled from school

Other (please specify)

8. Do you accompany your child/children from school today?

- ☐ a.) Yes
- ☐ b.) No

9. If Yes, is your child's/children's trip from school part of another journey i.e. from work or shopping?

- ☐ a.) Yes
- ☐ b.) No
- ☐ c.) N/A

Appendix D – Manual Travel Mode Surveys

Client	GHD
Location	Waitara Public School
Date	Mon, 26th June 2017
Survey Time	08:00-09:30 & 14:30-16:00 (3 hours)
Description	Mode of travel school Survey



Location

- Yellow - Ped
- Blue - Vehicle
- Green - Bus

School Gates

- G
- E
- B
- C

Pedestrian survey

[15mins interval]																																													
Time Period	A				B				C				D				E				F				G				H				I				Grand Total								
	Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School														
	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total												
8:00 to 8:15	6	12	0	4	4	14	11	35	0	12	12	3	6	0	1	1	7	0	10	10	1	1	2	0	1	1	1	2	0	1	1	1	9	1											
8:15 to 8:30	5	3	8	0	1	1	15	5	21	0	6	6	9	5	14	0	4	4	0	1	1	2	0	1	1	1	2	0	1	1	0	0	0	91											
8:30 to 8:45	12	4	16	0	1	1	20	5	25	0	2	2	15	6	21	0	7	7	1	1	2	0	3	3	8	3	11	0	1	1	8	5	0	113											
8:45 to 9:00	61	39	100	0	16	16	59	24	83	0	14	14	33	5	38	0	1	1	2	3	5	0	1	1	27	3	30	1	6	7	17	13	40	387											
9:00 to 9:15	68	42	110	0	11	11	146	69	215	0	23	23	24	24	47	0	14	14	13	21	34	0	14	14	56	23	79	0	6	6	56	32	124	8	132										
9:15 to 9:30	8	11	19	0	80	80	11	12	23	0	94	94	8	15	0	17	17	7	8	15	0	17	17	21	9	30	0	28	28	21	35	86	6	130	0	442									
Totals	160	105	265	0	113	113	265	127	392	0	151	151	90	53	141	0	44	44	26	38	64	0	47	47	114	40	154	1	43	44	114	67	181	1	85										
14:30 to 14:45	0	3	3	0	0	0	0	3	3	0	0	0	0	3	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12									
14:45 to 15:00	0	16	16	0	0	0	0	16	16	0	0	0	0	10	10	1	1	2	0	10	10	1	1	2	0	19	19	0	0	0	19	19	0	41	41	2	2	20	20	0	0				
15:00 to 15:15	2	89	91	117	46	163	0	92	92	105	51	156	0	35	35	23	22	45	0	35	35	21	18	39	0	29	26	15	41	0	29	29	16	41	0	9	9	131	43	174	0	6			
15:15 to 15:30	2	4	6	57	35	92	2	4	6	57	31	88	0	2	2	28	20	48	0	2	2	21	15	36	0	3	48	24	72	0	4	4	48	25	73	0	0	6	6	3	9	0	0		
15:30 to 15:45	1	4	5	13	11	24	1	7	8	21	11	32	0	1	1	12	9	21	0	1	1	8	6	14	0	1	8	6	14	0	1	1	8	6	14	0	0	0	0	0	0	0	0		
15:45 to 16:00	0	2	2	2	15	12	27	0	3	3	16	9	25	0	1	1	10	11	21	0	1	1	8	3	0	0	1	1	1	2	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0
Totals	5	118	123	202	104	306	3	125	128	199	102	301	0	52	52	74	63	137	0	52	52	55	44	99	0	53	53	83	46	129	2	54	56	83	47	130	0	50	50	206	50	256	0	26	
																																		26	26	62	26	88	0	24	24	34	24	58	2,065

[Hourly Summary]																																																							
Time Period	A				B				C				D				E				F				G				H				I				Grand Total																		
	Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School																								
	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total																						
8:00 to 9:00	84	32	116	6	22	28	108	46	154	6	34	40	60	19	79	6	13	19	15	6	16	22	38	18	45	1	9	10	37	20	57	1	19	20	11	11	22	6	16	6	5	7	12	6	2	2	5	4	9	6	4	556			
8:15 to 9:15	146	88	234	6	29	29	240	104	344	6	45	45	80	40	120	6	26	26	16	26	42	0	20	20	92	30	122	1	14	15	92	51	143	1	50	51	134	16	150	6	9	9	21	11	32	6	4	7	5	12	6	5	1,403		
8:30 to 9:30	143	96	245	6	108	108	236	110	346	6	133	133	78	43	121	6	39	39	23	33	56	6	35	41	112	38	150	1	41	42	112	65	177	1	83	84	139	20	159	6	16	16	25	15	41	11	7	5	12	6	5	3,780			
Totals	160	105	265	0	113	113	265	127	392	0	151	151	90	53	141	0	44	44	26	38	64	0	47	47	114	40	154	1	43	44	114	67	181	1	85	86	141	23	164	0	16	16	28	18	46	0	11	11	7	5	12	6	5	9,835	
14:30 to 14:45	0	12	12	174	81	255	2	15	17	162	32	244	0	3	3	50	52	83	95	0	50	50	43	34	77	0	4	51	52	74	39	113	0	74	74	100	0	50	50	206	50	256	0	26	26	62	26	88	0	24	24	34	24	58	2,835
14:45 to 15:30	5	113	118	187	92	279	3	119	122	157	321	276	0	48	48	64	52	116	0	48	48	51	40	91	0	52	52	82	45	127	0	53	53	82	46	128	0	50	50	206	50	256	0	26	26	62	26	88	0	24	24	34	24	58	1,606
15:00 to 16:00	5	99	104	202	104	306	3	105	109	199	102	301	0	39	39	73	62	135	0	39	39	54	43	97	0	34	34	83	46	129	2	35	37	83	47	130	0	9	9	204	50	254	0	6	6	62	26	88	0	3	3	32	24	58	1,675
Totals	5	118	123	202	104	306	3	125	128	199	102	301	0	52	52	74	63	137	0	52	52	55	44	99	0	53	53	83	46	129	2	54	56	83	47	130	0	50	50	206	50	256	0	26	26	62	26	88	0	24	24	34	24	58	2,065

[Peak Hour Summary]																																																							
Time Period	A				B				C				D				E				F				G				H (East)				H (West)				Grand Total																		
	Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School		Entering School		Leaving School																								
	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total	Children	Adults	Total																						
8:30 to 9:30	149	96	245	0	108	108	209	110	319	0	133	133	63	43	106	0	39	39	23	33	56	0	35	35	112	38	150	1	41	42	112	65	177	1	83	84	114	20	134	0	16	16	15	41	0	11	88	5	93	0	5	1,794			
14:45 to 15:45	5	113	118	187	92	279	3	119	122	157	321	250	0	48	48	63	52	115	0	48	48	51	40	91	0	52	52	82	45	127	0	53	53	82	46	128	0	50	50	206	50	256	0	26	26	62	26	88	0	24	24	144	24	168	2,004

Client GHD
 Location Waitara Public School
 Date Mon, 26th June 2017
 Survey Time 08:00-09:30 & 14:30-16:00 (3 hours)
 Description Mode of travel school Survey



[15mins interval]

		Vehicle Drop Off Zone														Grand Total
Time Period	A															
	Vehicles Drop off							Vehicles Pick up								
	1	2	3	4	5	6	Total	1	2	3	4	5	6	Total		
8:00 to 8:15	10	0	0	0	0	0	10	0	0	0	0	0	0	0	10	
8:15 to 8:30	14	1	0	0	0	0	15	0	0	0	0	0	0	0	15	
8:30 to 8:45	22	3	1	0	0	0	26	0	0	0	0	0	0	0	26	
8:45 to 9:00	19	2	0	1	0	0	22	0	0	0	0	0	0	0	22	
9:00 to 9:15	73	13	0	0	0	0	86	0	0	0	0	0	0	0	86	
9:15 to 9:30	13	0	0	0	0	0	13	0	0	0	0	0	0	0	13	
Totals	151	19	1	1	0	0	172	0	0	0	0	0	0	0	172	
14:30 to 14:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	
14:45 to 15:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	
15:00 to 15:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	
15:15 to 15:30	0	0	0	0	0	0	0	4	2	1	0	0	0	7	7	
15:30 to 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45 to 16:00	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	
Totals	0	0	0	0	0	0	0	12	2	1	0	0	0	15	15	

Vehicle Entry			Total
Time Period	B		
	entering School	leaving School	
8:00 to 8:15	3	1	4
8:15 to 8:30	2	0	2
8:30 to 8:45	1	2	3
8:45 to 9:00	0	0	0
9:00 to 9:15	0	0	0
9:15 to 9:30	0	0	0
Totals	6	3	9
14:30 to 14:45	0	0	0
14:45 to 15:00	1	0	1
15:00 to 15:15	0	1	1
15:15 to 15:30	0	0	0
15:30 to 15:45	0	2	2
15:45 to 16:00	0	2	2
Totals	1	5	6

