Shepparton CBD Inner East Link Road (Interim Name)

Network Traffic Modelling Assessment and Mitigations Report
FINAL for Discussion

Prepared by: GTA Consultants (Vic) Pty Ltd for Greater Shepparton City Council

on 3/04/2020

Reference: V171580

Issue #: B

GTAconsultants

Shepparton CBD Inner East Link Road (Interim Name)

Network Traffic Modelling Assessment and Mitigations Report
FINAL for Discussion

Client: Greater Shepparton City Council

on 3/04/2020

Reference: V171580

Issue #: B

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
B	03/04/2020	Final	Josh Kamil	Reece Humphreys	Reece Humphreys	

© GTA Consultants (VIC) Pty Ltd [ABN 34 137 610 381] 2020
The information contained in this document is confidential and intended solely for the use of the client for the purpose for which it has been prepared and no representation is made or is to be implied as being made to any third party. Use or copying of this document in whole or in part without the written permission of GTA Consultants constitutes an infringement of copyright. The intellectual property contained in this document remains the property of GTA Consultants.

GTAconsultants

Melbourne | Sydney | Brisbane
Adelaide | Perth

Executive Summary

EXECUTIVE SUMMARY

The proposed Shepparton CBD Inner East Link Road (Interim Name) is a series of higher-order Council collector roads between Wyndham Street and Verney Road in Shepparton.

When complete, the Shepparton CBD Inner East Link Road will:

- Provide a safe and efficient alternative route to Wyndham Street for vehicles travelling from the south and to the north-east of Shepparton to and through the CBD
- Connect destinations in and around the link-road, as an alternative to using local residential and industrial roads
- Provide a route for cyclists and pedestrians accessing the school or travelling along the Strategic Cycling Corridor.

Comprehensive surveys were undertaken to understand the existing traffic movements and volumes in the central areas of Shepparton to inform the development of a transport model. The analysis of vehicle classifications from the classified turning movement sites across the network showed that the volume of heavy vehicles was generally consistent throughout the day. Bus volumes peaked between 8:15am – 8:30am in the AM, and 3:30pm – 3:45pm in the afternoon, which aligns with the timetable peaks and school periods.

The data also suggested that the link road is currently used for shorter trips to access the various parts of the CBD, with origin and destination surveys showed that less than 10% of trips travelling from Hawdon Street in travel through to Hayes Street in the PM peak and less than 15% of vehicles northbound on Hayes Street travel through to Hawdon Street in the AM peak.

A transport model was used to test the effectiveness of the Inner East Link Road corridor with key land use changes that are occurring over the next three years including the Greater Shepparton Secondary College (GSSC) and Hospital redevelopment.

Eight key intersections are located along the length of the Inner East Link Road, within the scope of this study. Mitigations for five of the intersections were developed with input from a stakeholder working group that comprised officers from Council, Department of Transport (DoT) and Regional Roads Victoria (RRV).

Network Wide Results indicated the following:

- Traffic growth of around six percent is expected in each of the peak periods by 2022. This growth will result in marginal decreases in speeds of less than three percent indicating that the network has flexibility to accommodate this increase.
- By 2022, the GSSC will have the biggest influence on travel patterns on the Inner East Link Road. And will change the distribution of traffic around some of the key intersections in the area.
- The conversion of a roundabout to traffic signals at Knight Street causes some traffic to avoid the intersection during the peaks. This is expected due to the configuration constraints having regard for the rail crossing and the closely spaced intersection with Andrew Fairley Avenue. Notwithstanding, the resultant layout will provide improved and safer connectivity for pedestrians, in particular pedestrian traffic to and from GSSC.
- The capacity improvements along the Midland Highway will attract traffic to the link road keeping its function. It is noted that the intersection spacing on the Midland Highway as part of the mitigating works will require further investigation due to the nature of the closely spaced intersections.

A summary of the intersections and their cost estimates is provided in Table E.1.

Table E.1: Existing and Proposed Intersection Treatments

Location	Proposed mitigation / intersection treatments	Cost Estimate (with 40% Contingency)
Hayes Street / Goulburn Valley Highway (Wyndham Street) intersection	Signalised T-intersection	$1,854,500
Hayes Street / Johnson Street intersection works	Unsignalised T-intersection with improvements (interim), and potential to signalise (ultimate)	$296,000
Midland Highway / Hoskin Street / Railway Parade / Thompson Street intersections	Unsignalised T-intersection with modified priority	$4,171,000
Hoskin Street / High Street (Midland Highway) / Railway Parade	Removal of traffic signals at North Street and High Street intersection, signalisation of Hoskin Street and Railway Parade at High Street	
Fryers Street / Railway Parade / Thompson Street intersections	Dual roundabout controlled intersections of Fryers Street with Railway Parade and Thompson Street, including realignment (straightening) of Fryers Street	$3,180,000
Knight Street / Hawdon Street / Railway Parade / Andrew Fairley Avenue intersections	Signalised intersection with additional widening and land acquisition for ultimate layout	$3,994,000 (interim) $5,710,000.00 (ultimate)

The intersection of Hoskin Street, High Street (Midland Highway), and Railway Parade is conceptual in nature and further discussions will be required with DoT, RRV and VicTrack to confirm the detail of the final solution.

CONTENTS

1. Introduction 1
   1.1. Location 2
   1.2. Study Objectives 3
   1.3. Reference Documents 3
   1.4. Disclaimer 4
2. Study Overview 5
   2.1. Study Methodology 6
   2.2. Shepparton CBD Inner East Link Road (Interim Name) 6
3. Planned Growth for Shepparton 9
   3.1. Strategic Context 10
   3.2. Greater Shepparton Secondary College 10
   3.3. Goulburn Valley Health Redevelopment 11
   3.4. Shepparton CBD Revitalisation Project 11
   3.5. Population Growth 11
   3.6. Other Transport Network Considerations 11
   3.7. Proposed Rail Upgrades 12
   3.8. Summary 12
4. Data Analysis 13
   4.1. Overview 14
   4.2. Data Collection 14
   4.3. Key Results and Discussion 17
5. Building a Transport Model 24
   5.1. Building a Transport Model for Shepparton 25
   5.2. Model Extents 26
   5.3. Peak Periods 26
   5.4. Calibration and Validation 27
   5.5. Suitability of Model 27
6. Future Year Scenarios 31
   6.1. Overview 32

6.2. Scenario Inputs 32
6.3. Summary of traffic demand 37
7. Model Results 39
7.1. Network Performance 40
7.2. Difference Plots 41
7.3. Inner East Link Road Travel Times 47
7.4. Model Plots 47
7.5. Summary 47
8. Intersection Assessments 49
8.1. Overview 50
8.2. Methodology for Intersection Assessment 50
8.3. Results 50
8.4. Discussion 52
9. Opinion of Probable Costs 54
9.1. Introduction 55
9.2. Methodology 55
9.3. Opinion of Probable Costs 56

Appendices

A. Concept Designs
B. Visum Model Outputs
C. SIDRA Intersection Outputs
D. Opinion of Probable Costs

Figures

Figure 1.1:	Shepparton CBD Inner East Link Road (Interim Name)	2
Figure 2.1:	Study Methodology	6
Figure 3.1:	Broader transport network changes planned for Shepparton	12
Figure 4.1:	Transport Data Collection Type and Locations	16
Figure 4.2:	Core SCATS Data Collection Area	17
Figure 4.3:	SCATS Representation of Core and Wider Network Traffic Peaks	18
Figure 5.1:	Network Model Extents	26
Figure 6.1:	Traffic Demand Comparison of 2019 and 2022 AM	33
Figure 6.2:	Traffic Demand Comparison of 2019 and 2022 PM	33
Figure 6.3:	Application of Future Traffic Growth by Zones	34
Figure 6.4:	Proposed 40km/h Inner Urban Speed Restriction	35
Figure 6.5:	Location of North Street Closure (Prior to Inner East Link construction)	36
Figure 6.6:	Distribution of School Trip Arrivals and Departures	37
Figure 6.7:	Existing and future traffic demand (vehicles) for Shepparton (2022)	38
Figure 7.1:	AM Peak Difference Plot: 2019 Base – 2022 Base	41
Figure 7.2:	AM Peak Difference Plot: 2022 Base – 2022 Mitigation	42
Figure 7.3:	PM School Peak Difference Plot: 2019 Base – 2022 Base	43
Figure 7.4:	PM School Peak Difference Plot: 2022 Base – 2022 Mitigation	44
Figure 7.5:	PM Network Peak Difference Plot: 2019 Base – 2022 Base	45
Figure 7.6:	PM Network Peak Difference Plot: 2022 Base – 2022 Mitigation	46

Tables

Table E.1:	Existing and Proposed Intersection Treatments	iii
Table 2.1:	Mitigation and Design Development Process – Inner East Link Road	7
Table 2.2:	Existing and Proposed Intersection Treatments	7
Table 4.1:	Transport Data Collection Summary	14
Table 4.2:	Observed Travel Times Along the Inner East Link Road	22
Table 5.1:	Calibration and Validation Criteria	27
Table 5.2:	Link Validation Criteria –AM Peak (8:15 – 9:15)	28
Table 5.3:	Turn Validation Criteria –AM Peak (8:15 – 9:15)	28
Table 5.4:	Link Validation Criteria – PM School Peak (3:15 – 4:15)	29
Table 5.5:	Turn Validation Criteria –PM School Peak (3:15 – 4:15)	29
Table 5.6:	Link Validation Criteria – PM Network Peak (4:30 – 5:30)	30
Table 5.7:	Turn Validation Criteria –PM Network Peak (4:30 – 5:30)	30
Table 6.1:	Scenario Model Options	32
Table 7.1:	Vehicle Network Statistics	40

Table 7.2:	Inner East Link Road Modelled Travel Times (in minutes and seconds)	47
Table 8.1:	SIDRA Intersection Summary AM Peak (8:15AM – 9:15AM)	51
Table 8.2:	SIDRA Intersection Summary PM School Peak (3:15PM – 4:15PM)	51
Table 8.3:	SIDRA Intersection Summary PM School Peak (4:30PM – 5:30PM)	52
Table 9.1:	Opinion of Probable Costs	57

1. INTRODUCTION

01

1.1. Location

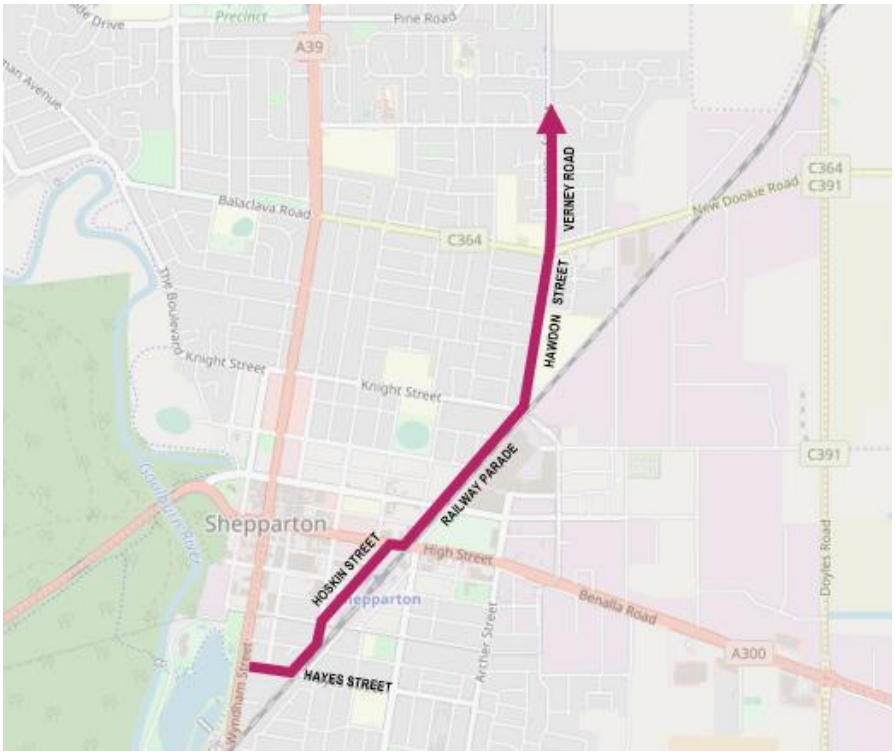
The proposed Shepparton CBD Inner East Link Road (Interim Name), (referred to throughout this report as the "*Inner East Link Road*" or 'link road') is a series of higher-order Council collector roads between Wyndham Street and Verney Road in Shepparton. The Inner East Link Road will provide a safe and efficient alternative route to Wyndham Street (Goulburn Valley Highway) for vehicles travelling between the south and north-east areas of Shepparton, including local trips to locations along the route.

The Inner East Link Road will connect the Goulburn Valley Highway to Verney Road (north of Balaclava Road / New Dookie Road) via the following roads (in a south to north direction):

- Hayes Street between Wyndham Street and Johnson Street
- Johnson Street between Hayes Street and Sobraon Street
- Hoskin Street between Sobraon Street and High Street (Midland Highway)
- Railway Parade between High Street and Knight Street
- Hawdon Street between Knight Street and north of Balaclava Road / New Dookie Road.

The Inner East Link Road as described above, is shown geographically in Figure 1.1.

Figure 1.1: Shepparton CBD Inner East Link Road (Interim Name)



In addition to the Inner East Link Road, a number of other proximate road network and land use changes are either planned, proposed or in-construction that would influence the travel in and around Shepparton. These are discussed in more detail throughout this report.

It is noted that a number of intersections along the route do not provide clear priority of movements with some turns at the Hoskin Street/High Street/Railway Parade intersection not currently allowed. The development of the Inner East Link Road seeks to overcome these challenges.

1.2. Study Objectives

The purpose of this assessment is to understand the current and future use of the road and to determine the infrastructure required to support the establishment of a more formal Inner East Link Road for Shepparton.

In order to understand the impacts and to identify the mitigating measures required, a network transport model was prepared, using traffic modelling software package *Visum*, for the Shepparton CBD, and its surrounds.

This report summarises the investigations, findings and recommendations for mitigations along the Inner East Link Road, for consideration by various stakeholders, including Council, state government agencies and the community.

Having regard to the above, the objectives of the study and subsequent assessments are to:

- Understand the existing function using traffic data of the Inner East Link Road with regards to traffic movements in and around the CBD
- Identify and establish the rationale for a formalised 'link road' to be established that can reduce trips on other routes
- Develop a traffic model for the Shepparton CBD, including the extent of the existing commercial areas, and the proposed Inner East Link Road
- Understand the impact of planned and approved changes to the Shepparton CBD over the next three years including the Greater Shepparton Secondary College (GSSC) and the Goulburn Valley Health expansion
- Determine the required mitigations for the Inner East Link Road intersections, having regard to the desired future role and function of the 'link road' and the Movement & Place framework developed by Department of Transport, and other strategic objectives
- Assess the suitability of each mitigation, and identify any additional interventions required to ensure the adequate operation of a 'desirable link road' connecting the south and north-east areas of the Shepparton CBD
- Identify the staging and indicative timing of each mitigation, including interim and ultimate solutions, and any applicable 'triggers'
- Provide an opinion of probable costs for each mitigation, to inform future funding and budget bids.

1.3. Reference Documents

In preparing this report, reference has been made to the following:

- Shepparton Education Plan, Victorian School Building Authority, 2017
- Movement & Place in Victoria, Department of Transport (DoT), February 2019
- Shepparton Mooroopna 2050 – Regional City Growth Plan (Draft), Victorian Planning Authority (VPA), September 2019
- Dial Before You Dig enquiry generated on 20/11/2019
- Nearmap aerial imagery accessed on 22/11/2019
- Transport Modelling Guidelines (Volume 4), Department of Transport, June 2019
- Rawlinsons Construction Cost Guide
- Austroads Guide to Road Design, and Guide to Traffic Management
- Relevant Australian Standards and other guidelines

- Traffic survey data collected by Council (various dates)
- Traffic survey data collected by Data Audit Systems during August 2019
- Inspections of the site/s and surrounds undertaken on various dates, by GTA staff
- Other documents as nominated throughout this report.

1.4. Disclaimer

This report has been prepared with a reliance upon the accuracy and completeness of the information provided by stakeholders and other third-party sources. GTA takes no responsibility for its accuracy, reliability or the correctness of the information. GTA has to the best of our ability sought to verify these sources and the best available information at the time of preparing this report.

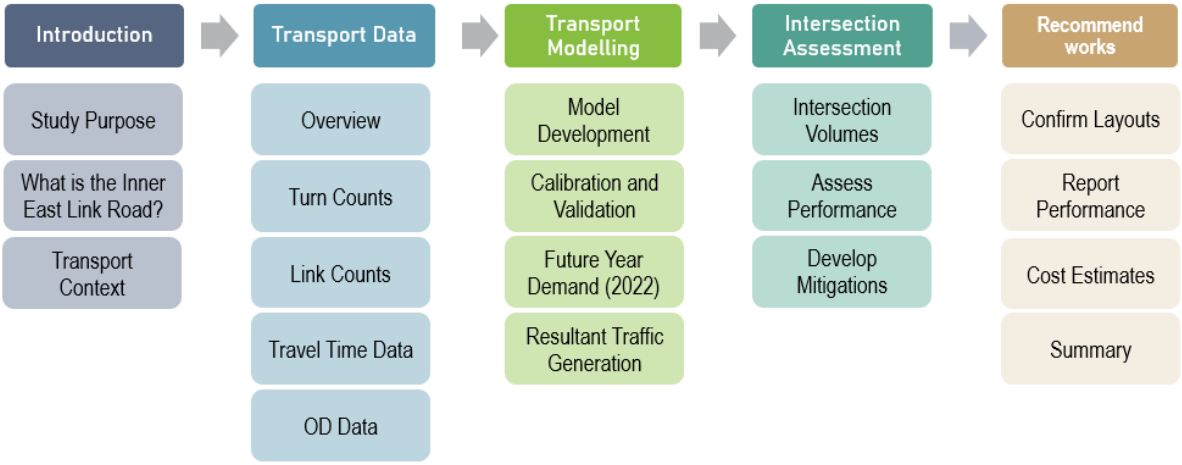
2. STUDY OVERVIEW

02

2.1. Study Methodology

An overview of the study methodology for the Shepparton Inner East Link Road is provided in Figure 2.1.

Figure 2.1: Study Methodology



This report summarises the findings of the relevant steps and recommended outcomes.

2.2. Shepparton CBD Inner East Link Road (Interim Name)

2.2.1. Vision

When complete, the Shepparton CBD Inner East Link Road will:

- Provide a safe and efficient alternative route to Wyndham Street for vehicles travelling from the south and to the north-east of Shepparton to and through the CBD
- Connect destinations in and around the link-road, as an alternative to using local residential and industrial roads
- Provide a route for cyclists and pedestrians accessing the school or travelling along the Strategic Cycling Corridor.

The roads which currently make up the 'link road' vary in their characteristics along with adjacent urban land use, with no real consistency along the route. The 'link road' does however generally follow the alignment of the railway line between Hayes Street to the south and Knight Street to the north. In this regard, the 'link road' effectively acts as a barrier between the industrial land uses to the east and the commercial centre to the west. The presence of railway level crossings presents a challenge for 'east-west' movements across the corridor.

After a range of correspondence and discussions with Council and stakeholders including the Department of Transport (DoT), it was agreed that the primary function of the Inner East Link Road will be to perform as a traffic route. It will still remain as a series of collector roads with the ability to accommodate a higher volume of car traffic along its route.

The route will still be able to function as a "place" with the ability to provide safe and efficient access to the abutting and nearby land uses.

2.2.2. Stakeholder Engagement

As part of the development of the study, a stakeholder working group was established, having input from the following internal and external authority stakeholder groups:

- Greater Shepparton City Council officers from the Strategic Planning, Engineering and Design departments
- Department of Transport (DoT), and
- Regional Roads Victoria (RRV).

At various stages of the project, input was sought on a number of items including potential mitigations for key intersections along the Inner East Link Road. In this regard, the following process was used to determine the types of treatments on the route.

Table 2.1: Mitigation and Design Development Process – Inner East Link Road

Stage	Description
1. Preliminary constructability advice	Desktop assessment of the potential opportunities and constraints at each potential location along the 'link road' including utilities and spatial constraints.
2. Stakeholder workshop 1	Consideration of the preliminary constructability advice mentioned above as well as opportunities to provide input into
3. Stakeholder workshop 2	Design development workshop incorporating the consideration and agreement of various design options for each location
4. Road safety[1] and active travel specialist input	Determine any existing and future requirements (including the proposed draft Strategic Cycling Corridor) and any other potential impacts to be considered as an outcome of the design
5. Detailed constructability advice	DBYD enquiry and onsite inspection to informing the concept designs
6. Concept design development	Preparation of concept designs in accordance with relevant guidelines and informed by the above steps, including preliminary modelling results (2022 do-nothing case)
7. Testing the mitigations using the model volumes (2022 do-nothing)	Application of the mitigations into the traffic modelling software packages (Visum and SIDRA intersection) and update to the conceptual designs as required
8. Stakeholder workshop 3	Presentation of final designs to the stakeholder group for feedback

2.2.3. Intersections

Eight key intersections are located along the length of the Inner East Link Road, within the scope of this study. Table 2.2 lists the existing intersection control and the proposed mitigations for each location, having regard for the process summarised in Table 2.1.

Table 2.2: Existing and Proposed Intersection Treatments

Location	Existing intersection control	Proposed mitigation / intersection treatments
Wyndham Street (Goulburn Valley Highway) and Hayes Street	Unsignalised T-intersection	Signalised T-intersection

[1] Please note that the Road Safety Review does not substitute the completion of a complete Road Safety Audit undertaken in accordance with relevant Austroads guidelines.

Hayes Street and Johnson Street	Unsignalised T-intersection	Unsignalised T-intersection with improvements (interim), and potential to signalise (ultimate)
Johnson Street, Sobraon Street, Corio Street and Hoskin Street	Four-leg roundabout (with additional access point from VicRoads office)	No change
Hoskin Street and North Street	Unsignalised T-intersection	Unsignalised T-intersection with modified priority
Hoskin Street, High Street (Midland Highway), and Railway Parade	Complex signalised intersection, linked with adjacent level crossing	Removal of traffic signals at North Street and High Street intersection, signalisation of Hoskin Street and Railway Parade at High Street
Railway Parade and Fryers Street	Four-leg roundabout	Dual-signalised intersections of Fryers Street with Railway Parade and Thompson Street, including realignment (straightening) of Fryers Street
Railway Parade, Knight Street and Andrew Fairley Avenue	Four-leg roundabout	Signalised intersection
Hawdon Street, Balaclava Road, Verney Road and New Dookie Road	Four-leg roundabout (currently being converted to signals)	No change

The proposed intersection treatments are discussed in more detail in Section 7.

3. PLANNED GROWTH FOR SHEPPARTON

03

3.1. Strategic Context

3.1.1. Shepparton Mooroopna 2050 Regional City Growth Plan (VPA, 2019)

The *Shepparton and Mooroopna 2050: Regional City Growth Plan* sets out the future vision for Shepparton and Mooroopna and makes recommendations on how to achieve it. It aims to guide and manage sustainable future growth and development over the next 30 years, while defining key projects/infrastructure to support growth and addressing key challenges for the region.

The recently released draft 'growth plan' for discussion outlines the Inner East Link Road, in the context of future growth within Shepparton, and planned or proposed major transport network changes.

3.1.2. Movement and Place in Victoria (DoT)

The Movement and Place Framework takes a future-focused, multi-modal approach to network planning. It takes into consideration the diverse role places play in planning the types of transport modes appropriate to a local road or street. In this new language, roads and streets are defined by the context of a local place and assigned various 'movement' and 'place' classifications.

The Framework offers a common language for coordinated transport planning between transport and planning agencies and local governments. It also provides a consistent approach to assessing the performance of the road and transport network, identifying project requirements and assessing project solutions.

The use of the Movement and Place framework in the Shepparton context represents an opportunity to guide the development of mitigations along the Inner East Link Road, having consideration for future surrounding land uses. It is noted while the Inner East Link Road has not been classified however the framework has guided the development of mitigations with an understanding of the current characteristics and how these may be impacted by transport network and land use changes.

3.1.3. Shepparton Bypass (Stage 1) – Major Road Projects Victoria

The Shepparton Bypass (Stage 1) is a state and federal funded major transport infrastructure project. The project will be supported by other transport network changes will significantly alter the role and function of Goulburn Valley Highway (Wyndham Street) through the Shepparton CBD. The bypass is still in planning and has not been funded. When constructed, future volumes of through traffic will ultimately reduce, supporting the revitalisation of the CBD and the establishment of the need for an Inner East Link Road.

3.2. Greater Shepparton Secondary College

The project is located on the site of the former Shepparton High School. As part of the Shepparton Education Plan, the site of the former Shepparton High School was chosen to accommodate the Greater Shepparton College (GSSC). The school was formed through the combination of four existing schools. The Shepparton High School site is being redeveloped to accommodate 3,000 students and staff initially from Term 1 2021, with capacity to further increase these numbers in the future.

3.3. Goulburn Valley Health Redevelopment

The redevelopment of Goulburn Valley Health site will deliver a number of new and improved facilities to support the community. Key improvements to the hospital include 64 new inpatient beds, emergency department and operating theatres, amongst other specialist services.

3.4. Shepparton CBD Revitalisation Project

The Shepparton CBD Revitalisation project includes sub-projects as the Maude Street Mall Redevelopment, Bus Interchange, and 40 km/h area speed limits, all of which are currently in construction or awaiting funding to commence.

These improvements will see major benefits to safety, amenity and viability of the CBD, all of which will be supported by reduced traffic with the establishment of alternate routes of travel through the CBD.

3.5. Population Growth

Shepparton is undergoing steady population growth, and transport infrastructure must respond accordingly.

Population growth over the next three years to 2022 is in the order of 1.1 – 2.8% per year, a total of 5.4% or 2,206 additional residents. The majority of these new residents will be catered for within existing PSP growth areas to the south and east of Shepparton.

A number of other key land use changes are proposed or planned prior to 2022 which have been considered. It is noted also that these projects, in particular the school project, were a key impetus in the development of this project.

3.6. Other Transport Network Considerations

An increase in traffic volumes attributed to Shepparton's ongoing growth is putting pressure on the arterial road network. Two significant arterial roads, Goulburn Valley Highway and Midland Highway, intersect at the centre of Shepparton's CBD. While these arterial roads have helped make Shepparton a highly accessible location and brought people into the city, they are beginning to compromise the safety, amenity and the viability of the city centre.

A range of network development activities are underway in the area including:

Stage 1 of the Shepparton Bypass: a full bypass of Shepparton is ultimately envisioned, as reflected with the Public Acquisition Overlay (PAO) that was put in place in 2006 through Amendment C33, and connects to the Goulburn Valley Highway to the south. As outlined earlier in this section, only Stage 1 between Midland Highway and Goulburn Valley Highway is currently being investigated through a full business case.

Shepparton Alternative Route (SAR): until such time that the full Shepparton Bypass is implemented, the main north-south bypass route is the Shepparton Alternative Route. This route is progressively being improved, with various key intersections recently and proposed to be upgraded, such as the Midland Highway, Old Dookie Road, New Dookie Road and Ford Road. Further investigations on when, what and how other sections of the route are upgraded is currently being investigated.

Wanganui Road and Ford Road: to support Stage 1 of the Shepparton Bypass and provide an alternative east-west route through the city centre of Shepparton via the Midland Highway, an upgrade of Wanganui Road and Ford Road to arterial level roads is proposed.

Midland Highway: various safety improvements have recently been, and are planned to be, implemented along the Midland Highway to the west of Shepparton.

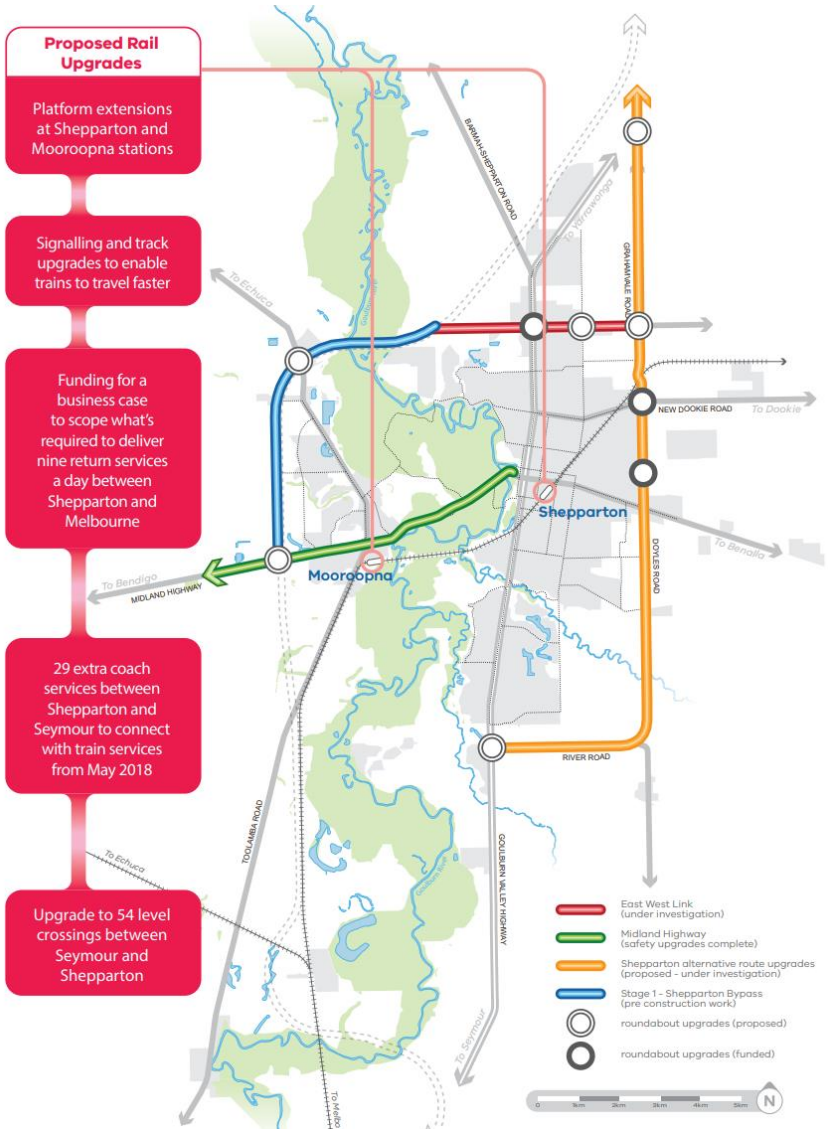
3.7. Proposed Rail Upgrades

Rail Projects Victoria is undertaking planning for an additional nine train services between Shepparton and Melbourne a day, an increase from the current four services. The project is currently in Stage 2 which upgrades the services and the line. As the Inner East Link Road runs parallel with the railway line, this has the ability to impact on the performance of the route. The key location that may be impacted would be the Hayes Street / Johnson Street intersection which currently experiences some delays during a boom gate closure.

3.8. Summary

Figure 3.1 summarises the key transport network changes planned for Shepparton.

Figure 3.1: Broader transport network changes planned for Shepparton



4. DATA ANALYSIS

04

4.1. Overview

The Inner East Link Road incorporates a number a local (Council managed) roads and arterial (Department of Transport managed) road intersections. This section presents the existing characteristics of the road, including data collected through various sources and site observations.

These data and information sources form the basis for the development of the transport model.

Examination of the data found that the full route of the Inner East Link Road is not heavily used in some sections, however it provides an attractive link for shorter trips from key east-west destinations and generators.

This section provides a summary of the traffic data and some insights into it.

4.2. Data Collection

4.2.1. Overview

Comprehensive surveys were undertaken to understand the existing traffic movements and volumes in the central areas of Shepparton to inform the development of the transport model. Data collection and analysis was critical in understanding the complexities of the road network, the traffic flow distribution and the peak operation. To obtain a clear picture of road network peak operation, a variety of data types were obtained and analysed.

This information will be key to the calibration and validation of the model. A summary of the data collected is provided in Table 4.1.

Table 4.1: Transport Data Collection Summary

Data Type	Source	Survey Date / Times
Classified Turning Movement Counts	Data Audit Systems as a subconsultant to GTA	Thursday 1 August 2019 (7:30am-9:30am & 3:00pm-6:00pm)
Travel Time Surveys (Floating Car)	Data Audit Systems as a subconsultant to GTA	Thursday 1 August 2019 (7:30am-9:30am & 3:00pm-6:00pm)
Origin-Destination Surveys	Data Audit Systems as a subconsultant to GTA	Thursday 1 August 2019 (7:30am-9:30am & 3:00pm-6:00pm)
Origin-Destination Surveys (Shepparton Bypass Study)	Regional Roads Victoria / MRPV	Wednesday 26 June 2019 (6:00am – 6:00pm)
SCATS Data, Phase, LX, Signal Linking, Signal Ops Sheets, Detector Counts	VicRoads / Department of Transport	Thursday 1 August 2019 Thursday 1 August 2019 January 2019 – December 2019

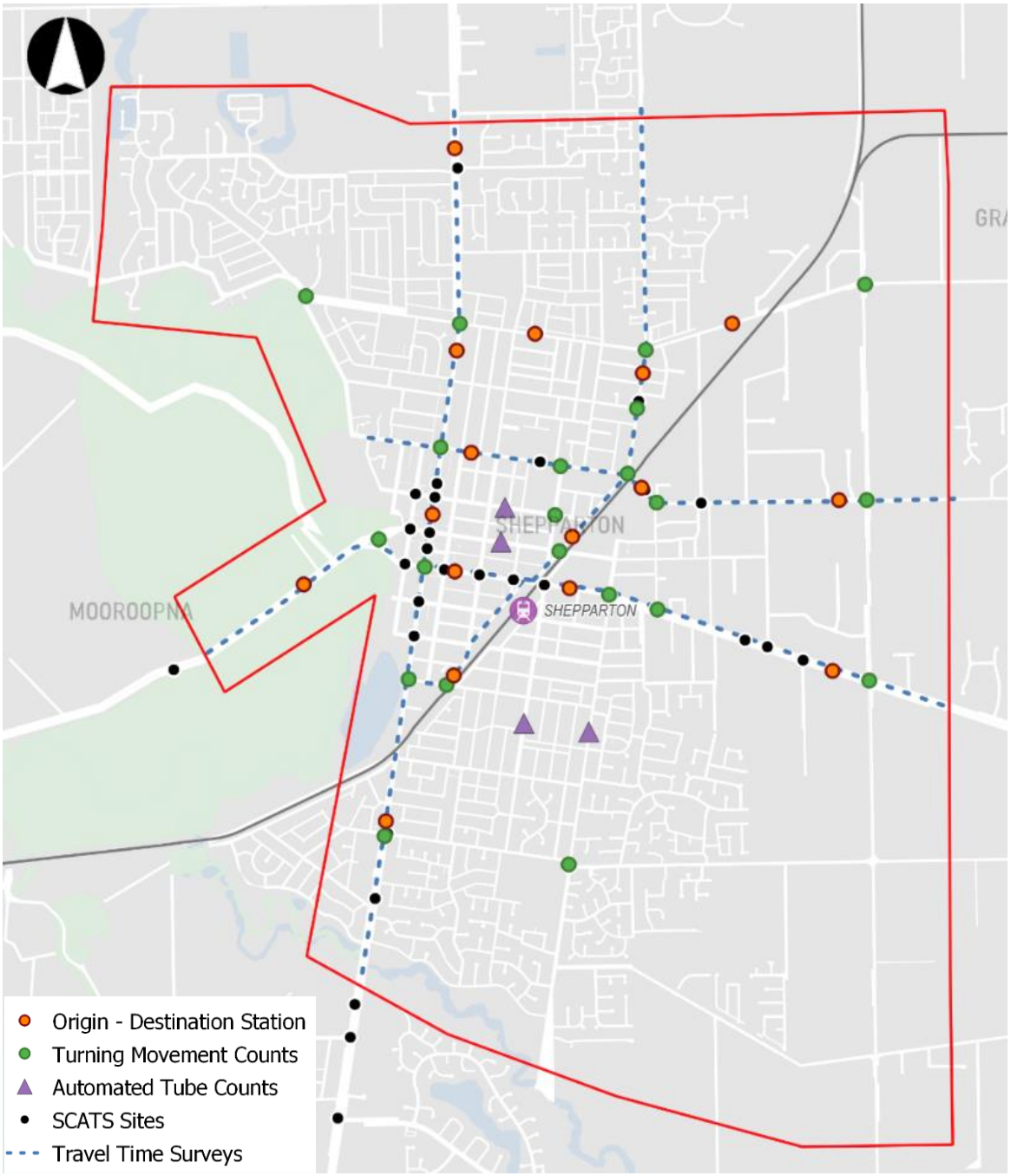
Data Type	Source	Survey Date / Times
Site Inspections	GTA Consultants	Various (peak/off-peak)
Public Transport (Bus) Data – GTFS	Public Transport Victoria (Online) / Department of Transport	August 2019

4.2.2. Survey Extent

The central area of Shepparton is bound by Pine Road to the north, Doyles Road to the east and the Goulburn and Broken Rivers to the west and south, respectively. This is the focal point of traffic data collection as it composes the city's employment and education hubs which are key attraction and generation points for vehicle trips.

Figure 4.1 details the location and type of traffic data collected for this study.

Figure 4.1: Transport Data Collection Type and Locations



4.3. Key Results and Discussion

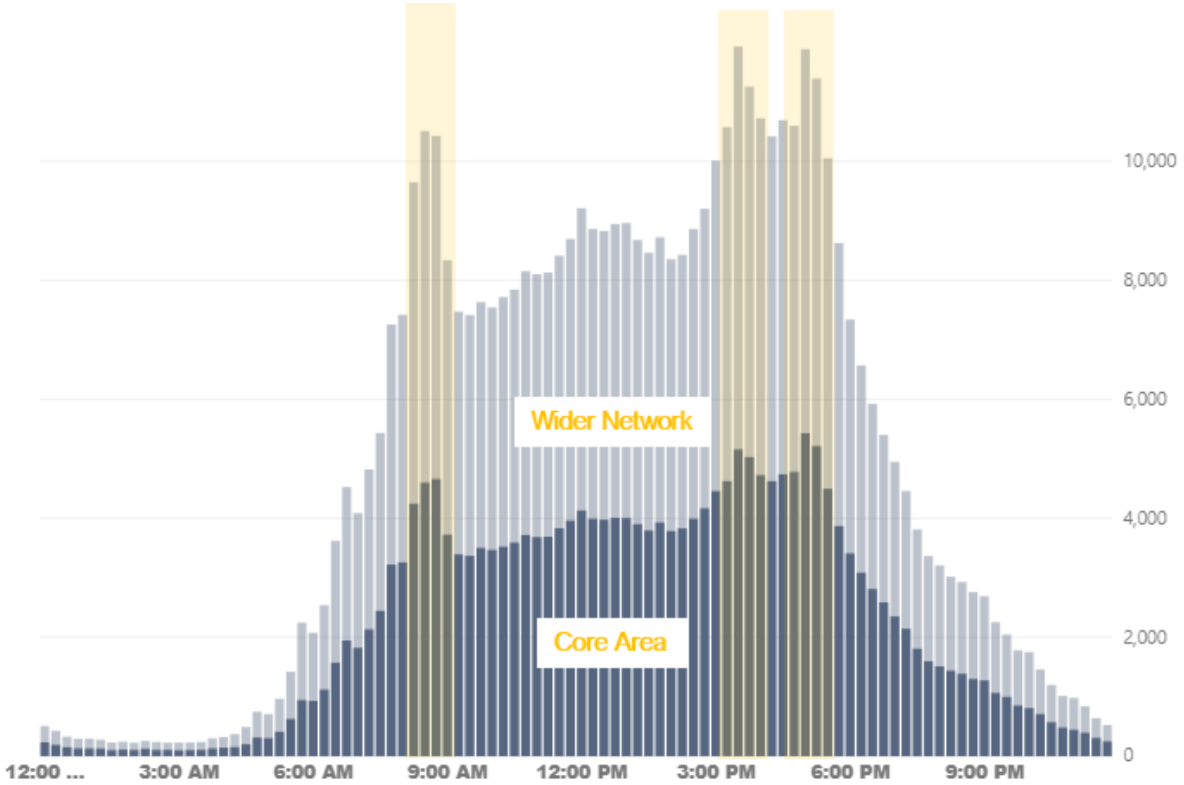
4.3.1. Network Profile

In order to inform the development of the model, including establishing the peak periods for targeting surveys, SCATS data was obtained from all signalised intersections within Shepparton. These sites have been separated into "all" sites and "core area" site which relate to the Shepparton CBD area, which are shown in Figure 4.2.

Figure 4.2: Core SCATS Data Collection Area

The volume profile for the SCATS sites across the day is shown in Figure 4.3.

Figure 4.3: SCATS Representation of Core and Wider Network Traffic Peaks



The data collected from both the core and wider area found that there were three distinctive peak periods being:

- AM Peak between 8:15am and 9:15am
- PM School Peak between 3:15pm and 4:15pm
- PM General Peak between 4:30pm and 5:30pm.

4.3.2. Vehicle Profile and Classifications

The analysis of vehicle classifications from the classified turning movement sites across the network showed that the volume of heavy vehicles was generally consistent throughout the day. Bus volumes peaked between 8:15am – 8:30am in the AM, and 3:30pm – 3:45pm in the afternoon, which aligns with the timetable peaks and school periods.

A representation of the classification splits, taken from the turning movement surveys referenced in Figure 4.1 are summarised in Figure 4.4 and Figure 4.5.

Figure 4.4: Vehicle Classification AM (7am – 9am)

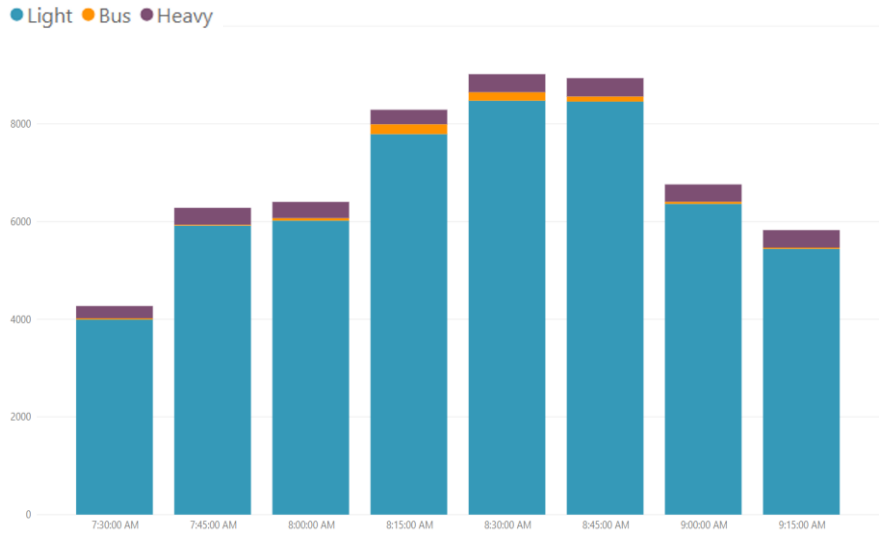
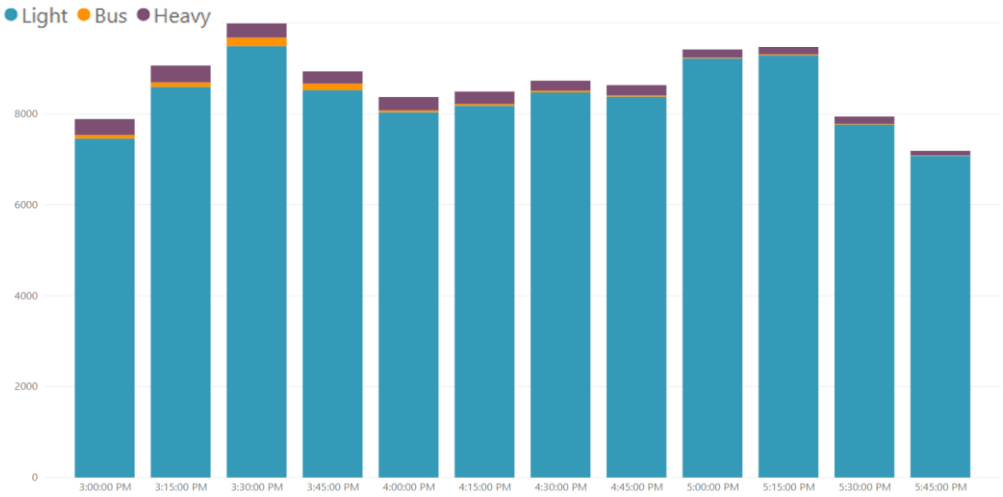


Figure 4.5 : Vehicle Classification (3pm – 6pm)



These figures not only highlight the increased number of buses in the school peaks when compared to the general PM peak, but also the consistent presence of heavy vehicles.

4.3.3. Origin Destination Data

The analysis of the origin destination (O-D) data found a number of key insights into the way traffic flows in-and-around Shepparton, including the number of trip types accessing the CBD. Four O-D stations were located on the link road with two on the north side of the Midland Highway and two south of the Midland Highway.

The volume matches for the Inner East Link Road have been represented in 'spider charts' for the AM one hour peak, and PM two hour peak (survey period), and are shown in Figure 3.6 and Figure 3.7.

Figure 4.6: AM one hour peak – origin destination data (internally matched trips)

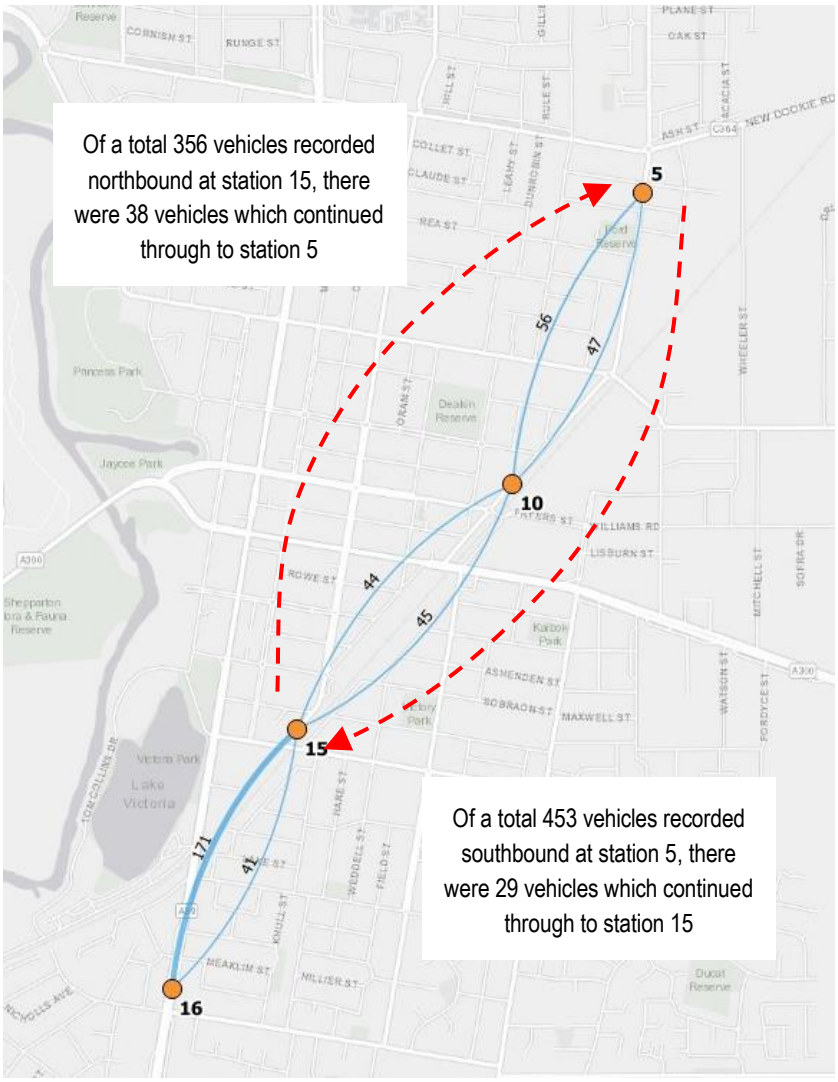
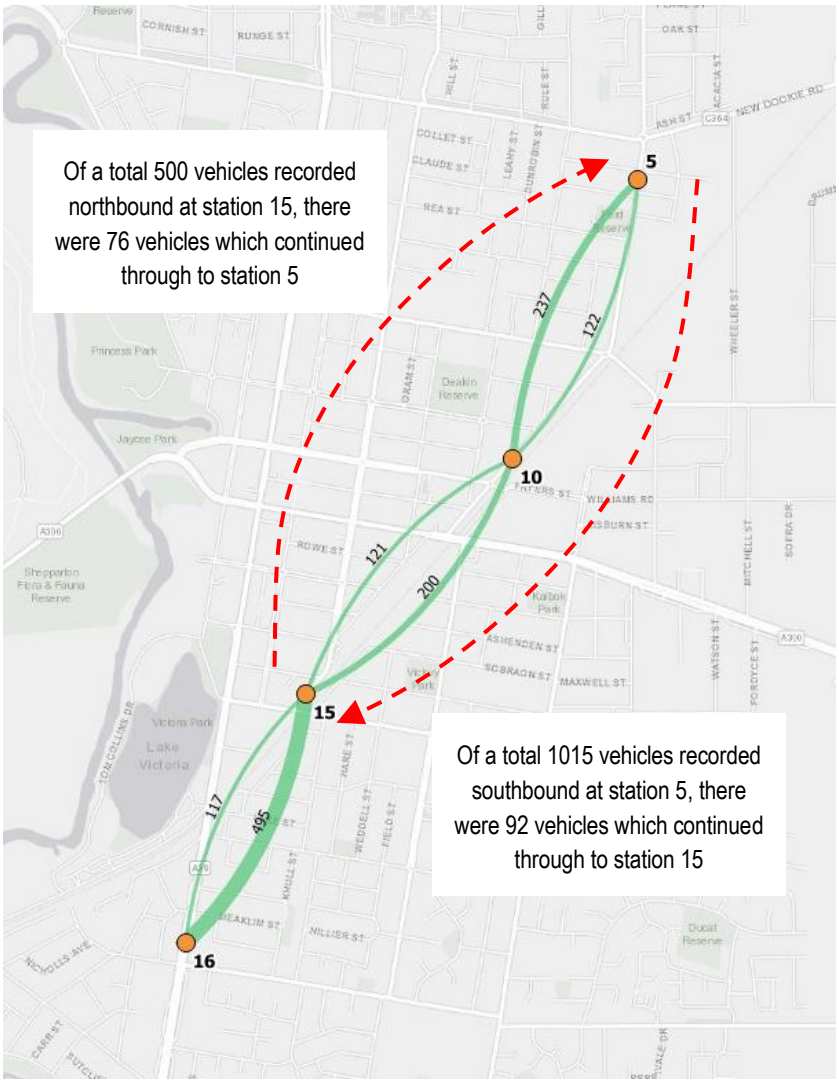


Figure 4.7: PM two hour (3:15 pm – 5:15 pm) peak – origin destination data (internally matched trips)



Further interrogation of the data identified the following insights for the origin and destinations on the Link Road:

- A higher level of concentrated trips are using the inner east link road in the PM peak when compared to the AM peak
- The southern sections of the link road are more utilised than the northern sections
- The section between the Goulburn Valley Highway (south) and Johnson Street is tidal for the AM peak (northbound) and PM peak (southbound), and
- A smaller proportion of motorists traverse the length of the inner east link road (between stations 5 and 15), with less than 10% of trips from Hawdon Street travelling through to Hayes Street (southbound) and less than 15% of vehicles on Hayes Street travelling northbound through to Hawdon Street.

The O-D data suggests that the Inner East Link Road is used as a key route for motorists destined for the Shepparton CBD, rather than a through route for long distanced trips.

4.3.4. Travel Time Data

Travel time data was collected for a number of routes, including the Inner East Link Road to help inform and calibrate the transport model. An analysis of the data found that the major congestion on the route occurs at the key intersections including roundabouts and signalised intersections, whilst midblock sections are generally free flowing. The travel time data is represented below in Figure 4.8 and Table 4.2.

Figure 4.8: Travel time data – Inner East Link Road (AM hour peak and PM 2-hour peak)

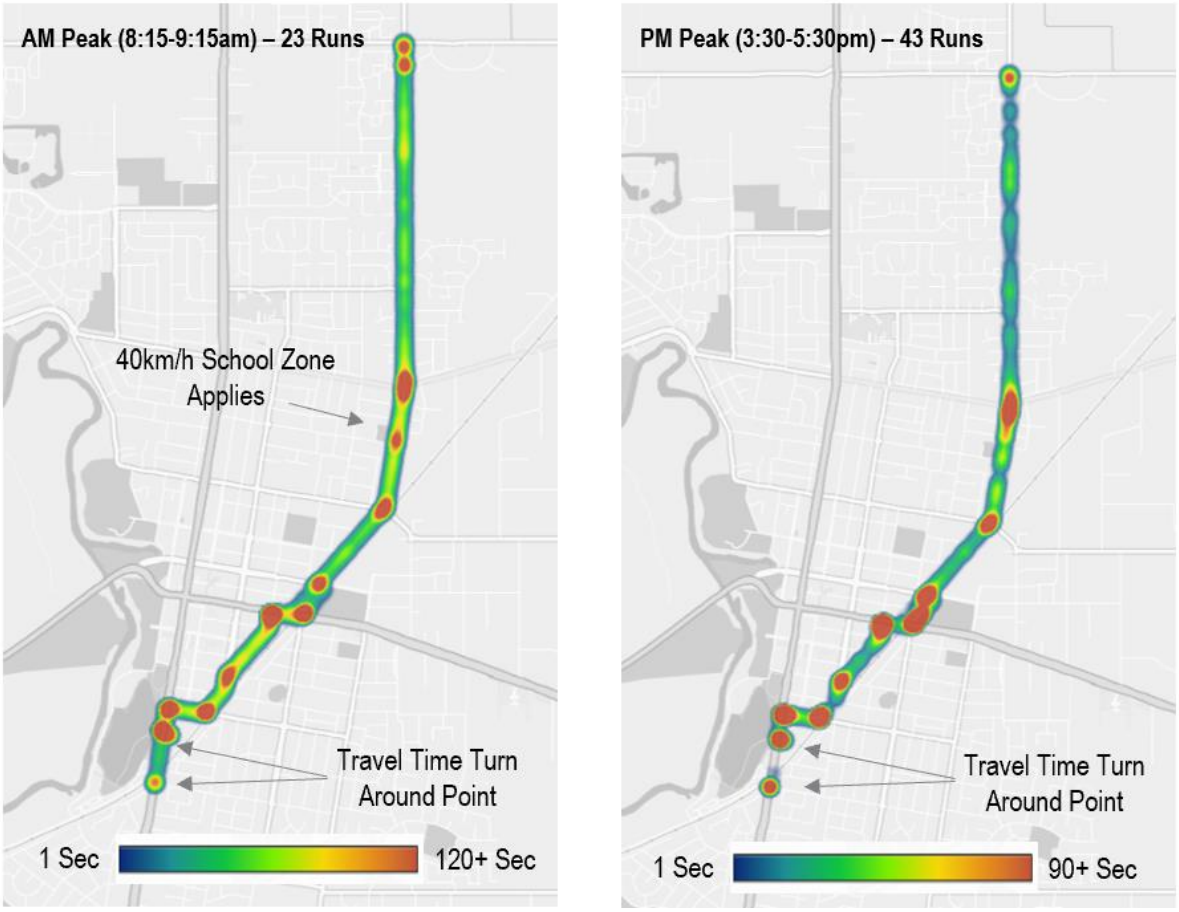


Table 4.2: Observed Travel Times Along the Inner East Link Road

Direction	AM 8:15-9:15AM	PM 3:15-4:15PM	PM 4:30-5:30PM
Northbound	5 min 40 sec	5 min 50 sec	6 min 27 sec
Southbound	5 min 58 sec	7 min 24 sec*	6 min 16 sec

Some important insights from the travel time data are:

- The PM School Peak in the southbound direction has the highest travel time, followed by the PM Network Peak, both directions
- During the PM School Peak, southbound direction of this route experiences the highest delay at the intersection of Thompson Street / High Street
- Delay is encountered at intersections and not mid route, particularly within the PM peak, and
- The intersection of Johnson Street and Hayes Street experienced some delays, particularly around the instance of the level crossing activations.

5. BUILDING A TRANSPORT MODEL

05

5.1. Building a Transport Model for Shepparton

5.1.1. Overview

The modelling has been undertaken with the consideration of two (2) key components; a network model and detailed intersection modelling. The objective of this approach is for the network model to provide understanding of the broader impacts resulting from changes in the urban centre of Shepparton, whilst intersection modelling using SIDRA is used to provide an enhanced and more detailed understanding of intersection performance and design requirements at critical locations.

5.1.2. Modelling packages

Dynamic Simulation Based Assignment (SBA) within PTV Visum (version 18.02-13) software has been used in the development of the Shepparton network model, whilst SIDRA Intersection 8.0 was used for the detailed intersection assessments.

Dynamic assignment is based on iterated simulation where the drivers choose their routes through the network based on the travel cost they experienced during the preceding simulations. The simulation is continued until a stable situation (convergence) is reached which means that the volumes and travel times on specific sections of the network are comparable between iterations.

The initial network geometry was brought in as part of an Open Street Map import, requiring manual refinement to ensure network alignment, geometry and parameters (i.e. speed, capacity, priorities) represented the model environment are reflective of reality.

This zone structure has been based on a refinement of the S-VITM and historic Shepparton Strategic Model. This zones structure compatibility permitted the use of previous modelling demands to fill in unknown values (i.e. no data available to estimate) within the 'prior' demand matrices before undergoing demand adjustment towards current survey targets. Refinements included things such as the separation of schools and residential demand components from zones previously sharing and the separation of larger zones into smaller counterparts.

Public transport and signalised intersection elements also form key components of the network model.

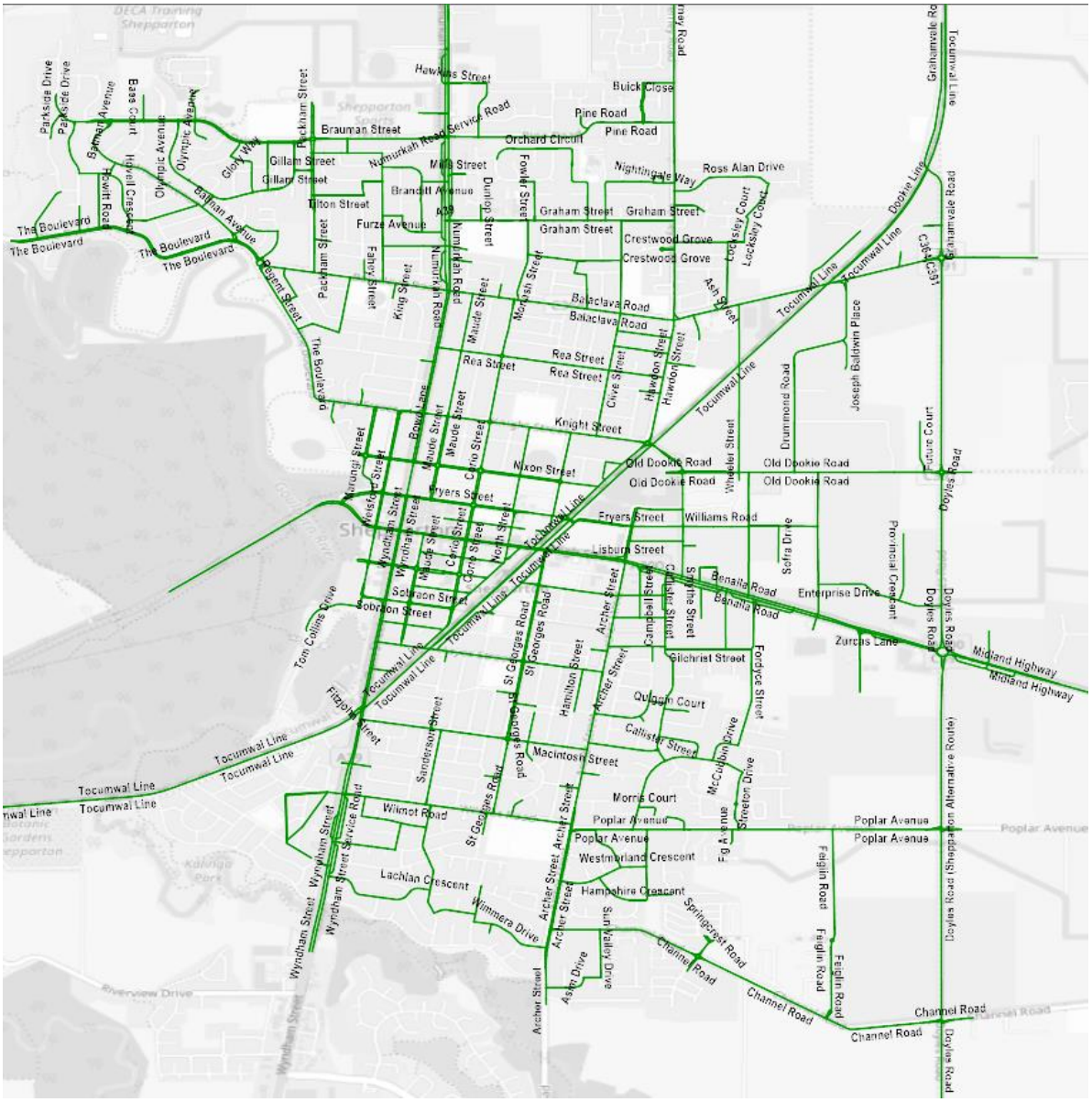
5.1.3. Ongoing benefits of the model

The model has been developed in such a way that it will offer Greater Shepparton City Council a tool which can be reused on future projects to provide ongoing transport modelling advice. Secondly, the network model offers the capability to extract 'subareas' for microsimulation assessment, should more detailed evaluations be required in future endeavours.

5.2. Model Extents

The extent of the model, the zone structure and link inclusions have been illustrated in Figure 5.1.

Figure 5.1: Network Model Extents



5.3. Peak Periods

A one (1) hour AM peak and two (2) hour PM peak was modelled as part of this study and incorporates the following periods;

- AM Peak: 7:45am – 9:45am (inclusive of warm-up and cooldown periods).
- PM Peak: 3:00pm – 6:00pm (inclusive of warm-up and cooldown periods).

The above periods were adopted to capture the network peak times, noting the larger PM periods has been chosen to ensure the school peak and later network peak are captured. The warm-up periods are designed to preload traffic into the model and to ensure the accurate reflection on the road network at the start of the peak period.

The adopted times were selected based on a combination of the peak volumes recorded as part of the turning count surveys conducted and SCATS signalised intersection detector counts.

5.4. Calibration and Validation

The model calibration and validation criteria have been based on the VicRoads Simulation Modelling Guidelines and reproduced in Table 5.1.

Table 5.1: Calibration and Validation Criteria

Item	Criteria
Network Wide Volumes	Tolerance limits for individual link and turn volumes: • 90% GEH ≤ 5 (or 80% GEH ≤ 5 in the Periphery Area) • 100% GEH ≤ 10 (or GEH ≤ 12 within the Periphery Area) Volume category limits and for individual link and turn volumes: • 90% of volumes (or 80% Periphery) within 30 veh/h for Category 1 (<100 veh/h) • 90% of volumes (or 80% Periphery) within 50 veh/h for Category 1 (100-700 veh/h) • 90% of volumes (or 80% Periphery) within 15% for Category 2 (700-2,700 veh/h) • 90% of volumes (or 80% Periphery) within 400 veh/h for Category 3 (>2,700 veh/h) veh/h) • 100% of individual link and turn volumes within 400 veh/h for Category 3 (>2,700 veh/h) Plots of observed versus modelled hourly flows: • Slope value to be included with plots and be between 0.9 and 1.1 • R2 value to be included with plots and be > 0.95
Travel Time Average	• Average modelled travel time to be within 10% of average observed journey time for full length of route. • Average modelled travel time to be within 10% of average observed travel time for individual sections.
Visual Checks	• Visual checks to ensure reasonable network distribution and congestion in the correct locations.

The available turn and link counts were used for calibration. The validation process utilised the surveyed travel time data to ensure that the simulated travel times are as close as possible to surveyed travel times, as well as visual checks of network distribution and congestion hotspots. Full details on the calibration and validation of the model are provided in the model calibration report which is separate to this study.

5.5. Suitability of Model

Mesoscopic modelling and in particular VISUM with simulation-based assignment (SBA) was selected for this study for multiple reasons:

- The relatively large study area – comprising much of the urban centre of Shepparton – includes a range of land uses and road classes. Mesoscopic modelling was selected as this can capture how the changes to traffic demand and the urban road network can affect route choice across the whole urban road network.
- Shepparton has a relatively brief AM and PM peak characterised by short and sharp spikes in traffic flow concentrated on a handful of roads. Simulation-based assignment allows a 15-minute-based profiling of traffic flows that can capture a shorter traffic peak more accurately than an equivalent 1-hour static model.

While mesoscopic modelling can assist in accurately representing peaks, detailed analysis of intersections has been undertaken in SIDRA to understand intersection performance. This will be discussed further in Section 7.

The Core Area of focus shown in the following tables is along the trajectory of the proposed Inner East Link Road and at the surrounding intersections. Table 4.2 shows the Link Validation for the AM peak period, whilst Table 4.3 shows the Turn Validation, also for the AM peak.

Table 5.2: Link Validation Criteria –AM Peak (8:15 – 9:15)

	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
Category	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	5	5	0	100%	4	4	0	100%	Within +-30 veh
Category 2	100-700	67	55	-12	82%	30	26	-4	87%	Within +-50 veh
Category 3	700-2700	7	7	0	100%	1	1	0	100%	Within 15%
Category 4	>2700	0	0	0	N/A	0	0	0	N/A	Within 15%

The AM peak model demonstrates a level of suitability by either meeting the requirements except for three of Category 2 volumes which are within eight and three percent respectively.

Table 5.3: Turn Validation Criteria –AM Peak (8:15 – 9:15)

	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
Category	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	113	103	-10	91%	29	27	-2	93%	Within +-30 veh
Category 2	100-700	85	77	-8	91%	18	18	0	100%	Within +-50 veh
Category 3	700-2700	5	5	0	100%	0	0	0	N/A	Within 15%
Category 4	>2700	0	0	0	N/A	0	0	0	N/A	Within 15%

The turn count validation shows that all of the counts meet the 90% minimum target requirement.

Table 4.4 shows the Link Validation for the school (PM) peak period, whilst Table 4.5 shows the Turn Validation, also for the school peak.

Table 5.4: Link Validation Criteria – PM School Peak (3:15 – 4:15)

	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
Category	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	5	4	-1	80%	4	3	-1	75%	Within +-30 veh
Category 2	100-700	60	56	-4	93%	29	26	-3	90%	Within +-50 veh
Category 3	700-2700	14	14	0	100%	4	4	0	100%	Within 15%
Category 4	>2700	0	0	0	N/A	0	0	0	N/A	Within 15%

Table 5.5: Turn Validation Criteria –PM School Peak (3:15 – 4:15)

	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
Category	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	132	121	-11	92%	85	74	-11	87%	Within +-30 veh
Category 2	100-700	96	89	-7	93%	34	31	-3	91%	Within +-50 veh
Category 3	700-2700	9	9	0	100%	0	0	0	N/A	Within 15%
Category 4	>2700	0	0	0	N/A	0	0	0	N/A	Within 15%

The PM model demonstrates a similar level of suitability by generally meeting link and turn criteria for the overall network for the period. The second PM network peak is summarised in Table 4.6 and Table 4.7.

Table 5.6: Link Validation Criteria – PM Network Peak (4:30 – 5:30)

Category	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	7	5	-2	**71%**	4	4	0	**100%**	Within +-30 veh
Category 2	100-700	57	52	-5	**91%**	29	26	-3	**90%**	Within +-50 veh
Category 3	700-2700	15	12	-3	**80%**	4	2	-2	**50%**	Within 15%
Category 4	>2700	0	0	0		0	0	0		Within 15%

Table 5.7: Turn Validation Criteria –PM Network Peak (4:30 – 5:30)

Category	Whole Network					Core Area (Inner-East Link and Surrounds)				Criteria
	Count	Total	Met	Unmet	%Met	Total	Met	Unmet	%Met	
Category 1	<100	138	126	-12	**91%**	50	47	-3	**94%**	Within +-30 veh
Category 2	100-700	85	73	-12	**86%**	33	29	-4	**88%**	Within +-50 veh
Category 3	700-2700	12	11	-1	**92%**	0	0	0	**N/A**	Within 15%
Category 4	>2700	0	0	0	**N/A**	0	0	0	**N/A**	Within 15%

A review of the travel times indicates that the AM peak achieves a close level of calibration based on observations. The PM peak exhibited some challenges with replicating the travel times due to a number of factors including trip patterns for the School Peak and variability in signal operations.

Spot checks have been undertaken in AM and PM models to ensure that path selection as well as flows along the arterials is consistent both with expectations and with the origin-destination data collected.

Overall, the model is considered to be suitable for use as part of the testing of the 2022 demand and mitigating works in this study. Full discussion on the suitability of the model against the guidelines is discussed further in the Calibration and Validation report.

6. FUTURE YEAR SCENARIOS

06

6.1. Overview

In order to inform the required mitigations for the future Inner East Link Road, scenario modelling was undertaken to capture several key changes within the urban road network, including known changes to land uses which have traffic generation implications for the network. These scenarios, including their inclusions, are listed in Table 6.1. A core focus of the scenario modelling is to test the effectiveness of the Inner East Link Road corridor with key land use changes including the Greater Shepparton Secondary College, both of which are anticipated to alter traffic flow and route choice across the city.

Table 6.1: Scenario Model Options

Year / Scenario	Transport Infrastructure		Land Use and Demand Changes			
	Existing Network Geometry	Planned Network Upgrades	Greater Shepparton Secondary College	Goulburn Valley Health Redevelopment	Background Growth	Potential Mitigations
2019	✓					
2022 Base	✓	✓	✓	✓	✓	
2022 Mitigations	✓	✓	✓	✓	✓	✓

6.2. Scenario Inputs

6.2.1. Future Demand Development

The 2022 Scenario inputs include imminent upgrades to the road network as well as traffic management initiatives in addition to the land use changes.

The formula for estimating future trips is as follows:

[2019 Hourly Base] – [2019 Hourly Base School Trips] + [GVH Hospital Growth] + [GSSC Trips]

The 2022 hourly matrix is then balanced using the Furness process and separated into 15-minute matrices based on the existing demand profiles for the AM and PM peaks. This is in order to maintain a relatively consistent profile between the base year and scenario year models. Peak profiles for Base and Future years are shown in Figure 6.1 and Figure 6.2 for AM and PM, respectively.

Figure 6.1: Traffic Demand Comparison of 2019 and 2022 AM

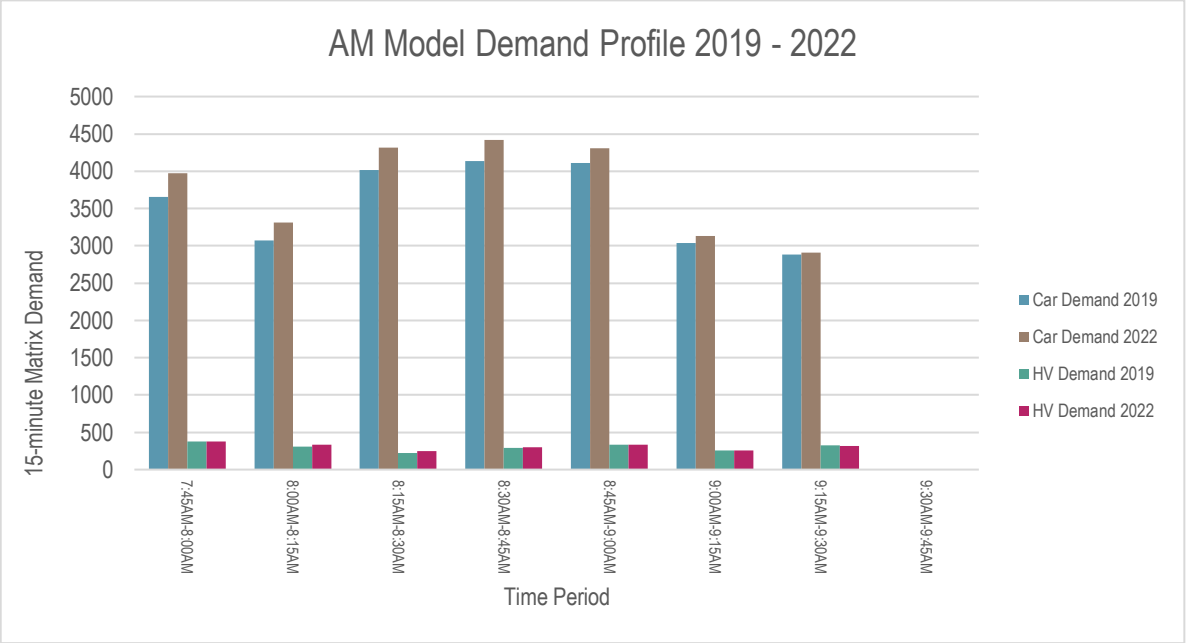


Figure 6.2: Traffic Demand Comparison of 2019 and 2022 PM

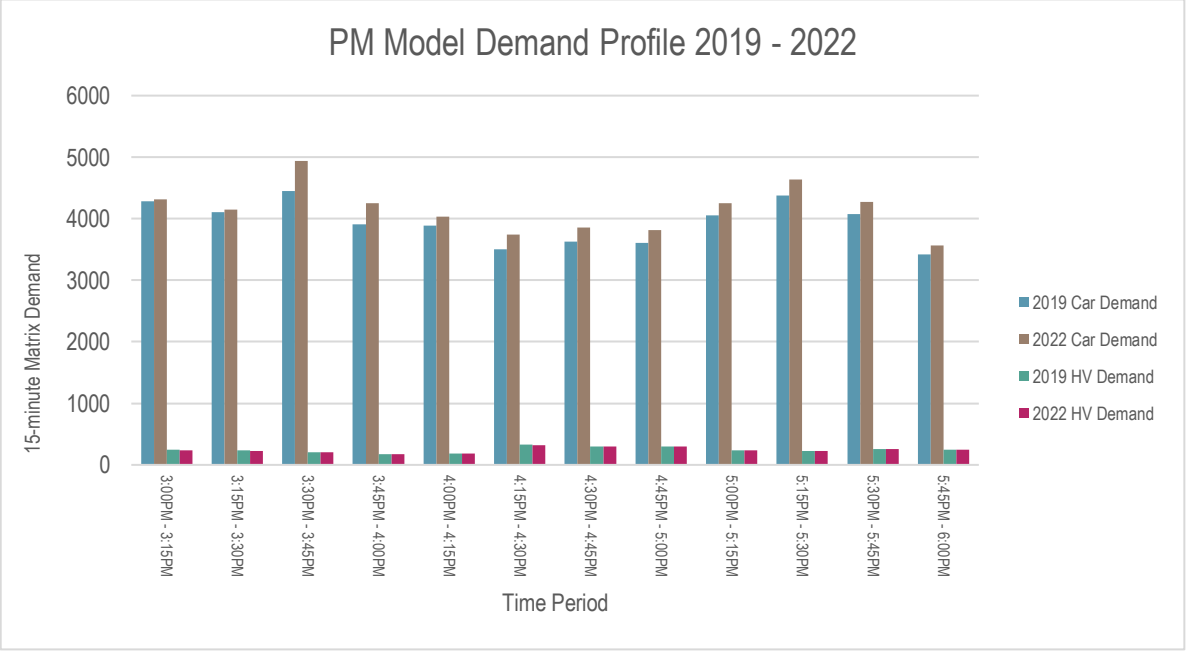
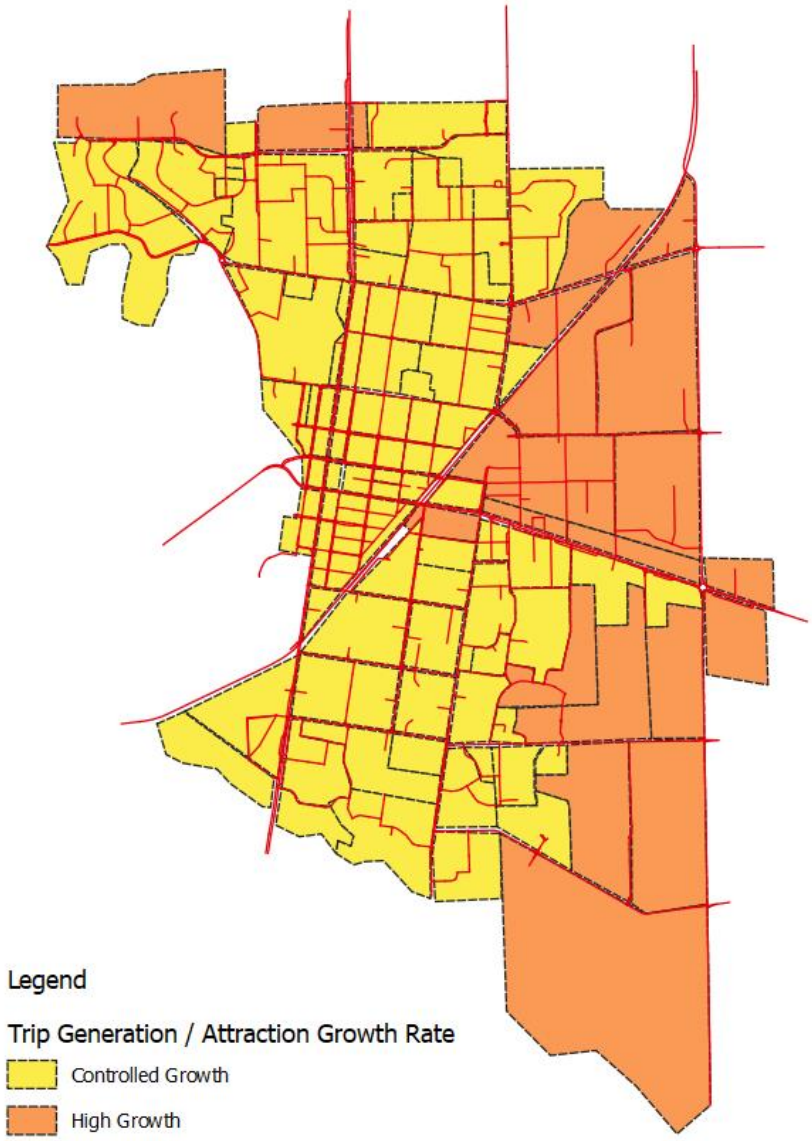


Figure 6.2 shows a distinct spike in 2022 network traffic for the periods of 3:30PM-3:45PM, corresponding to the impact of the estimated peak traffic generation/attraction period for Greater Shepparton Secondary College.

Estimates of the uplift in trips associated with growth in population and change in land use have been based on ABS estimation of population growth between 2019 and 2022. ABS data estimates population uplift to be 5.36% between 2019 and 2022. Locations where population growth is likely to be highest has been based on land use assessment by aerial photograph to determine the locations of planned new suburbs and

developments currently under construction. This has been translated in a 'high growth' and 'controlled growth' factor applied to trips to and from the corresponding zone in VISUM and is highlighted in Figure 6.3. The ratio of trip growth rate for high growth compared to controlled growth is approximately 3:1 in all peak periods.