[Hourly Summary]

Vehicle Drop Off Zone																Grand Total
Time Period	A															
	Vehicles Drop off							Vehicles Pick up								
	1	2	3	4	5	6	Total	1	2	3	4	5	6	Total		
8:00 to 9:00	65	6	1	1	0	0	73	0	0	0	0	0	0	0	73	
8:15 to 9:15	128	19	1	1	0	0	149	0	0	0	0	0	0	0	149	
8:30 to 9:30	127	18	1	1	0	0	147	0	0	0	0	0	0	0	147	
Totals	151	19	1	1	0	0	172	0	0	0	0	0	0	0	172	
14:30 to 15:30	0	0	0	0	0	0	0	7	2	1	0	0	0	10	10	
14:45 to 15:45	0	0	0	0	0	0	0	6	2	1	0	0	0	9	9	
15:00 to 16:00	0	0	0	0	0	0	0	10	2	1	0	0	0	13	13	
Totals	0	0	0	0	0	0	0	12	2	1	0	0	0	15	15	

Vehicle Entry			Total
Time Period	B		
	entering School	leaving School	
8:00 to 9:00	6	3	9
8:15 to 9:15	3	2	5
8:30 to 9:30	1	2	3
Totals	6	3	9
14:30 to 15:30	1	1	2
14:45 to 15:45	1	3	4
15:00 to 16:00	0	5	5
Totals	1	5	6

[Peak Hour Summary]

Vehicle Drop Off Zone															Grand Total
Time Period	A														
	Vehicles Drop off							Vehicles Pick up							
	1	2	3	4	5	6	Total	1	2	3	4	5	6	Total	
8:15 to 9:15	128	19	1	1	0	0	149	0	0	0	0	0	0	0	149
15:00 to 16:00	0	0	0	0	0	0	0	10	2	1	0	0	0	13	13

Vehicle Entry			Total
Time Period	B		
	entering School	leaving School	
8:00 to 9:00	6	3	9
15:00 to 16:00	0	5	5

Client GHD
Location Waitara Public School
Date Mon, 26th June 2017
Survey Time 08:00-09:30 & 14:30-16:00 (3 hours)
Description Mode of travel school Survey



A (Public bus stop)			
Arrival time	Drop off	Pick up	Departure time
8:53:00	1	-	8:54:00
9:05:00	80	-	9:09:00
AM Totals	81	0	AM Totals
15:05:00	-	50	15:15:00
15:13:00	-	60	15:18:00
PM Totals	81	110	PM Totals

Appendix E – SIDRA Outputs

2017 AM Peak

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2017 AM]

 Network: N101 [Waitara_PS_2017AM]

Palmerston Road and Edgeworth David Ave
8:30 AM to 9:30 AM
Signals - Actuated Coordinated Cycle Time = 108 seconds (Network Cycle Time - Program)
Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	889	3.8	889	3.8	0.515	0.4	LOS A	2.5	18.3	0.12	0.11	48.2
6	R2	192	1.6	192	1.6	0.264	14.9	LOS B	6.0	42.3	0.76	0.76	35.1
Approach		1081	3.4	1081	3.4	0.515	3.0	LOS A	6.0	42.3	0.23	0.22	41.0
North: Palmerston Road													
7	L2	154	0.6	154	0.6	0.246	26.7	LOS C	5.2	36.5	0.66	0.73	29.1
Approach		154	0.6	154	0.6	0.246	26.7	LOS C	5.2	36.5	0.66	0.73	29.1
West: Edgeworth David West													
10	L2	37	5.4	37	5.4	0.655	32.5	LOS C	17.6	127.2	0.84	0.78	29.5
11	T1	661	3.3	661	3.3	0.655	28.1	LOS C	17.6	127.2	0.82	0.77	10.2
Approach		698	3.4	698	3.4	0.655	28.3	LOS C	17.6	127.2	0.83	0.77	12.2
All Vehicles		1933	3.2	1933	3.2	0.655	14.0	LOS B	17.6	127.2	0.48	0.46	25.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.7 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2017 AM]

 Network: N101 [Waitara_PS_2017AM]

Edgeworth David Ave and Myra Street
8:30 AM to 9:30 AM
Signals - Actuated Coordinated Cycle Time = 108 seconds (Network Cycle Time - Program)
Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	349	3.2	349	3.2	0.404	25.0	LOS C	12.0	86.0	0.73	0.63	26.0
3	R2	72	4.2	72	4.2	0.404	48.4	LOS D	4.4	31.7	0.90	0.76	19.7
Approach		421	3.3	421	3.3	0.404	29.0	LOS C	12.0	86.0	0.76	0.65	24.6
East: Edgeworth David East													
4	L2	90	0.0	90	0.0	0.720	44.7	LOS D	16.2	115.8	0.95	0.84	23.1
6	R2	732	3.6	732	3.6	0.720	34.7	LOS C	20.8	150.2	0.88	0.83	12.5
Approach		822	3.2	822	3.2	0.720	35.8	LOS D	20.8	150.2	0.89	0.83	14.7
North: Edgeworth David North													
7	L2	536	3.7	536	3.7	0.665	15.2	LOS B	8.0	57.1	0.48	0.66	9.5
8	T1	283	1.1	283	1.1	0.665	48.1	LOS D	8.0	57.1	1.00	0.88	20.2
Approach		819	2.8	819	2.8	0.665	26.5	LOS C	8.0	57.1	0.66	0.73	17.3
All Vehicles		2062	3.1	2062	3.1	0.720	30.7	LOS C	20.8	150.2	0.77	0.76	18.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.7 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2017 AM]

Network: N101 [Waitara_PS_2017AM]

New Site
8:30 AM to 9:30 AM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgworth David East													
5	T1	822	2.9	822	2.9	0.303	0.9	LOS A	2.1	14.7	0.15	0.08	31.0
6	R2	130	2.3	130	2.3	0.303	7.7	LOS A	2.1	14.7	0.51	0.27	36.7
Approach		952	2.8	952	2.8	0.303	1.9	NA	2.1	14.7	0.20	0.11	34.3
North: Jubilee Street													
7	L2	177	1.7	177	1.7	0.134	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	6	33.3	6	33.3	0.106	64.8	LOS F	0.3	2.7	0.95	0.97	16.7
Approach		183	2.7	183	2.7	0.134	5.4	LOS A	0.3	2.7	0.03	0.47	35.8
West: Edgeworth David West													
10	L2	24	8.3	24	8.3	0.014	3.5	LOS A	0.0	0.0	0.00	0.45	38.0
11	T1	581	3.6	581	3.6	0.305	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		605	3.8	605	3.8	0.305	0.1	NA	0.0	0.0	0.00	0.02	39.7
All Vehicles		1740	3.2	1740	3.2	0.305	1.6	NA	2.1	14.7	0.11	0.11	36.5

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.7 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingalara - 2017 AM]

Network: N101 [Waitara_PS_2017AM]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingalara Avenue													
1	L2	81	1.2	81	1.2	0.114	9.6	LOS A	0.4	2.9	0.49	0.94	33.8
3	R2	2	0.0	2	0.0	0.038	69.8	LOS F	0.1	0.7	0.95	1.00	22.9
Approach		83	1.2	83	1.2	0.114	11.0	LOS B	0.4	2.9	0.50	0.94	33.1
East: Edgeworth David East													
4	L2	12	0.0	12	0.0	0.232	3.4	LOS A	0.0	0.0	0.00	0.01	40.1
5	T1	875	3.0	875	3.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.01	39.9
Approach		887	2.9	887	2.9	0.232	0.1	NA	0.0	0.0	0.00	0.01	39.9
West: Edgeworth David West													
11	T1	724	3.2	724	3.2	0.323	1.2	LOS A	1.3	9.4	0.14	0.03	38.7
12	R2	36	2.8	36	2.8	0.323	12.1	LOS B	1.3	9.4	0.22	0.04	38.3
Approach		760	3.2	760	3.2	0.323	1.7	NA	1.3	9.4	0.15	0.03	38.7
All Vehicles		1730	2.9	1730	2.9	0.323	1.3	NA	1.3	9.4	0.09	0.06	39.0

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.7 %

Number of Iterations: 10 (maximum specified: 10)

2017 PM Peak

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2017 PM]

 Network: N101 [Waitara_PS_2017PM]

Palmerston Road and Edgeworth David Ave
8:30 AM to 9:30 AM
Signals - Actuated Coordinated Cycle Time = 103 seconds (Network Cycle Time - Program)
Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	m		per veh	km/h
East: Edgeworth David East													
5	T1	946	3.4	946	3.4	0.550	0.4	LOS A	2.9	20.8	0.13	0.12	48.0
6	R2	191	1.0	191	1.0	0.281	17.3	LOS B	6.4	45.1	0.84	0.78	33.7
Approach		1137	3.0	1137	3.0	0.550	3.3	LOS A	6.4	45.1	0.25	0.23	40.3
North: Palmerston Road													
7	L2	158	1.3	158	1.3	0.305	28.5	LOS C	5.5	38.8	0.71	0.75	28.3
Approach		158	1.3	158	1.3	0.305	28.5	LOS C	5.5	38.8	0.71	0.75	28.3
West: Edgeworth David West													
10	L2	25	4.0	25	4.0	0.717	29.6	LOS C	18.0	128.6	0.85	0.79	30.7
11	T1	739	2.6	739	2.6	0.717	25.7	LOS C	18.0	128.6	0.84	0.79	10.9
Approach		764	2.6	764	2.6	0.717	25.9	LOS C	18.0	128.6	0.84	0.79	12.3
All Vehicles		2059	2.7	2059	2.7	0.717	13.6	LOS B	18.0	128.6	0.50	0.48	25.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2017 PM]

 Network: N101 [Waitara_PS_2017PM]

Edgeworth David Ave and Myra Street
8:30 AM to 9:30 AM
Signals - Actuated Coordinated Cycle Time = 103 seconds (Network Cycle Time - Program)
Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows		Arrival Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %	Total veh/h	HV %								
South: Myra Street													
2	T1	259	1.5	259	1.5	0.335	23.9	LOS C	9.0	63.7	0.72	0.61	26.4
3	R2	69	1.4	69	1.4	0.368	50.6	LOS D	3.3	23.4	0.93	0.76	19.1
Approach		328	1.5	328	1.5	0.368	29.5	LOS C	9.0	63.7	0.76	0.64	24.4
East: Edgeworth David East													
4	L2	95	2.1	95	2.1	0.754	36.8	LOS D	21.0	150.8	0.93	0.85	25.0
6	R2	872	3.4	872	3.4	0.754	31.6	LOS C	21.0	150.8	0.89	0.84	13.4
Approach		967	3.3	967	3.3	0.754	32.1	LOS C	21.0	150.8	0.89	0.84	15.5
North: Edgeworth David North													
7	L2	627	2.9	627	2.9	0.752	15.7	LOS B	8.0	57.1	0.51	0.67	9.2
8	T1	268	1.1	268	1.1	0.752	47.4	LOS D	8.0	57.1	1.00	0.88	20.3
Approach		895	2.3	895	2.3	0.752	25.2	LOS C	8.0	57.1	0.66	0.73	16.7
All Vehicles		2190	2.6	2190	2.6	0.754	28.9	LOS C	21.0	150.8	0.78	0.77	17.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 2 [Edgeworth and Jubilee - 2017 PM]

 Network: N101 [Waitara_PS_2017PM]

New Site
8:30 AM to 9:30 AM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	962	3.3	962	3.3	0.387	1.2	LOS A	3.2	22.7	0.15	0.09	29.7
6	R2	175	2.3	175	2.3	0.387	9.6	LOS A	3.2	22.7	0.63	0.40	35.1
Approach		1137	3.2	1137	3.2	0.387	2.5	NA	3.2	22.7	0.22	0.14	33.0
North: Jubilee Street													
7	L2	186	2.2	186	2.2	0.141	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	6	33.3	6	33.3	0.226	145.7	LOS F	0.6	5.4	0.98	1.00	9.6
Approach		192	3.1	192	3.1	0.226	7.9	LOS A	0.6	5.4	0.03	0.47	34.2
West: Edgeworth David West													
10	L2	15	0.0	15	0.0	0.008	3.4	LOS A	0.0	0.0	0.00	0.45	38.1
11	T1	680	2.8	680	2.8	0.355	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		695	2.7	695	2.7	0.355	0.1	NA	0.0	0.0	0.00	0.01	39.8
All Vehicles		2024	3.0	2024	3.0	0.387	2.2	NA	3.2	22.7	0.13	0.13	35.4

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 3 [Edgeworth and Ingalara - 2017 PM]

 Network: N101 [Waitara_PS_2017PM]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingalara Avenue													
1	L2	58	0.0	58	0.0	0.095	10.5	LOS B	0.3	2.3	0.53	0.97	33.2
3	R2	1	0.0	1	0.0	0.040	136.0	LOS F	0.1	0.7	0.98	1.00	16.2
Approach		59	0.0	59	0.0	0.095	12.7	LOS B	0.3	2.3	0.54	0.97	32.1
East: Edgeworth David East													
4	L2	6	0.0	6	0.0	0.286	3.4	LOS A	0.0	0.0	0.00	0.01	40.1
5	T1	1086	3.3	1086	3.3	0.286	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		1092	3.3	1092	3.3	0.286	0.1	NA	0.0	0.0	0.00	0.00	40.0
West: Edgeworth David West													
11	T1	835	2.8	835	2.8	0.375	1.8	LOS A	1.9	13.8	0.16	0.02	38.2
12	R2	33	0.0	33	0.0	0.375	17.0	LOS C	1.9	13.8	0.25	0.04	37.6
Approach		868	2.6	868	2.6	0.375	2.4	NA	1.9	13.8	0.16	0.02	38.2
All Vehicles		2019	2.9	2019	2.9	0.375	1.4	NA	1.9	13.8	0.09	0.04	38.9

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.5 %

Number of Iterations: 10 (maximum specified: 10)

2021 AM Peak – No Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2021 AM School Peak - No Build]  Network: N101 [Waitara_PS_2021 AM School Peak - No Build]

Palmerston Road and Edgeworth David Ave

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 110 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	960	3.9	960	3.9	0.555	0.4	LOS A	2.9	21.3	0.12	0.11	48.0
6	R2	207	1.4	207	1.4	0.280	13.5	LOS B	6.0	42.5	0.70	0.73	36.1
Approach		1167	3.4	1167	3.4	0.555	2.7	LOS A	6.0	42.5	0.22	0.22	41.6
North: Palmerston Road													
7	L2	166	0.6	166	0.6	0.546	39.5	LOS D	7.5	53.0	0.85	0.80	24.2
Approach		166	0.6	166	0.6	0.546	39.5	LOS D	7.5	53.0	0.85	0.80	24.2
West: Edgeworth David West													
10	L2	40	5.0	40	5.0	0.740	28.9	LOS C	15.9	114.6	0.83	0.79	31.0
11	T1	714	3.4	714	3.4	0.740	23.4	LOS C	15.9	114.6	0.81	0.78	11.8
Approach		754	3.4	754	3.4	0.740	23.7	LOS C	15.9	114.6	0.81	0.78	13.9
All Vehicles		2087	3.2	2087	3.2	0.740	13.2	LOS B	15.9	114.6	0.49	0.47	26.1

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2021 AM School Peak - No Build]  Network: N101 [Waitara_PS_2021 AM School Peak - No Build]

Edgeworth David Ave and Myra Street

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 110 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	377	3.2	377	3.2	0.455	25.3	LOS C	12.9	92.5	0.73	0.63	25.8
3	R2	78	3.8	78	3.8	0.455	50.0	LOS D	5.2	37.5	0.91	0.77	19.4
Approach		455	3.3	455	3.3	0.455	29.5	LOS C	12.9	92.5	0.76	0.65	24.5
East: Edgeworth David East													
4	L2	97	0.0	97	0.0	0.733	49.0	LOS D	14.9	106.4	0.96	0.83	22.2
6	R2	790	3.5	790	3.5	0.733	35.3	LOS D	26.0	187.3	0.89	0.84	12.4
Approach		887	3.2	887	3.2	0.733	36.8	LOS D	26.0	187.3	0.90	0.84	14.4
North: Edgeworth David North													
7	L2	579	3.8	579	3.8	0.703	16.6	LOS B	8.0	57.1	0.62	0.72	8.8
8	T1	305	1.0	305	1.0	0.703	48.7	LOS D	8.0	57.1	1.00	0.89	20.0
Approach		884	2.8	884	2.8	0.703	27.7	LOS C	8.0	57.1	0.75	0.78	16.8
All Vehicles		2226	3.1	2226	3.1	0.733	31.7	LOS C	26.0	187.3	0.81	0.78	17.9

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2021 AM School Peak - No Build]

Network: N101
[Waitara_PS_2021 AM School Peak - No Build]