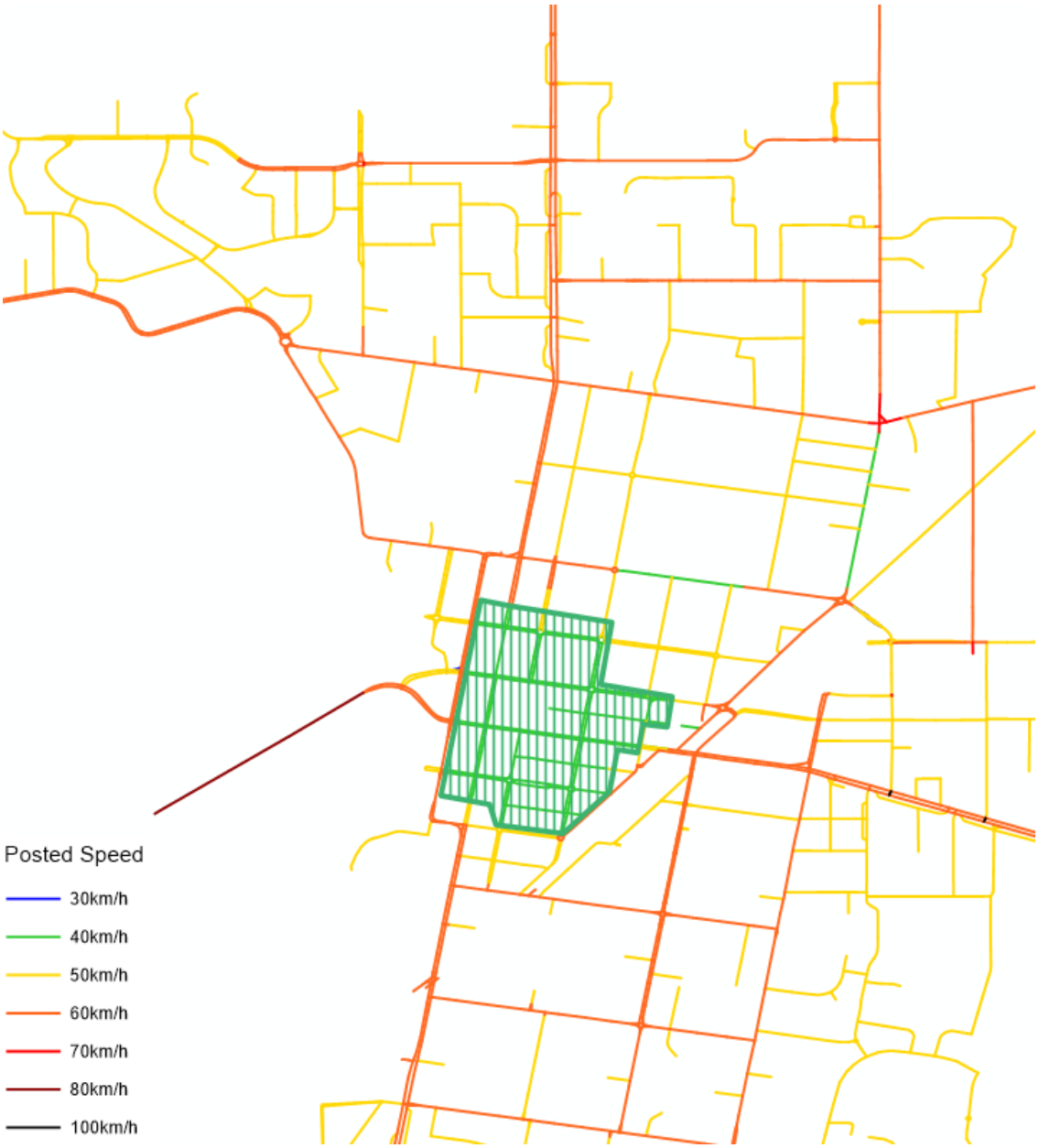
Figure 6.3: Application of Future Traffic Growth by Zones



6.2.2. Road Network Upgrades and Traffic Management

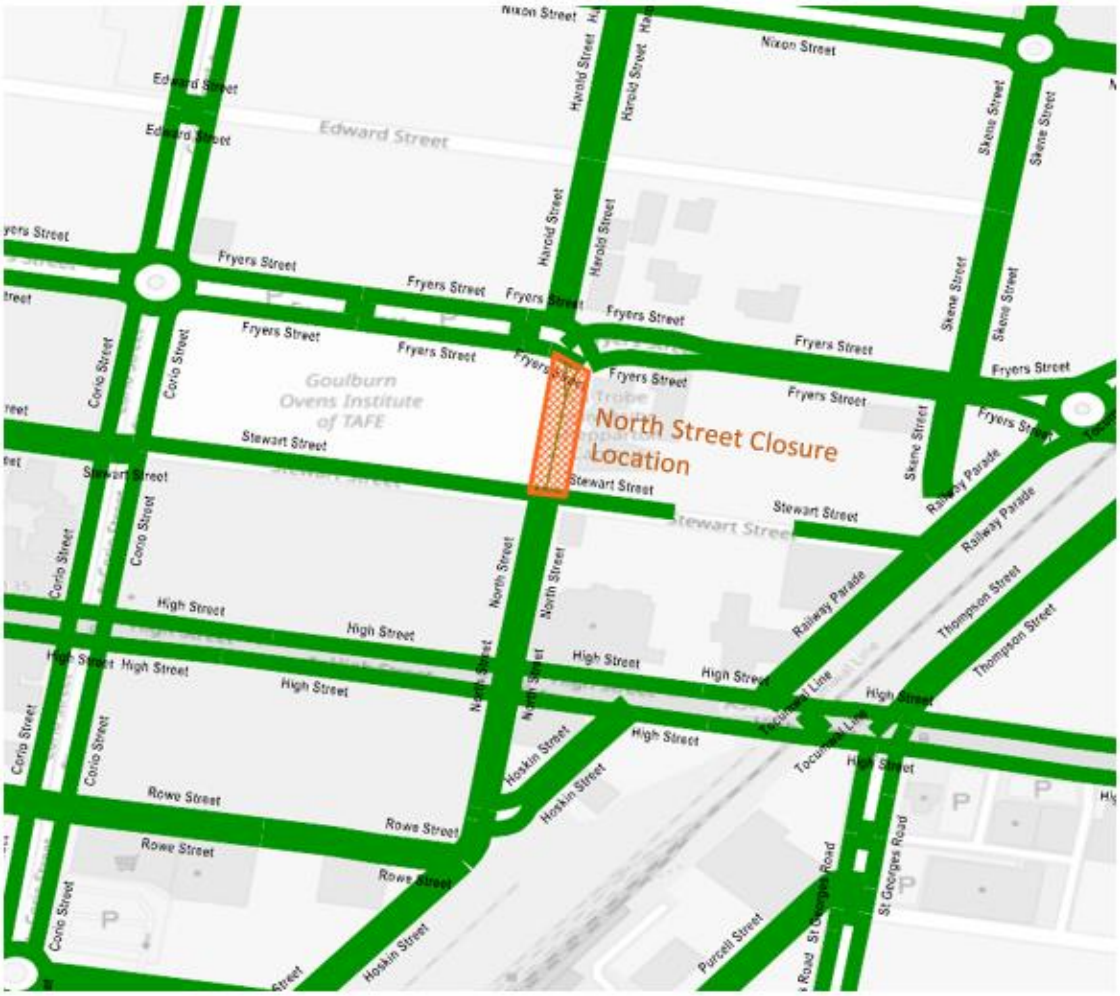
Greater Shepparton City Council seeks to impose a 40km/h speed limit in addition to several pedestrian access and safety measures in the urban core of the city. It is recognised that the implementation of the speed reduction is in planning and requires approval This assumption has been included in all 2022 Future scenarios as depicted in Figure 6.4.

Figure 6.4: Proposed 40km/h Inner Urban Speed Restriction



The existing section of North Street between Fryers Street and Stewart Street as shown in Figure 6.5 is proposed to be downgraded to through traffic by 2022 and has been assumed to be closed in the Future scenario models.

Figure 6.5: Location of North Street Closure (Prior to Inner East Link construction)



Greater Shepparton City Council has also provided information on other imminent road network upgrades that are located within the extents of this study. These include:

1. Intersection of Hawdon Street / Balaclava Road / New Dookie Road is to be upgraded from a roundabout to signals. This is scheduled to open in April 2020
2. The duplication of the north and south approaches to intersection of New Dookie Road / Doyles Road
3. The duplication of north and south approaches to intersection of Old Dookie Road / Doyles Road.

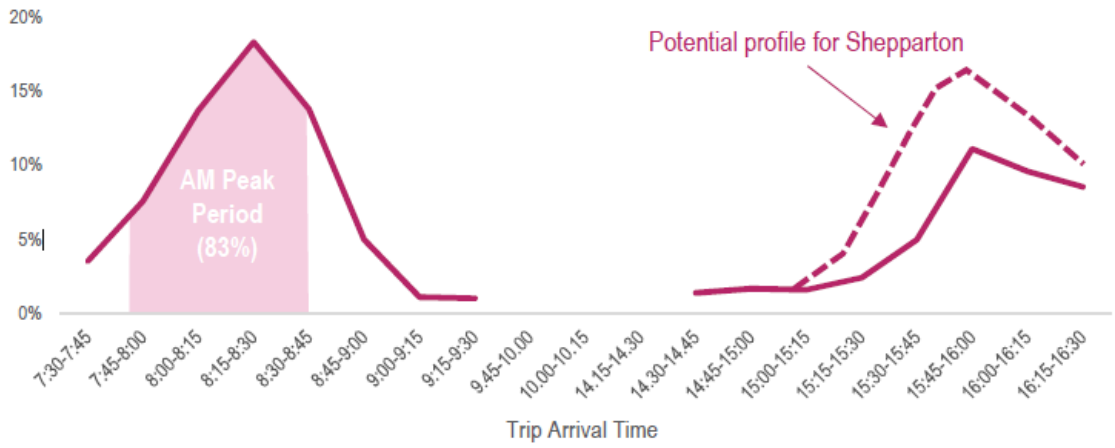
6.2.3. Greater Shepparton Secondary College

One of the largest single attractors/generators of traffic in the 2022 future Shepparton network is Greater Shepparton Secondary College (GSSC). Information on the school has been provided from the Department of Education and Training (DET) however it is still unclear about the likely traffic generation of the school. In this regard, several assumptions have been developed for the future GSSC, as follows:

- All trips to and from the school within a 2km radius will be by active travel (walking, cycling etc)
- McGuire College and Wanganui College (located within the model extent) will be closed and will no longer attract or generate traffic during the school peaks when GSSC is completed in 2022

- The number of hourly trips to and from GSSC has been estimated as 720 veh/hr in the AM and School PM peaks, with distribution profile shown indicated in Figure 6.6
- Trips to and from McGuire College and Wanganui College have been estimated based on the number of pupils and staff at each school. In the 2022 Future scenario, these are removed in the AM Peak and School PM Peak periods.

Figure 6.6: Distribution of School Trip Arrivals and Departures



The profile presented in Figure 6.6 shows that there is a sharp arrival and departure profile for the school around 8.45am and 3.45pm.

It is also understood that a bus management plan is in development with the DET and the likely impacts of this may require further investigation outside of this study.

6.2.4. Goulburn Valley Health (Shepparton Hospital) Redevelopment

The redevelopment of Shepparton Hospital is likely to increase the number of trips by private car to and from this site. A traffic impact assessments has been provided from Council which estimates the number of additional trips to be 227 per day. This was calculated using a standard trip generation rate based on the number of additional beds per ward.

6.3. Summary of traffic demand

A summary of the total traffic demand for the modelled network in Shepparton forecast for the 2022 design year is provided in Figure 6.7.

Figure 6.7: Existing and future traffic demand (vehicles) for Shepparton (2022)

	AM	School PM Peak	Network PM Peak
Existing Trips	15,305	15,858	16,378
School Growth	924*	1,351*	100*
Hospital Growth	204	193	197
Other Traffic Growth	878	706	1,293
Total	17,311	18,107	17,967

* Does not exclude reduced trips to and from existing school sites (former Maguire College and former Wanganui High School)

Figure 6.6 shows that across the modelled network the School will represent the highest increase in volumes, in particular in the vicinity of the Greater Shepparton Secondary College.

7. MODEL RESULTS

07

7.1. Network Performance

General network statistics have been extracted from the models and include the following:

- Total Vehicles: total number of vehicles that arrived at their destination and vehicles still travelling in the network.
- Total Travelled Distance: total number of kilometres travelled by all the vehicles that have crossed the network.
- Total Travel Time: total travel time experienced by all the vehicles that have crossed the network.
- Speed: average speed for all vehicles that have completed their trips by classification (i.e. Car and Heavy Vehicle).
- Vehicles Waiting to Enter: number of vehicles that are waiting to enter the network.

The network performance measures are aggregated across the entire modelled area or are an average for all trips within the model (one-hour peak period). A summary of the model performance is provided in Table 6.1.

Table 7.1: Vehicle Network Statistics

Scenario	Total Vehicles	Total Travel Distance (km)	Total Travel Time (hours)	Speed (km/h) – CAR	Speed (km/h) - HV	Vehicles Waiting to Enter
						AM Peak
2019	27,003	91,182	2080	36.1	34.7	0
2022 Base	28,507	98,531	2447	35.5	34.2	0
2022 Project Options	28,500	98,637	2500	35.5	34.3	0
PM Peak (3.15 – 5.15)						
2019	46,920	164,355	2937	35.3	34.3	0
2022 Base	48,926	173,903	3152	34.8	33.8	0
2022 Project Options	48,926	174,010	3139	35.0	33.9	0

The increase in the total number of trips in the network is less than six percent which is in the order of two percent per annum. The change in travel behaviour however is expected to result in an increase in the total distance travelled of more than eight percent meaning that the trip distances have increased, this is likely a result of the new GSSC and hospital.

The results show that in each of the peak periods there is a marginal change in average speed across the network between 2019 and 2022. This is expected due to the increased traffic growth on the network as well as additional congestion around the new GSSC.

The PM peak exhibits the highest increase in traffic growth with almost 5% of vehicles waiting to enter the network at the end of the simulation. This indicates there is a blockage in a particular part of the network and will require further exploration.

7.2. Difference Plots

A difference plot for between the 2019 and 2022 Base scenario has been prepared which indicates the differences in link volumes expected on the network for the relevant peak hours. This is shown below in Figure 7.1 where links that are red indicate an increase in volume between scenarios and green links are those that decrease in volume between scenarios. The thickness of the line is an overview of the quantum of volume difference.

Figure 7.1: AM Peak Difference Plot: 2019 Base – 2022 Base

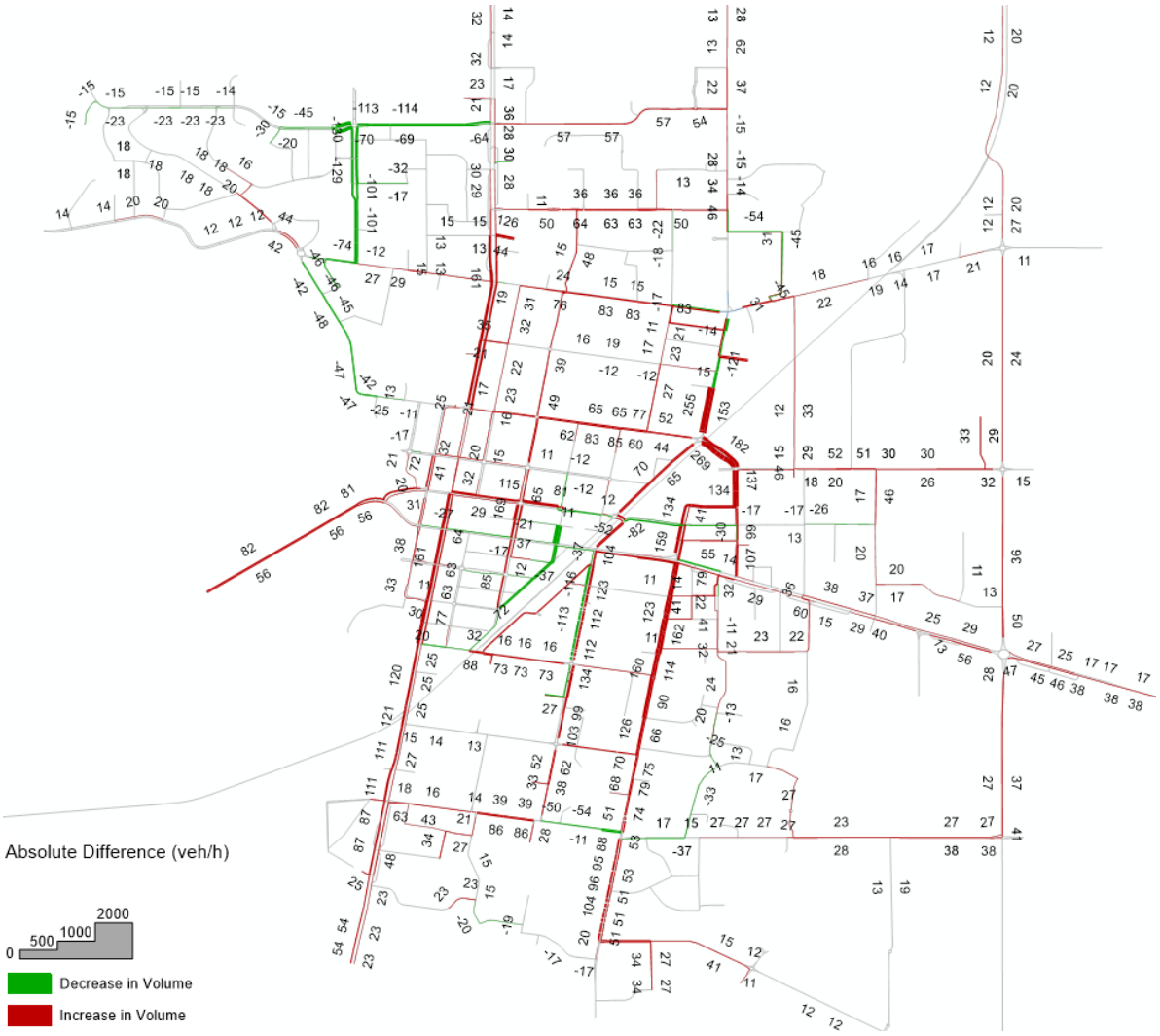
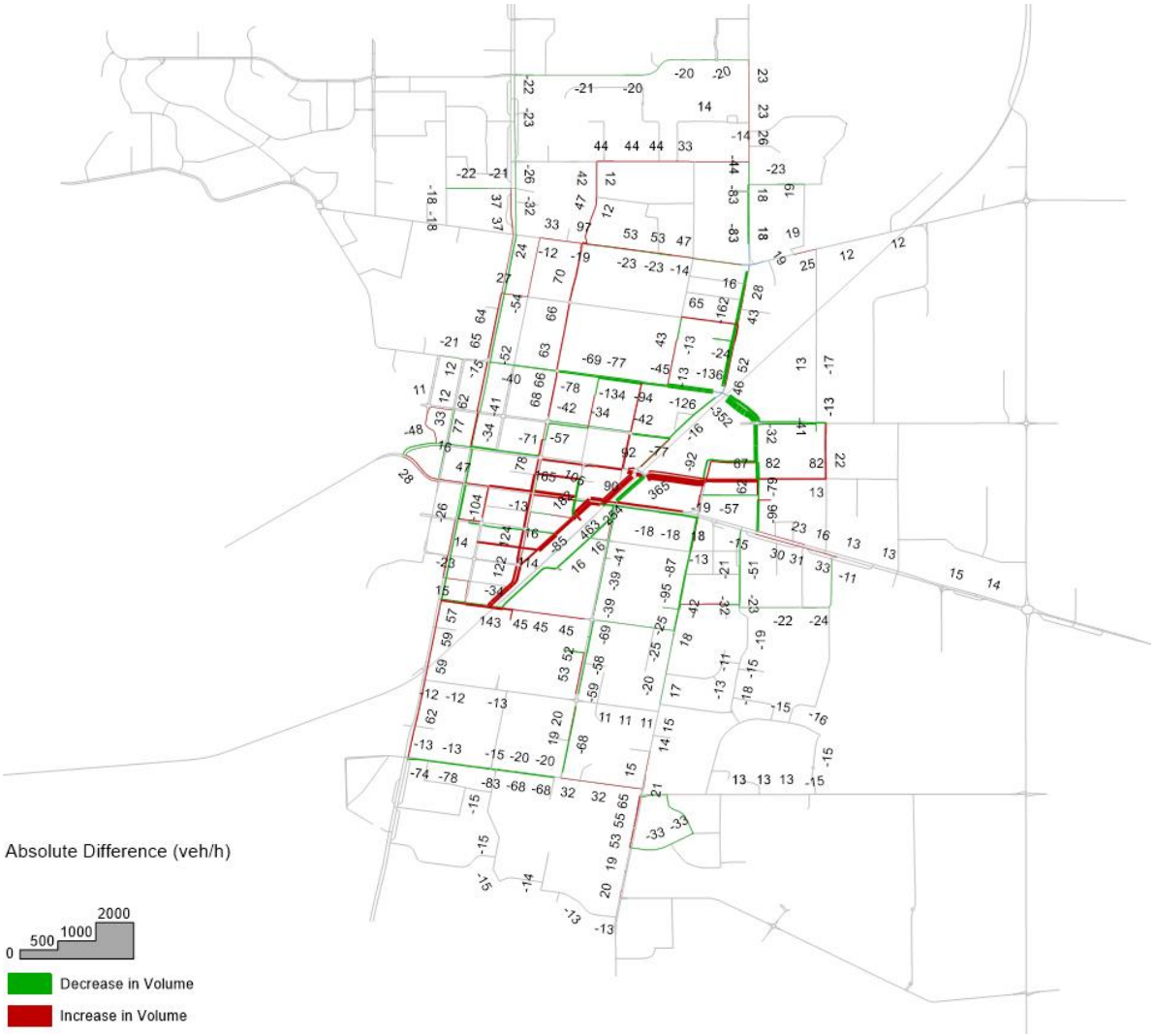


Figure 7.1 shows that there is expected to be volume increases broadly across the network as a result of growth in traffic demands associated with the forecast growth. There is expected to be a decrease in volumes around former Wanganui Park Secondary College which is expected as a result of students relocating from the school. There is a marginal reduction in volumes along North Street and St Georges Road which is likely due to demand shifting across to Archer Street to the east and Corio Street to the West as well as the closure of a section of North Street shown in Figure 6.5.

Volumes within the CBD do not increase much which indicates that the lower speeds reduce the attractiveness for vehicular traffic.

The volume difference plot between the 2022 Base and the 2022 with mitigation is provided below in Figure 7.2. The intention of this plot is to show the impact of the mitigations.

Figure 7.2: AM Peak Difference Plot: 2022 Base – 2022 Mitigation



The results show that the mitigations will result in the Inner East Link Road attracting traffic which is afforded by the capacity provided. Volumes on Archer Street will reduce indicating network flexibility. The northern sections of the Link Road do show a decrease in volumes which is a result of the new signal operation for the Knight Street and Railway Parade reducing the overall capacity due to the limited capacity increases afforded with the signalised operation being 'split phase'. A similar outcome is noted at the Balaclava Road / Hawdon Street intersection.

A difference plot for between the 2019 and 2022 Base for the first PM peak is shown in Figure 7.3.

Figure 7.3: PM School Peak Difference Plot: 2019 Base – 2022 Base

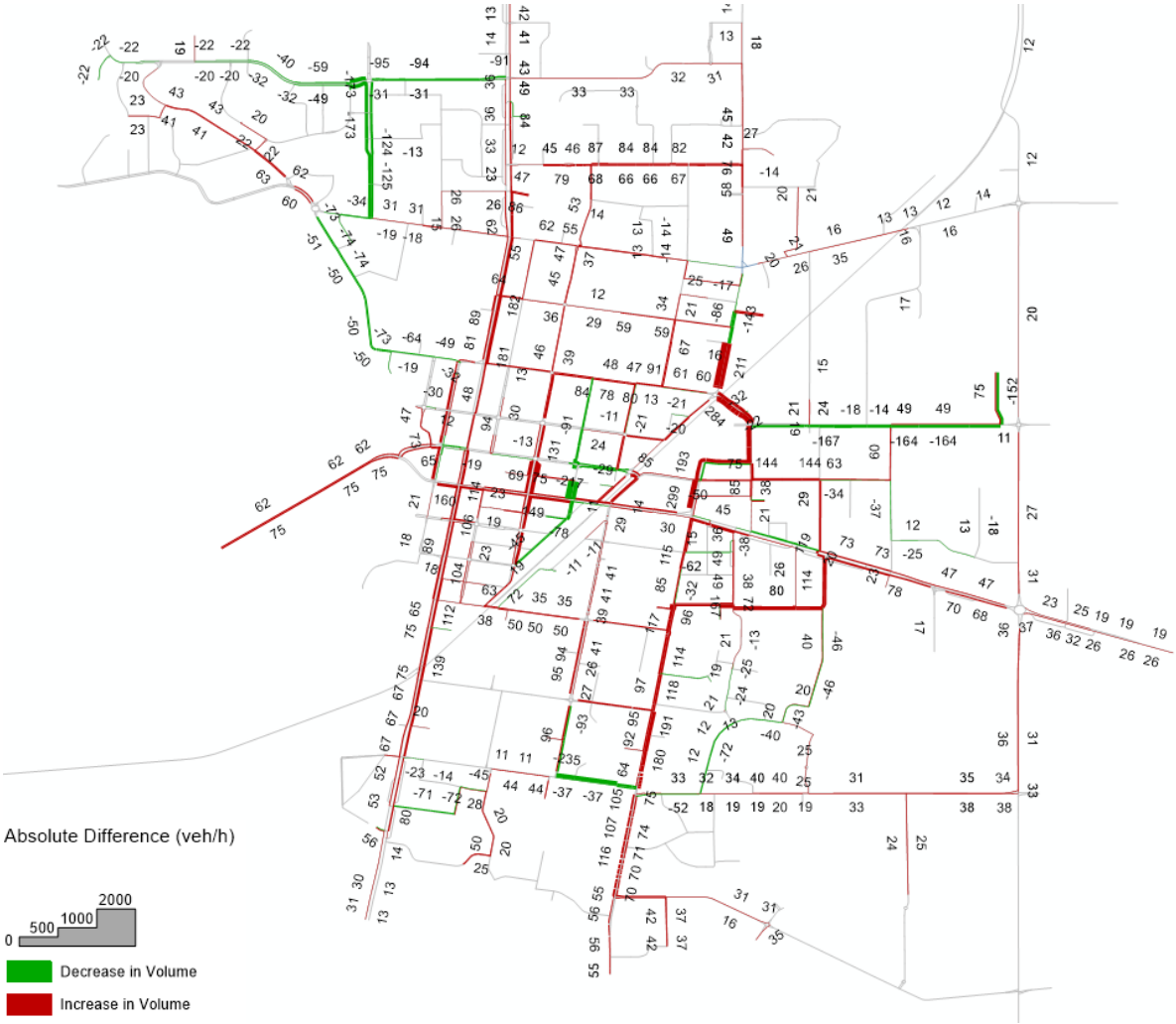
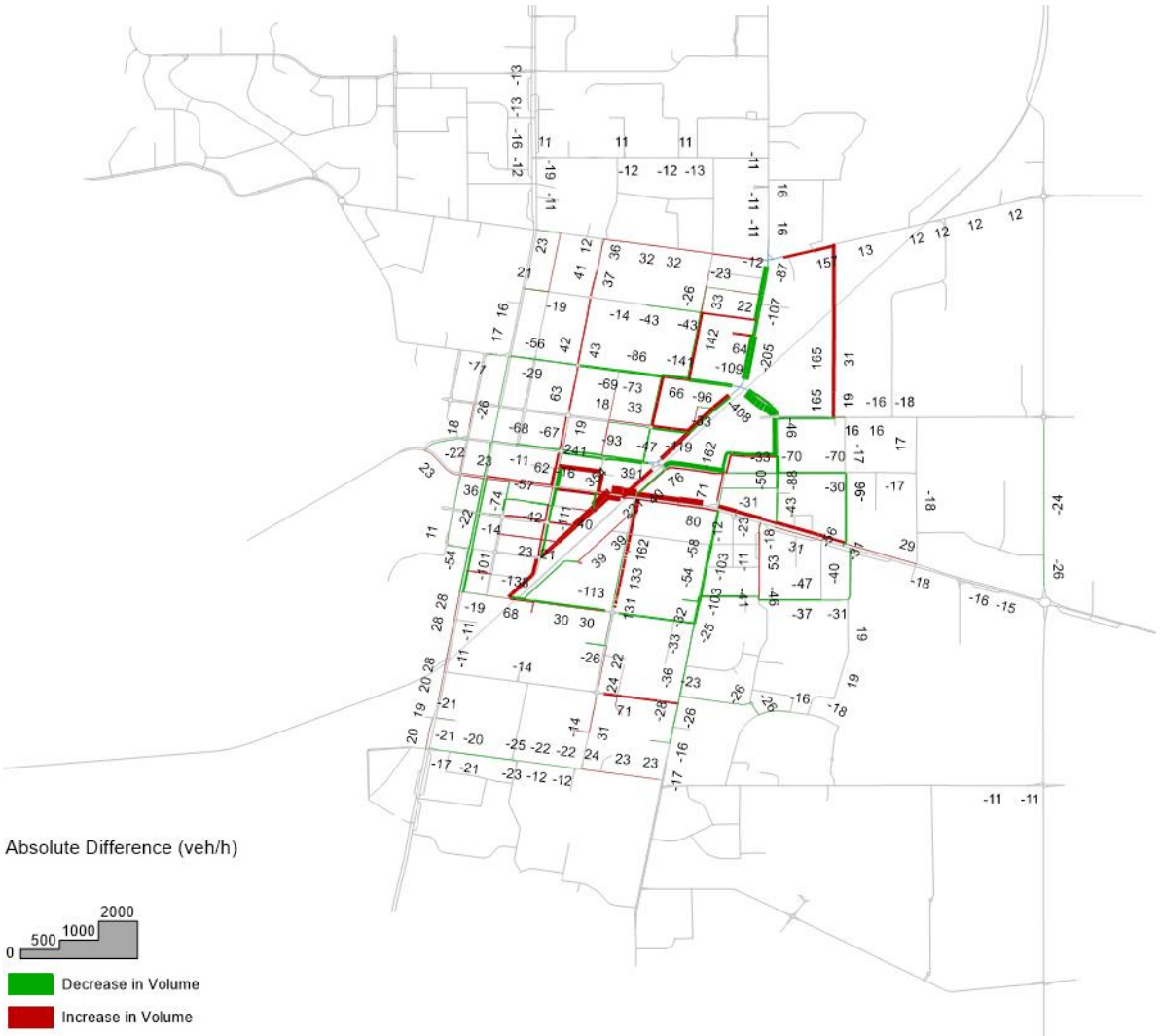


Figure 7.3 shows a similar change in traffic on each road as observed in the AM Peak period, in particular an increase in volumes at the Greater Shepparton Secondary College and a decrease in volumes around former Wanganui Park Secondary College. There is a marginal reduction in volumes along North Street and St Georges Road which is likely due to demand shifting across to Archer Street to the east and Corio Street to the west.

The volume difference plot between the 2022 Base and the 2022 with mitigation is provided below in Figure 7.4.

Figure 7.4: PM School Peak Difference Plot: 2022 Base – 2022 Mitigation



Similarly to the AM peak, the results show that the mitigations will result in the Inner East Link Road attracting traffic due to the additional capacity provided. In addition, the Knight Street / Railway Parade and Balaclava Road / Hawdon Street intersections do not increase their capacity due to the signalised operation being 'split phase'.

A difference plot for between the 2019 and 2022 Base for the second PM peak is shown in Figure 7.3.

Figure 7.5: PM Network Peak Difference Plot: 2019 Base – 2022 Base

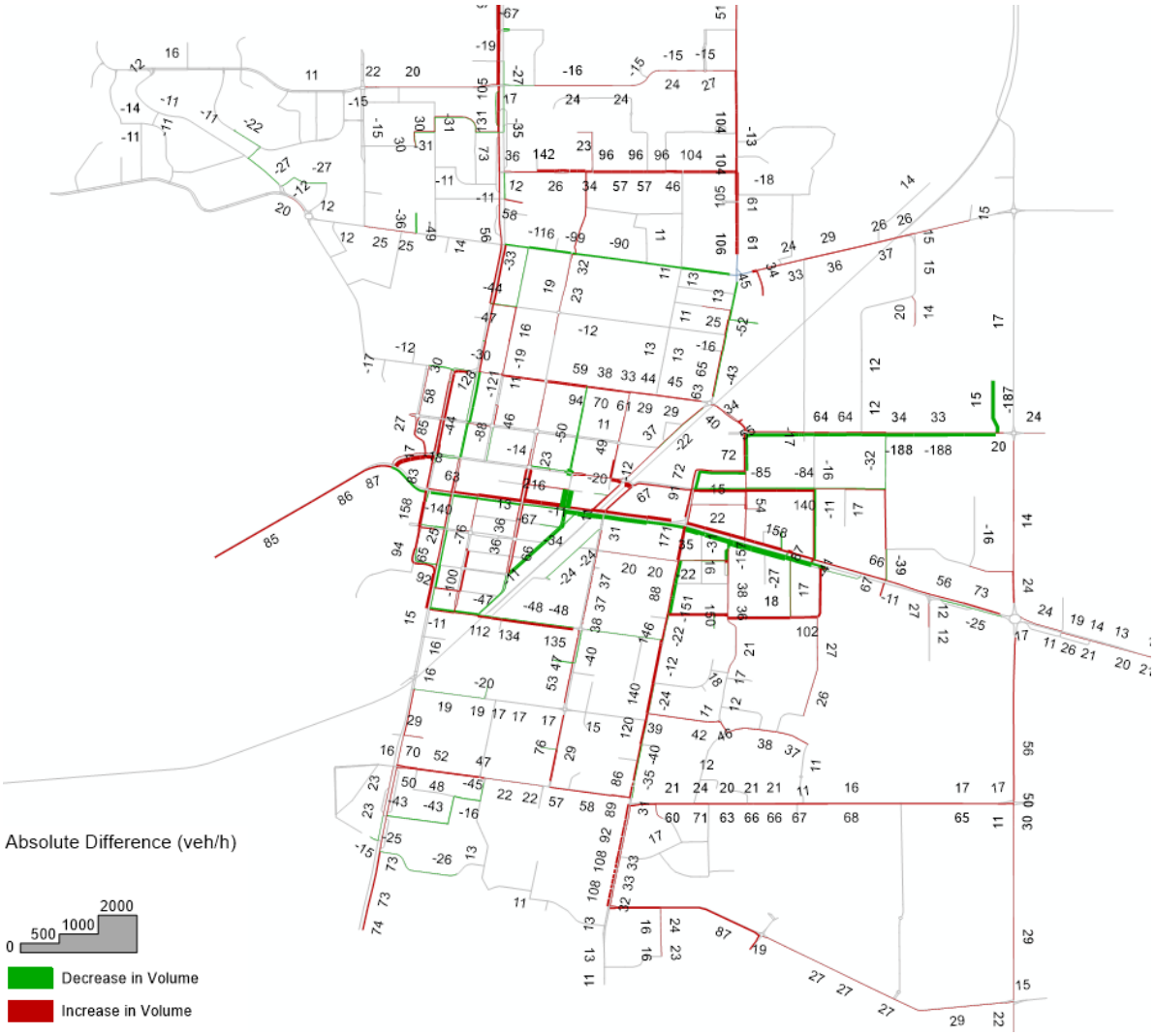


Figure 7.5 shows a general increase in traffic on the network for most roads, although relatively smaller in comparison to the School PM Peak period as the school represents the largest single change in traffic patterns. Vehicles are tending to travel along Midland Highway to avoid the CBD area and choose routes outside the proposed 40km/k speed zone reductions. There is also some decrease in trips along Verney Road associated with its signalisation at Hawdon Street.

The volume difference plot between the 2022 Base and the 2022 with mitigation is provided below in Figure 7.6.

Figure 7.6: PM Network Peak Difference Plot: 2022 Base – 2022 Mitigation

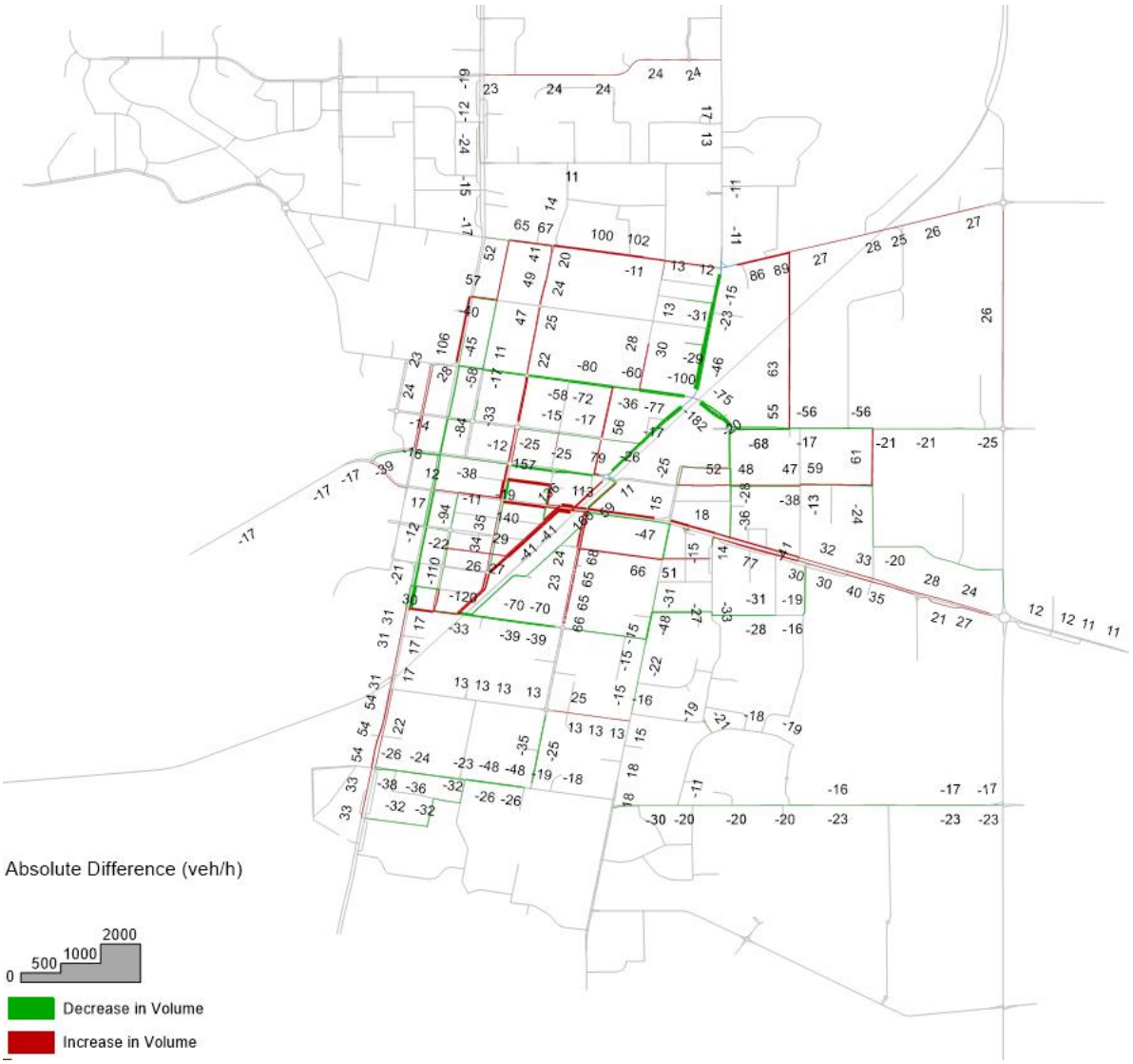


Figure 7.6 shows that the mitigations will result in the Inner East Link Road attracting traffic which is afforded by the additional capacity provided. Volumes on Archer Street reduce which is likely a result of some shifting of traffic to other parts of the network. The northern sections of the Link Road show a decrease in volumes which as a result of the signal operational changes.

7.3. Inner East Link Road Travel Times

Travel time along the Inner East Link Road are able to be extracted from the Visum model and are summarised in Table 6.2.

Table 7.2: Inner East Link Road Modelled Travel Times (in minutes and seconds)

Year	Northbound			Southbound		
	‡Southern Section	†Northern Section	Total	‡Southern Section	†Northern Section	Total
AM Peak (8:15 – 9:15)						
2019	2:40	2:36	5:06	1:34	3:17	4:51
2022 Base	2:18	4:41	6:02	1:19	4:58	6:17
2022 Project Options	2:33	6:19	8:52	1:22	3:49	5:11
PM Peak (3:00 – 5:30)						
2019	3:33	2:55	6:28	1:36	4:09	5:53
2022 Base	3:01	3:54	6:55	1:50	5:31	7:21
2022 Project Options	2:43	4:51	7:34	1:31	5:11	6:42

†Northern Section: Inner East Link from Midland Highway to Balaclava Road via Railway Parade and Hawdon Street (both directions)

‡Southern Section: Inner East Link from Wyndham Street to Midland Highway via Hayes Street, Johnson Street and Hoskin Street SB/ North Street NB (both directions)

The travel times show that by 2022 without mitigation both the northbound and southbound travel times will experience increased travel times in the AM peak. The highest increases are in the northern section for both the northbound and southbound direction. In the southbound direction, the mitigations will improve the travel times in both northern and southern sections of the Inner East Link.

Interrogation of the results suggest that the increases in the northbound direction are due to the signalisation of the Knight Street and Hawdon Street Intersection. The southern section of the southbound movement also improves slightly which could be attributed to the new signals at the Hayes Street and Johnson Street improving this flow.

7.4. Model Plots

Detailed model outputs in the form of volume to capacity, speed and volume plots for the relevant scenarios are provided in Appendix B of this report.

7.5. Summary

Network Wide Results for each scenario show the following:

- The AM and PM peaks will experience increases of around six percent of traffic in each of the peak periods. This will result in marginal decreases in speeds of less than three percent indicating that the network has flexibility to accommodate this increase.

- By 2022, the GSSC will have the biggest influence on travel patterns on the Inner East Link Road. The only exception is at Balaclava Road which shows marginal differences in throughput from 2019 conditions which is due to the introduction of the traffic signals. Notwithstanding, the new signals at Balaclava Road, whilst not necessarily increasing capacity during the peaks, will provide better safety and pedestrian connectivity.
- The conversion of a roundabout to traffic signals at Knight Street causes some traffic to avoid the intersection during the peaks which is due to an increase in delay relative to the existing conditions. This is expected due to the configuration constraints having regard for the rail crossing and the closely spaced intersection with Andrew Fairley Avenue. Similar to Balaclava Road signalisation, the resultant layout will provide improved and safer connectivity for pedestrians, in particular pedestrian traffic to and from GSSC.
- The capacity improvements along the Midland Highway will attract traffic to the link road keeping its function. It is noted that the intersection spacing on the Midland Highway as part of the mitigating works will require further investigation due to the nature of the closely spaced intersections.

8. INTERSECTION ASSESSMENTS

08

8.1. Overview

An intersection assessment was conducted using SIDRA for selected sites along the Inner East Link Road to better ascertain the performance of individual intersections as well as informing the configurations into the designs. As VISUM is a mesoscopic modelling program, SIDRA offers a higher level of detail for the purposes of intersection assessments. Intersection assessments were conducted across the following sites:

- Goulbourn Valley Highway / Hayes Street
- Hayes Street at Johnson Street and Baker Street
- High Street (Midland Highway) at North Street, Hoskins Street, Railway Parade and Thompson Street
- Fryers Street at Railway Parade and Thompson Street
- Knight Street / Hawdon Street.

Each of the above locations has been evaluated under three project scenarios (for each peak) discussed in Section 6, including;

1. Existing Conditions (2019)
2. Future Do Nothing (2022)
3. Future Mitigated Option (2022).

Full SIDRA outputs for the above, and as referenced throughout this section, are provided in Appendix C of this report.

8.2. Methodology for Intersection Assessment

SIDRA has been used to undertake detailed intersection analysis as it can provide more detailed insight into intersection performance, including delay and degree of saturation.

For the 2019 Base Case and 2022 Business as Usual scenarios, the selected intersections were configured to match their existing layouts using a desktop review of the sites on Nearmap. The 2022 Business as Usual scenario assumes that the intersection layouts will remain the same into the near future.