New Site
8:30 AM to 9:30 AM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	888	2.9	888	2.9	0.354	1.0	LOS A	2.4	16.9	0.13	0.08	31.0
6	R2	140	2.1	140	2.1	0.354	8.4	LOS A	2.4	16.9	0.57	0.33	36.0
Approach		1028	2.8	1028	2.8	0.354	2.0	NA	2.4	16.9	0.19	0.11	33.9
North: Jubilee Street													
7	L2	191	1.6	191	1.6	0.144	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	6	33.3	6	33.3	0.175	89.1	LOS F	0.4	3.5	0.96	0.99	13.7
Approach		197	2.5	197	2.5	0.175	6.0	LOS A	0.4	3.5	0.03	0.47	35.4
West: Edgeworth David West													
10	L2	26	7.7	26	7.7	0.015	3.5	LOS A	0.0	0.0	0.00	0.45	38.0
11	T1	628	3.7	628	3.7	0.330	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		654	3.8	654	3.8	0.330	0.2	NA	0.0	0.0	0.00	0.02	39.7
All Vehicles		1879	3.1	1879	3.1	0.354	1.8	NA	2.4	16.9	0.11	0.12	36.3

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingalara - 2021 AM School Peak - No Build]

Network: N101 [Waitara_PS_2021 AM School Peak - No Build]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingalara Avenue													
1	L2	87	1.1	87	1.1	0.128	9.9	LOS A	0.5	3.3	0.51	0.96	33.6
3	R2	2	0.0	2	0.0	0.052	92.7	LOS F	0.1	1.0	0.96	1.00	20.0
Approach		89	1.1	89	1.1	0.128	11.8	LOS B	0.5	3.3	0.52	0.96	32.6
East: Edgeworth David East													
4	L2	13	0.0	13	0.0	0.250	3.4	LOS A	0.0	0.0	0.00	0.01	40.1
5	T1	945	3.0	945	3.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.01	39.9
Approach		958	2.9	958	2.9	0.250	0.1	NA	0.0	0.0	0.00	0.01	39.9
West: Edgeworth David West													
11	T1	782	3.2	782	3.2	0.355	1.5	LOS A	1.7	12.3	0.16	0.03	38.4
12	R2	39	2.6	39	2.6	0.355	13.8	LOS B	1.7	12.3	0.25	0.04	37.9
Approach		821	3.2	821	3.2	0.355	2.1	NA	1.7	12.3	0.17	0.03	38.4
All Vehicles		1868	2.9	1868	2.9	0.355	1.5	NA	1.7	12.3	0.10	0.06	38.8

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.4 %

Number of Iterations: 10 (maximum specified: 10)

2021 AM Peak – Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2021 AM School Peak - Build]

 Network: N101 [Waitara_PS_2021 AM School Peak - Build]

Palmerston Road and Edgeworth David Ave

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	960	3.9	960	3.9	0.554	0.5	LOS A	3.3	24.2	0.14	0.13	47.8
6	R2	207	1.4	207	1.4	0.289	17.7	LOS B	7.4	52.7	0.81	0.78	33.5
Approach		1167	3.4	1167	3.4	0.554	3.5	LOS A	7.4	52.7	0.26	0.24	39.8
North: Palmerston Road													
7	L2	181	0.6	181	0.6	0.574	39.6	LOS D	8.4	58.8	0.85	0.81	24.2
Approach		181	0.6	181	0.6	0.574	39.6	LOS D	8.4	58.8	0.85	0.81	24.2
West: Edgeworth David West													
10	L2	40	5.0	40	5.0	0.815	31.0	LOS C	18.7	134.8	0.89	0.83	30.1
11	T1	778	3.1	778	3.1	0.815	25.9	LOS C	18.8	134.8	0.88	0.82	10.9
Approach		818	3.2	818	3.2	0.815	26.1	LOS C	18.8	134.8	0.88	0.82	12.8
All Vehicles		2166	3.1	2166	3.1	0.815	15.1	LOS B	18.8	134.8	0.54	0.51	24.5

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2021 AM School Peak - Build]

 Network: N101 [Waitara_PS_2021 AM School Peak - Build]

Edgeworth David Ave and Myra Street

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	377	3.2	377	3.2	0.493	24.4	LOS C	13.4	96.7	0.72	0.62	26.2
3	R2	78	3.8	78	3.8	0.493	53.6	LOS D	4.8	34.4	0.93	0.77	18.6
Approach		455	3.3	455	3.3	0.493	29.4	LOS C	13.4	96.7	0.76	0.65	24.5
East: Edgeworth David East													
4	L2	122	0.0	122	0.0	0.887	53.8	LOS D	19.0	135.9	1.00	0.88	21.3
6	R2	790	3.5	790	3.5	0.887	43.0	LOS D	30.5	220.0	0.98	0.91	10.8
Approach		912	3.1	912	3.1	0.887	44.4	LOS D	30.5	220.0	0.98	0.91	13.2
North: Edgeworth David North													
7	L2	579	3.8	579	3.8	0.741	15.4	LOS B	8.1	57.1	0.60	0.71	9.3
8	T1	384	0.8	384	0.8	0.741	51.1	LOS D	8.1	57.1	1.00	0.90	19.6
Approach		963	2.6	963	2.6	0.741	29.6	LOS C	8.1	57.1	0.76	0.78	17.3
All Vehicles		2330	2.9	2330	2.9	0.887	35.4	LOS D	30.5	220.0	0.85	0.81	17.3

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2021 AM School Peak - Build]

Network: N101
[Waitara_PS_2021 AM School Peak - Build]

New Site
8:30 AM to 9:30 AM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	913	2.8	913	2.8	0.373	0.9	LOS A	2.3	16.7	0.12	0.08	31.4
6	R2	140	2.1	140	2.1	0.373	8.5	LOS A	2.3	16.7	0.57	0.35	35.9
Approach		1053	2.8	1053	2.8	0.373	1.9	NA	2.3	16.7	0.18	0.11	34.0
North: Jubilee Street													
7	L2	191	1.6	191	1.6	0.144	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	7	28.6	7	28.6	0.233	96.3	LOS F	0.5	4.1	0.96	1.00	13.0
Approach		198	2.5	198	2.5	0.233	6.7	LOS A	0.5	4.1	0.03	0.47	35.0
West: Edgeworth David West													
10	L2	26	7.7	26	7.7	0.015	3.5	LOS A	0.0	0.0	0.00	0.45	38.0
11	T1	628	3.7	628	3.7	0.330	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		654	3.8	654	3.8	0.330	0.2	NA	0.0	0.0	0.00	0.02	39.7
All Vehicles		1905	3.1	1905	3.1	0.373	1.8	NA	2.3	16.7	0.11	0.12	36.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingalaria - 2021 AM School Peak - Build]

Network: N101
[Waitara_PS_2021 AM School Peak - Build]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingalaria Avenue													
1	L2	90	1.1	90	1.1	0.135	10.1	LOS B	0.5	3.4	0.51	0.96	33.5
3	R2	2	0.0	2	0.0	0.054	96.7	LOS F	0.1	1.0	0.97	1.00	19.6
Approach		92	1.1	92	1.1	0.135	12.0	LOS B	0.5	3.4	0.52	0.97	32.6
East: Edgeworth David East													
4	L2	13	0.0	13	0.0	0.256	3.4	LOS A	0.0	0.0	0.00	0.01	40.1
5	T1	968	2.9	968	2.9	0.256	0.0	LOS A	0.0	0.0	0.00	0.01	39.9
Approach		981	2.9	981	2.9	0.256	0.1	NA	0.0	0.0	0.00	0.01	39.9
West: Edgeworth David West													
11	T1	782	3.2	782	3.2	0.358	1.6	LOS A	1.8	12.8	0.17	0.03	38.3
12	R2	39	2.6	39	2.6	0.358	14.3	LOS B	1.8	12.8	0.26	0.05	37.7
Approach		821	3.2	821	3.2	0.358	2.2	NA	1.8	12.8	0.17	0.03	38.3
All Vehicles		1894	2.9	1894	2.9	0.358	1.6	NA	1.8	12.8	0.10	0.06	38.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.4 %
Number of Iterations: 10 (maximum specified: 10)

2021 PM Peak – No-Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2021 PM School Peak - No Build]

 Network: N101
[Waitara_PS_2021 PM School Peak - No Build]

Palmerston Road and Edgeworth David Ave

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 104 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1022	3.4	1022	3.4	0.593	0.5	LOS A	3.4	24.7	0.14	0.13	47.8
6	R2	206	1.0	206	1.0	0.294	13.0	LOS B	5.6	39.4	0.69	0.73	36.4
Approach		1228	3.0	1228	3.0	0.593	2.6	LOS A	5.6	39.4	0.23	0.23	41.9
North: Palmerston Road													
7	L2	170	1.2	170	1.2	0.637	42.1	LOS D	7.8	55.4	0.90	0.82	23.4
Approach		170	1.2	170	1.2	0.637	42.1	LOS D	7.8	55.4	0.90	0.82	23.4
West: Edgeworth David West													
10	L2	27	3.7	27	3.7	0.756	24.7	LOS C	16.1	115.5	0.81	0.78	33.0
11	T1	799	2.6	799	2.6	0.756	20.0	LOS B	16.1	115.5	0.80	0.77	13.2
Approach		826	2.7	826	2.7	0.756	20.1	LOS C	16.1	115.5	0.80	0.77	14.7
All Vehicles		2224	2.7	2224	2.7	0.756	12.1	LOS B	16.1	115.5	0.49	0.48	26.7

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.2 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2021 PM School Peak - No Build]

 Network: N101
[Waitara_PS_2021 PM School Peak - No Build]

Edgeworth David Ave and Myra Street

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 104 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	279	1.4	279	1.4	0.356	24.0	LOS C	9.8	69.4	0.72	0.62	26.4
3	R2	74	1.4	74	1.4	0.414	51.7	LOS D	3.6	25.6	0.93	0.76	18.9
Approach		353	1.4	353	1.4	0.414	29.8	LOS C	9.8	69.4	0.77	0.65	24.4
East: Edgeworth David East													
4	L2	102	2.0	102	2.0	0.758	41.6	LOS D	18.4	131.9	0.95	0.85	23.8
6	R2	941	3.4	941	3.4	0.758	32.3	LOS C	26.9	193.4	0.89	0.84	13.2
Approach		1043	3.3	1043	3.3	0.758	33.2	LOS C	26.9	193.4	0.90	0.84	15.2
North: Edgeworth David North													
7	L2	677	2.8	677	2.8	0.785	16.6	LOS B	8.0	57.1	0.59	0.71	8.8
8	T1	289	1.0	289	1.0	0.785	47.9	LOS D	8.0	57.1	1.00	0.89	20.2
Approach		966	2.3	966	2.3	0.785	25.9	LOS C	8.0	57.1	0.71	0.76	16.4
All Vehicles		2362	2.6	2362	2.6	0.785	29.7	LOS C	26.9	193.4	0.80	0.78	17.6

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.2 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2021 PM School Peak - No Build]

Network: N101
[Waitara_PS_2021 PM School Peak - No Build]

Edgeworth and Jubilee - 2021 PM School Peak - No Build
3:00 PM to 4:00 PM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1039	3.4	1039	3.4	0.453	1.2	LOS A	3.4	24.5	0.12	0.09	30.5
6	R2	189	2.1	189	2.1	0.453	10.8	LOS B	3.4	24.5	0.69	0.51	34.1
Approach		1228	3.2	1228	3.2	0.453	2.6	NA	3.4	24.5	0.20	0.15	32.8
North: Jubilee Street													
7	L2	201	2.0	201	2.0	0.152	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	6	33.3	6	33.3	0.455	296.1	LOS F	0.9	8.4	0.99	1.02	5.4
Approach		207	2.9	207	2.9	0.455	11.9	LOS B	0.9	8.4	0.03	0.47	31.8
West: Edgeworth David West													
10	L2	16	0.0	16	0.0	0.009	3.4	LOS A	0.0	0.0	0.00	0.45	38.1
11	T1	735	2.9	735	2.9	0.384	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		751	2.8	751	2.8	0.384	0.1	NA	0.0	0.0	0.00	0.01	39.8
All Vehicles		2186	3.0	2186	3.0	0.455	2.6	NA	3.4	24.5	0.12	0.13	34.6

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.2 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingallara - 2021 PM School Peak - No Build]

Network: N101 [Waitara_PS_2021 PM School Peak - No Build]

Edgeworth and Ingallara - 2021 PM School Peak - No Build
3:00 PM to 4:00 PM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingallara Avenue													
1	L2	63	0.0	63	0.0	0.111	11.1	LOS B	0.4	2.7	0.56	0.99	32.9
3	R2	1	0.0	1	0.0	0.061	199.2	LOS F	0.2	1.1	0.98	1.00	12.6
Approach		64	0.0	64	0.0	0.111	14.1	LOS B	0.4	2.7	0.56	0.99	31.4
East: Edgeworth David East													
4	L2	6	0.0	6	0.0	0.309	3.4	LOS A	0.0	0.0	0.00	0.00	40.1
5	T1	1173	3.3	1173	3.3	0.309	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		1179	3.3	1179	3.3	0.309	0.1	NA	0.0	0.0	0.00	0.00	40.0
West: Edgeworth David West													
11	T1	902	2.8	902	2.8	0.417	2.5	LOS A	2.7	19.2	0.19	0.03	37.7
12	R2	36	0.0	36	0.0	0.417	20.4	LOS C	2.7	19.2	0.29	0.04	36.7
Approach		938	2.7	938	2.7	0.417	3.2	NA	2.7	19.2	0.19	0.03	37.6
All Vehicles		2181	2.9	2181	2.9	0.417	1.8	NA	2.7	19.2	0.10	0.04	38.6

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 14.8 %

Number of Iterations: 10 (maximum specified: 10)

2021 PM Peak – Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2021 PM School Peak - Build]

 Network: N101
[Waitara_PS_2021 PM School Peak - Build]

Palmerston Road and Edgeworth David Ave

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 110 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1022	3.4	1022	3.4	0.589	0.5	LOS A	4.3	31.0	0.17	0.14	47.3
6	R2	206	1.0	206	1.0	0.297	18.8	LOS B	7.5	53.0	0.82	0.78	32.9
Approach		1228	3.0	1228	3.0	0.589	3.6	LOS A	7.5	53.0	0.28	0.25	39.5
North: Palmerston Road													
7	L2	182	1.1	182	1.1	0.600	40.4	LOS D	8.4	59.7	0.87	0.81	24.0
Approach		182	1.1	182	1.1	0.600	40.4	LOS D	8.4	59.7	0.87	0.81	24.0
West: Edgeworth David West													
10	L2	27	3.7	27	3.7	0.845	30.3	LOS C	20.3	145.3	0.91	0.85	30.4
11	T1	847	2.5	847	2.5	0.845	25.6	LOS C	20.3	145.3	0.90	0.84	11.0
Approach		874	2.5	874	2.5	0.845	25.8	LOS C	20.3	145.3	0.90	0.84	12.2
All Vehicles		2284	2.7	2284	2.7	0.845	15.0	LOS B	20.3	145.3	0.56	0.52	24.1

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2021 PM School Peak - Build]

 Network: N101
[Waitara_PS_2021 PM School Peak - Build]

Edgeworth David Ave and Myra Street

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 110 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	279	1.4	279	1.4	0.329	22.6	LOS C	9.7	69.1	0.68	0.58	26.9
3	R2	74	1.4	74	1.4	0.426	54.3	LOS D	3.8	27.1	0.94	0.76	18.4
Approach		353	1.4	353	1.4	0.426	29.2	LOS C	9.7	69.1	0.74	0.62	24.5
East: Edgeworth David East													
4	L2	122	1.6	122	1.6	0.960	62.4	LOS E	27.3	196.2	1.00	1.00	19.8
6	R2	941	3.4	941	3.4	0.960	58.3	LOS E	36.2	261.1	1.00	1.04	8.5
Approach		1063	3.2	1063	3.2	0.960	58.8	LOS E	36.2	261.1	1.00	1.03	10.5
North: Edgeworth David North													
7	L2	677	2.8	677	2.8	0.785	16.7	LOS B	8.1	57.1	0.58	0.70	8.8
8	T1	349	0.9	349	0.9	0.785	50.7	LOS D	8.1	57.1	1.00	0.90	19.6
Approach		1026	2.1	1026	2.1	0.785	28.3	LOS C	8.1	57.1	0.72	0.77	16.5
All Vehicles		2442	2.5	2442	2.5	0.960	41.7	LOS D	36.2	261.1	0.84	0.86	14.7

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2021 PM School Peak - Build]

Network: N101
[Waitara_PS_2021 PM School Peak - Build]

Edgeworth and Jubilee - 2021 PM School Peak - Build
3:00 PM to 4:00 PM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1058	3.3	1058	3.3	0.492	0.9	LOS A	3.0	21.4	0.08	0.07	32.5
6	R2	189	2.1	189	2.1	0.492	11.1	LOS B	3.0	21.4	0.69	0.61	33.6
Approach		1247	3.1	1247	3.1	0.492	2.4	NA	3.0	21.4	0.17	0.15	33.3
North: Jubilee Street													
7	L2	201	2.0	201	2.0	0.152	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	6	33.3	6	33.3	0.780	568.4	LOS F	1.2	10.7	0.99	1.07	3.0
Approach		207	2.9	207	2.9	0.780	19.8	LOS C	1.2	10.7	0.03	0.47	28.0
West: Edgeworth David West													
10	L2	16	0.0	16	0.0	0.009	3.4	LOS A	0.0	0.0	0.00	0.45	38.1
11	T1	735	2.9	735	2.9	0.384	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		751	2.8	751	2.8	0.384	0.1	NA	0.0	0.0	0.00	0.01	39.8
All Vehicles		2205	3.0	2205	3.0	0.780	3.2	NA	3.0	21.4	0.10	0.13	33.5