In the 2022 with Mitigations scenario, several changes were introduced to the nominated sites based on proposed concept layout plans (refer to Appendix A) aimed to improve the attractiveness of the Inner East Link Road. In the instances of Hayes Street at Johnson Street and Baker Street as well as High Street (Midland Highway) at Hoskins Street and Railway Parade, interim layout configurations were used rather than the ultimate layout configuration.

Volume inputs were based on VISUM model outputs for all scenarios. For consistency, the 2019 Base SIDRAs have used outputs of the calibrated 2019 Base AM and PM models.

8.3. Results

The extracted results include intersection performance statistics of degree of saturation, average delay, Queueing and level of service. A summary of these results has been provided within Appendix C. It is noted that the PM mitigation options are still being investigated and will be reported in the next revision of the report.

It is important to note that there are two different analysis packages that are developed for different purposes. The Visum packages is a network package and is intended to understand the broader network impacts of the changes in demand. The SIDRA analysis is purely to identify the specific intersection requirements and design requirements. In this regard, some of the outputs may differ or conflict with one another.

Table 8.1 provides a summary of the AM peak results

Table 8.1: SIDRA Intersection Summary AM Peak (8:15AM – 9:15AM)

Intersection	2019 AM Peak			2022 Future Do Nothing AM Peak			2022 Future Mitigations AM Peak		
	DOS	LOS	Average Delay	DOS	LOS	Average Delay	DOS	LOS	Average Delay
Goulburn Valley HWY / Hayes Street	0.55	-	4.8s	0.53	-	4.6s	0.66	B	19.0s
Hayes Street / Johnson Street	0.16	-	2.6s	0.19	-	4.1s	0.61	-	7.7s
High Street / Hoskins Street	0.25	-	1.0s	0.23	-	1.0s	0.43	B	13.9s
High Street / Railway Parade	0.24	-	0.1s	0.23	-	0.2s	0.51	B	17.7s
Fryers Street / Railway Parade	0.50	A	7.3s	0.48	A	6.5s	0.776	A	8.2s
Fryers Street / Thompson Street	0.84	-	12.2s	0.98	-	19.9s	1.24	F	110.6s
Knight Street / Railway Parade	0.54	A	8.0s	0.77	B	12.2s	0.95	D	51.2s

†Unsignalised intersections assessed on LOS for approach with longest delay time (s)

Table 8.2: SIDRA Intersection Summary PM School Peak (3:15PM – 4:15PM)

Intersection	2019 School PM Peak			2022 Future Do Nothing School PM Peak			2022 Future Mitigations School PM Peak		
	DOS	LOS	Average Delay	DOS	LOS	Average Delay	DOS	LOS	Average Delay
Goulburn Valley HWY / Hayes Street	0.62	-	4.8s	0.60	-	4.7s	0.71	B	21.4s
Hayes Street / Johnson Street	0.30	-	5.7s	0.36	-	6.1s	0.47	-	7.0s
High Street / Hoskins Street	0.32	-	0.6s	0.31	-	0.6s	0.64	B	13.2s
High Street / Railway Parade	0.32	-	0.6s	0.30	-	0.7s	0.66	B	16.7s

Intersection	2019 School PM Peak			2022 Future Do Nothing School PM Peak			2022 Future Mitigations School PM Peak		
	DOS	LOS	Average Delay	DOS	LOS	Average Delay	DOS	LOS	Average Delay
Fryers Street / Railway Parade	0.64	A	9.7s	0.64	A	9.3s	0.61	A	8.2s
Fryers Street / Thompson Street	0.72	-	8.6s	1.17	-	34.8s	0.39	A	6.7s
Knight Street / Railway Parade	0.56	A	8.5s	0.85	B	15.3s	1.55	F	484.8s

Table 8.3: SIDRA Intersection Summary PM School Peak (4:30PM – 5:30PM)

Intersection	2019 PM Peak			2022 Future Do Nothing PM Peak			2022 Future Mitigations PM Peak		
	DOS	LOS	Average Delay	DOS	LOS	Average Delay	DOS	LOS	Average Delay
Goulburn Valley HWY / Hayes Street	0.71	-	5.9s	0.62	-	5.9s	0.64	C	22.3s
Hayes Street / Johnson Street	0.43	-	6.3s	0.22	-	4.6s	0.43	-	6.4s
High Street / Hoskins Street	0.25	-	1.0s	0.23	-	0.3s	0.35	-	9.2s
High Street / Railway Parade	0.24	-	0.1s	0.23	-	0.8s	0.44	-	12.5s
Fryers Street / Railway Parade	0.50	A	7.3s	0.59	A	7.1s	0.57	A	6.4s
Fryers Street / Thompson Street	0.62	-	8.2s	0.94	-	16.8s	0.37	A	6.8s
Knight Street / Railway Parade	0.56	A	8.2s	0.65	A	9.4s	1.04	E	62.2s

8.4. Discussion

The SIDRA analysis has informed the design parameters of the concept layouts and through this investigation they have identified a number of intersections that will experience reduced levels of performance by 2022. It is noted that based on traffic, some of the mitigating works will result in lower levels of capacity when introduced. The notable intersections are those that are proposed to be converted from roundabouts to traffic signals, such as Fryers Street / Railway Parade and Knight Street / Railway Parade.

The results should not be considered the only reason that intersections be increased which could be a way of improving safety and pedestrian connectivity. This analysis does not consider the benefits of these improvements, rather the broader impacts to the network as a result of these reduced capacity (as discussed in Section 6).

In relation to the SIDRA analysis, the key observations are:

- All of the intersections operate at acceptable levels in the existing situation
- The Goulburn Valley Highway / Hayes Street intersection will operate at similar levels of DOS as the existing with the introduction of signals. There will be significant pedestrian and cyclist improvements at this intersection with controlled crossing points provided with the signalisation
- With the additional traffic demand in 2022, the current configuration of the intersection of Fryers Street and Thompson Street will experience delays causing it to approach / exceed its theoretical capacity, in both the AM and PM peak periods
- In the AM peak, the conversion of Fryers Street / Thompson Street to a signalised intersection will reduce the capacity of the intersection and result in a DOS in excess of 1.3. This is due to the layout being constrained and the number of lanes, particularly turning lanes, being significantly short and ineffective
- The Knight Street / Railway Parade intersection will also reduce its capacity with a conversion to signals. In the AM peak it will still likely operate at acceptable levels.

Finally, it was identified through the signal operations team that the proposed treatment on the Midland Highway will result in an additional two sets of signals along the road. In addition to the level crossing, the interaction of these signals will result in significant challenges with signal linking, operation and efficiency and would require significant and detailed investigations to test their viability. This should be undertaken in close collaboration with RRV through the design process.

9. OPINION OF PROBABLE COSTS

09

9.1. Introduction

The Shepparton CBD Inner East Link Road mitigations consists of a total of five intersections. The opinion of probable cost estimates of the five intersections outlined within this section of the report relate to the concept designs developed in order to enable the establishment of the Inner East Link Road.

The consolidated opinion of probable costs will be primarily used for the purposes of evaluation of benefits, constructability and feasibility which takes into consideration impact on existing services as well as other project risks identified from earlier stages of this study.

Four of the five intersections are adjacent to an at-grade railway crossing and intersections have proposed new and/or altered traffic signal controls in the ultimate scenario. These railway crossing modifications and coordination with proposed traffic signal works are included within the opinion of probable cost estimate.

9.2. Methodology

9.2.1. Introduction

The opinion of probable costs are provided with itemised costs, having consideration of the associated construction risks including contingency. The consolidated opinion of probable costs were prepared for each location based on adopting a standardised unit rate consisting of block pricing that is all inclusive of supply, labour, traffic management, preliminaries, etc.

The majority of the proposed construction works relate to road widening, pavement construction, traffic signal intersection works including at-grade railway crossing, and other roadside infrastructure upgrade works as per below. The following items are included in the relevant opinion of probable cost:

- Pavement and kerb works
- Signs and line marking works
- Public lighting works
- Traffic signal intersection works
- Railway crossing works
- Type V asphalt re-sheet works within, approach and departure of intersection
- Type H asphalt re-sheet works within, approach and departure of intersection.

9.2.2. Service authorities and associated infrastructure

Services relocation and/or protection costs were broadly estimated having regard to DBYD enquiry information, site inspections and other similar project experience. It is noted that formal cost estimates from the relevant service authorities were not obtained or included in this feasibility study.

As such, it is recommended that formal quotes be obtained from the following service authorities based on the preliminary design arrangements in order to obtain a more informed understanding of extents of works and the associated costs. The most appropriate time to do this would be when further design work (e.g. functional or detailed design work) is completed. In this instance, quotations from the relevant infrastructure managers will need to be necessary to gain an understanding of the actual costs of modifying the relevant infrastructure include (but not necessarily limited to) the following:

- Powercor
- Telstra
- Nextgen (Communication service)
- Optus

- Water
- Gas
- Sewer
- Irrigation channel protection.

9.2.3. Risk identification

The following tasks were carried out in terms of services and risk identification:

- Obtain and review 'Dial Before You Dig' information and undertake a site visit as it relates to existing services in the vicinity of the proposed works which will be included within the opinion of probable costs.
- Validation of the concept designs as it relates to constructability and ensuring that existing services information from 'Dial Before You Dig' is reviewed holistically and considered within the opinion of probable costs with respect to its potential need for relocation.
- Preparation of consolidated opinion of probable costs of the proposed works with a P90 level of confidence (including a 40% contingency).
- Proposed materials and surface treatments will be based on RRV (Regional Roads Victoria) and Council's standard drawings.

9.2.4. Exclusions and Assumptions

The following exclusions/assumptions will be included with the Engineer's opinion of probable cost estimate:

- a 40% contingency will be applied to the opinion of probable costs
- land acquisition will be excluded
- consideration has not been given to potential staging of the works
- price escalation will not be included in the estimate
- any allowance for abnormal weather conditions will be excluded
- no allowance will be made for night-works if required.

The consolidated opinion of probable costs should be considered current as of the date of this report, and will be based upon the project scope as developed and approved by Council. An assurance that the costs provided will not rise or fall due to changes to the project scope can therefore not be provided. This includes changes as a result of further design development, and/or any future variation of the cost of construction or materials. The future outcome may vary, and this variation may be material. Any party requiring opinion of probable costs for budgeting, quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

9.3. Opinion of Probable Costs

A summary of the Probable Costs for the five key intersections is provided in Table 9.1.

Table 9.1: Opinion of Probable Costs

Item	Intersection	Drawing Number	High-level cost estimate	High-level cost estimate with 40% contingency
1.0	Hayes Street / Goulburn Valley Highway (Wyndham Street)	V171580-01-P2	$1,422,600	$1,854,500
2.0	Hayes Street / Johnson Street intersection	V171580-02-P1	$229,200	$296,000
3.0	Midland Highway / Hoskin Street / Railway Parade / Thompson Street intersections	V171580-03-P1	$3,200,000	$4,171,000
4.0	Fryers Street / Railway Parade / Thompson Street intersection	V171580-09-P1	$1,823,000	$2,376,000
5A	Knight Street / Hawdon Street / Railway Parade / Andrew Fairley Avenue intersection (interim)	V171580-05-P1	$3,064,000	$3,994,000
5B	Knight Street / Hawdon Street / Railway Parade / Andrew Fairley Avenue intersection (ultimate)	V171580-07-P1	$4,381,000	$5,710,000

A. CONCEPT DESIGNS

A

PARK

NO STOPPING FOR 20m (PROPOSED)

NO STOPPING FOR 26m (PROPOSED)

NO STOPPING FOR 20m (PROPOSED)

INDENTED PARKING AND BICYCLE LANE DESIGN AS PER COUNCIL CONCEPT

GOULBURN VALLEY HIGHWAY

3.0 3.5 3.5 3.5 2.0 3.2 (E) 3.4 (E) 2.3 (E)

3.0

3.0

2.3 1.7 3.5 3.5 2.0 3.5 3.2 3.2 2.1

NO STOPPING FOR 20m (PROPOSED)

NO STOPPING FOR 26m (PROPOSED)

NO STOPPING FOR 20m (PROPOSED)

RESIDENTIAL

HAYES STREET

NO STOPPING FOR 20m (PROPOSED)

2.5 3.0 3.0 6.3 (E)

NO STOPPING FOR 20m (PROPOSED)

RESIDENTIAL

PROPOSED SHARED PATH

N

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

CONCEPT ONLY - NOT FOR CONSTRUCTION

PLOTTED BY : RanjuAbraham ON 17/02/2020 AT 10:30:00 PM

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P2	17.02.20	MINOR MODIFICATIONS	R.A.	A.D.	R.H.
P1	29.11.19	INITIAL ISSUE	R.A.	A.D.	R.H.

GENERAL NOTES

1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

3. DECLARED MAIN ROAD - GOULBURN VALLEY HIGHWAY - SPEED ZONE 60KM/H
LOCAL ROAD - HAYES STREET - SPEED ZONE 60KM/H

4. DESIGN VEHICLE - 12.5m SINGLE UNIT TRUCK

DESIGNED: R. ABRAHAM	DESIGN CHECK: -
DRAWN: R. ABRAHAM	DRAFTING CHECK: -
APPROVED BY: R. HUMPHREYS	DATE APPROVED FOR INITIAL ISSUE: 29 NOVEMBER 2019
SCALE A3 Hor. 0 5 10 1:500	CAD FILE NO. V171580-01-P2.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON CITY COUNCIL

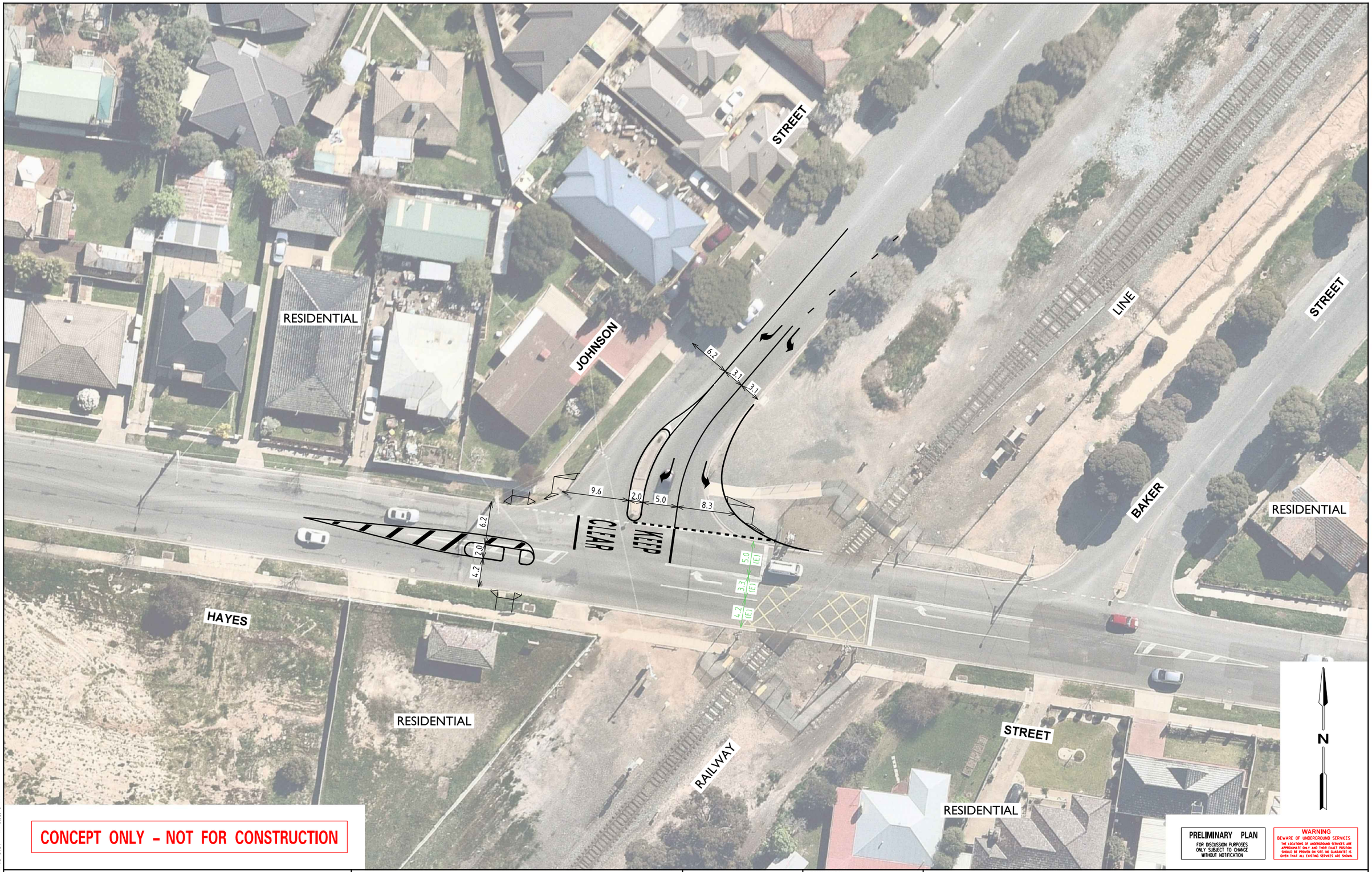
SHEPPARTON INNER EAST LINK ROAD

GOULBURN VALLEY HIGHWAY / HAYES STREET SHEPPARTON

CONCEPT LAYOUT

DRAWING NO. V171580-01

ISSUE P2



CONCEPT ONLY - NOT FOR CONSTRUCTION

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY. SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PLOTTED BY : RinjuAbraham ON 4/02/2020 AT 5:52:45 PM

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	29.11.19	INITIAL ISSUE	R.A.	A.D.	R.H.

GENERAL NOTES
1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

3. LOCAL ROAD - HAYES STREET - SPEED ZONE 60KM/H
LOCAL ROAD - JOHNSON STREET - SPEED ZONE 50KM/H

4. DESIGN VEHICLE - 12.5m BUS

DESIGNED: R. ABRAHAM	DESIGN CHECK: -
DRAWN: R. ABRAHAM	DRAFTING CHECK: -
APPROVED BY: R. HUMPHREYS	DATE APPROVED FOR INITIAL ISSUE: 29 NOVEMBER 2019
SCALE A3 Hor. 0 5 10 1:500	CAD FILE NO. V171580-02-P1.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON CITY COUNCIL

SHEPPARTON INNER EAST LINK ROAD

HAYES STREET / JOHNSON STREET SHEPPARTON

CONCEPT LAYOUT

DRAWING NO. V171580-02

ISSUE P1

CONCEPT ONLY - NOT FOR CONSTRUCTION

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY. SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PLOTTED BY : Rinju.Abraham ON 4/02/2020 AT 5:54:37 PM

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	29.11.19	INITIAL ISSUE	H.S.	A.D.	R.H.

GENERAL NOTES
1.ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

2.BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

3.DECLARED MAIN ROAD- MIDLAND HIGHWAY - SPEED ZONE 50KM/H
LOCAL ROAD- HOSKIN STREET - SPEED ZONE 50KM/H

4.DESIGN VEHICLE - 12.5m SINGLE UNIT TRUCK

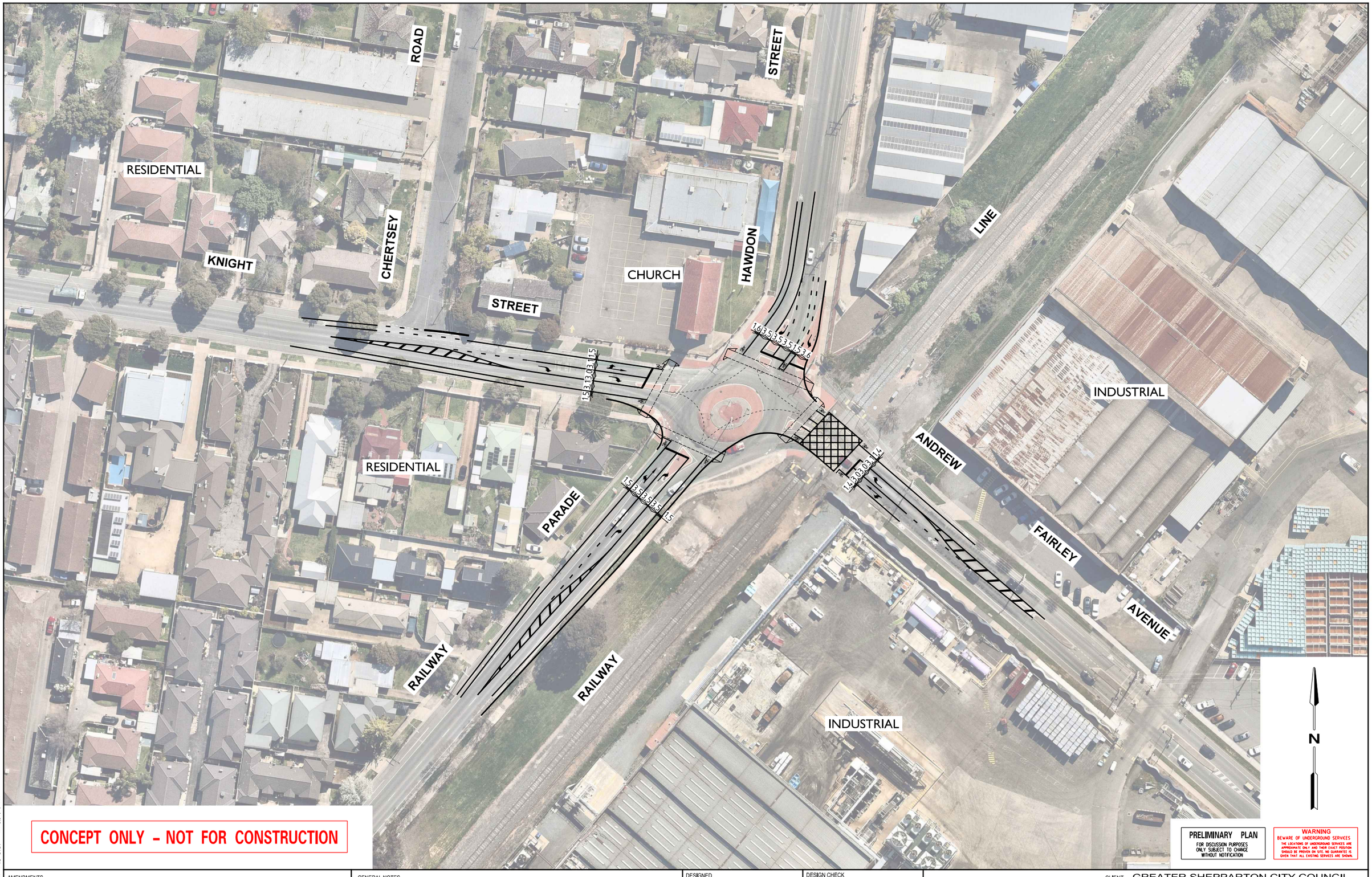
DESIGNED: H. STEVENSON	DESIGN CHECK: -
DRAWN: H. STEVENSON	DRAFTING CHECK: -
APPROVED BY: R. HUMPREYS	DATE APPROVED FOR INITIAL ISSUE: 29 NOVEMBER 2019
SCALE A3 Hor. 0 10 20 1:1000	CAD FILE NO. V171580-03-P1.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON COUNCIL

SHEPPARTON INNER EAST LINK ROAD
MIDLAND HIGHWAY / HOSKIN STREET / RAILWAY PARADE / THOMPSON STREET
SHEPPARTON
CONCEPT LAYOUT

DRAWING NO. V171580-03
ISSUE P1



CONCEPT ONLY - NOT FOR CONSTRUCTION

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

ON 4/02/2020 AT 5:57:46 PM
PLOTTED BY : Rinju.Abraham

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	29.11.19	INITIAL ISSUE	R.A.	A.D.	R.H.

GENERAL NOTES
1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE.
GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED.
PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

3. LOCAL ROAD - KNIGHT ST - SPEED ZONE 60KM/H
LOCAL ROAD - HAWDON ST - SPEED ZONE 60KM/H
LOCAL ROAD - RAILWAY PDE - SPEED ZONE 60KM/H
LOCAL ROAD - ANDREW FAIRLEY AVE - SPEED ZONE 50KM/H
4. DESIGN VEHICLE - 12.5m BUS

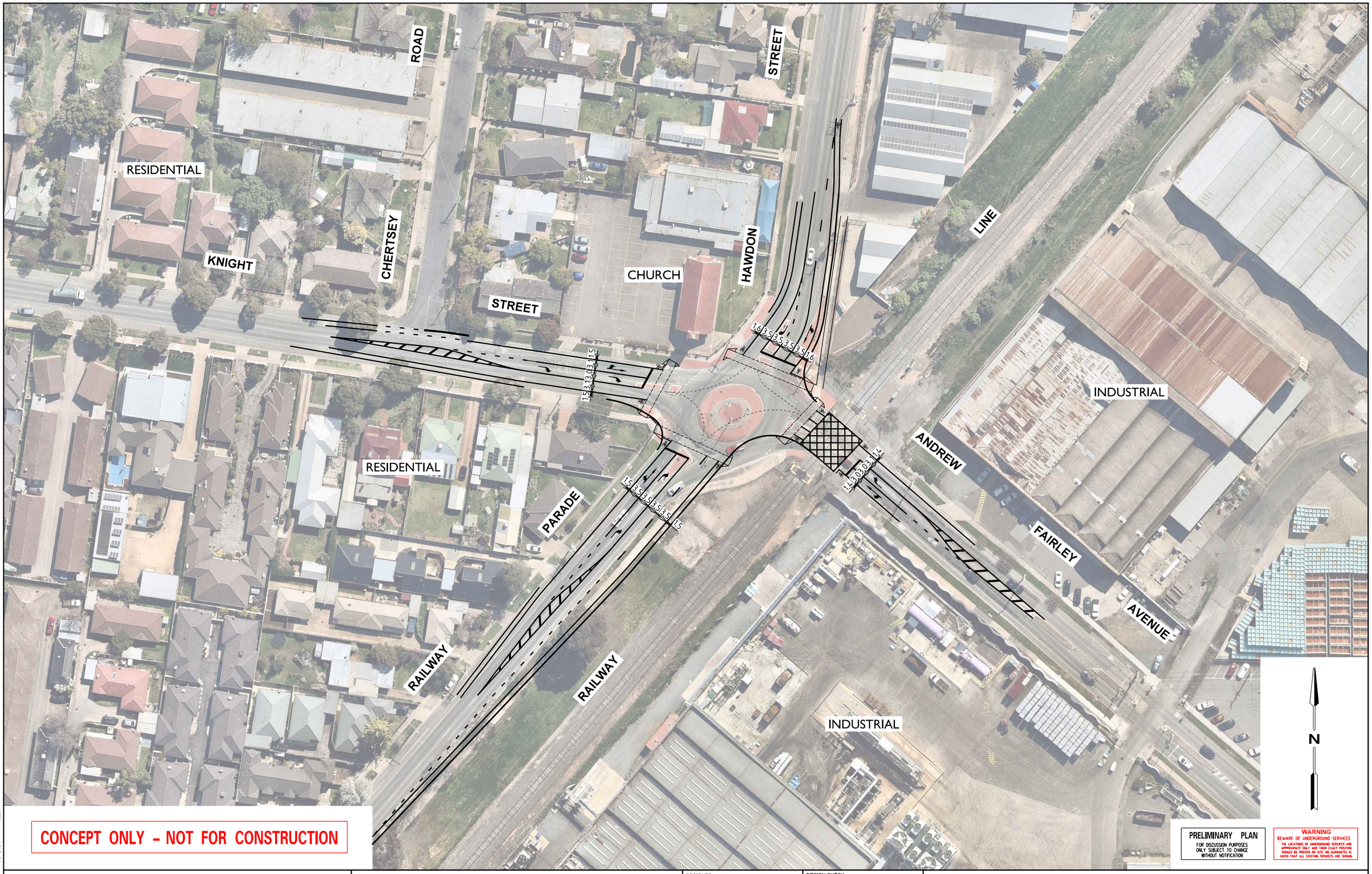
DESIGNED R. ABRAHAM	DESIGN CHECK -
DRAWN R. ABRAHAM	DRAFTING CHECK -
APPROVED BY R. HUMPHREYS	DATE APPROVED FOR INITIAL ISSUE 29 NOVEMBER 2019
SCALE A3 Hor. 0 10 20 1:1000	CAD FILE NO. V171580-05-P1.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON CITY COUNCIL

SHEPPARTON INNER EAST LINK ROAD
KNIGHT ST / HAWDON ST / RAILWAY PDE / ANDREW FAIRLEY AVE
SHEPPARTON
CONCEPT LAYOUT

DRAWING NO. V171580-05
ISSUE P1



CONCEPT ONLY - NOT FOR CONSTRUCTION

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PLOTTED BY : Rinju.Abraham ON 14/02/2020 AT 10:22:09 AM

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	14.02.20	INITIAL ISSUE	R.A.	A.D.	R.H.

GENERAL NOTES
1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

3. LOCAL ROAD - KNIGHT ST - SPEED ZONE 60KM/H
LOCAL ROAD - HAWDON ST - SPEED ZONE 60KM/H
LOCAL ROAD - RAILWAY PDE - SPEED ZONE 60KM/H
LOCAL ROAD - ANDREW FAIRLEY AVE - SPEED ZONE 50KM/H
4. DESIGN VEHICLE - 12.5m BUS

DESIGNED: R. ABRAHAM	DESIGN CHECK: -
DRAWN: R. ABRAHAM	DRAFTING CHECK: -
APPROVED BY: R. HUMPHREYS	DATE APPROVED FOR INITIAL ISSUE: 14 FEBRUARY 2020
SCALE A3 Hor. 0 10 20 1:1000	CAD FILE NO. V171580-07-P1.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON CITY COUNCIL

SHEPPARTON INNER EAST LINK ROAD
KNIGHT ST / HAWDON ST / RAILWAY PDE / ANDREW FAIRLEY AVE - OPTION
SHEPPARTON
CONCEPT LAYOUT

DRAWING NO. V171580-07
ISSUE P1

CONCEPT ONLY - NOT FOR CONSTRUCTION

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PLOTTED BY : brendanklinko ON 4/03/2020 AT 5:50:21 PM

AMENDMENTS

ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	04.03.20	INITIAL ISSUE	B.K.	A.D.	R.H.

GENERAL NOTES

1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
3. LOCAL ROAD- FRYERS STREET - SPEED ZONE 50KM/H
   LOCAL ROAD- RAILWAY PARADE - SPEED ZONE 60KM/H
   LOCAL ROAD - THOMPSON STREET- SPEED ZONE 60KM/H
4. DESIGN VEHICLE - 12.5m SINGLE UNIT TRUCK

DESIGNED: R. ABRAHAM / B. KLINKO	DESIGN CHECK: -
DRAWN: R. ABRAHAM / B. KLINKO	DRAFTING CHECK: -
APPROVED BY: R. HUMPREYS	DATE APPROVED FOR INITIAL ISSUE: 04 MARCH 2020
SCALE A3 Hor. 0 10 20 1:1000	CAD FILE NO. V171580-09-P1.dgn

GTA consultants
www.gta.com.au
Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

CLIENT GREATER SHEPPARTON CITY COUNCIL

SHEPPARTON INNER EAST LINK ROAD
FRYERS ST / RAILWAY PARADE / THOMPSON ST SHEPPARTON
CONCEPT LAYOUT - DOUBLE ROUNDABOUT OPTION