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingallara - 2021 PM School Peak - Build]

Network: N101 [Waitara_PS_2021 PM School Peak - Build]

Edgeworth and Ingallara - 2021 PM School Peak - Build
3:00 PM to 4:00 PM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingallara Avenue													
1	L2	64	0.0	64	0.0	0.114	11.2	LOS B	0.4	2.8	0.56	1.00	32.9
3	R2	1	0.0	1	0.0	0.064	206.2	LOS F	0.2	1.1	0.99	1.00	12.3
Approach		65	0.0	65	0.0	0.114	14.2	LOS B	0.4	2.8	0.57	1.00	31.3
East: Edgeworth David East													
4	L2	6	0.0	6	0.0	0.313	3.4	LOS A	0.0	0.0	0.00	0.00	40.1
5	T1	1190	3.3	1190	3.3	0.313	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		1196	3.3	1196	3.3	0.313	0.1	NA	0.0	0.0	0.00	0.00	40.0
West: Edgeworth David West													
11	T1	902	2.8	902	2.8	0.419	2.6	LOS A	2.8	19.9	0.19	0.03	37.6
12	R2	36	0.0	36	0.0	0.419	20.9	LOS C	2.8	19.9	0.30	0.04	36.5
Approach		938	2.7	938	2.7	0.419	3.3	NA	2.8	19.9	0.20	0.03	37.5
All Vehicles		2199	2.9	2199	2.9	0.419	1.9	NA	2.8	19.9	0.10	0.04	38.5

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.5 %

Number of Iterations: 10 (maximum specified: 10)

2031 AM Peak – No Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2031 AM School Peak - No Build]  Network: N101 [Waitara_PS_2031 AM School Peak - No Build]

Palmerston Road and Edgeworth David Ave

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1138	3.9	1021	3.9	0.589	0.8	LOS A	6.3	45.4	0.24	0.22	46.1
6	R2	246	1.6	221	1.6	0.326	23.4	LOS C	8.0	57.1	0.87	0.80	30.5
Approach		1384	3.5	1241 ^{N1}	3.5	0.589	4.8	LOS A	8.0	57.1	0.35	0.32	37.2
North: Palmerston Road													
7	L2	197	0.5	197	0.5	0.624	40.4	LOS D	9.3	65.4	0.87	0.82	24.0
Approach		197	0.5	197	0.5	0.624	40.4	LOS D	9.3	65.4	0.87	0.82	24.0
West: Edgeworth David West													
10	L2	48	6.3	48	6.3	0.893	38.3	LOS D	24.0	173.0	0.96	0.93	27.3
11	T1	846	3.3	846	3.3	0.893	33.1	LOS C	24.6	176.8	0.95	0.93	8.9
Approach		894	3.5	894	3.5	0.893	33.4	LOS C	24.6	176.8	0.95	0.93	10.8
All Vehicles		2475	3.2	2332 ^{N1}	3.4	0.893	18.8	LOS B	24.6	176.8	0.63	0.60	21.8

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 310.1 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2031 AM School Peak - No Build]  Network: N101 [Waitara_PS_2031 AM School Peak - No Build]

Edgeworth David Ave and Myra Street

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	447	3.1	447	3.1	0.805	30.0	LOS C	17.5	125.5	0.84	0.74	24.2
3	R2	92	4.3	92	4.3	0.805	58.4	LOS E	7.5	54.4	1.00	0.81	17.9
Approach		539	3.3	539	3.3	0.805	34.9	LOS C	17.5	125.5	0.87	0.75	22.8
East: Edgeworth David East													
4	L2	115	0.0	115	0.0	1.380	733.7	LOS F	36.5	261.1	1.00	3.46	3.0
6	R2	937	3.5	937	3.5	1.380	732.8	LOS F	36.5	261.1	1.00	3.49	0.8
Approach		1052	3.1	1052	3.1	1.380	732.9	LOS F	36.5	261.1	1.00	3.49	1.1
North: Edgeworth David North													
7	L2	686	3.8	686	3.8	0.833	17.8	LOS B	8.0	57.1	0.60	0.71	8.3
8	T1	362	1.1	362	1.1	0.833	53.4	LOS D	8.0	57.1	1.00	0.90	19.1
Approach		1048	2.9	1048	2.9	0.833	30.1	LOS C	8.0	57.1	0.74	0.78	16.0
All Vehicles		2639	3.1	2639	3.1	1.380	311.2	LOS F	36.5	261.1	0.87	1.85	3.0

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 310.1 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 2 [Edgeworth and Jubilee - 2031 AM School Peak - No Build]

Network: N101
[Waitara_PS_2031 AM School Peak - No Build]

New Site
8:30 AM to 9:30 AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1052	2.9	1052	2.9	0.416	1.5	LOS A	9.1	65.3	0.16	0.09	28.3
6	R2	167	2.4	167	2.4	0.416	11.0	LOS B	9.1	65.3	0.67	0.37	34.6
Approach		1219	2.9	1219	2.9	0.416	2.8	NA	9.1	65.3	0.23	0.13	31.9
North: Jubilee Street													
7	L2	227	1.8	227	1.8	0.172	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	8	37.5	8	37.5	0.955	656.2	LOS F	1.7	15.7	0.99	1.21	2.6
Approach		235	3.0	235	3.0	0.955	25.6	LOS D	1.7	15.7	0.03	0.48	25.8
West: Edgeworth David West													
10	L2	31	9.7	31	9.7	0.018	3.5	LOS A	0.0	0.0	0.00	0.45	38.0
11	T1	744	3.6	744	3.6	0.391	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		775	3.9	775	3.9	0.391	0.2	NA	0.0	0.0	0.00	0.02	39.7
All Vehicles		2229	3.2	2229	3.2	0.955	4.3	NA	9.1	65.3	0.13	0.13	31.9

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 310.1 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

 Site: 3 [Edgeworth and Ingallara - 2031 AM School Peak - No Build]

Network: N101 [Waitara_PS_2031 AM School Peak - No Build]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingallara Avenue													
1	L2	103	1.0	103	1.0	0.346	11.9	LOS B	0.7	5.0	0.56	1.05	32.5
3	R2	3	0.0	3	0.0	0.183	219.2	LOS F	0.5	3.2	0.99	1.01	11.8
Approach		106	0.9	106	0.9	0.346	17.8	LOS C	0.7	5.0	0.57	1.05	29.7
East: Edgeworth David East													
4	L2	15	0.0	15	0.0	0.297	3.4	LOS A	14.1	101.3	0.00	0.01	40.1
5	T1	1120	2.9	1120	2.9	0.297	0.0	LOS A	90.7	651.2	0.00	0.01	39.9
Approach		1135	2.9	1135	2.9	0.297	0.1	NA	90.7	651.2	0.00	0.01	39.9
West: Edgeworth David West													
11	T1	926	3.1	926	3.1	0.444	2.8	LOS A	3.2	23.2	0.22	0.03	37.4
12	R2	46	2.2	46	2.2	0.444	19.7	LOS C	3.2	23.2	0.35	0.05	36.2
Approach		972	3.1	972	3.1	0.444	3.6	NA	3.2	23.2	0.23	0.03	37.3
All Vehicles		2213	2.9	2213	2.9	0.444	2.5	NA	90.7	651.2	0.13	0.07	38.1

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 310.1 %

Number of Iterations: 10 (maximum specified: 10)

2031 AM Peak – Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2031 AM School Peak - Build]

 Network: N101
[Waitara_PS_2031 AM School Peak - Build]

Palmerston Road and Edgeworth David Ave

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1138	3.9	962	3.9	0.555	0.7	LOS A	5.6	40.2	0.23	0.20	46.4
6	R2	246	1.6	208	1.6	0.320	32.9	LOS C	8.0	57.1	0.93	0.86	26.6
Approach		1384	3.5	1170 ^{N1}	3.5	0.555	6.4	LOS A	8.0	57.1	0.35	0.32	34.4
North: Palmerston Road													
7	L2	212	0.5	212	0.5	0.672	41.1	LOS D	10.2	71.9	0.89	0.83	23.7
Approach		212	0.5	212	0.5	0.672	41.1	LOS D	10.2	71.9	0.89	0.83	23.7
West: Edgeworth David West													
10	L2	48	6.3	48	6.3	0.955	56.0	LOS E	32.7	235.5	1.00	1.10	22.3
11	T1	910	3.1	910	3.1	0.955	51.6	LOS D	34.3	246.1	1.00	1.11	6.1
Approach		958	3.2	958	3.2	0.955	51.8	LOS D	34.3	246.1	1.00	1.11	7.4
All Vehicles		2554	3.1	2340 ^{N1}	3.4	0.955	28.1	LOS C	34.3	246.1	0.67	0.69	17.0