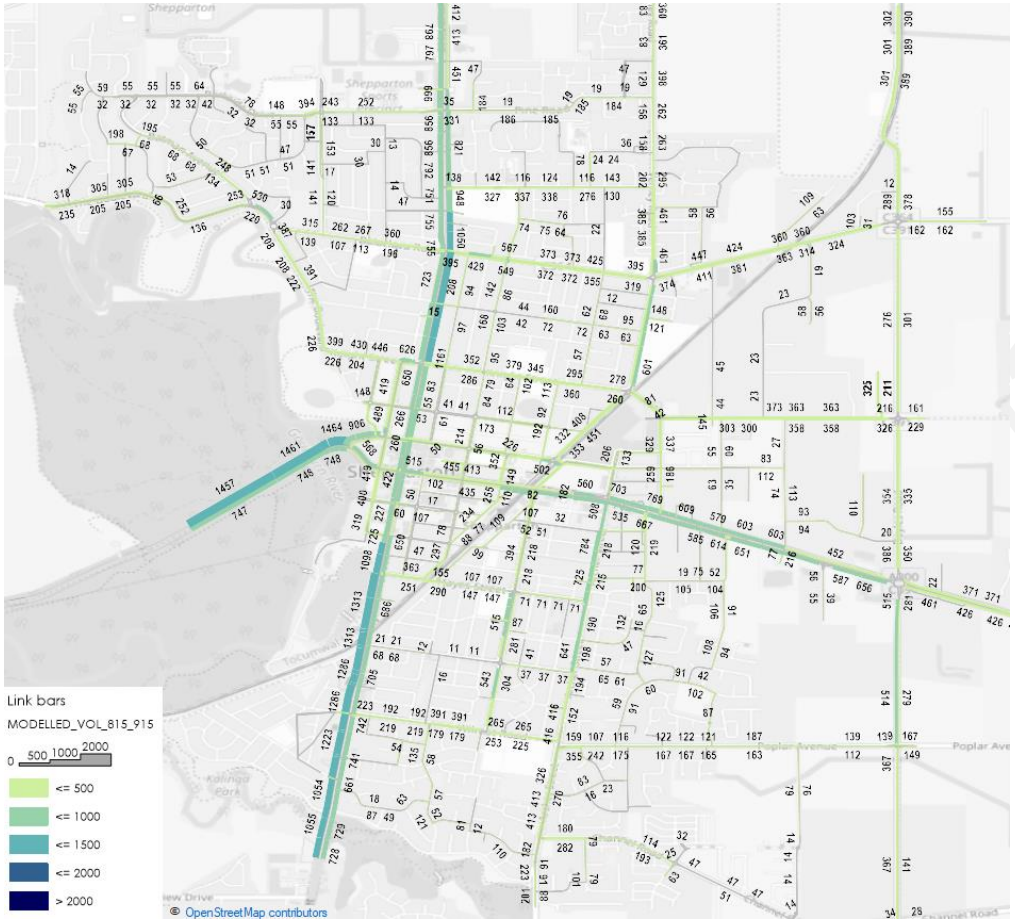
DRAWING NO. V171580-09
ISSUE P1

B.VISUM MODEL OUTPUTS

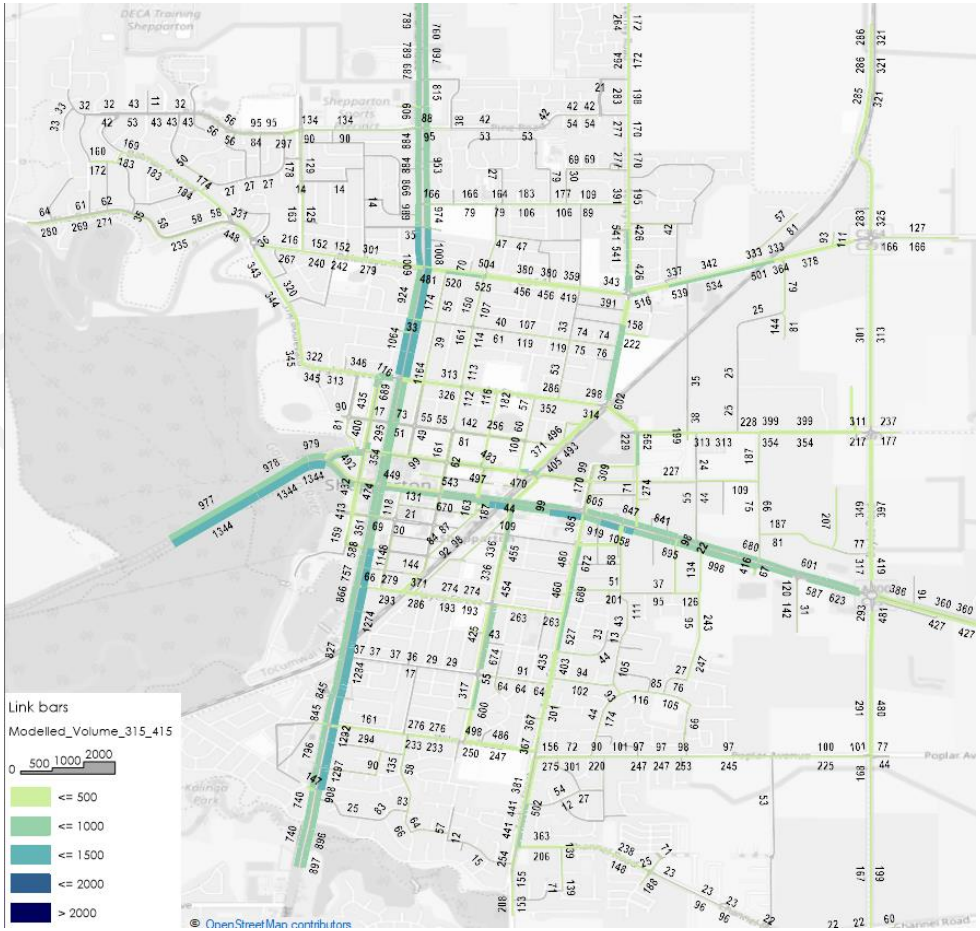
B

NETWORK VOLUMES – EXISTING CONDITIONS

Existing Conditions 8:15AM – 9:15AM

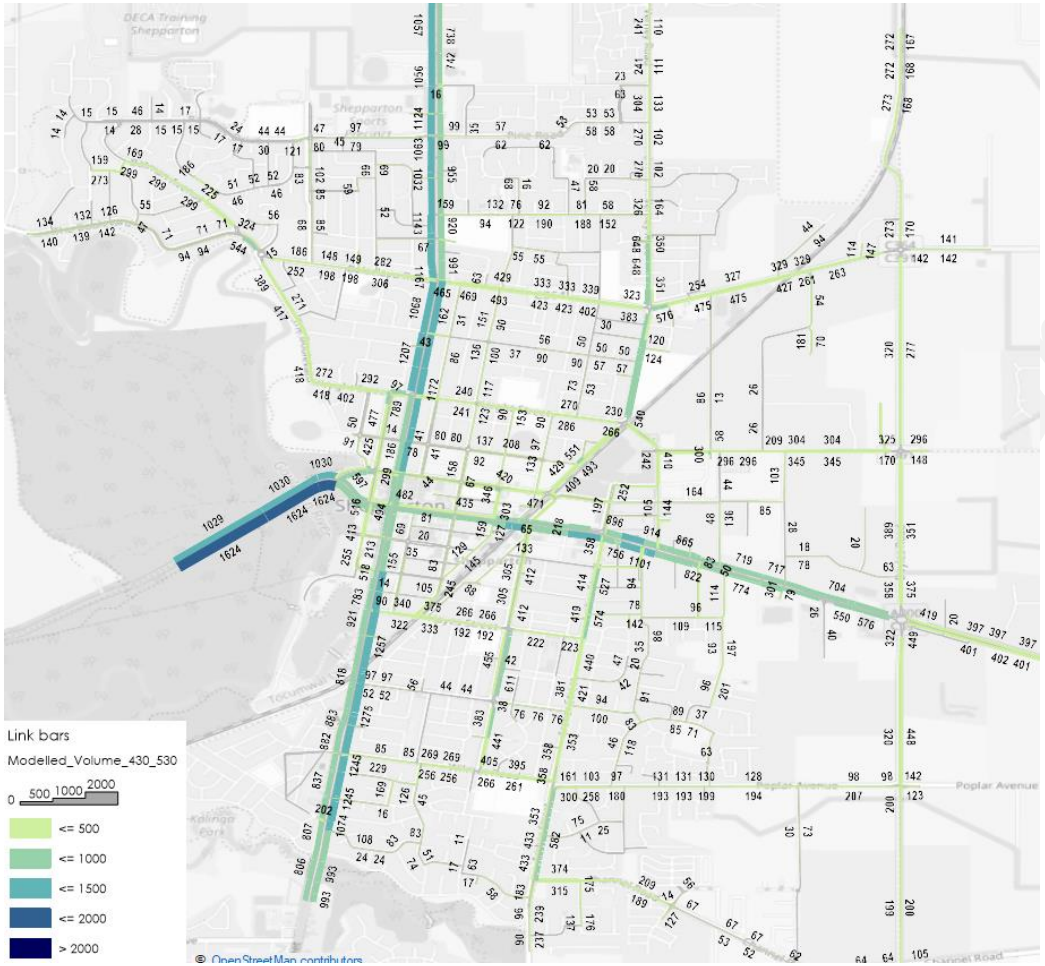


Existing Conditions 3:15PM – 4:15PM



NETWORK VOLUMES – EXISTING CONDITIONS

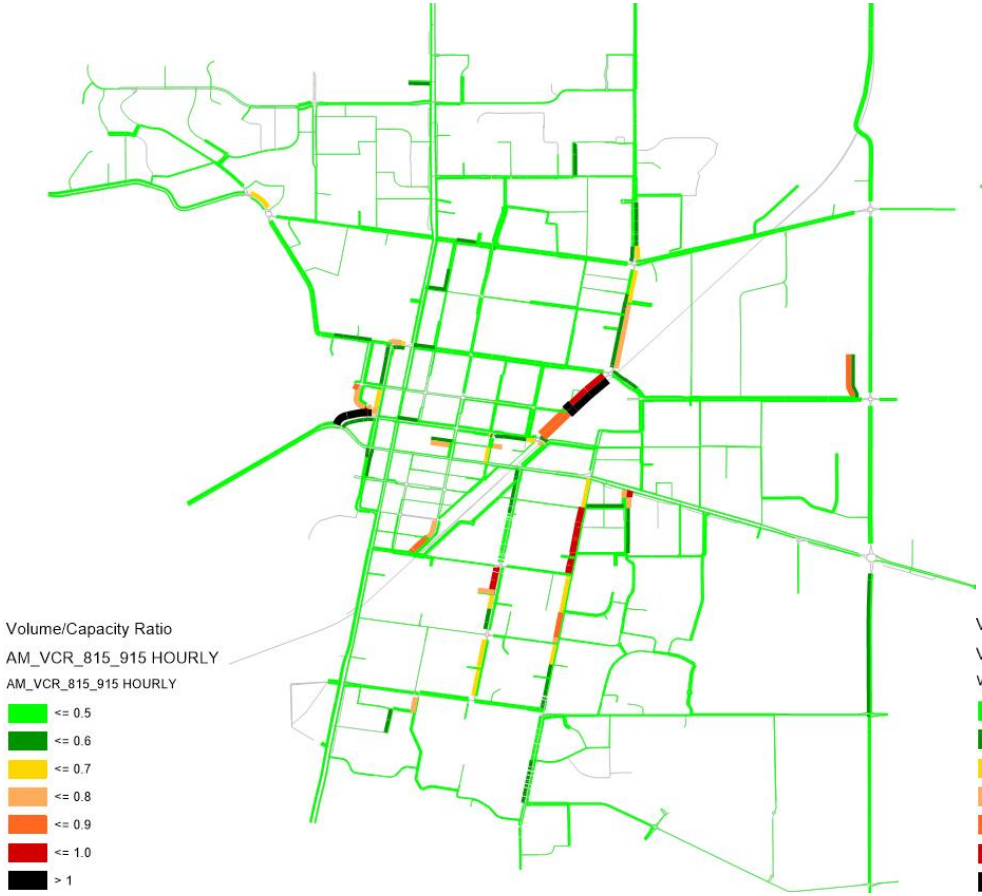
Existing Conditions 4:30PM – 5:30PM



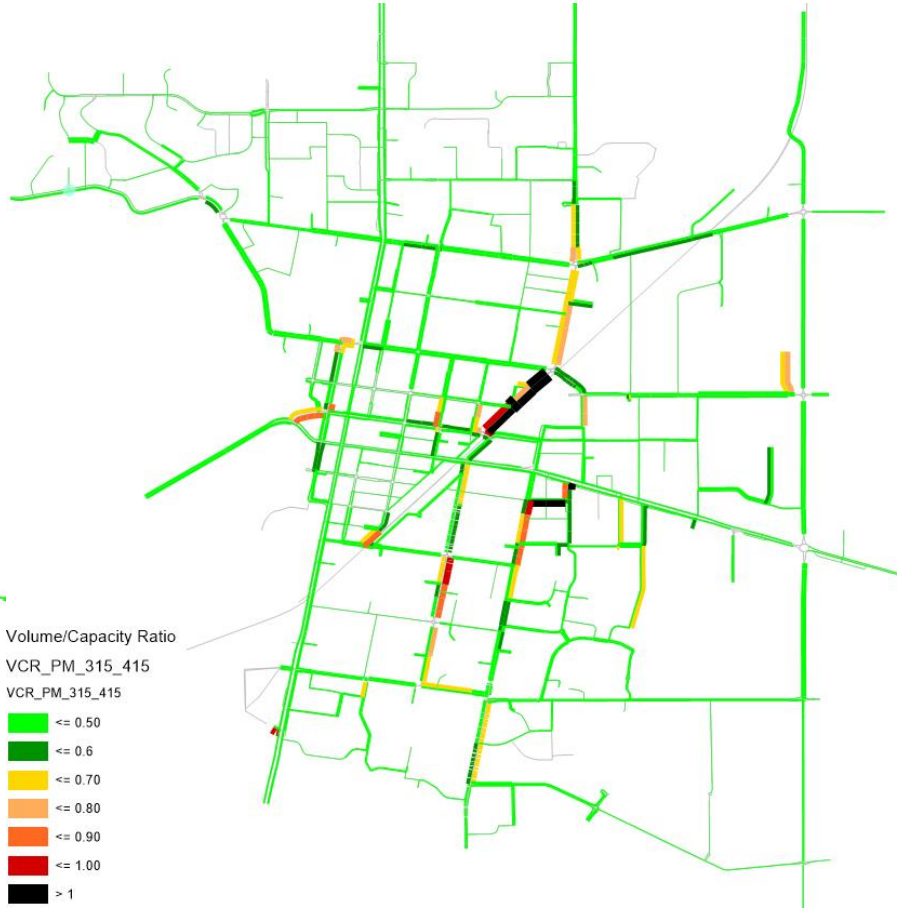
ry Only

VOLUME/CAPACITY RATIO – EXISTING CONDITIONS

Existing Conditions 8:15AM – 9:15AM

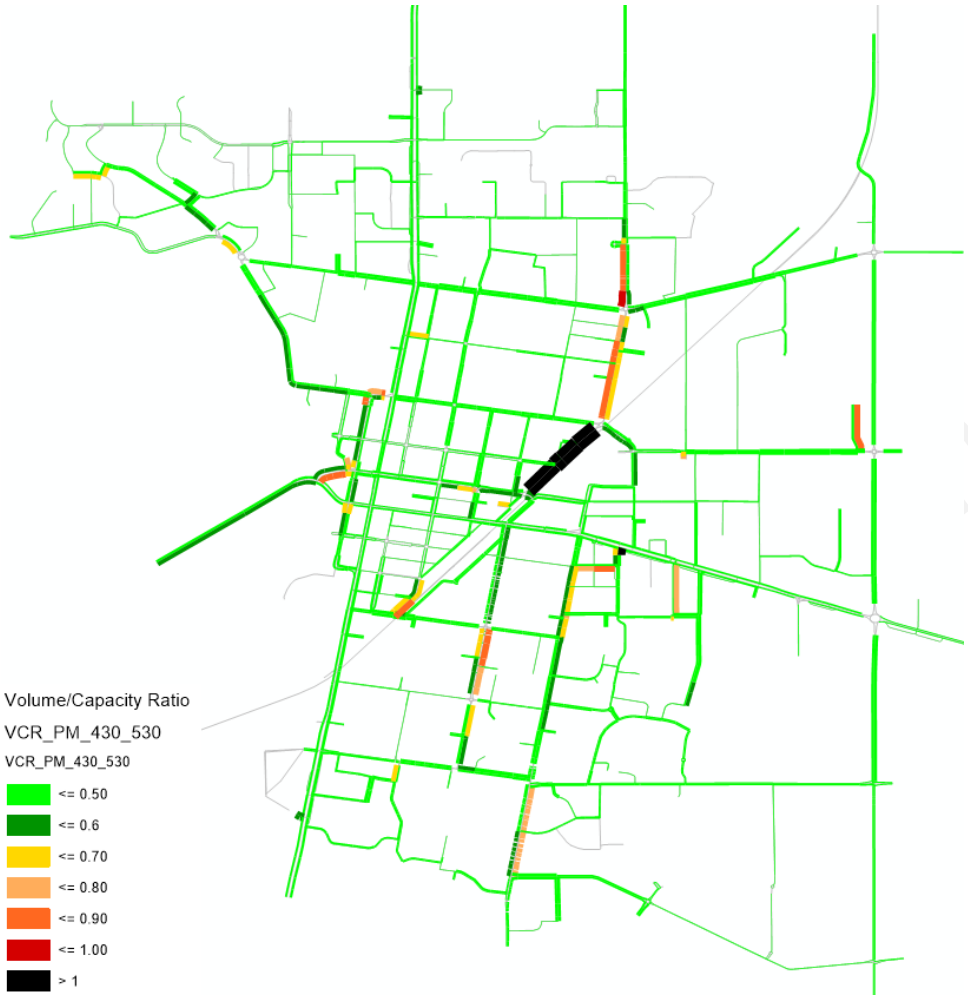


Existing Conditions 3:15PM – 4:15PM



VOLUME/CAPACITY RATIO – EXISTING CONDITIONS

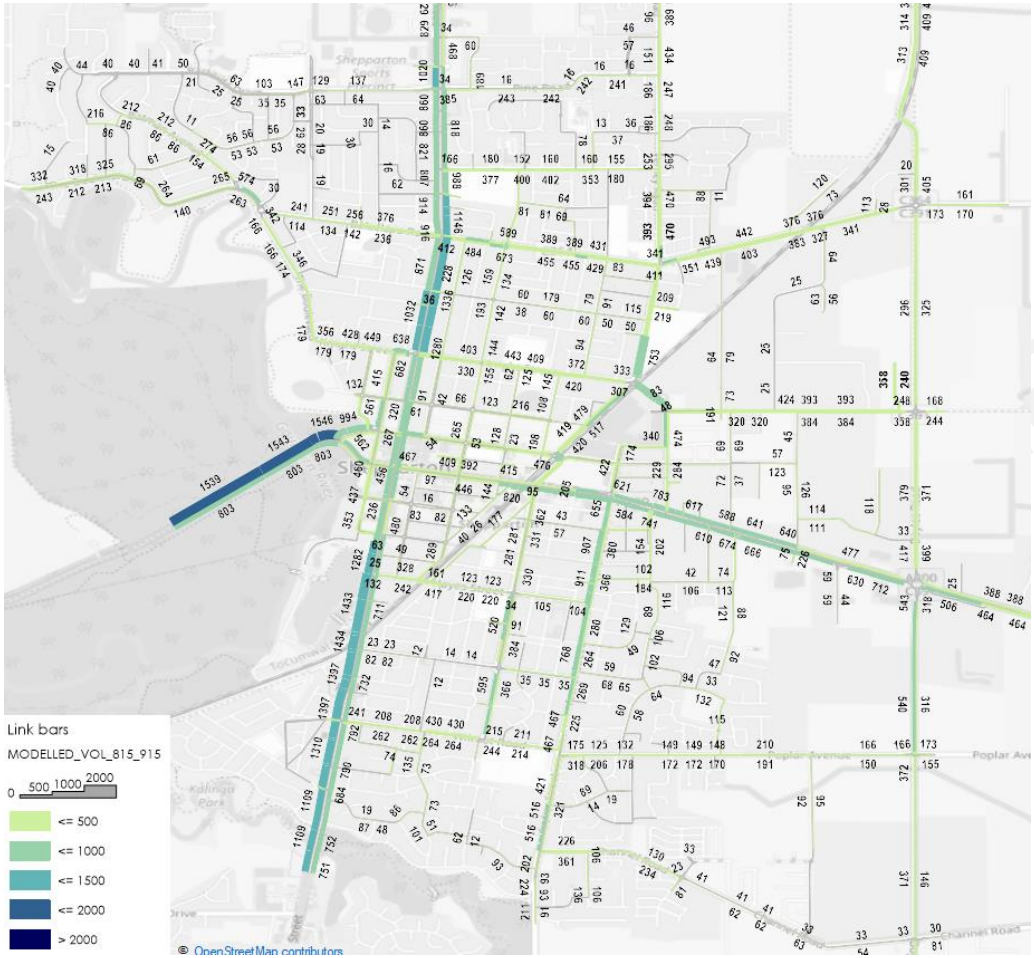
Existing Conditions 4:30PM – 5:30PM



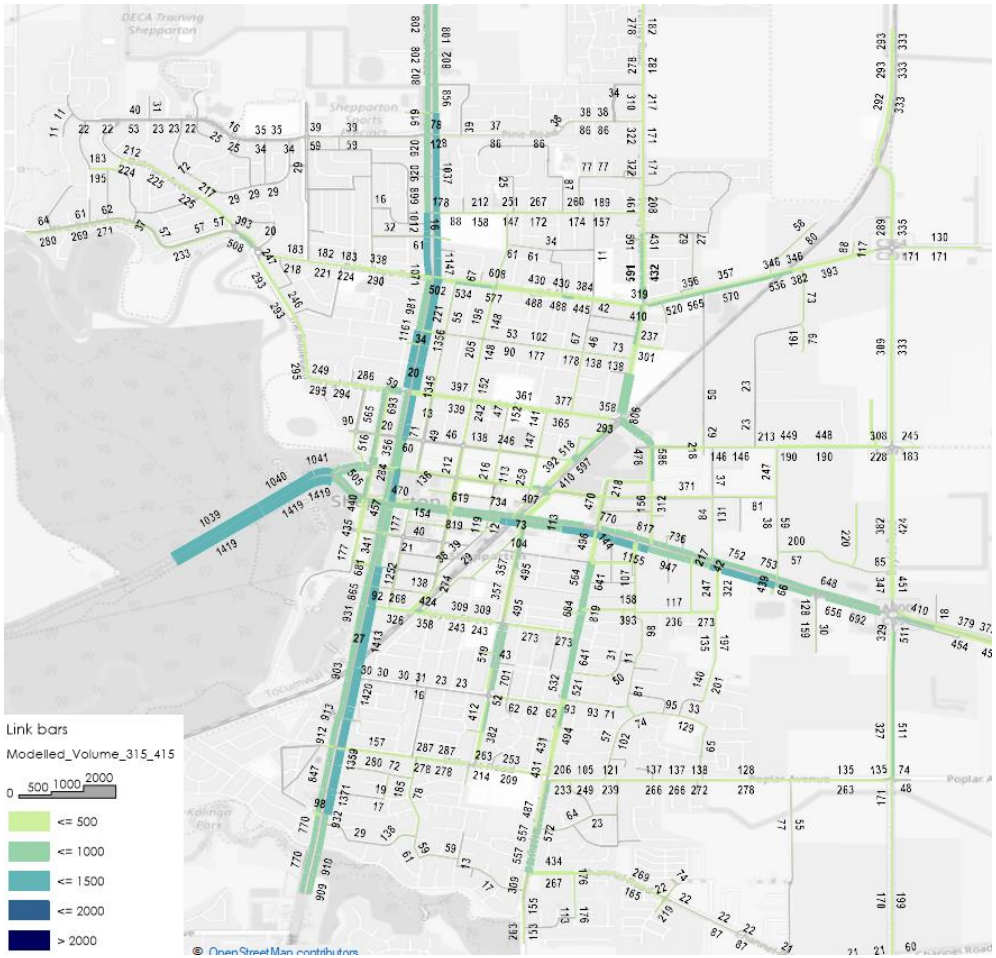
ary Only

NETWORK VOLUMES – 2022 FUTURE DO MINIMUM

2022 Future Do Minimum 8:15AM – 9:15AM

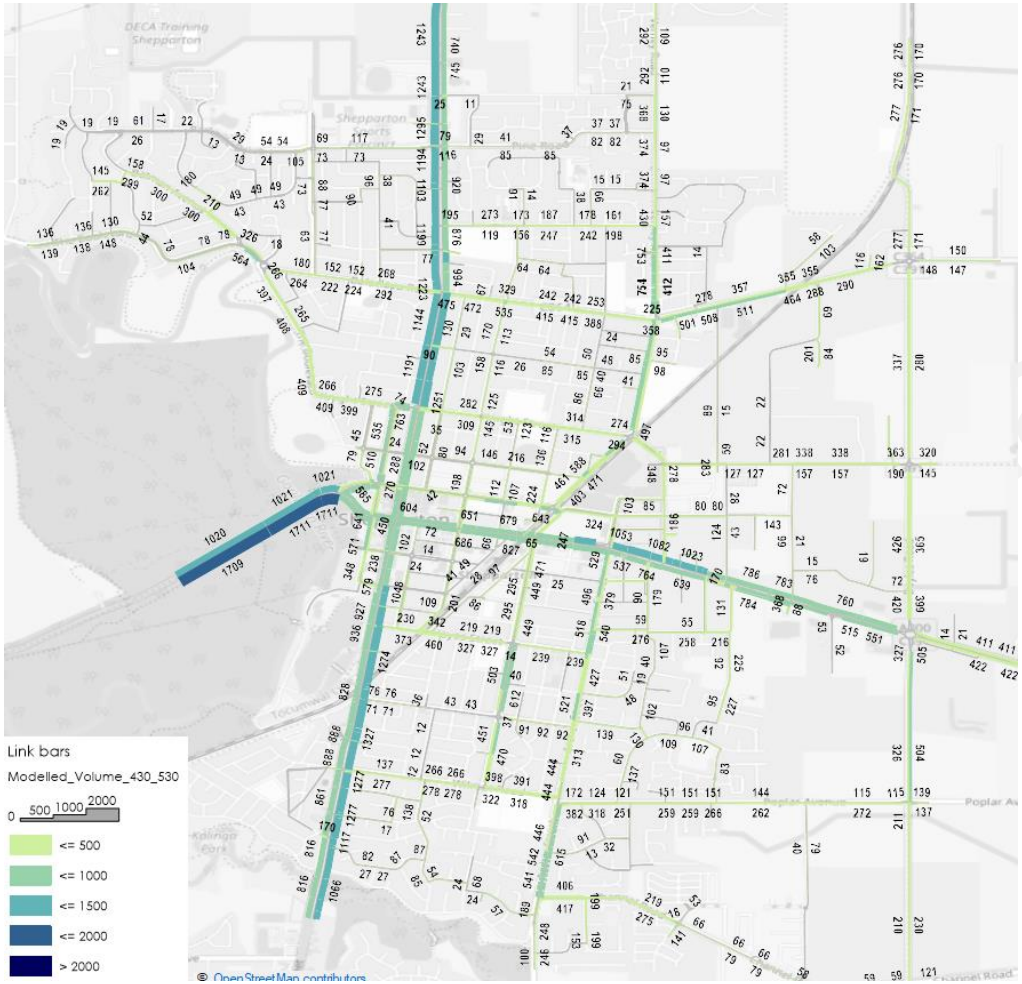


2022 Future Do Minimum 3:15PM – 4:15PM



NETWORK VOLUMES – 2022 FUTURE DO MINIMUM

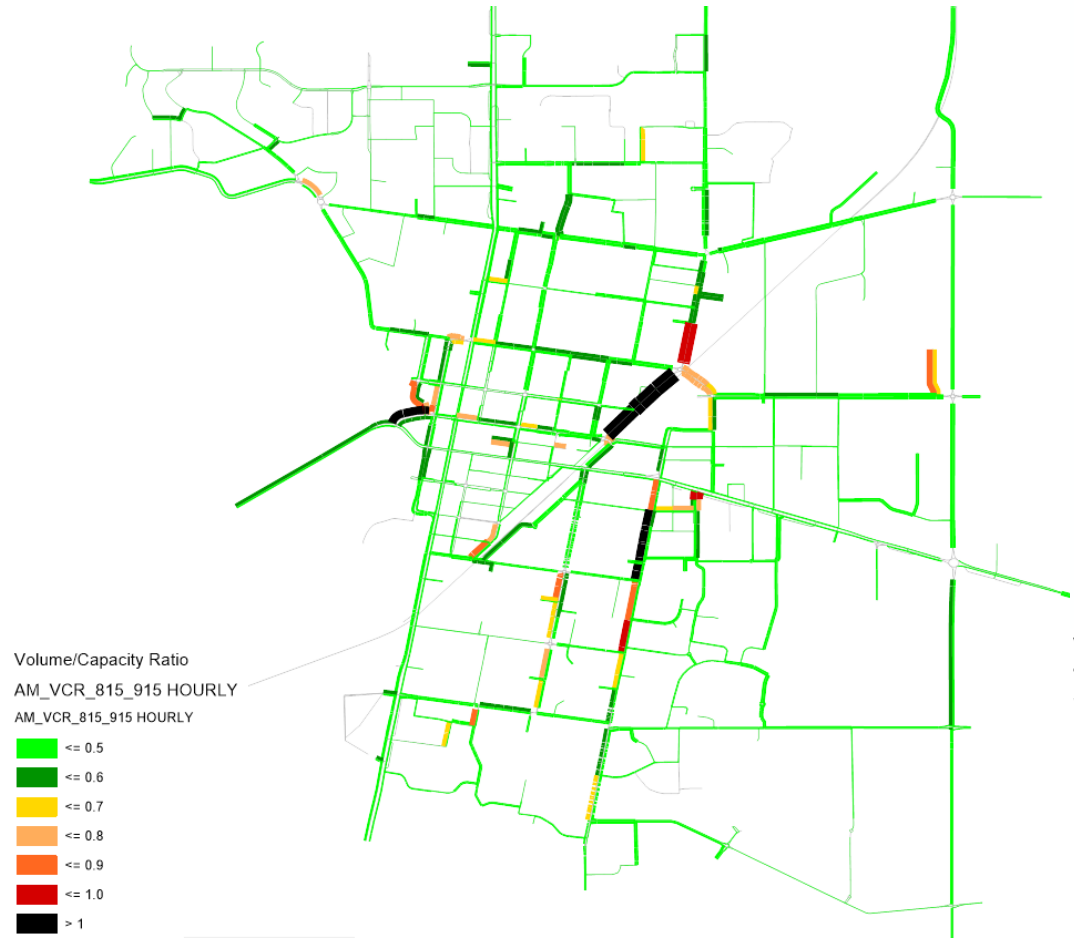
2022 Future Do Minimum 4:30PM – 5:30PM



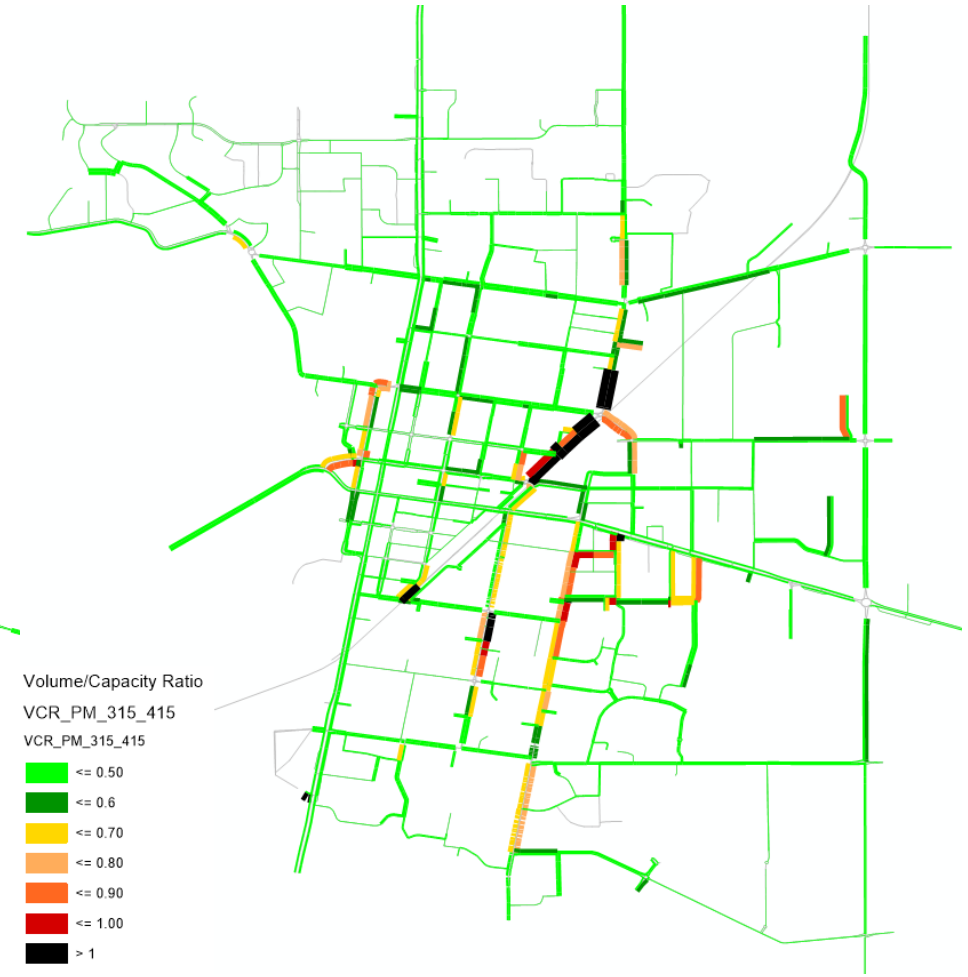
Preliminary Only

VOLUME/CAPACITY RATIO - 2022 FUTURE DO MINIMUM

2022 Future Do Minimum 8:15AM – 9:15AM

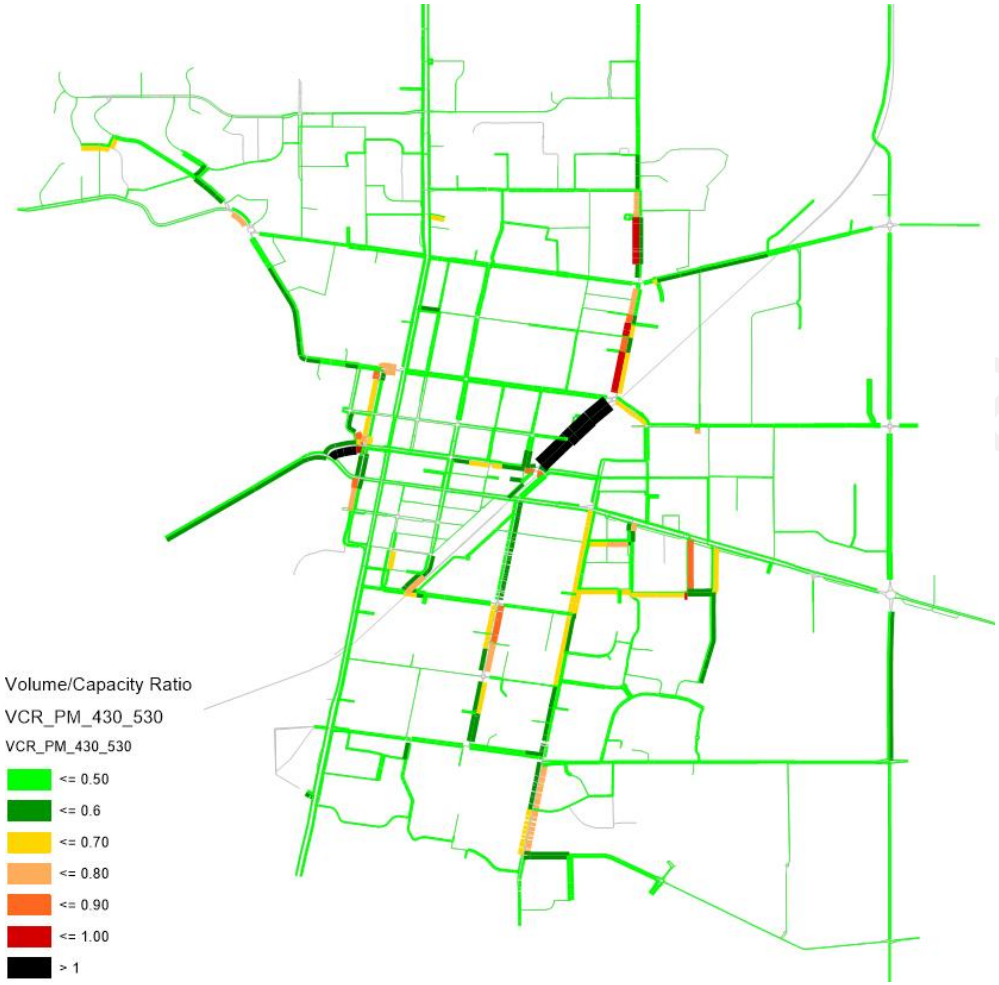


2022 Future Do Minimum 3:15PM – 4:15PM



VOLUME/CAPACITY RATIO – 2022 FUTURE DO MINIMUM

2022 Future Do Minimum 4:30PM – 5:30PM

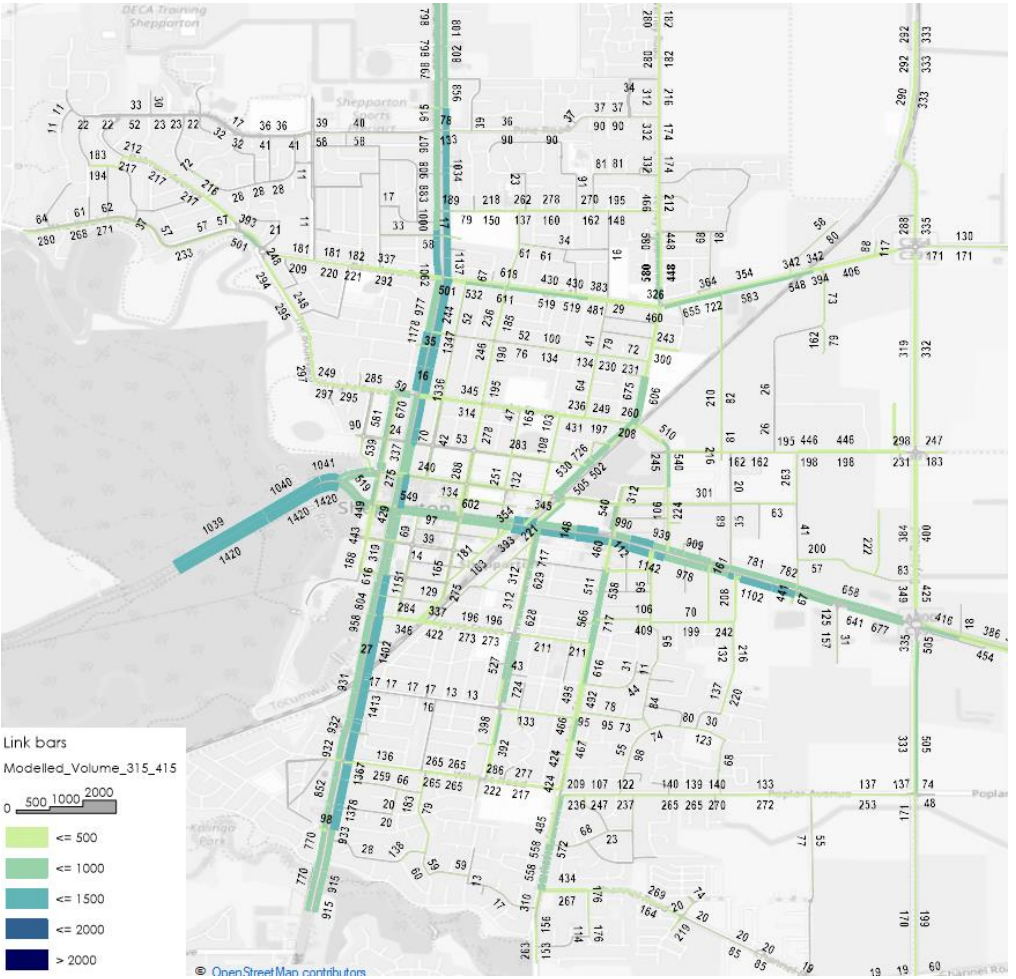


ary Only

NETWORK VOLUMES – 2022 FUTURE MITIGATIONS

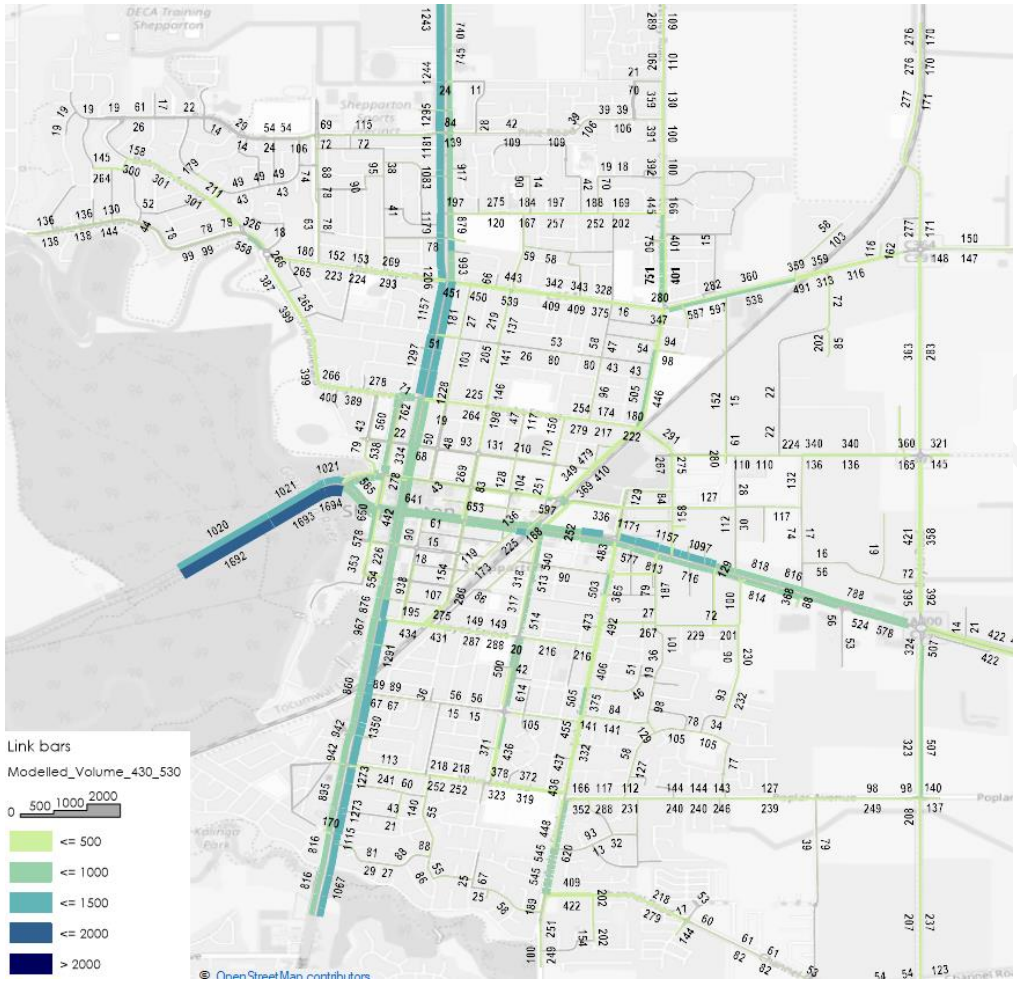
2022 Future Mitigations 8:15AM – 9:15AM

2022 Future Mitigations 3:15PM – 4:15PM



NETWORK VOLUMES – 2022 FUTURE MITIGATIONS

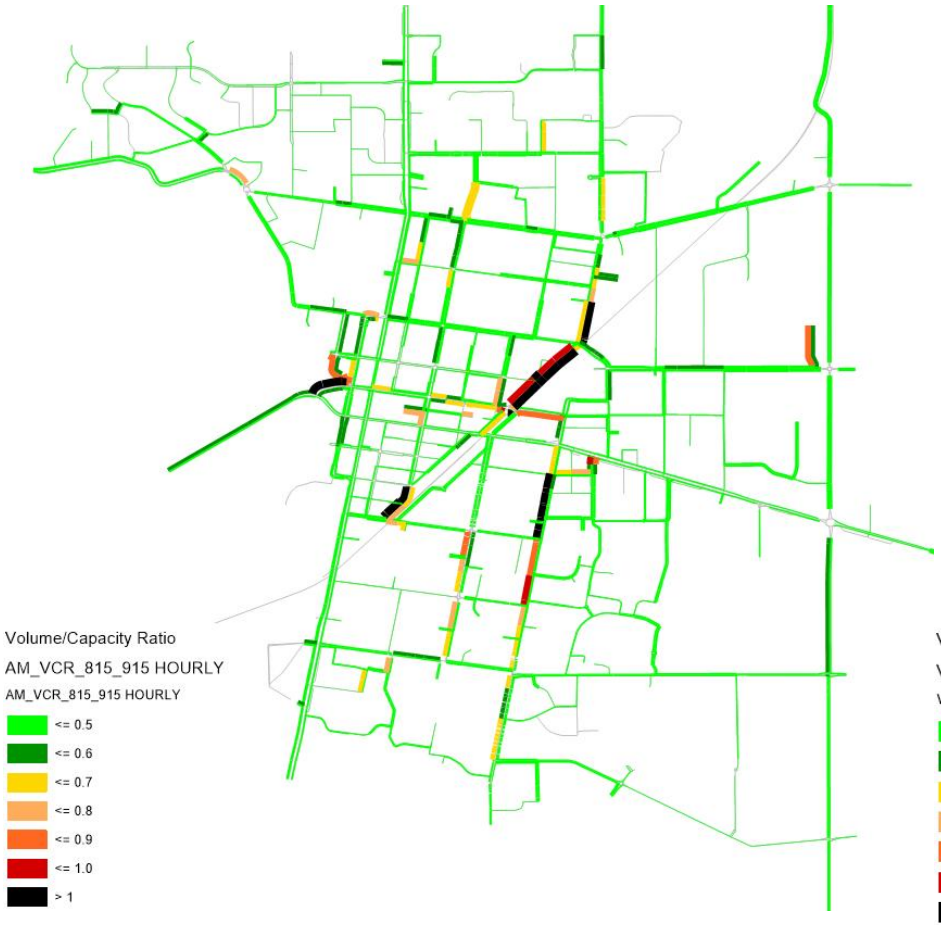
2022 Future Mitigations 4:30PM – 5:30PM



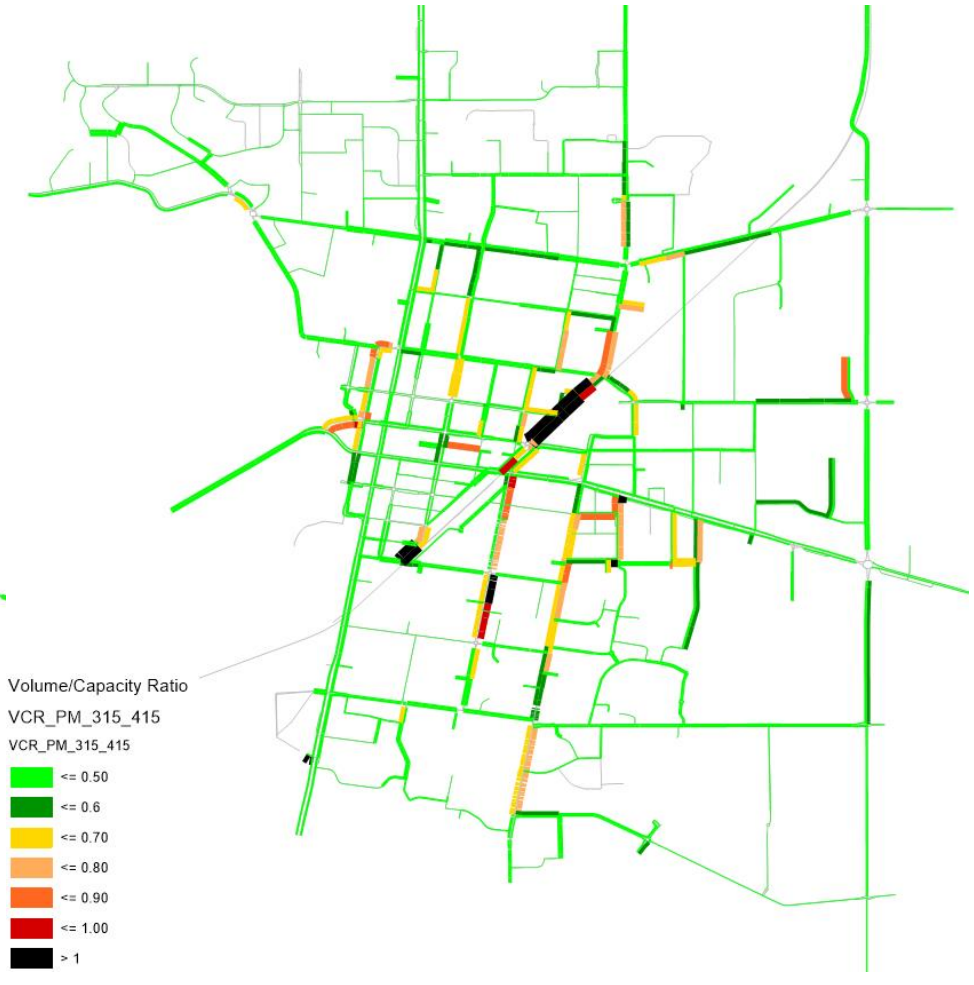
Preliminary Only

VOLUME/CAPACITY RATIO - 2022 FUTURE MITIGATIONS

2022 Future Mitigations 8:15AM – 9:15AM

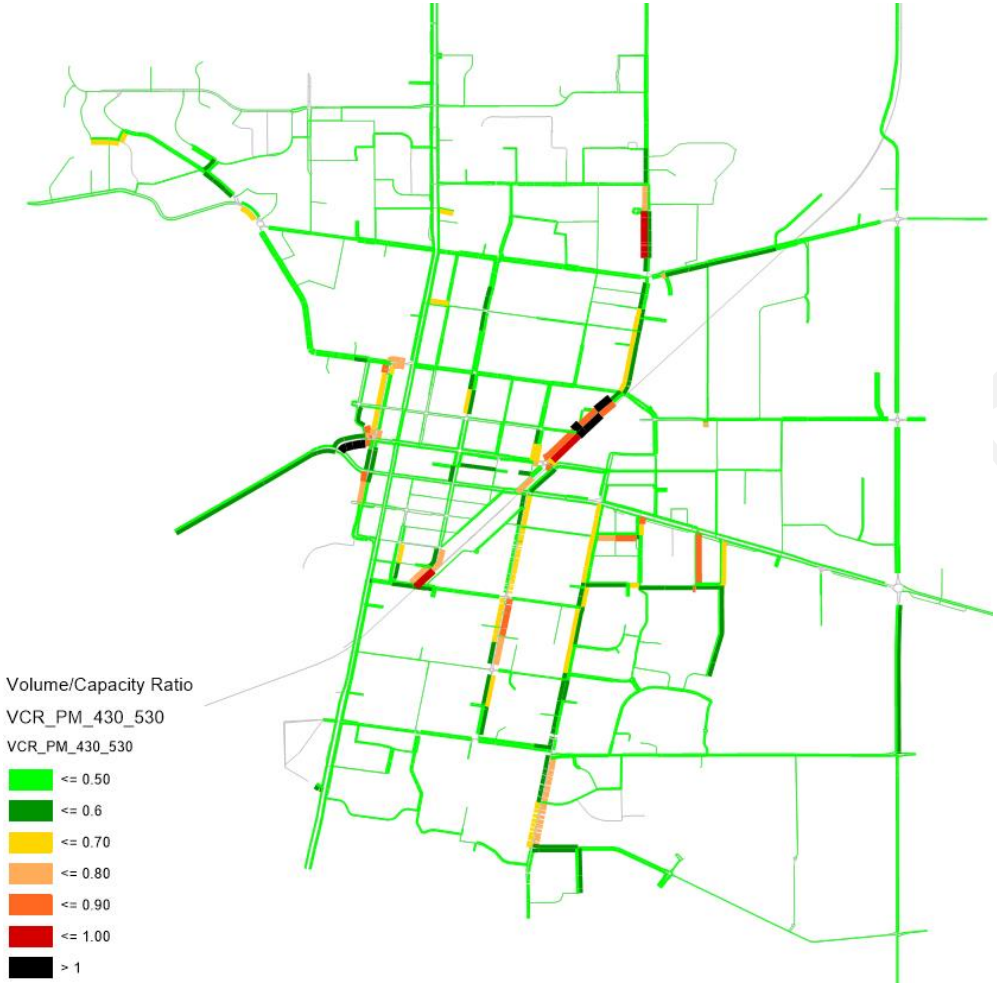


2022 Future Mitigations 3:15PM – 4:15PM



VOLUME/CAPACITY RATIO - 2022 FUTURE MITIGATIONS

2022 Future Mitigations 4:30PM – 5:30PM



ary Only

C. SIDRA INTERSECTION OUTPUTS

C

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - AM

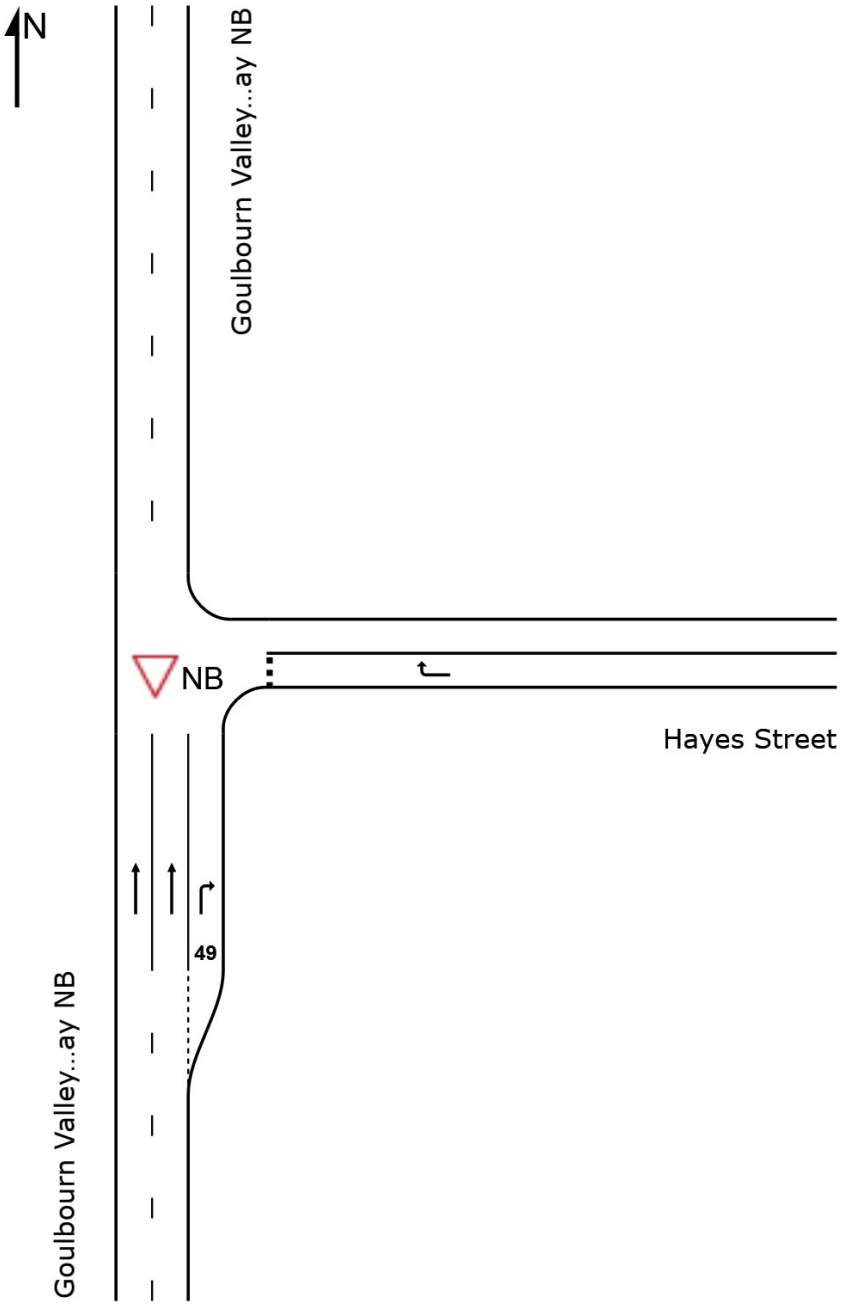
Template: GTA site layout and movement summary