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 392.5 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2031 AM School Peak - Build]

 Network: N101
[Waitara_PS_2031 AM School Peak - Build]

Edgeworth David Ave and Myra Street

8:30 AM to 9:30 AM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	447	3.1	447	3.1	0.735	27.2	LOS C	18.2	130.6	0.81	0.71	25.2
3	R2	92	4.3	92	4.3	0.735	60.3	LOS E	5.8	42.2	0.99	0.80	17.4
Approach		539	3.3	539	3.3	0.735	32.9	LOS C	18.2	130.6	0.84	0.72	23.4
East: Edgeworth David East													
4	L2	140	0.0	140	0.0	1.427	816.6	LOS F	36.5	261.1	1.00	3.67	2.7
6	R2	937	3.5	937	3.5	1.427	816.6	LOS F	36.5	261.1	1.00	3.71	0.7
Approach		1077	3.1	1077	3.1	1.427	816.6	LOS F	36.5	261.1	1.00	3.70	1.0
North: Edgeworth David North													
7	L2	686	3.8	686	3.8	0.871	16.2	LOS B	8.1	57.1	0.58	0.71	8.9
8	T1	441	0.9	441	0.9	0.871	55.6	LOS E	8.1	57.1	1.00	0.91	18.8
Approach		1127	2.7	1127	2.7	0.871	31.6	LOS C	8.1	57.1	0.74	0.79	16.5
All Vehicles		2743	3.0	2743	3.0	1.427	340.1	LOS F	36.5	261.1	0.86	1.92	2.9

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 392.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2031 AM School Peak - Build]

Network: N101
[Waitara_PS_2031 AM School Peak - Build]

New Site
8:30 AM to 9:30 AM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgworth David East													
5	T1	1077	2.9	1077	2.9	0.422	1.6	LOS A	9.1	65.3	0.17	0.09	28.2
6	R2	167	2.4	167	2.4	0.422	11.1	LOS B	9.1	65.3	0.67	0.37	34.6
Approach		1244	2.8	1244	2.8	0.422	2.8	NA	9.1	65.3	0.23	0.13	31.8
North: Jubilee Street													
7	L2	227	1.8	227	1.8	0.172	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	8	37.5	8	37.5	1.041	785.4	LOS F	2.2	20.6	1.00	1.33	2.2
Approach		235	3.0	235	3.0	1.041	30.0	LOS D	2.2	20.6	0.03	0.48	24.2
West: Edgworth David West													
10	L2	31	9.7	31	9.7	0.018	3.5	LOS A	0.0	0.0	0.00	0.45	38.0
11	T1	744	3.6	744	3.6	0.391	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		775	3.9	775	3.9	0.391	0.2	NA	0.0	0.0	0.00	0.02	39.7
All Vehicles		2254	3.2	2254	3.2	1.041	4.8	NA	9.1	65.3	0.13	0.13	31.2

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 392.5 %

Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingallara - 2031 AM School Peak - Build]

Network: N101 [Waitara_PS_2031 AM School Peak - Build]

New Site
8:30 AM to 9:30 AM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingallara Avenue													
1	L2	106	0.9	106	0.9	0.363	12.2	LOS B	0.8	5.3	0.57	1.06	32.3
3	R2	3	0.0	3	0.0	0.193	232.5	LOS F	0.5	3.4	0.99	1.01	11.3
Approach		109	0.9	109	0.9	0.363	18.3	LOS C	0.8	5.3	0.58	1.05	29.5
East: Edgeworth David East													
4	L2	15	0.0	15	0.0	0.303	3.4	LOS A	40.9	293.5	0.00	0.01	40.1
5	T1	1143	2.9	1143	2.9	0.303	0.0	LOS A	127.9	917.7	0.00	0.01	39.9
Approach		1158	2.8	1158	2.8	0.303	0.1	NA	127.9	917.7	0.00	0.01	39.9
West: Edgeworth David West													
11	T1	926	3.1	926	3.1	0.448	3.0	LOS A	3.4	24.3	0.23	0.03	37.2
12	R2	46	2.2	46	2.2	0.448	20.5	LOS C	3.4	24.3	0.36	0.05	36.0
Approach		972	3.1	972	3.1	0.448	3.8	NA	3.4	24.3	0.23	0.03	37.2
All Vehicles		2239	2.9	2239	2.9	0.448	2.6	NA	127.9	917.7	0.13	0.07	38.0

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

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 392.5 %

Number of Iterations: 10 (maximum specified: 10)

2031 PM Peak – No Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2031 PM School Peak - No Build]

 Network: N101
[Waitara_PS_2031 PM School Peak - No Build]

Palmerston Road and Edgeworth David Ave

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1211	3.4	976	3.2	0.561	0.7	LOS A	5.7	41.0	0.23	0.21	46.4
6	R2	245	1.2	198	1.2	0.305	32.6	LOS C	8.1	57.1	0.93	0.85	26.7
Approach		1456	3.0	1174 ^{N1}	2.8	0.561	6.1	LOS A	8.1	57.1	0.35	0.31	34.8
North: Palmerston Road													
7	L2	203	1.5	203	1.5	0.648	40.8	LOS D	9.7	68.7	0.88	0.82	23.8
Approach		203	1.5	203	1.5	0.648	40.8	LOS D	9.7	68.7	0.88	0.82	23.8
West: Edgeworth David West													
10	L2	32	3.1	32	3.1	0.964	60.4	LOS E	35.4	253.6	1.00	1.15	21.4
11	T1	946	2.5	946	2.5	0.964	56.4	LOS E	36.5	261.0	1.00	1.15	5.7
Approach		978	2.6	978	2.6	0.964	56.6	LOS E	36.5	261.0	1.00	1.15	6.5
All Vehicles		2637	2.7	2355 ^{N1}	3.1	0.964	30.0	LOS C	36.5	261.0	0.66	0.71	15.9

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 65.5 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2031 PM School Peak - No Build]

 Network: N101
[Waitara_PS_2031 PM School Peak - No Build]

Edgeworth David Ave and Myra Street

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	331	1.5	331	1.5	0.495	24.3	LOS C	12.7	89.8	0.73	0.64	26.3
3	R2	88	1.1	88	1.1	0.505	58.2	LOS E	4.8	33.8	0.96	0.78	17.7
Approach		419	1.4	419	1.4	0.505	31.4	LOS C	12.7	89.8	0.78	0.67	23.8
East: Edgeworth David East													
4	L2	122	2.5	122	2.4	1.484	917.3	LOS F	36.3	261.1	1.00	3.93	2.4
6	R2	1116	3.4	1112	3.3	1.484	917.6	LOS F	36.3	261.1	1.00	3.95	0.7
Approach		1238	3.3	1234 ^{N1}	3.2	1.484	917.6	LOS F	36.3	261.1	1.00	3.95	0.9
North: Edgeworth David North													
7	L2	803	2.9	803	2.9	0.889	19.9	LOS B	8.0	57.1	0.62	0.73	7.6
8	T1	343	1.2	343	1.2	0.889	54.9	LOS D	8.0	57.1	1.00	0.92	18.8
Approach		1146	2.4	1146	2.4	0.889	30.4	LOS C	8.0	57.1	0.73	0.79	14.9
All Vehicles		2803	2.6	2799 ^{N1}	2.6	1.484	421.6	LOS F	36.3	261.1	0.86	2.16	2.1

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 65.5 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2031 PM School Peak - No Build]

Network: N101
[Waitara_PS_2031 PM School Peak - No Build]

Edgeworth and Jubilee - 2021 PM School Peak - No Build
3:00 PM to 4:00 PM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1231	3.3	1231	3.3	0.545	1.7	LOS A	9.1	65.3	0.13	0.10	28.1
6	R2	224	2.2	224	2.2	0.545	14.8	LOS B	9.1	65.3	0.85	0.63	31.9
Approach		1455	3.2	1455	3.2	0.545	3.7	NA	9.1	65.3	0.24	0.18	30.5
North: Jubilee Street													
7	L2	238	2.1	238	2.1	0.180	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	8	37.5	8	37.5	2.667	3671.1	LOS F	9.4	86.6	1.00	1.78	0.5
Approach		246	3.3	246	3.3	2.667	122.7	LOS F	9.4	86.6	0.03	0.50	10.4
West: Edgeworth David West													
10	L2	19	0.0	19	0.0	0.010	3.4	LOS A	0.0	0.0	0.00	0.45	38.1
11	T1	870	2.8	870	2.8	0.735	0.1	LOS A	0.0	0.0	0.00	0.00	39.7
Approach		889	2.7	889	2.7	0.735	0.2	NA	0.0	0.0	0.00	0.01	39.5
All Vehicles		2590	3.0	2590	3.0	2.667	13.8	NA	9.4	86.6	0.14	0.15	21.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 65.5 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingallara - 2031 PM School Peak - No Build]

Network: N101 [Waitara_PS_2031 PM School Peak - No Build]

Edgeworth and Ingallara - 2021 PM School Peak - No Build
3:00 PM to 4:00 PM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingallara Avenue													
1	L2	74	0.0	74	0.0	0.313	13.8	LOS B	0.6	4.1	0.65	1.04	31.5
3	R2	1	0.0	1	0.0	0.189	647.0	LOS F	0.4	3.1	1.00	1.00	5.0
Approach		75	0.0	75	0.0	0.313	22.2	LOS C	0.6	4.1	0.65	1.04	27.7
East: Edgeworth David East													
4	L2	8	0.0	8	0.0	0.366	3.5	LOS A	62.5	449.7	0.00	0.01	40.1
5	T1	1390	3.3	1390	3.3	0.366	0.0	LOS A	168.6	1213.9	0.00	0.00	39.9
Approach		1398	3.3	1398	3.3	0.366	0.1	NA	168.6	1213.9	0.00	0.00	39.9
West: Edgeworth David West													
11	T1	1068	2.7	1068	2.7	0.538	5.5	LOS A	12.2	87.5	0.62	0.04	35.5
12	R2	42	0.0	42	0.0	0.538	32.6	LOS D	12.2	87.5	1.00	0.07	33.3
Approach		1110	2.6	1110	2.6	0.538	6.5	NA	12.2	87.5	0.63	0.04	35.4
All Vehicles		2583	2.9	2583	2.9	0.538	3.5	NA	168.6	1213.9	0.29	0.05	37.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 65.5 %
Number of Iterations: 10 (maximum specified: 10)

2031 PM Peak – Build

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Palmerston and Edgeworth David - 2031 PM School Peak - Build]

Network: N101
[Waitara_PS_2031 PM School Peak - Build]

Palmerston Road and Edgeworth David Ave

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1211	3.4	945	3.2	0.543	0.7	LOS A	5.3	38.4	0.22	0.20	46.5
6	R2	245	1.2	191	1.1	0.297	34.5	LOS C	8.1	57.1	0.95	0.85	26.1
Approach		1456	3.0	1137 ^{N1}	2.8	0.543	6.4	LOS A	8.1	57.1	0.34	0.31	34.3
North: Palmerston Road													
7	L2	214	1.4	214	1.4	0.682	41.3	LOS D	10.4	73.5	0.90	0.83	23.7
Approach		214	1.4	214	1.4	0.682	41.3	LOS D	10.4	73.5	0.90	0.83	23.7
West: Edgeworth David West													
10	L2	32	3.1	32	3.1	1.010	102.9	LOS F	48.7	347.8	1.00	1.43	15.0
11	T1	994	2.4	994	2.4	1.010	99.3	LOS F	50.2	358.7	1.00	1.44	3.4
Approach		1026	2.4	1026	2.4	1.010	99.4	LOS F	50.2	358.7	1.00	1.44	3.9
All Vehicles		2696	2.7	2377 ^{N1}	3.0	1.010	49.7	LOS D	50.2	358.7	0.68	0.85	10.9

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 46.1 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

 Site: TCS 1455 [TCS 1455_Edgeworth and Myra - 2031 PM School Peak - Build]

Network: N101
[Waitara_PS_2031 PM School Peak - Build]

Edgeworth David Ave and Myra Street

3:00 PM to 4:00 PM

Signals - Actuated Coordinated Cycle Time = 112 seconds (Network Cycle Time - Program)

Common Control Group: 1455 [Name]

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Myra Street													
2	T1	331	1.5	331	1.5	0.484	23.8	LOS C	12.4	87.9	0.72	0.62	26.5
3	R2	88	1.1	88	1.1	0.565	60.0	LOS E	4.8	34.3	0.97	0.77	17.4
Approach		419	1.4	419	1.4	0.565	31.4	LOS C	12.4	87.9	0.77	0.66	23.9
East: Edgeworth David East													
4	L2	141	2.1	141	2.1	1.531	1001.6	LOS F	36.4	261.1	1.00	4.11	2.3
6	R2	1116	3.4	1112	3.3	1.531	1002.4	LOS F	36.4	261.1	1.00	4.14	0.6
Approach		1257	3.3	1253 ^{N1}	3.1	1.531	1002.3	LOS F	36.4	261.1	1.00	4.14	0.8
North: Edgeworth David North													
7	L2	803	2.9	803	2.9	0.924	19.2	LOS B	8.1	57.1	0.60	0.73	7.8
8	T1	403	1.0	403	1.0	0.924	59.1	LOS E	8.1	57.1	1.00	0.95	18.1
Approach		1206	2.2	1206	2.2	0.924	32.5	LOS C	8.1	57.1	0.73	0.80	15.1
All Vehicles		2882	2.6	2878 ^{N1}	2.6	1.531	454.5	LOS F	36.4	261.1	0.86	2.23	2.0

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

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

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

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

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 46.1 %

Number of Iterations: 10 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 2 [Edgeworth and Jubilee - 2031 PM School Peak - Build]

Network: N101
[Waitara_PS_2031 PM School Peak - Build]

Edgeworth and Jubilee - 2021 PM School Peak - Build
3:00 PM to 4:00 PM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Edgeworth David East													
5	T1	1250	3.3	1250	3.3	0.551	1.7	LOS A	9.1	65.3	0.13	0.10	27.9
6	R2	224	2.2	224	2.2	0.551	15.0	LOS B	9.1	65.3	0.85	0.62	31.8
Approach		1474	3.1	1474	3.1	0.551	3.8	NA	9.1	65.3	0.24	0.18	30.3
North: Jubilee Street													
7	L2	238	2.1	238	2.1	0.180	3.4	LOS A	0.0	0.0	0.00	0.45	37.3
9	R2	8	37.5	8	37.5	2.667	3664.2	LOS F	9.3	86.4	1.00	1.78	0.5
Approach		246	3.3	246	3.3	2.667	122.5	LOS F	9.3	86.4	0.03	0.50	10.4
West: Edgeworth David West													
10	L2	19	0.0	19	0.0	0.010	3.4	LOS A	0.0	0.0	0.00	0.45	38.1
11	T1	870	2.8	870	2.8	0.756	0.1	LOS A	0.0	0.0	0.00	0.00	39.6
Approach		889	2.7	889	2.7	0.756	0.2	NA	0.0	0.0	0.00	0.01	39.5
All Vehicles		2609	3.0	2609	3.0	2.667	13.7	NA	9.3	86.4	0.14	0.15	21.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 46.1 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 3 [Edgeworth and Ingalaria - 2031 PM School Peak - Build]

Network: N101
[Waitara_PS_2031 PM School Peak - Build]

Edgeworth and Ingalaria - 2021 PM School Peak - Build
3:00 PM to 4:00 PM
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ingalaria Avenue													
1	L2	76	0.0	76	0.0	0.327	14.1	LOS B	0.6	4.4	0.65	1.05	31.4
3	R2	1	0.0	1	0.0	0.202	703.8	LOS F	0.5	3.3	1.00	1.00	4.6
Approach		77	0.0	77	0.0	0.327	23.1	LOS C	0.6	4.4	0.66	1.05	27.4
East: Edgeworth David East													
4	L2	8	0.0	8	0.0	0.371	3.5	LOS A	83.1	597.6	0.00	0.01	40.1
5	T1	1407	3.3	1407	3.3	0.371	0.0	LOS A	184.7	1329.2	0.00	0.00	39.9
Approach		1415	3.3	1415	3.3	0.371	0.1	NA	184.7	1329.2	0.00	0.00	39.9
West: Edgeworth David West													
11	T1	1068	2.7	1068	2.7	0.543	5.8	LOS A	12.5	89.4	0.61	0.04	35.3
12	R2	42	0.0	42	0.0	0.543	33.6	LOS D	12.5	89.4	1.00	0.07	33.0
Approach		1110	2.6	1110	2.6	0.543	6.8	NA	12.5	89.4	0.63	0.04	35.2
All Vehicles		2602	2.9	2602	2.9	0.543	3.6	NA	184.7	1329.2	0.29	0.05	37.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 46.1 %
Number of Iterations: 10 (maximum specified: 10)

GHD

Level 15

133 Castlereagh Street

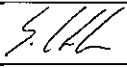
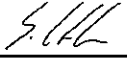
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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	ML	SC				
B	ML	SC		M. Dean		25/8/17

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