Site: NB [1A. Goulbourn Valley Highway NB / Hayes]

Network: 23 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: AM
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulbourn Valley Highway NB														
2	T1	1307	5.0	1307	5.0	0.343	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	265	5.0	265	5.0	0.147	5.8	LOS A	1.6	11.9	0.00	0.63	0.00	50.5
Approach		1573	5.0	1573	5.0	0.343	1.0	NA	1.6	11.9	0.00	0.11	0.00	58.9
East: Hayes Street														
6	R2	43	5.0	43	5.0	0.226	22.3	LOS C	0.7	5.5	0.88	0.96	0.95	33.1
Approach		43	5.0	43	5.0	0.226	22.3	LOS C	0.7	5.5	0.88	0.96	0.95	33.1
All Vehicles		1616	5.0	1616	5.0	0.343	1.6	NA	1.6	11.9	0.02	0.13	0.03	58.2

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).

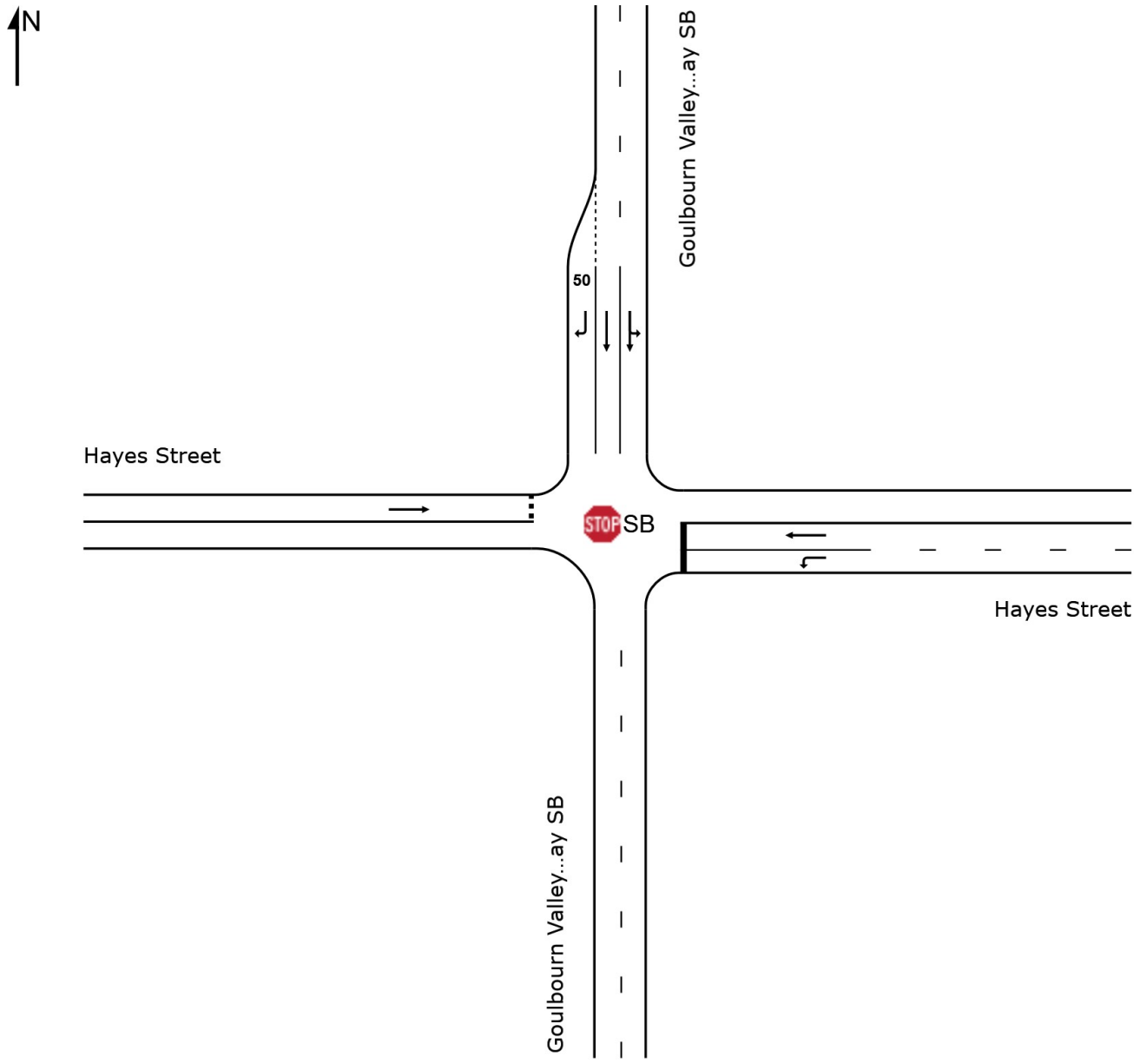
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: SB [1B. Goulbourn Valley Highway SB / Hayes]

Network: 23 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: AM
Stop (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
4	L2	97	5.0	97	5.0	0.094	9.6	LOS A	0.4	2.7	0.40	0.89	0.40	48.8
5	T1	42	5.0	42	5.0	0.105	15.2	LOS C	0.4	2.7	0.67	1.00	0.67	32.2

Approach		139	5.0	139	5.0	0.105	11.3	LOS B	0.4	2.7	0.48	0.92	0.48	45.7
North: Goulbourn Valley Highway SB														
7	L2	89	5.0	89	5.0	0.205	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	55.4
8	T1	676	5.0	676	5.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.4
9	R2	1	5.0	1	5.0	0.001	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		766	5.0	766	5.0	0.205	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
West: Hayes Street														
11	T1	265	5.0	265	5.0	0.532	12.3	LOS B	1.7	12.4	0.78	1.02	1.27	31.7
Approach		265	5.0	265	5.0	0.532	12.3	LOS B	1.7	12.4	0.78	1.02	1.27	31.7
All Vehicles		1171	5.0	1171	5.0	0.532	4.6	NA	1.7	12.4	0.23	0.39	0.34	53.9

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - AM

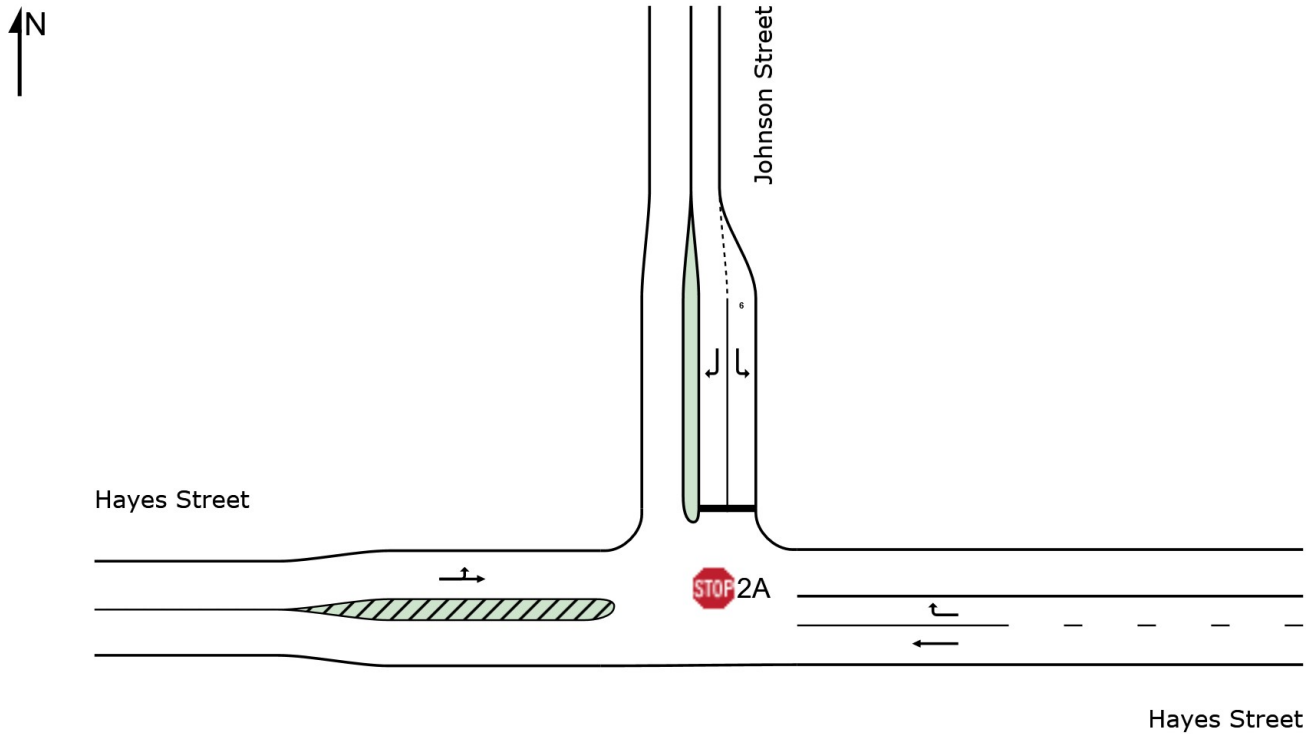
Template: GTA site layout and movement summary

Site: 2A [2A. Hayes Street/Johnson Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Hayes Street														
5	T1	218	5.0	218	5.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	231	5.0	231	5.0	0.186	6.2	LOS A	0.9	6.4	0.46	0.65	0.46	48.5
Approach		448	5.0	448	5.0	0.186	3.2	NA	0.9	6.4	0.24	0.33	0.24	52.0
North: Johnson Street														
7	L2	117	5.0	117	5.0	0.103	9.2	LOS A	0.4	3.0	0.33	0.88	0.33	47.4
9	R2	37	5.0	37	5.0	0.096	16.0	LOS C	0.3	2.5	0.66	1.00	0.66	43.8
Approach		154	5.0	154	5.0	0.103	10.8	LOS B	0.4	3.0	0.41	0.91	0.41	46.2
West: Hayes Street														
10	L2	142	5.0	142	5.0	0.172	5.6	LOS A	0.0	0.0	0.00	0.24	0.00	54.9
11	T1	203	5.0	203	5.0	0.172	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	52.4
Approach		345	5.0	345	5.0	0.172	2.3	NA	0.0	0.0	0.00	0.24	0.00	54.1

All Vehicles	947	5.0	947	5.0	0.186	4.1	NA	0.9	6.4	0.18	0.39	0.18	51.4

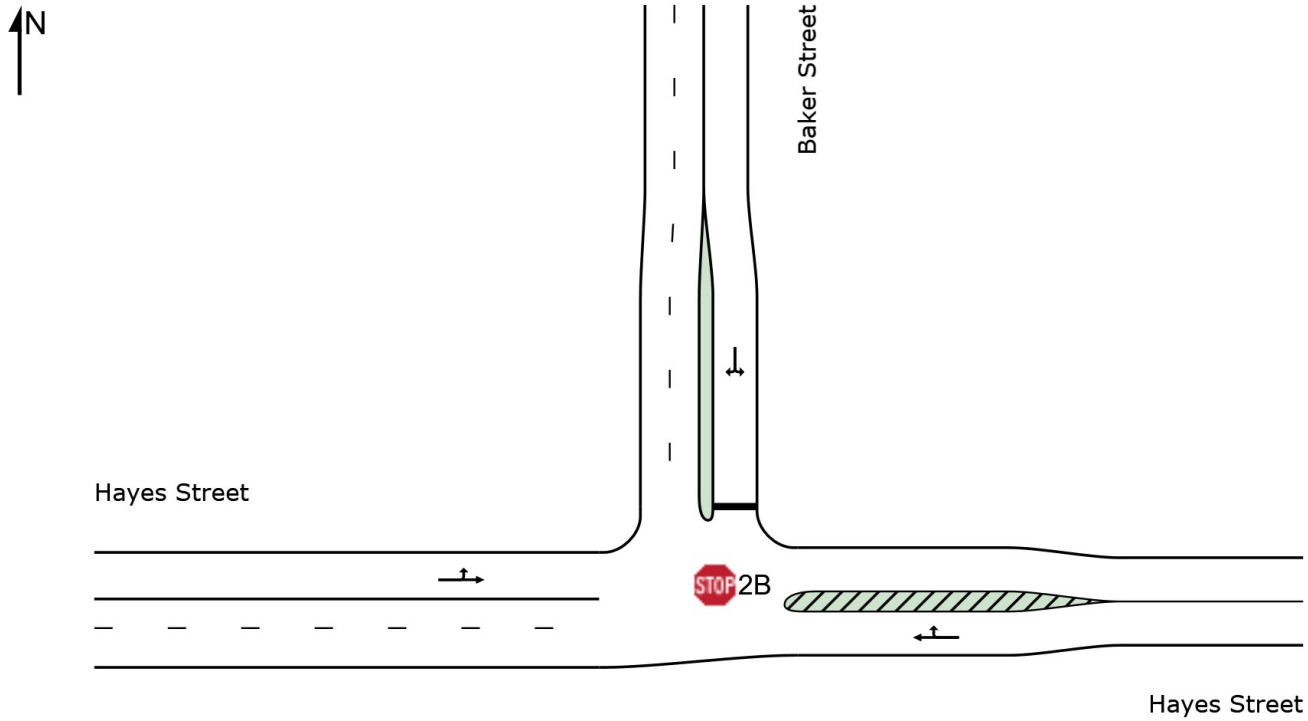
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 2B [2B. Hayes Street/Baker Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	364	5.0	364	5.0	0.239	0.4	LOS A	0.7	5.3	0.20	0.11	0.20	56.7
6	R2	75	5.0	75	5.0	0.239	7.1	LOS A	0.7	5.3	0.20	0.11	0.20	56.3
Approach		439	5.0	439	5.0	0.239	1.6	NA	0.7	5.3	0.20	0.11	0.20	56.6
North: Baker Street														
7	L2	6	5.0	6	5.0	0.173	8.9	LOS A	0.6	4.2	0.55	0.99	0.55	48.9
9	R2	84	5.0	84	5.0	0.173	13.5	LOS B	0.6	4.2	0.55	0.99	0.55	43.4
Approach		91	5.0	91	5.0	0.173	13.1	LOS B	0.6	4.2	0.55	0.99	0.55	44.1
West: Hayes Street														
10	L2	157	5.0	157	5.0	0.160	4.7	LOS A	0.0	0.0	0.00	0.28	0.00	53.4
11	T1	163	5.0	163	5.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	56.3
Approach		320	5.0	320	5.0	0.160	2.3	NA	0.0	0.0	0.00	0.28	0.00	54.8
All Vehicles		849	5.0	849	5.0	0.239	3.1	NA	0.7	5.3	0.16	0.27	0.16	54.4

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - AM

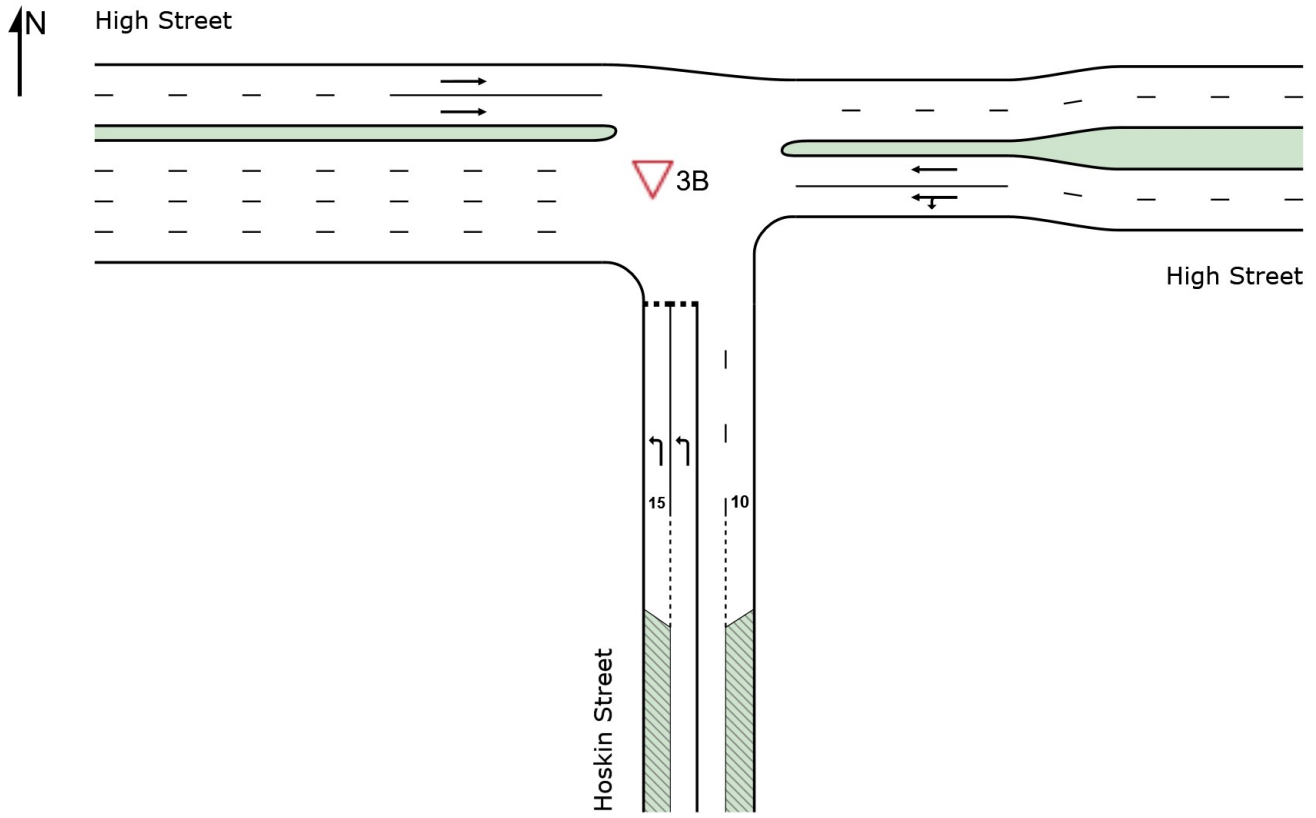
Template: GTA site layout and movement summary

Site: 3B [3B. High Street/Hoskins Street]

Network: 6 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskin Street														
1	L2	4	5.0	4	5.0	0.002	6.8	LOS A	0.0	0.1	0.17	0.59	0.17	32.9
Approach		4	5.0	4	5.0	0.002	6.8	LOS A	0.0	0.1	0.17	0.59	0.17	32.9
East: High Street														
4	L2	253	5.0	253	5.0	0.232	4.9	LOS A	0.0	0.0	0.00	0.34	0.00	42.9
5	T1	612	5.0	612	5.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	54.9
Approach		864	5.0	864	5.0	0.232	1.4	NA	0.0	0.0	0.00	0.17	0.00	49.9
West: High Street														
11	T1	437	5.0	437	5.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		437	5.0	437	5.0	0.116	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0

All Vehicles	1305	5.0	1305	5.0	0.232	1.0	NA	0.0	0.1	0.00	0.11	0.00	51.4

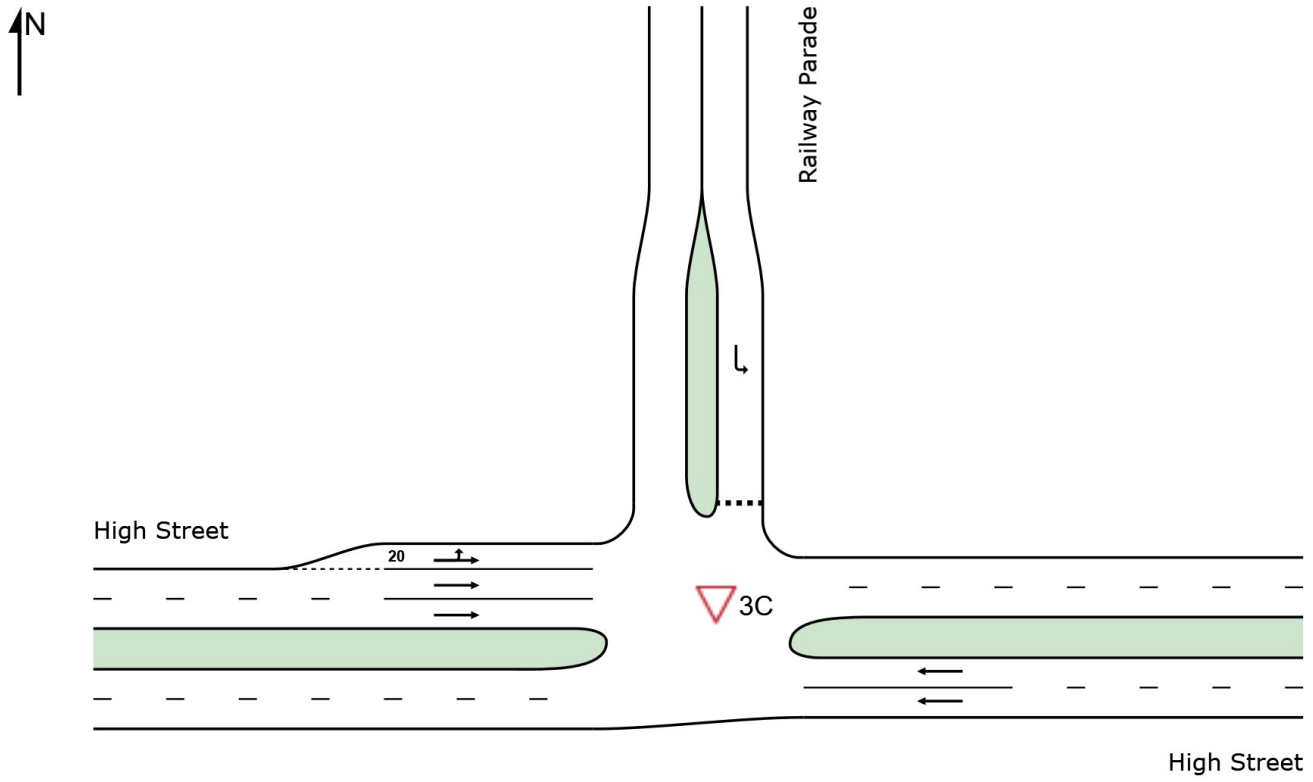
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 3C [3C. High Street/Railway Parade]

Network: 6 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	864	5.0	864	5.0	0.229	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		864	5.0	864	5.0	0.229	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
North: Railway Parade														
7	L2	23	5.0	23	5.0	0.018	5.7	LOS A	0.1	0.5	0.06	0.55	0.06	48.3
Approach		23	5.0	23	5.0	0.018	5.7	LOS A	0.1	0.5	0.06	0.55	0.06	48.3
West: High Street														
10	L2	22	5.0	22	5.0	0.021	4.9	LOS A	0.0	0.0	0.00	0.34	0.00	52.7
11	T1	415	5.0	415	5.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.3
Approach		437	5.0	437	5.0	0.106	0.3	NA	0.0	0.0	0.00	0.03	0.00	58.1
All Vehicles		1324	5.0	1324	5.0	0.229	0.2	NA	0.1	0.5	0.00	0.02	0.00	57.9

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - AM

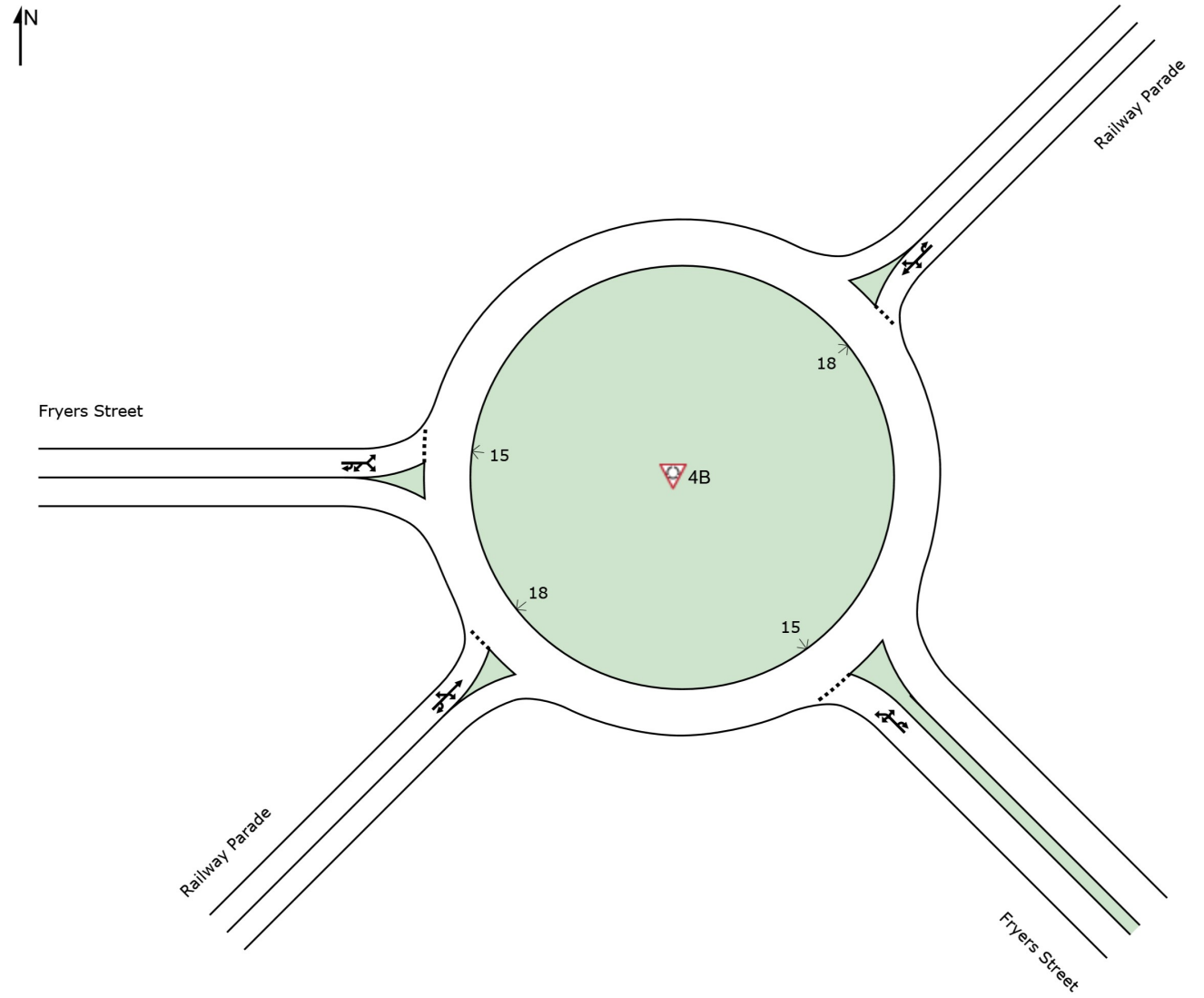
Template: GTA site layout and movement summary

Site: 4B [4B. Fryers Street/Railway Parade]

Network: 7 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

2018 Railway Parade & Fryers Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Fryers Street														
21	L2	1	5.0	1	5.0	0.473	3.2	LOS A	3.1	22.3	0.32	0.56	0.32	43.4
21a	L1	365	5.0	365	5.0	0.473	3.1	LOS A	3.1	22.3	0.32	0.56	0.32	20.4

23	R2	286	5.0	286	5.0	0.473	7.3	LOS A	3.1	22.3	0.32	0.56	0.32	51.5
23u	U	1	5.0	1	5.0	0.473	9.3	LOS A	3.1	22.3	0.32	0.56	0.32	28.3
Approach		654	5.0	654	5.0	0.473	4.9	LOS A	3.1	22.3	0.32	0.56	0.32	37.3
NorthEast: Railway Parade														
24	L2	346	5.0	346	5.0	0.483	6.5	LOS A	3.5	25.8	0.65	0.70	0.65	48.6
25	T1	5	5.0	5	5.0	0.483	6.8	LOS A	3.5	25.8	0.65	0.70	0.65	51.4
26a	R1	92	5.0	92	5.0	0.483	10.1	LOS B	3.5	25.8	0.65	0.70	0.65	38.7
26u	U	1	5.0	1	5.0	0.483	13.0	LOS B	3.5	25.8	0.65	0.70	0.65	54.3
Approach		444	5.0	444	5.0	0.483	7.2	LOS A	3.5	25.8	0.65	0.70	0.65	46.0
West: Fryers Street														
10a	L1	123	5.0	123	5.0	0.387	5.2	LOS A	2.2	16.4	0.54	0.70	0.54	48.9
12a	R1	262	5.0	262	5.0	0.387	8.7	LOS A	2.2	16.4	0.54	0.70	0.54	26.4
12b	R3	4	5.0	4	5.0	0.387	10.6	LOS B	2.2	16.4	0.54	0.70	0.54	43.6
12u	U	1	5.0	1	5.0	0.387	11.6	LOS B	2.2	16.4	0.54	0.70	0.54	18.3
Approach		391	5.0	391	5.0	0.387	7.6	LOS A	2.2	16.4	0.54	0.70	0.54	39.9
SouthWest: Railway Parade														
30b	L3	43	5.0	43	5.0	0.132	10.0	LOS B	0.7	5.4	0.73	0.78	0.73	26.8
31	T1	32	5.0	32	5.0	0.132	10.1	LOS B	0.7	5.4	0.73	0.78	0.73	49.1
32	R2	4	5.0	4	5.0	0.132	14.3	LOS B	0.7	5.4	0.73	0.78	0.73	36.7
32u	U	1	5.0	1	5.0	0.132	16.2	LOS B	0.7	5.4	0.73	0.78	0.73	45.5
Approach		80	5.0	80	5.0	0.132	10.4	LOS B	0.7	5.4	0.73	0.78	0.73	37.5
All Vehicles		1568	5.0	1568	5.0	0.483	6.5	LOS A	3.5	25.8	0.49	0.64	0.49	40.8

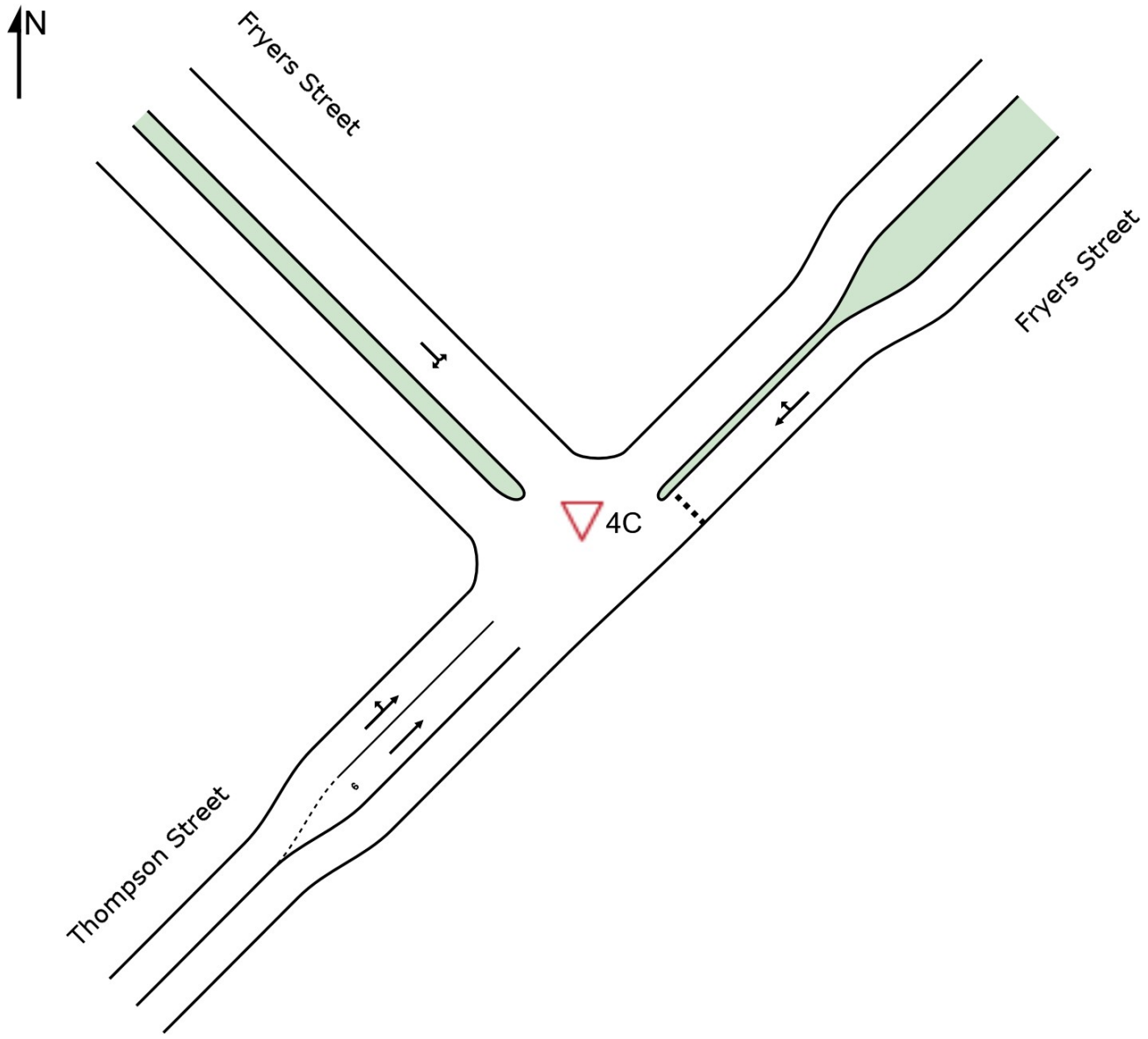
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4C [4C. Fryers Street/Thompson Street]

Network: 7 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Fryers Street														
25	T1	40	5.0	40	5.0	0.982	61.9	LOS F	15.3	111.9	0.98	2.09	4.88	18.5
26	R2	267	5.0	267	5.0	0.982	71.9	LOS F	15.3	111.9	0.98	2.09	4.88	13.4

Approach		307	5.0	307	5.0	0.982	70.6	LOS F	15.3	111.9	0.98	2.09	4.88	14.1
NorthWest: Fryers Street														
27	L2	124	5.0	124	5.0	0.461	4.1	LOS A	3.0	21.8	0.12	0.51	0.12	47.2
29	R2	488	5.0	488	5.0	0.461	4.1	LOS A	3.0	21.8	0.12	0.51	0.12	42.9
Approach		613	5.0	613	5.0	0.461	4.1	NA	3.0	21.8	0.12	0.51	0.12	44.0
SouthWest: Thompson Street														
30	L2	385	5.0	385	5.0	0.207	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	42.0
31	T1	17	5.0	17	5.0	0.009	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		402	5.0	402	5.0	0.207	5.4	NA	0.0	0.0	0.00	0.55	0.00	43.3
All Vehicles		1322	5.0	1322	5.0	0.982	19.9	NA	15.3	111.9	0.28	0.89	1.19	27.1

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.

USER REPORT FOR SITE

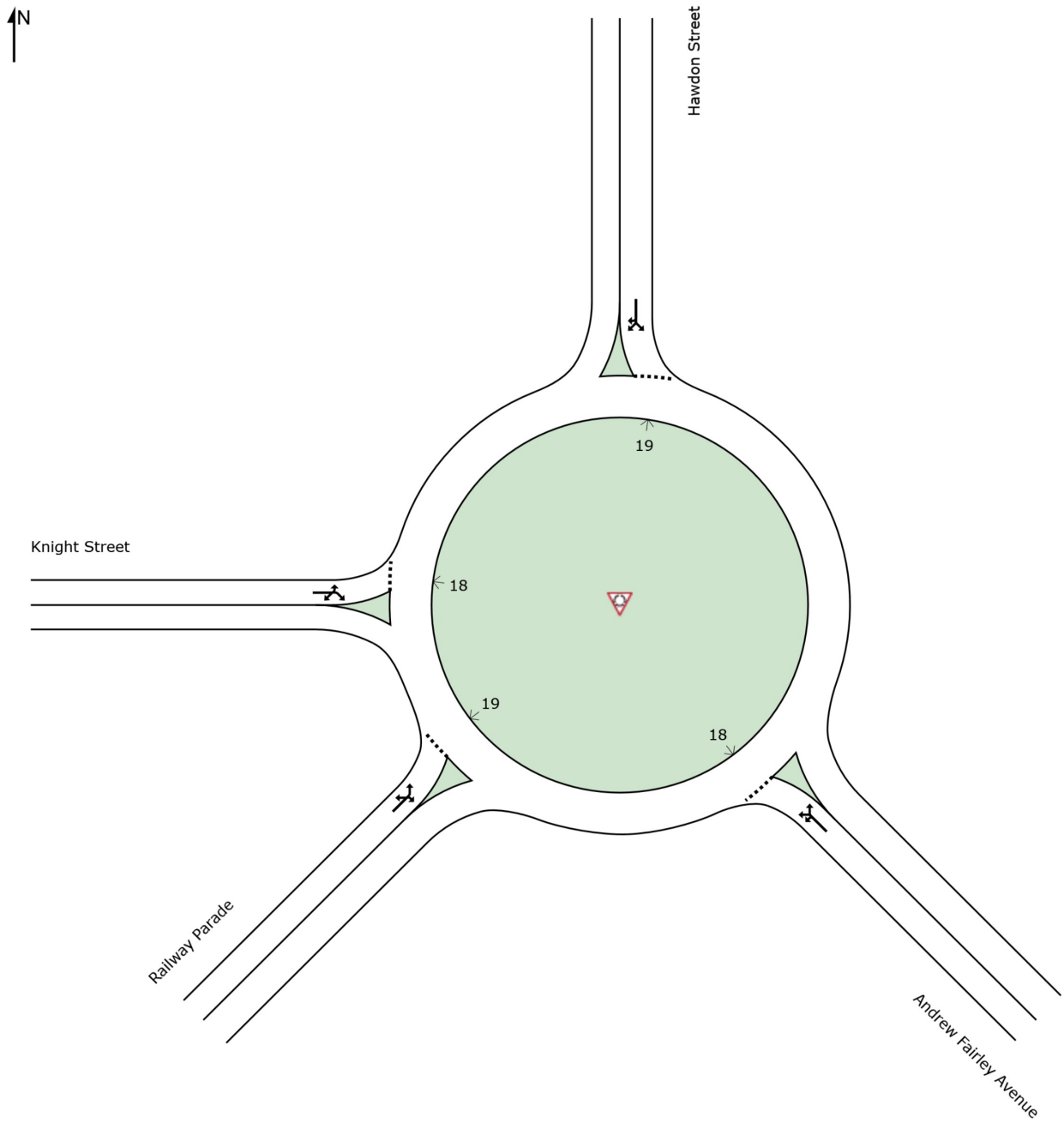
Project: 2. 2022 Do Nothing Volumes - AM

Template: GTA site layout and movement summary

Site: [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand 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	Aver. No. Cycles	Average Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	95	5.0	0.768	11.9	LOS B	9.5	69.6	0.94	1.07	1.28	48.4

21a	L1	254	5.0	0.768	11.6	LOS B	9.5	69.6	0.94	1.07	1.28	49.2
23a	R1	324	5.0	0.768	15.4	LOS B	9.5	69.6	0.94	1.07	1.28	49.0
Approach		673	5.0	0.768	13.5	LOS B	9.5	69.6	0.94	1.07	1.28	49.0
North: Hawdon Street												
7a	L1	278	5.0	0.731	7.4	LOS A	7.5	54.8	0.76	0.85	0.88	51.6
9a	R1	456	5.0	0.731	11.2	LOS B	7.5	54.8	0.76	0.85	0.88	51.3
9	R2	66	5.0	0.731	12.2	LOS B	7.5	54.8	0.76	0.85	0.88	51.8
Approach		800	5.0	0.731	10.0	LOS A	7.5	54.8	0.76	0.85	0.88	51.5
West: Knight Street												
10	L2	78	5.0	0.548	13.0	LOS B	4.8	35.4	0.92	1.05	1.15	47.1
12a	R1	273	5.0	0.548	16.6	LOS B	4.8	35.4	0.92	1.05	1.15	47.6
12b	R3	1	5.0	0.548	18.6	LOS B	4.8	35.4	0.92	1.05	1.15	48.3
Approach		352	5.0	0.548	15.8	LOS B	4.8	35.4	0.92	1.05	1.15	47.5
SouthWest: Railway Parade												
30b	L3	3	5.0	0.631	11.2	LOS B	6.1	44.9	0.91	1.02	1.14	49.3
30a	L1	382	5.0	0.631	10.7	LOS B	6.1	44.9	0.91	1.02	1.14	50.4
32	R2	86	5.0	0.631	15.6	LOS B	6.1	44.9	0.91	1.02	1.14	50.6
Approach		472	5.0	0.631	11.6	LOS B	6.1	44.9	0.91	1.02	1.14	50.5
All Vehicles		2296	5.0	0.768	12.2	LOS B	9.5	69.6	0.87	0.98	1.09	49.9

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

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - PM

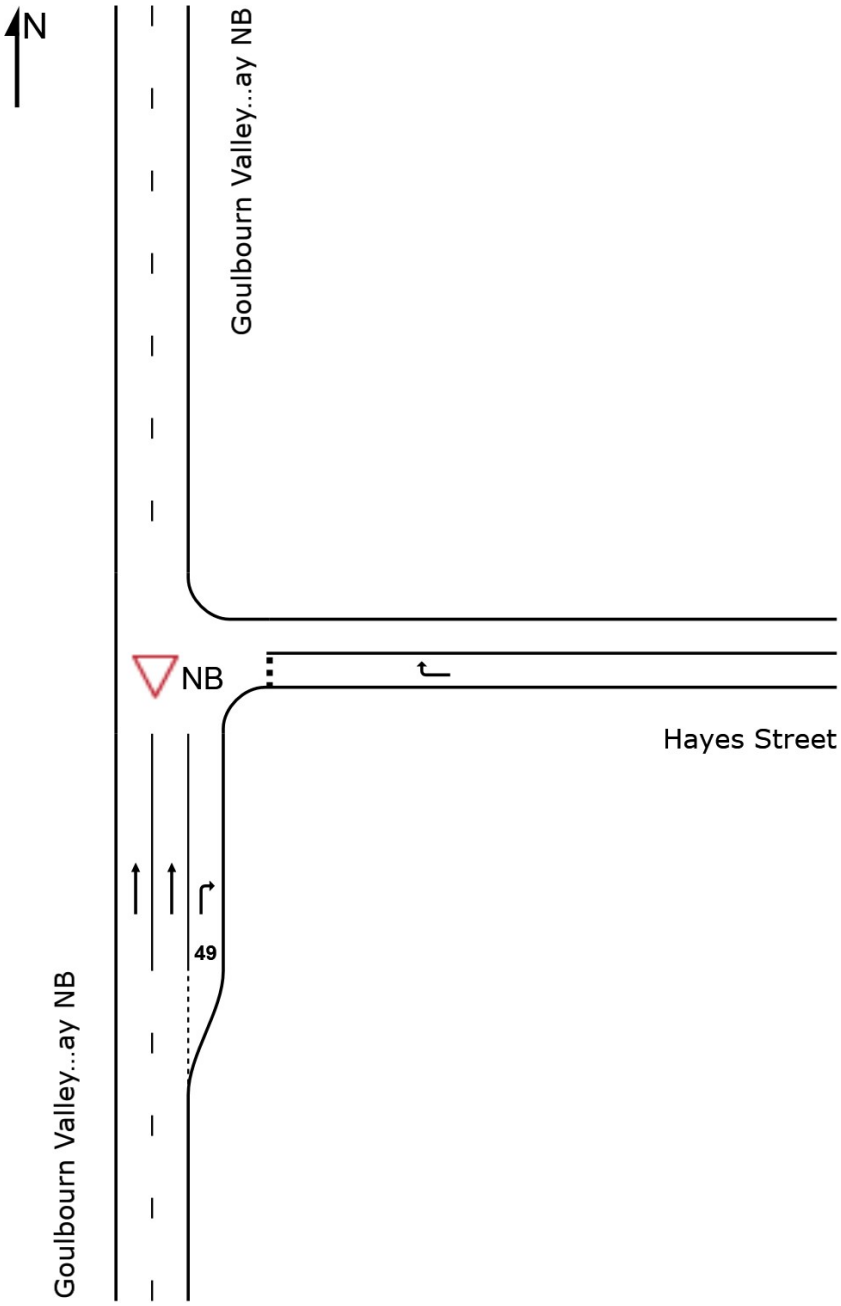
Template: GTA site layout and movement summary

Site: NB [1A. Goulbourn Valley Highway NB / Hayes]

Network: 25 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: PM2
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulbourn Valley Highway NB														
2	T1	886	5.0	886	5.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	99	5.0	99	5.0	0.055	5.8	LOS A	0.3	2.1	0.00	0.63	0.00	50.5
Approach		985	5.0	985	5.0	0.232	0.6	NA	0.3	2.1	0.00	0.06	0.00	59.4
East: Hayes Street														
6	R2	91	5.0	91	5.0	0.218	10.2	LOS B	0.8	6.0	0.73	0.88	0.77	42.1
Approach		91	5.0	91	5.0	0.218	10.2	LOS B	0.8	6.0	0.73	0.88	0.77	42.1
All Vehicles		1076	5.0	1076	5.0	0.232	1.4	NA	0.8	6.0	0.06	0.13	0.07	58.2

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).

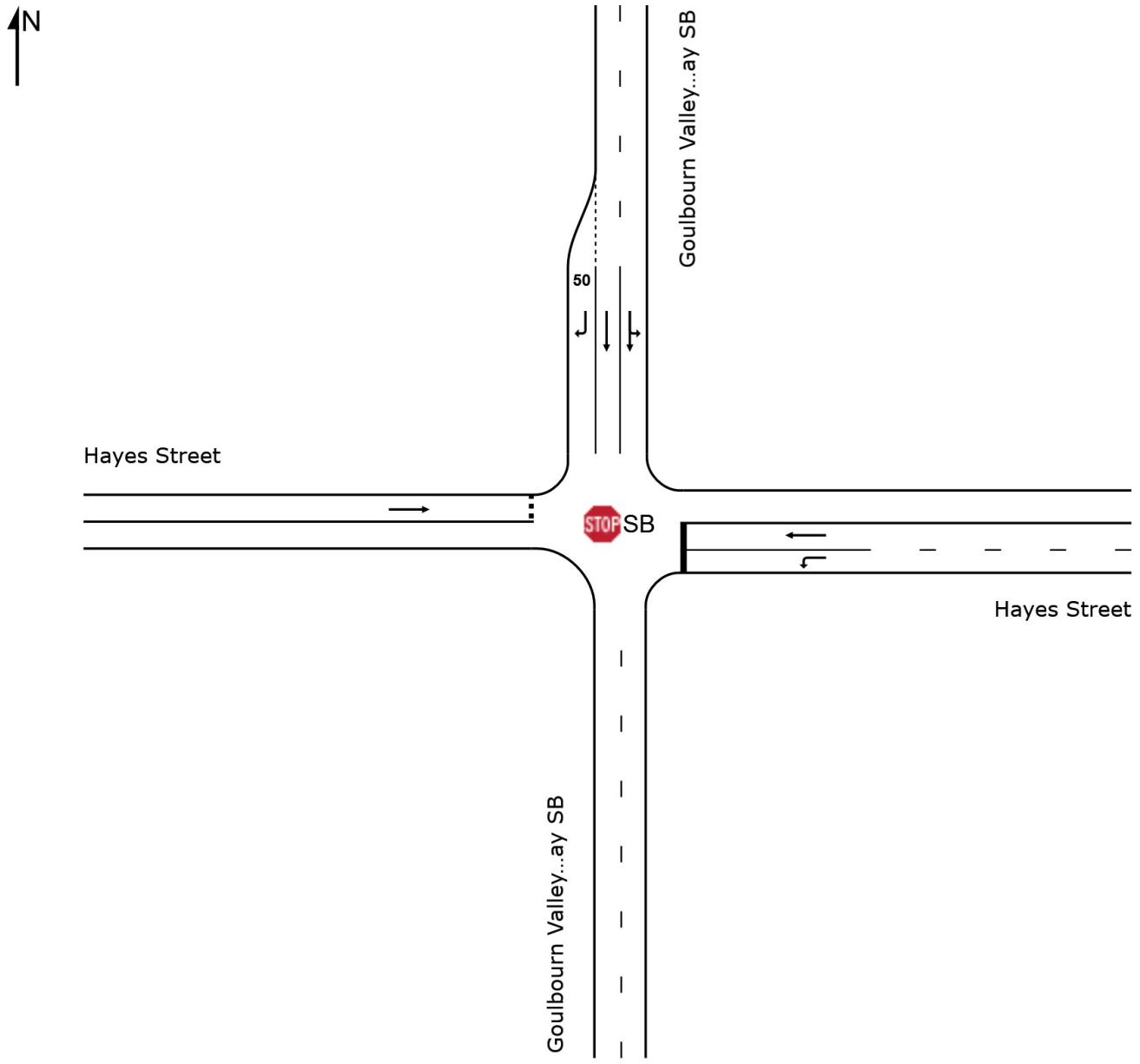
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: SB [1B. Goulbourn Valley Highway SB / Hayes]

Network: 25 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: PM2
Stop (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
4	L2	188	5.0	188	5.0	0.272	12.6	LOS B	1.2	8.6	0.61	1.02	0.66	46.7
5	T1	89	5.0	89	5.0	0.615	47.6	LOS E	2.4	17.7	0.93	1.13	1.44	15.5

Approach		278	5.0	278	5.0	0.615	23.9	LOS C	2.4	17.7	0.71	1.06	0.92	36.4
North: Goulbourn Valley Highway SB														
7	L2	51	5.0	51	5.0	0.336	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.4
8	T1	1207	5.0	1207	5.0	0.336	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
9	R2	1	5.0	1	5.0	0.001	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		1259	5.0	1259	5.0	0.336	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Hayes Street														
11	T1	99	5.0	99	5.0	0.473	27.0	LOS D	1.7	12.4	0.91	1.03	1.25	21.4
Approach		99	5.0	99	5.0	0.473	27.0	LOS D	1.7	12.4	0.91	1.03	1.25	21.4
All Vehicles		1636	5.0	1636	5.0	0.615	5.9	NA	2.4	17.7	0.18	0.26	0.23	53.9

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.

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - PM

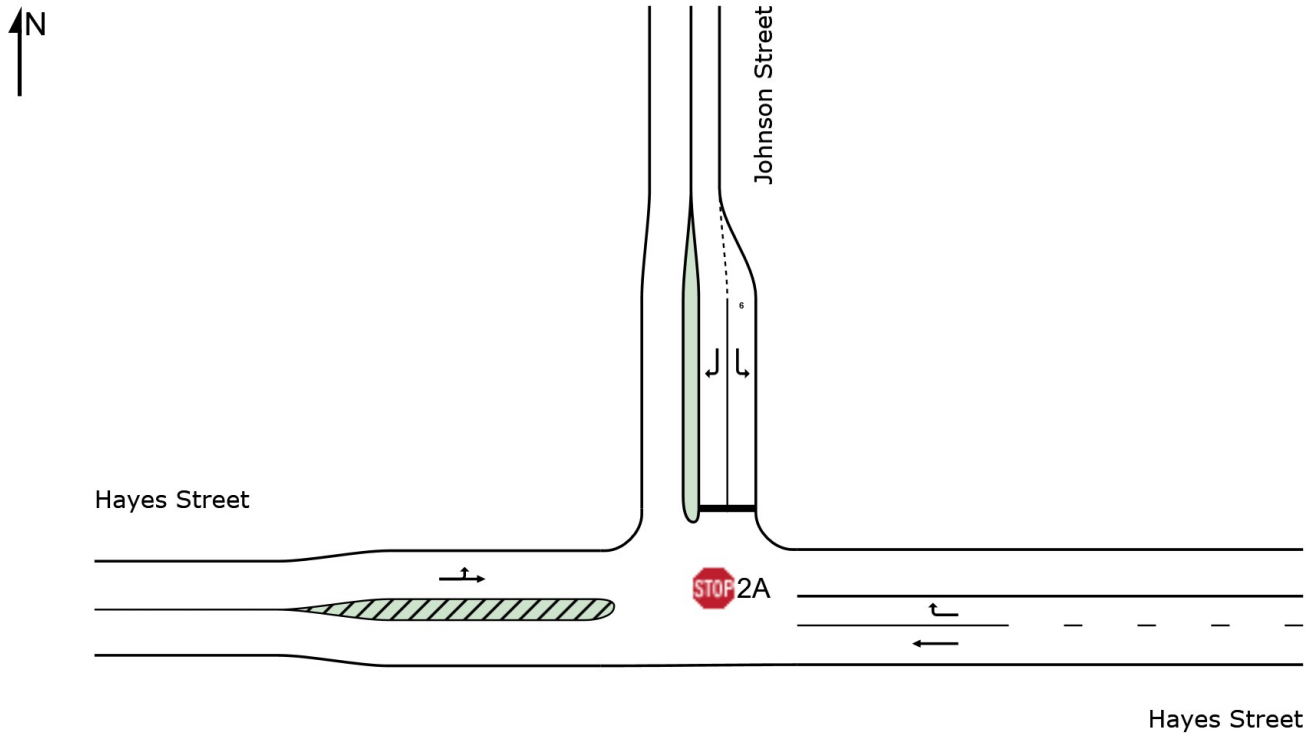
Template: GTA site layout and movement summary

Site: 2A [2A. Hayes Street/Johnson Street]

Network: 20 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Hayes Street														
5	T1	315	5.0	315	5.0	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	211	5.0	211	5.0	0.151	5.7	LOS A	0.7	5.2	0.37	0.59	0.37	48.9
Approach		525	5.0	525	5.0	0.158	2.3	NA	0.7	5.2	0.15	0.24	0.15	53.4
North: Johnson Street														
7	L2	249	5.0	249	5.0	0.220	9.3	LOS A	1.0	7.2	0.36	0.89	0.36	47.3
9	R2	78	5.0	78	5.0	0.214	17.4	LOS C	0.8	5.9	0.71	1.01	0.74	42.9
Approach		327	5.0	327	5.0	0.220	11.2	LOS B	1.0	7.2	0.44	0.92	0.45	45.8
West: Hayes Street														
10	L2	37	5.0	37	5.0	0.119	5.6	LOS A	0.0	0.0	0.00	0.09	0.00	56.5
11	T1	205	5.0	205	5.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	57.0
Approach		242	5.0	242	5.0	0.119	0.9	NA	0.0	0.0	0.00	0.09	0.00	56.8

All Vehicles	1095	5.0	1095	5.0	0.220	4.6	NA	1.0	7.2	0.20	0.41	0.21	50.7

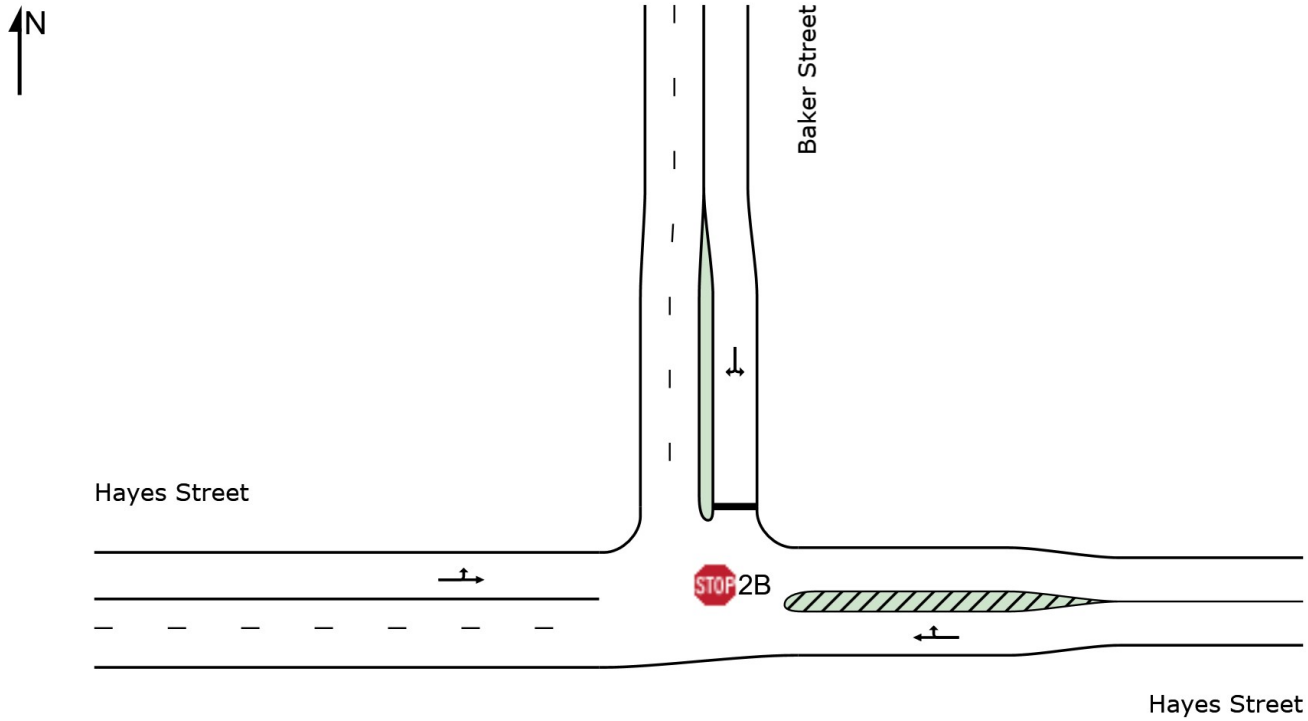
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 2B [2B. Hayes Street/Baker Street]

Network: 20 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	480	5.0	480	5.0	0.240	0.0	LOS A	0.1	0.4	0.01	0.01	0.01	59.8
6	R2	4	5.0	4	5.0	0.240	8.1	LOS A	0.1	0.4	0.01	0.01	0.01	57.8
Approach		484	5.0	484	5.0	0.240	0.1	NA	0.1	0.4	0.01	0.01	0.01	59.7
North: Baker Street														
7	L2	1	5.0	1	5.0	0.124	10.0	LOS A	0.4	2.8	0.69	1.00	0.69	47.3
9	R2	45	5.0	45	5.0	0.124	16.1	LOS C	0.4	2.8	0.69	1.00	0.69	41.0
Approach		46	5.0	46	5.0	0.124	16.0	LOS C	0.4	2.8	0.69	1.00	0.69	41.2
West: Hayes Street														
10	L2	96	5.0	96	5.0	0.224	4.7	LOS A	0.0	0.0	0.00	0.12	0.00	55.3
11	T1	359	5.0	359	5.0	0.224	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.3
Approach		455	5.0	455	5.0	0.224	1.0	NA	0.0	0.0	0.00	0.12	0.00	57.6
All Vehicles		985	5.0	985	5.0	0.240	1.3	NA	0.4	2.8	0.04	0.11	0.04	57.5

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - PM

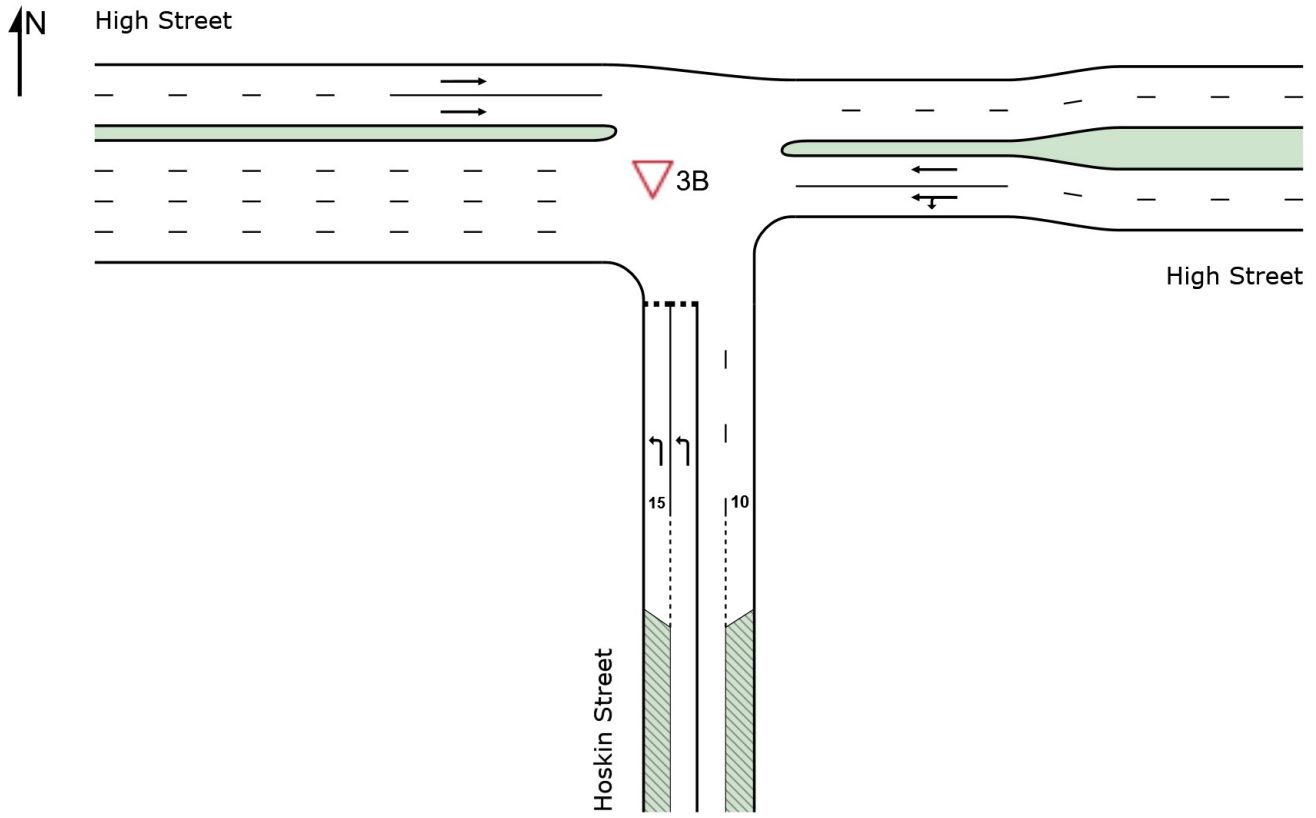
Template: GTA site layout and movement summary

Site: 3B [3B. High Street/Hoskins Street]

Network: 21 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskin Street														
1	L2	3	5.0	3	5.0	0.002	7.0	LOS A	0.0	0.0	0.17	0.59	0.17	32.7
Approach		3	5.0	3	5.0	0.002	7.0	LOS A	0.0	0.0	0.17	0.59	0.17	32.7
East: High Street														
4	L2	80	5.0	80	5.0	0.232	4.9	LOS A	0.0	0.0	0.00	0.11	0.00	48.6
5	T1	791	5.0	791	5.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	57.4
Approach		871	5.0	871	5.0	0.232	0.5	NA	0.0	0.0	0.00	0.05	0.00	56.1
West: High Street														
11	T1	705	5.0	705	5.0	0.187	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		705	5.0	705	5.0	0.187	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0

All Vehicles	1579	5.0	1579	5.0	0.232	0.3	NA	0.0	0.0	0.00	0.03	0.00	57.0

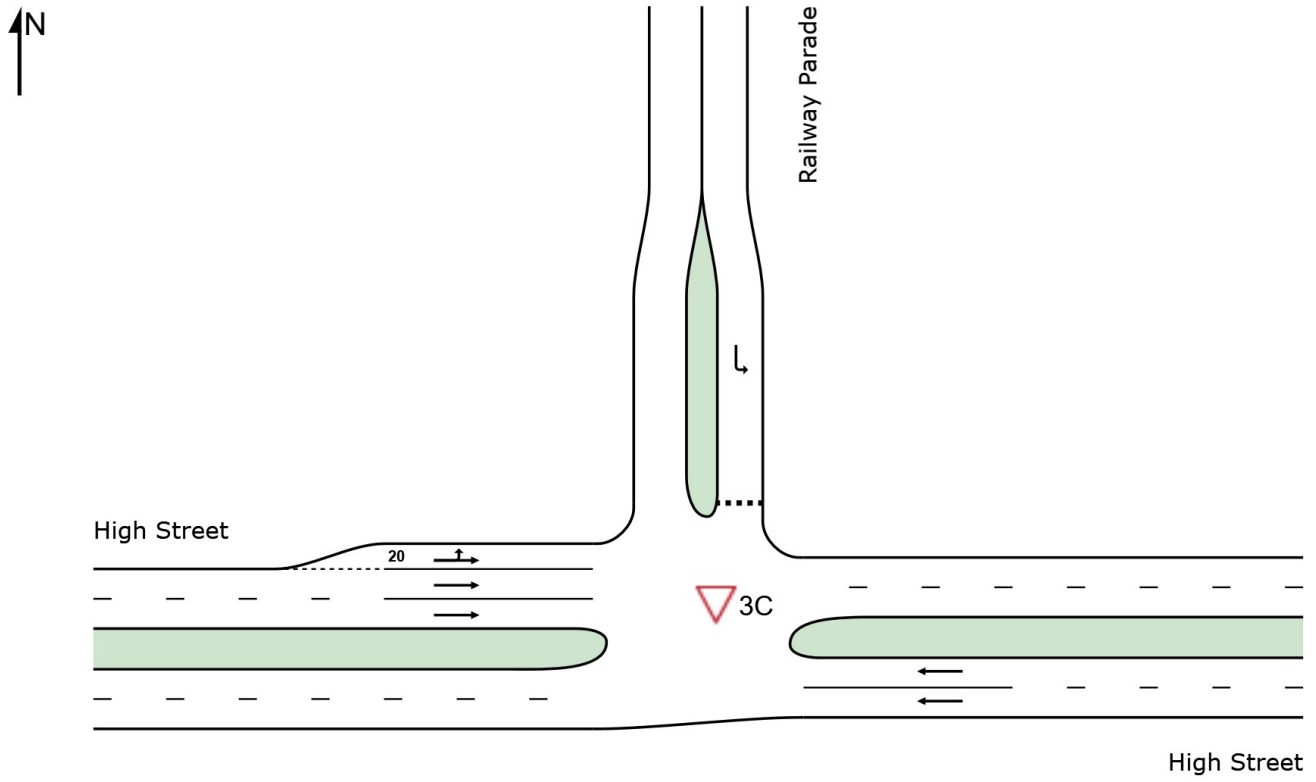
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 3C [3C. High Street/Railway Parade]

Network: 21 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	871	5.0	871	5.0	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		871	5.0	871	5.0	0.230	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
North: Railway Parade														
7	L2	219	5.0	219	5.0	0.173	5.7	LOS A	0.7	5.2	0.10	0.55	0.10	48.1
Approach		219	5.0	219	5.0	0.173	5.7	LOS A	0.7	5.2	0.10	0.55	0.10	48.1
West: High Street														
10	L2	34	5.0	34	5.0	0.034	4.9	LOS A	0.0	0.0	0.00	0.32	0.00	53.0
11	T1	672	5.0	672	5.0	0.171	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.3
Approach		705	5.0	705	5.0	0.171	0.2	NA	0.0	0.0	0.00	0.03	0.00	58.2
All Vehicles		1795	5.0	1795	5.0	0.230	0.8	NA	0.7	5.2	0.01	0.08	0.01	54.1

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - PM

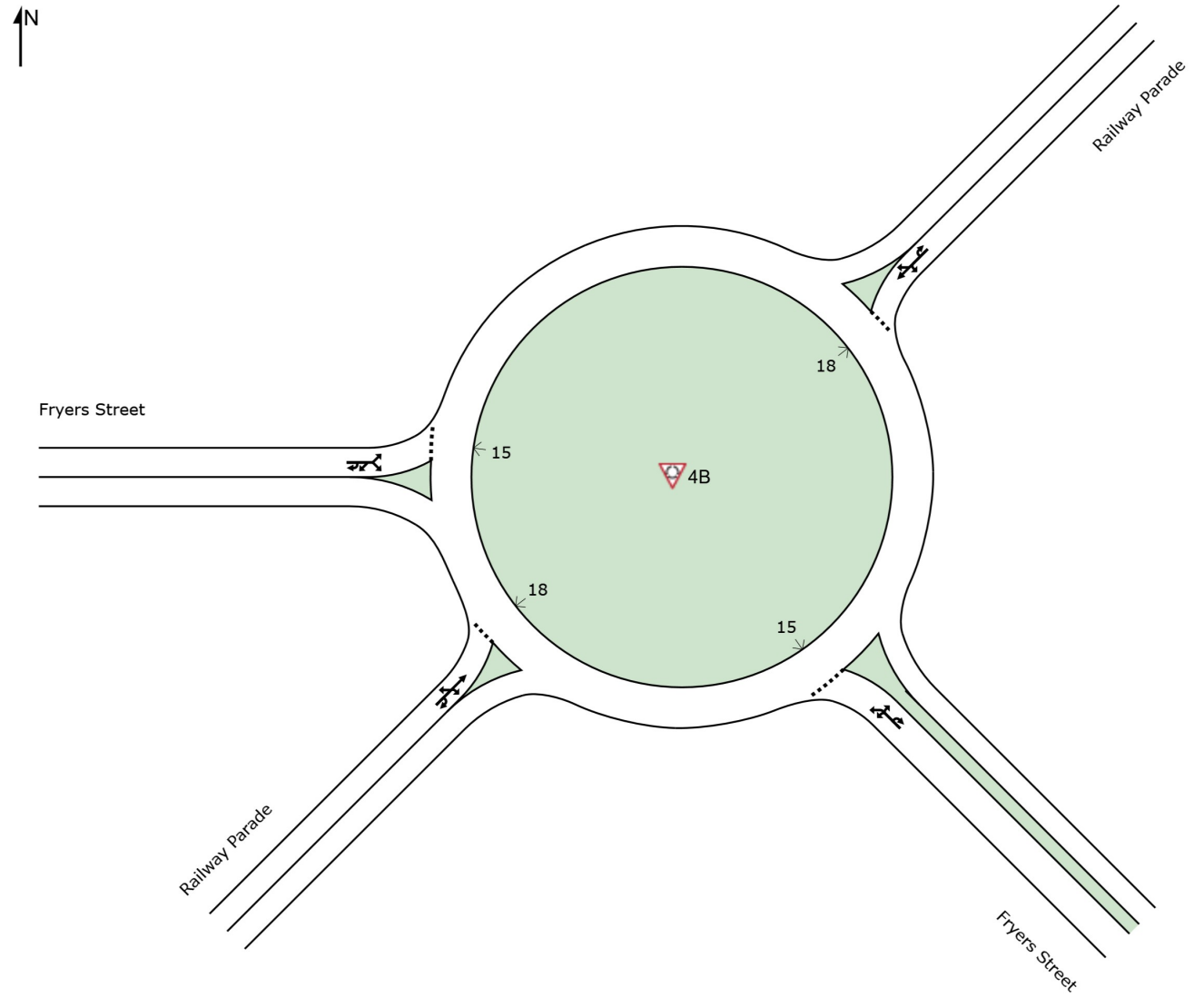
Template: GTA site layout and movement summary

Site: 4B [4B. Fryers Street/Railway Parade]

Network: 22 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

2018 Railway Parade & Fryers Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Fryers Street														
21	L2	6	5.0	6	5.0	0.594	3.9	LOS A	4.2	30.8	0.51	0.62	0.51	43.0
21a	L1	491	5.0	491	5.0	0.594	3.8	LOS A	4.2	30.8	0.51	0.62	0.51	20.0

23	R2	245	5.0	245	5.0	0.594	8.0	LOS A	4.2	30.8	0.51	0.62	0.51	51.2
23u	U	1	5.0	1	5.0	0.594	10.0	LOS A	4.2	30.8	0.51	0.62	0.51	27.3
Approach		743	5.0	743	5.0	0.594	5.2	LOS A	4.2	30.8	0.51	0.62	0.51	33.5
NorthEast: Railway Parade														
24	L2	260	5.0	260	5.0	0.472	6.6	LOS A	3.4	24.9	0.66	0.71	0.66	48.0
25	T1	32	5.0	32	5.0	0.472	6.9	LOS A	3.4	24.9	0.66	0.71	0.66	51.0
26a	R1	132	5.0	132	5.0	0.472	10.2	LOS B	3.4	24.9	0.66	0.71	0.66	38.4
26u	U	1	5.0	1	5.0	0.472	13.1	LOS B	3.4	24.9	0.66	0.71	0.66	53.9
Approach		424	5.0	424	5.0	0.472	7.7	LOS A	3.4	24.9	0.66	0.71	0.66	44.7
West: Fryers Street														
10a	L1	152	5.0	152	5.0	0.436	5.4	LOS A	2.7	19.7	0.58	0.72	0.58	48.6
12a	R1	234	5.0	234	5.0	0.436	8.8	LOS A	2.7	19.7	0.58	0.72	0.58	26.1
12b	R3	47	5.0	47	5.0	0.436	10.7	LOS B	2.7	19.7	0.58	0.72	0.58	43.3
12u	U	1	5.0	1	5.0	0.436	11.7	LOS B	2.7	19.7	0.58	0.72	0.58	18.3
Approach		434	5.0	434	5.0	0.436	7.8	LOS A	2.7	19.7	0.58	0.72	0.58	41.4
SouthWest: Railway Parade														
30b	L3	59	5.0	59	5.0	0.298	12.3	LOS B	1.9	13.8	0.86	0.91	0.86	25.7
31	T1	88	5.0	88	5.0	0.298	12.4	LOS B	1.9	13.8	0.86	0.91	0.86	47.4
32	R2	1	5.0	1	5.0	0.298	16.6	LOS B	1.9	13.8	0.86	0.91	0.86	34.1
32u	U	1	5.0	1	5.0	0.298	18.5	LOS B	1.9	13.8	0.86	0.91	0.86	43.4
Approach		149	5.0	149	5.0	0.298	12.4	LOS B	1.9	13.8	0.86	0.91	0.86	39.8
All Vehicles		1751	5.0	1751	5.0	0.594	7.1	LOS A	4.2	30.8	0.59	0.69	0.59	39.3

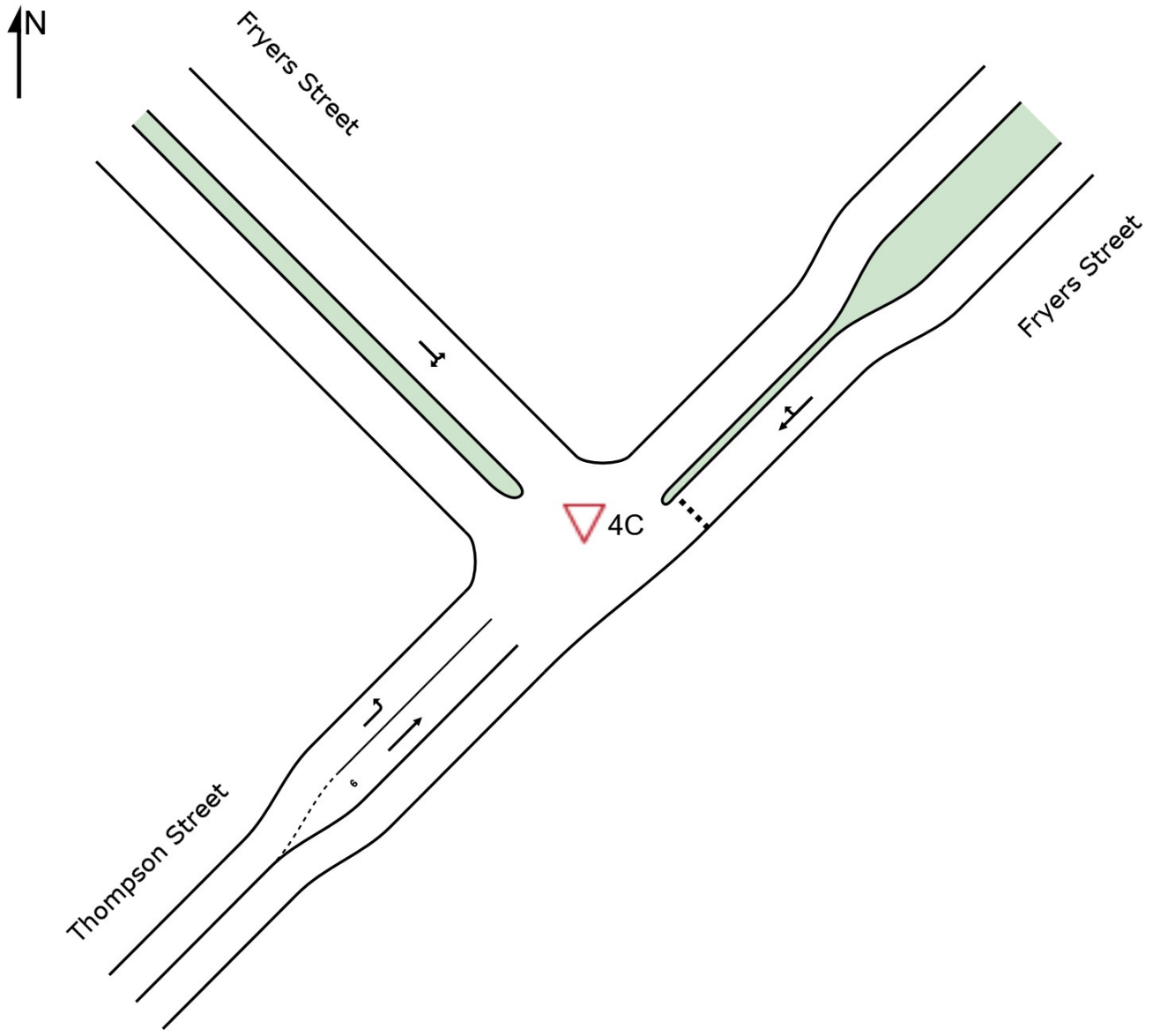
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4C [4C. Fryers Street/Thompson Street]

Network: 22 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Fryers Street														
25	T1	2	5.0	2	5.0	0.937	40.9	LOS E	12.7	92.8	0.97	1.88	4.07	23.1
26	R2	334	5.0	334	5.0	0.937	49.8	LOS E	12.7	92.8	0.97	1.88	4.07	17.4
Approach		336	5.0	336	5.0	0.937	49.7	LOS E	12.7	92.8	0.97	1.88	4.07	17.4

NorthWest: Fryers Street														
27	L2	107	5.0	107	5.0	0.298	3.9	LOS A	1.7	12.7	0.05	0.52	0.05	47.6
29	R2	387	5.0	387	5.0	0.298	4.0	LOS A	1.7	12.7	0.05	0.52	0.05	43.4
Approach		495	5.0	495	5.0	0.298	4.0	NA	1.7	12.7	0.05	0.52	0.05	44.5
SouthWest: Thompson Street														
30	L2	408	5.0	408	5.0	0.220	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	42.0
31	T1	5	5.0	5	5.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		414	5.0	414	5.0	0.220	5.5	NA	0.0	0.0	0.00	0.57	0.00	42.4
All Vehicles		1244	5.0	1244	5.0	0.937	16.8	NA	12.7	92.8	0.28	0.90	1.12	29.3

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR SITE

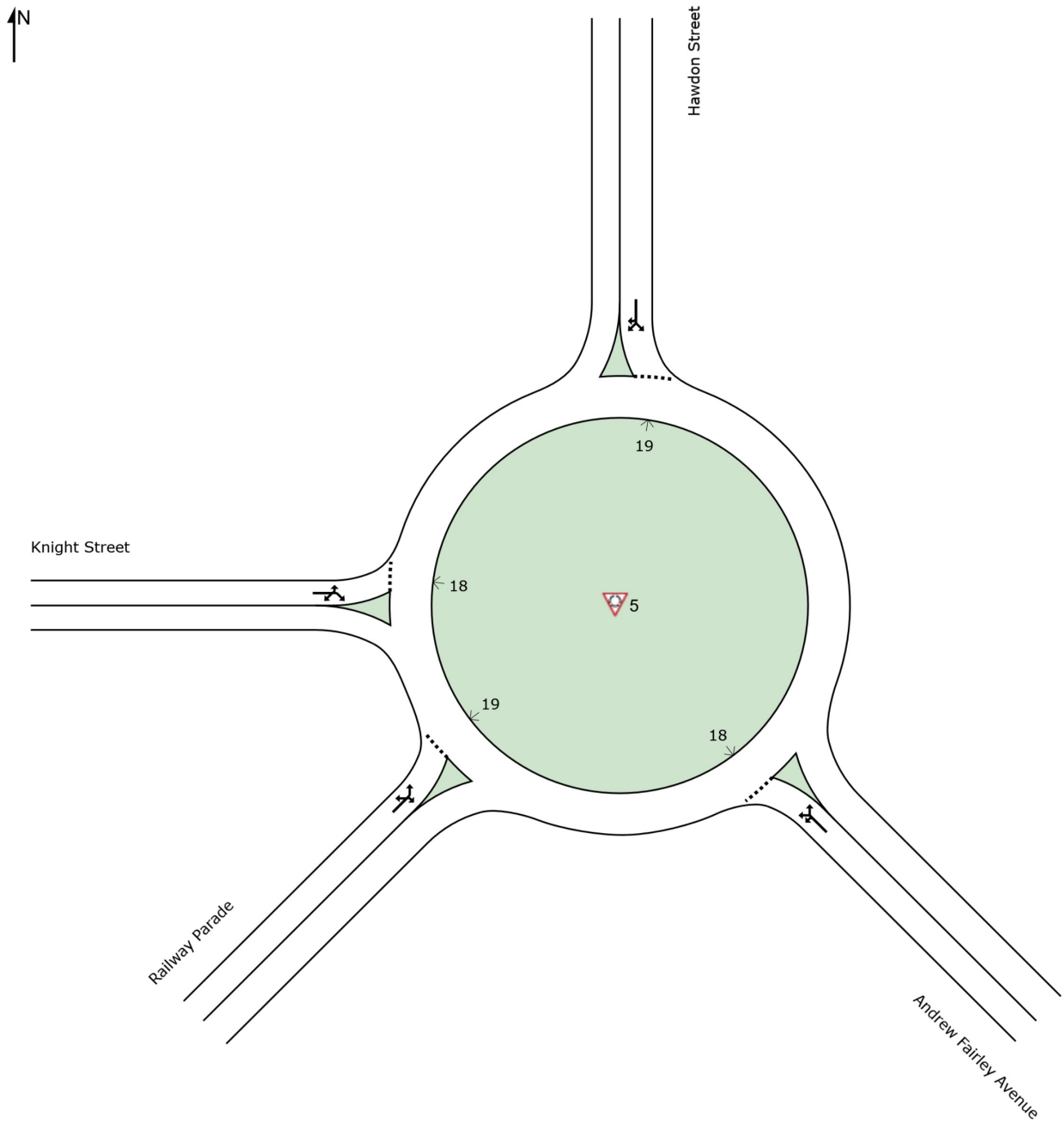
Project: 2. 2022 Do Nothing Volumes - PM

Template: GTA site layout and movement summary

Site: 5 [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	31	5.0	0.523	7.1	LOS A	3.7	26.9	0.67	0.79	0.72	51.6
21a	L1	256	5.0	0.523	6.8	LOS A	3.7	26.9	0.67	0.79	0.72	52.5
23a	R1	224	5.0	0.523	10.6	LOS B	3.7	26.9	0.67	0.79	0.72	52.3
Approach		511	5.0	0.523	8.5	LOS A	3.7	26.9	0.67	0.79	0.72	52.4
North: Hawdon Street												
7a	L1	121	5.0	0.455	4.9	LOS A	2.6	19.2	0.49	0.67	0.49	52.5
9a	R1	383	5.0	0.455	8.8	LOS A	2.6	19.2	0.49	0.67	0.49	52.3
9	R2	18	5.0	0.455	9.8	LOS A	2.6	19.2	0.49	0.67	0.49	52.7
Approach		522	5.0	0.455	7.9	LOS A	2.6	19.2	0.49	0.67	0.49	52.3
West: Knight Street												
10	L2	68	5.0	0.443	10.5	LOS B	3.3	24.5	0.87	0.96	0.95	48.5
12a	R1	181	5.0	0.443	14.1	LOS B	3.3	24.5	0.87	0.96	0.95	49.0
12b	R3	40	5.0	0.443	16.1	LOS B	3.3	24.5	0.87	0.96	0.95	49.7
Approach		289	5.0	0.443	13.5	LOS B	3.3	24.5	0.87	0.96	0.95	49.0
SouthWest: Railway Parade												
30b	L3	41	5.0	0.647	9.5	LOS A	6.2	45.6	0.83	0.92	1.00	50.6
30a	L1	483	5.0	0.647	9.1	LOS A	6.2	45.6	0.83	0.92	1.00	51.8
32	R2	57	5.0	0.647	13.9	LOS B	6.2	45.6	0.83	0.92	1.00	52.0
Approach		581	5.0	0.647	9.6	LOS A	6.2	45.6	0.83	0.92	1.00	51.8
All Vehicles		1903	5.0	0.647	9.4	LOS A	6.2	45.6	0.70	0.82	0.78	51.6

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

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - SCHOOL PM

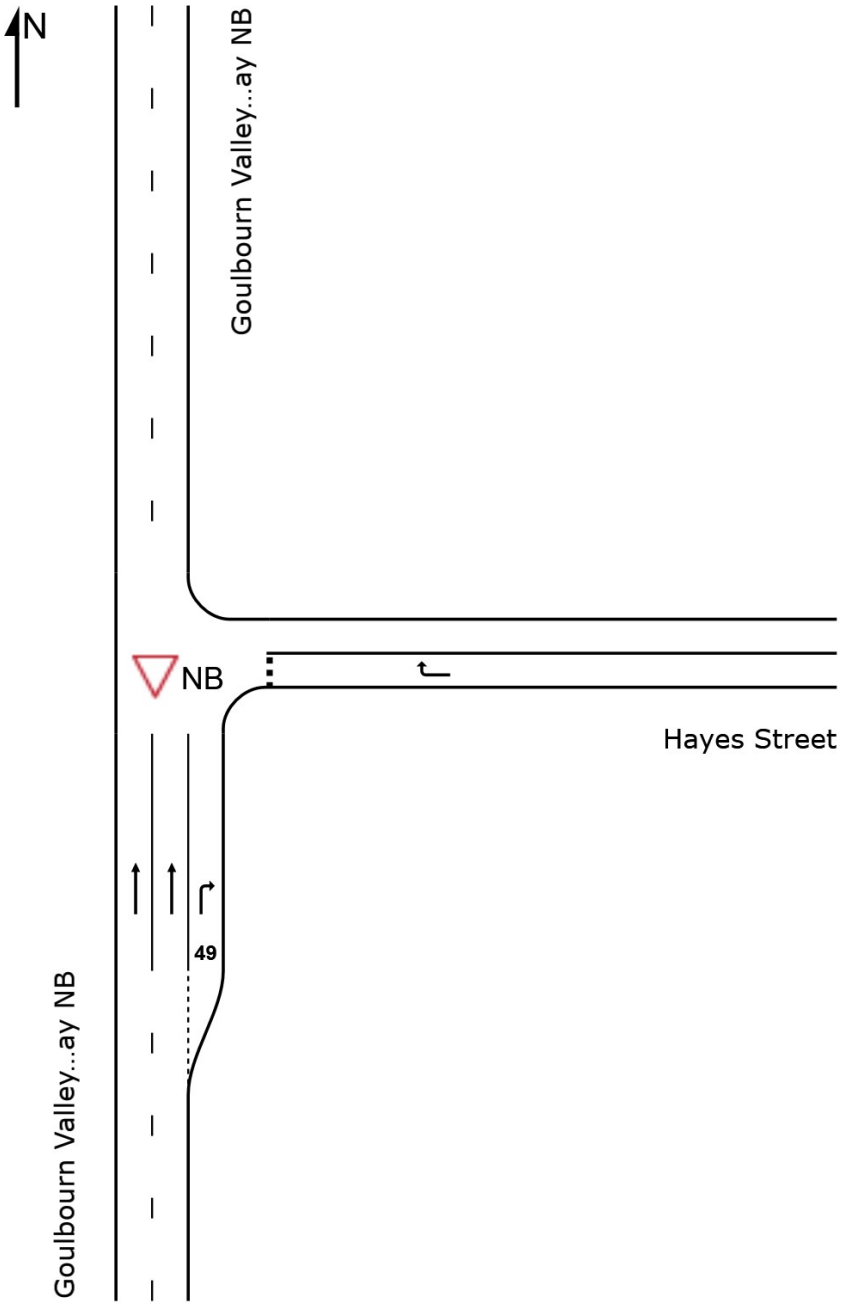
Template: GTA site layout and movement summary

Site: NB [1A. Goulbourn Valley Highway NB / Hayes]

Network: 25 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: PM2
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulbourn Valley Highway NB														
2	T1	891	5.0	891	5.0	0.233	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	89	5.0	89	5.0	0.050	5.8	LOS A	0.8	5.8	0.00	0.63	0.00	50.5
Approach		980	5.0	980	5.0	0.233	0.6	NA	0.8	5.8	0.00	0.06	0.00	59.4
East: Hayes Street														
6	R2	21	5.0	21	5.0	0.051	9.3	LOS A	0.2	1.3	0.69	0.85	0.69	43.0
Approach		21	5.0	21	5.0	0.051	9.3	LOS A	0.2	1.3	0.69	0.85	0.69	43.0
All Vehicles		1001	5.0	1001	5.0	0.233	0.7	NA	0.8	5.8	0.01	0.07	0.01	59.2

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).

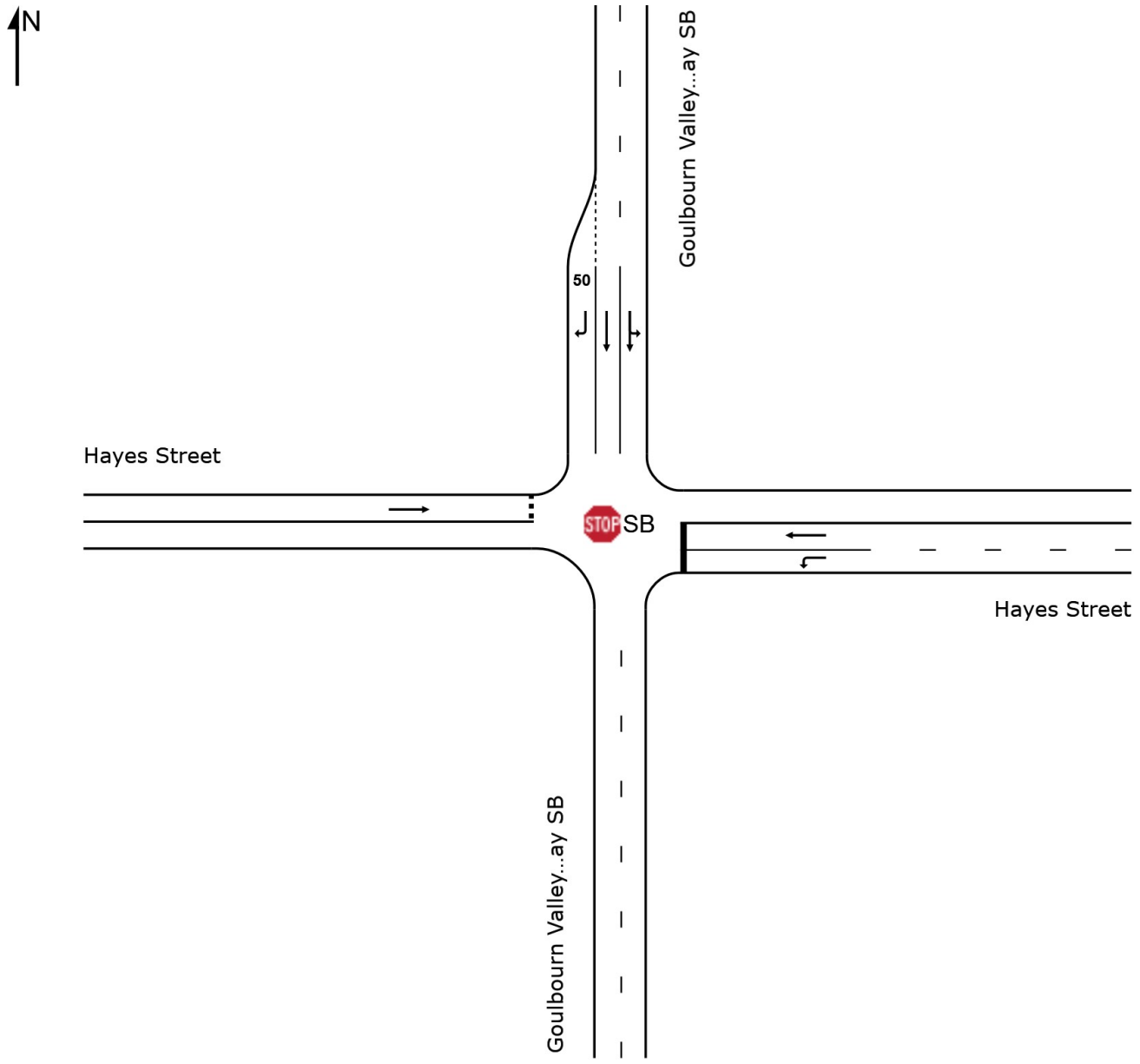
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: SB [1B. Goulbourn Valley Highway SB / Hayes]

Network: 25 [1. Goulburn Valley Highway/ Hayes Street]

Site Category: PM2
Stop (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
4	L2	213	5.0	213	5.0	0.312	13.1	LOS B	1.4	10.6	0.62	1.04	0.73	46.4
5	T1	20	5.0	20	5.0	0.166	39.3	LOS E	0.5	3.8	0.92	1.00	0.93	17.9

Approach		233	5.0	233	5.0	0.312	15.3	LOS C	1.4	10.6	0.65	1.04	0.75	44.2
North: Goulbourn Valley Highway SB														
7	L2	118	5.0	118	5.0	0.380	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	55.8
8	T1	1299	5.0	1299	5.0	0.380	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
9	R2	1	5.0	1	5.0	0.001	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	50.6
Approach		1418	5.0	1418	5.0	0.380	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2
West: Hayes Street														
11	T1	89	5.0	89	5.0	0.595	43.0	LOS E	1.7	12.4	0.95	1.09	1.41	15.8
Approach		89	5.0	89	5.0	0.595	43.0	LOS E	1.7	12.4	0.95	1.09	1.41	15.8
All Vehicles		1740	5.0	1740	5.0	0.595	4.7	NA	1.7	12.4	0.14	0.24	0.17	55.0

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.

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - SCHOOL PM

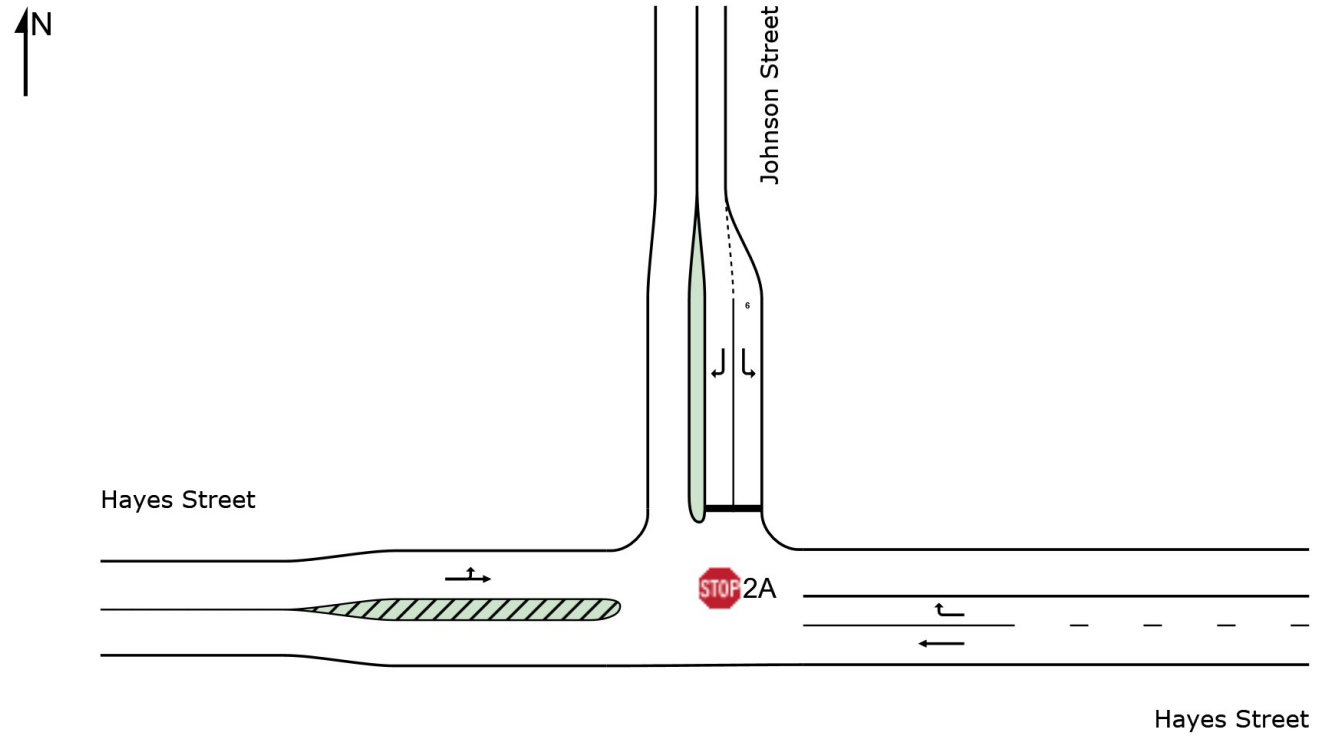
Template: GTA site layout and movement summary

Site: 2A [2A. Hayes Street/Johnson Street]

Network: 20 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Hayes Street														
5	T1	199	5.0	199	5.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	227	5.0	227	5.0	0.170	5.9	LOS A	0.8	5.9	0.41	0.61	0.41	48.7
Approach		426	5.0	426	5.0	0.170	3.1	NA	0.8	5.9	0.22	0.33	0.22	52.0
North: Johnson Street														
7	L2	288	5.0	288	5.0	0.265	9.6	LOS A	1.2	8.9	0.41	0.89	0.41	47.0
9	R2	144	5.0	144	5.0	0.357	18.0	LOS C	1.7	12.1	0.72	1.06	0.92	42.6
Approach		433	5.0	433	5.0	0.357	12.4	LOS B	1.7	12.1	0.51	0.95	0.58	45.0
West: Hayes Street														
10	L2	37	5.0	37	5.0	0.138	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	56.6
11	T1	244	5.0	244	5.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	57.3
Approach		281	5.0	281	5.0	0.138	0.7	NA	0.0	0.0	0.00	0.08	0.00	57.1

All Vehicles	1140	5.0	1140	5.0	0.357	6.1	NA	1.7	12.1	0.28	0.50	0.30	49.1

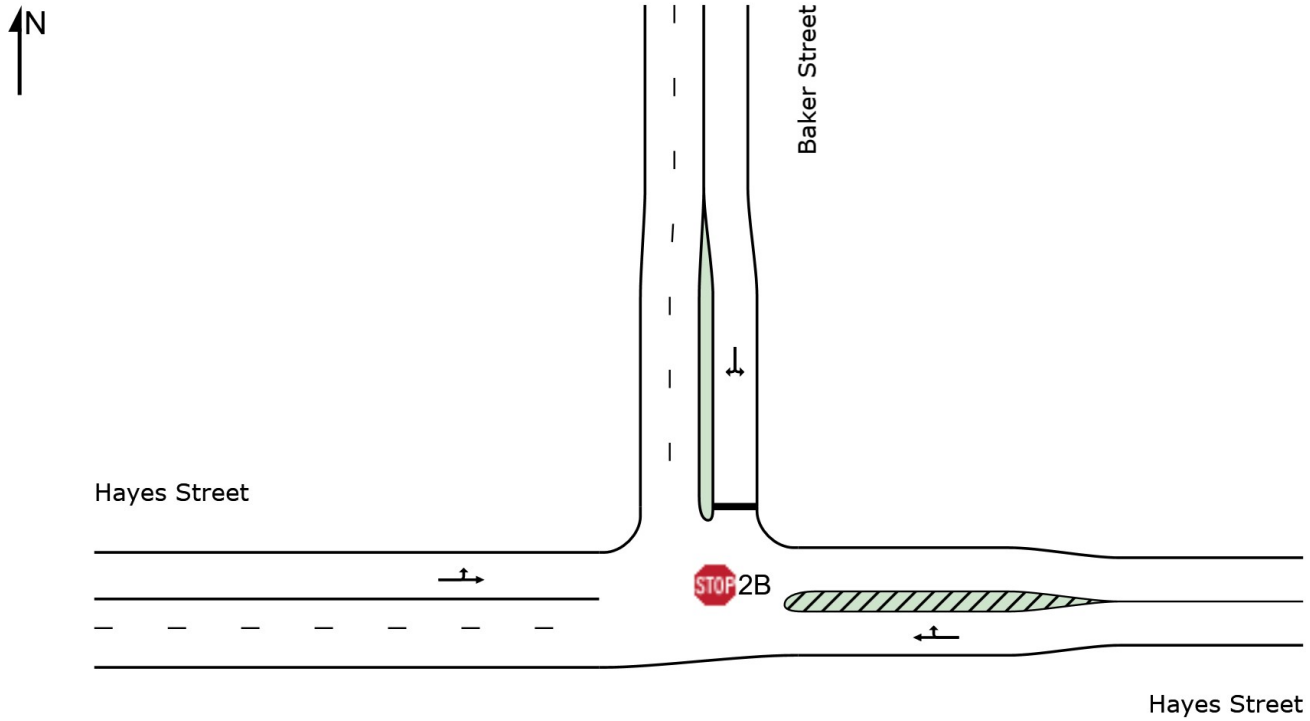
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 2B [2B. Hayes Street/Baker Street]

Network: 20 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	365	5.0	365	5.0	0.192	0.2	LOS A	0.2	1.2	0.05	0.02	0.05	59.2
6	R2	12	5.0	12	5.0	0.192	8.5	LOS A	0.2	1.2	0.05	0.02	0.05	57.5
Approach		377	5.0	377	5.0	0.192	0.4	NA	0.2	1.2	0.05	0.02	0.05	59.1
North: Baker Street														
7	L2	2	5.0	2	5.0	0.162	10.7	LOS B	0.5	3.8	0.69	1.00	0.69	47.5
9	R2	61	5.0	61	5.0	0.162	15.9	LOS C	0.5	3.8	0.69	1.00	0.69	41.2
Approach		63	5.0	63	5.0	0.162	15.7	LOS C	0.5	3.8	0.69	1.00	0.69	41.5
West: Hayes Street														
10	L2	88	5.0	88	5.0	0.261	4.7	LOS A	0.0	0.0	0.00	0.10	0.00	55.6
11	T1	444	5.0	444	5.0	0.261	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	58.6
Approach		533	5.0	533	5.0	0.261	0.8	NA	0.0	0.0	0.00	0.10	0.00	58.1
All Vehicles		973	5.0	973	5.0	0.261	1.6	NA	0.5	3.8	0.07	0.13	0.07	57.0

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - SCHOOL PM

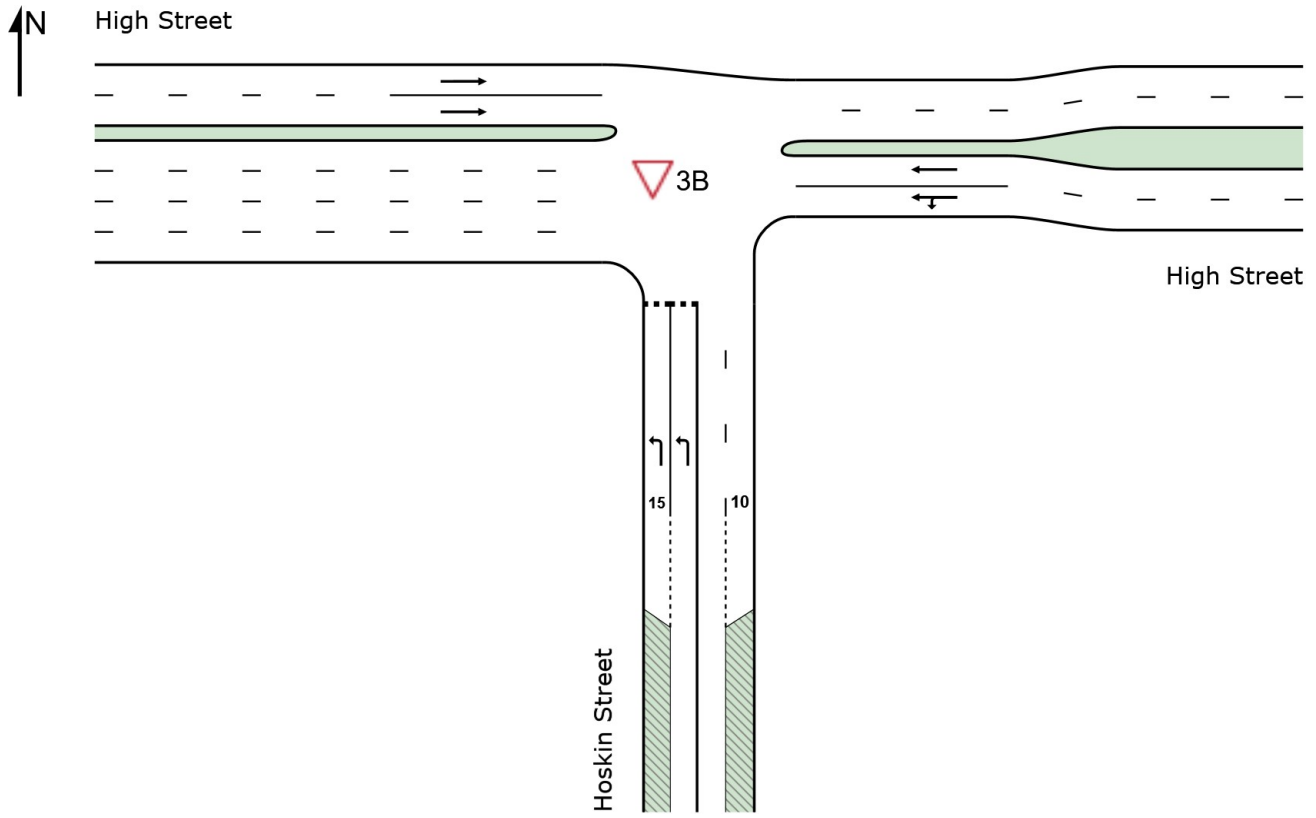
Template: GTA site layout and movement summary

Site: 3B [3B. High Street/Hoskins Street]

Network: 21 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskin Street														
1	L2	1	5.0	1	5.0	0.001	7.2	LOS A	0.0	0.0	0.16	0.59	0.16	32.3
Approach		1	5.0	1	5.0	0.001	7.2	LOS A	0.0	0.0	0.16	0.59	0.16	32.3
East: High Street														
4	L2	225	5.0	225	5.0	0.305	4.9	LOS A	0.0	0.0	0.00	0.23	0.00	45.4
5	T1	914	5.0	914	5.0	0.305	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	55.4
Approach		1139	5.0	1139	5.0	0.305	1.0	NA	0.0	0.0	0.00	0.12	0.00	52.5
West: High Street														
11	T1	760	5.0	760	5.0	0.201	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		760	5.0	760	5.0	0.201	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0

All Vehicles	1900	5.0	1900	5.0	0.305	0.6	NA	0.0	0.0	0.00	0.07	0.00	54.1

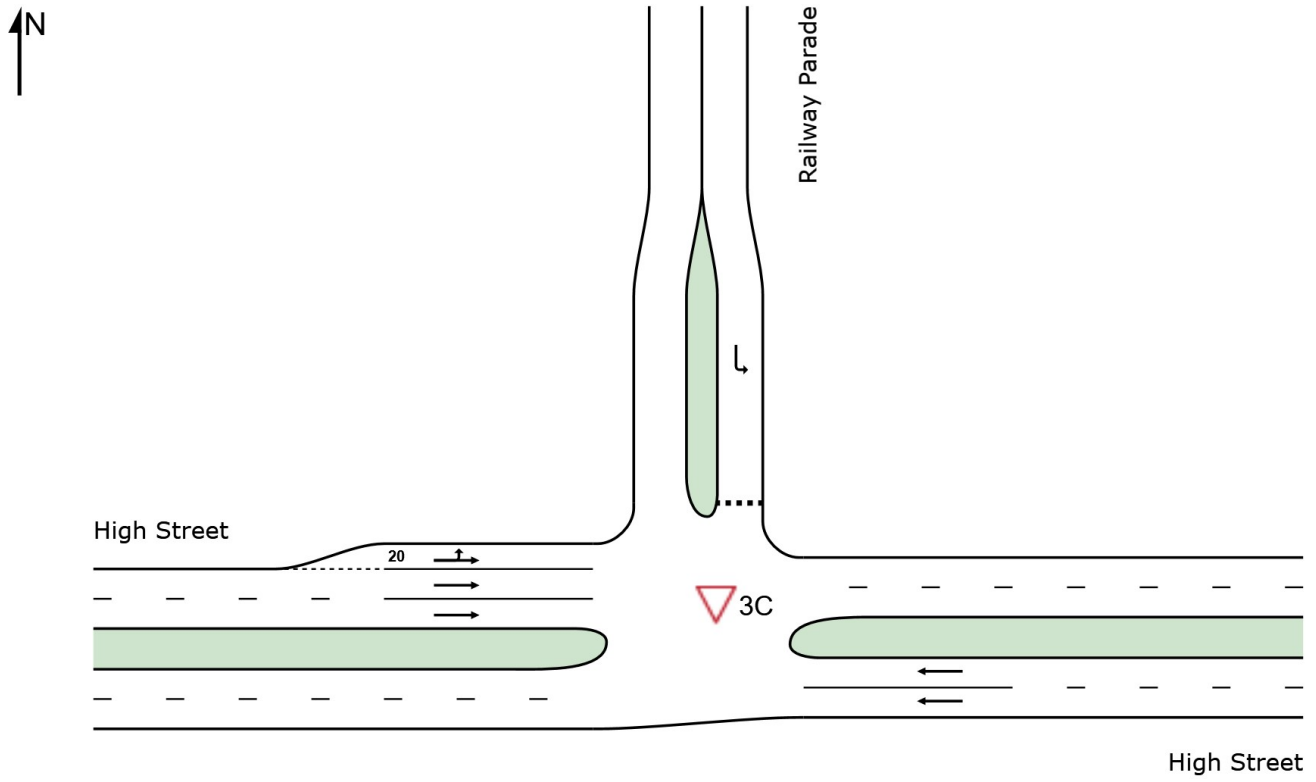
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 3C [3C. High Street/Railway Parade]

Network: 21 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	1139	5.0	1139	5.0	0.302	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1139	5.0	1139	5.0	0.302	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Railway Parade														
7	L2	179	5.0	179	5.0	0.138	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	48.6
Approach		179	5.0	179	5.0	0.138	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	48.6
West: High Street														
10	L2	102	5.0	102	5.0	0.058	4.9	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
11	T1	658	5.0	658	5.0	0.174	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		760	5.0	760	5.0	0.174	0.7	NA	0.0	0.0	0.00	0.08	0.00	56.0
All Vehicles		2078	5.0	2078	5.0	0.302	0.7	NA	0.0	0.0	0.00	0.08	0.00	54.5

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.

USER REPORT FOR NETWORK SITE

Project: 2. 2022 Do Nothing Volumes - SCHOOL PM

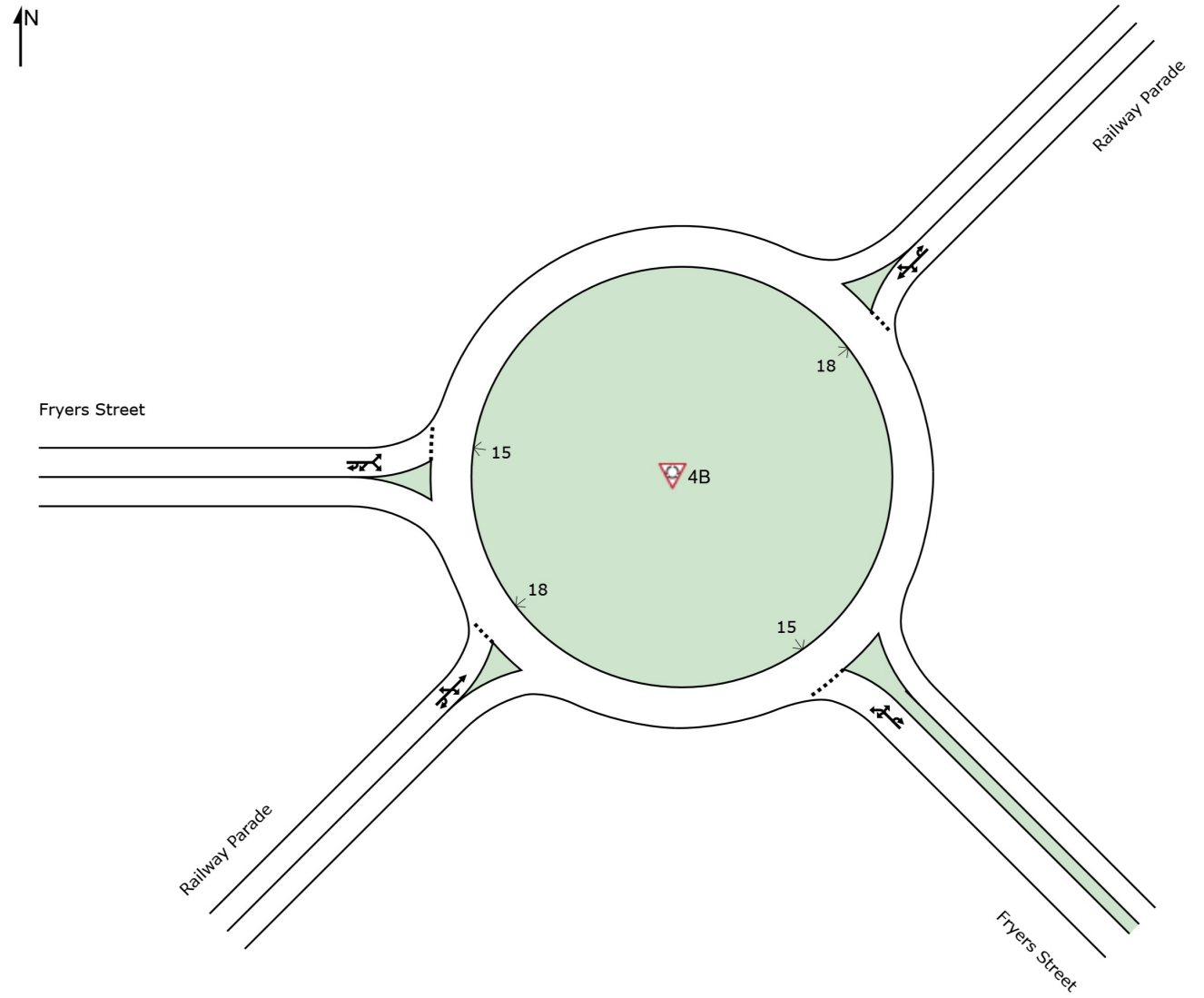
Template: GTA site layout and movement summary

Site: 4B [4B. Fryers Street/Railway Parade]

Network: 22 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

2018 Railway Parade & Fryers Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Fryers Street														
21	L2	1	5.0	1	5.0	0.465	3.2	LOS A	3.0	22.2	0.34	0.57	0.34	43.1
21a	L1	347	5.0	330	5.0	0.465	3.1	LOS A	3.0	22.2	0.34	0.57	0.34	20.3

23	R2	315	5.0	299	5.0	0.465	7.3	LOS A	3.0	22.2	0.34	0.57	0.34	51.3
23u	U	1	5.0	1	5.0	0.465	9.3	LOS A	3.0	22.2	0.34	0.57	0.34	27.9
Approach		664	5.0	632[N1]	5.0	0.465	5.1	LOS A	3.0	22.2	0.34	0.57	0.34	38.2
NorthEast: Railway Parade														
24	L2	342	5.0	342	5.0	0.638	13.0	LOS B	6.3	46.2	0.90	1.04	1.18	42.0
25	T1	51	5.0	51	5.0	0.638	13.3	LOS B	6.3	46.2	0.90	1.04	1.18	46.3
26a	R1	38	5.0	38	5.0	0.638	16.6	LOS B	6.3	46.2	0.90	1.04	1.18	34.8
26u	U	1	5.0	1	5.0	0.638	19.5	LOS B	6.3	46.2	0.90	1.04	1.18	49.8
Approach		432	5.0	432	5.0	0.638	13.4	LOS B	6.3	46.2	0.90	1.04	1.18	41.8
West: Fryers Street														
10a	L1	76	5.0	76	5.0	0.564	7.1	LOS A	4.4	32.0	0.69	0.84	0.77	46.4
12a	R1	437	5.0	437	5.0	0.564	10.5	LOS B	4.4	32.0	0.69	0.84	0.77	22.9
12b	R3	23	5.0	23	5.0	0.564	12.4	LOS B	4.4	32.0	0.69	0.84	0.77	40.4
12u	U	1	5.0	1	5.0	0.564	13.4	LOS B	4.4	32.0	0.69	0.84	0.77	17.3
Approach		537	5.0	537	5.0	0.564	10.1	LOS B	4.4	32.0	0.69	0.84	0.77	31.3
SouthWest: Railway Parade														
30b	L3	45	5.0	45	5.0	0.245	9.6	LOS A	1.4	10.6	0.74	0.84	0.74	26.4
31	T1	22	5.0	22	5.0	0.245	9.7	LOS A	1.4	10.6	0.74	0.84	0.74	47.8
32	R2	91	5.0	91	5.0	0.245	13.9	LOS B	1.4	10.6	0.74	0.84	0.74	35.1
32u	U	1	5.0	1	5.0	0.245	15.8	LOS B	1.4	10.6	0.74	0.84	0.74	44.0
Approach		159	5.0	159	5.0	0.245	12.1	LOS B	1.4	10.6	0.74	0.84	0.74	34.8
All Vehicles		1792	5.0	1759[N1]	5.1	0.638	9.3	LOS A	6.3	46.2	0.62	0.79	0.72	37.8

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

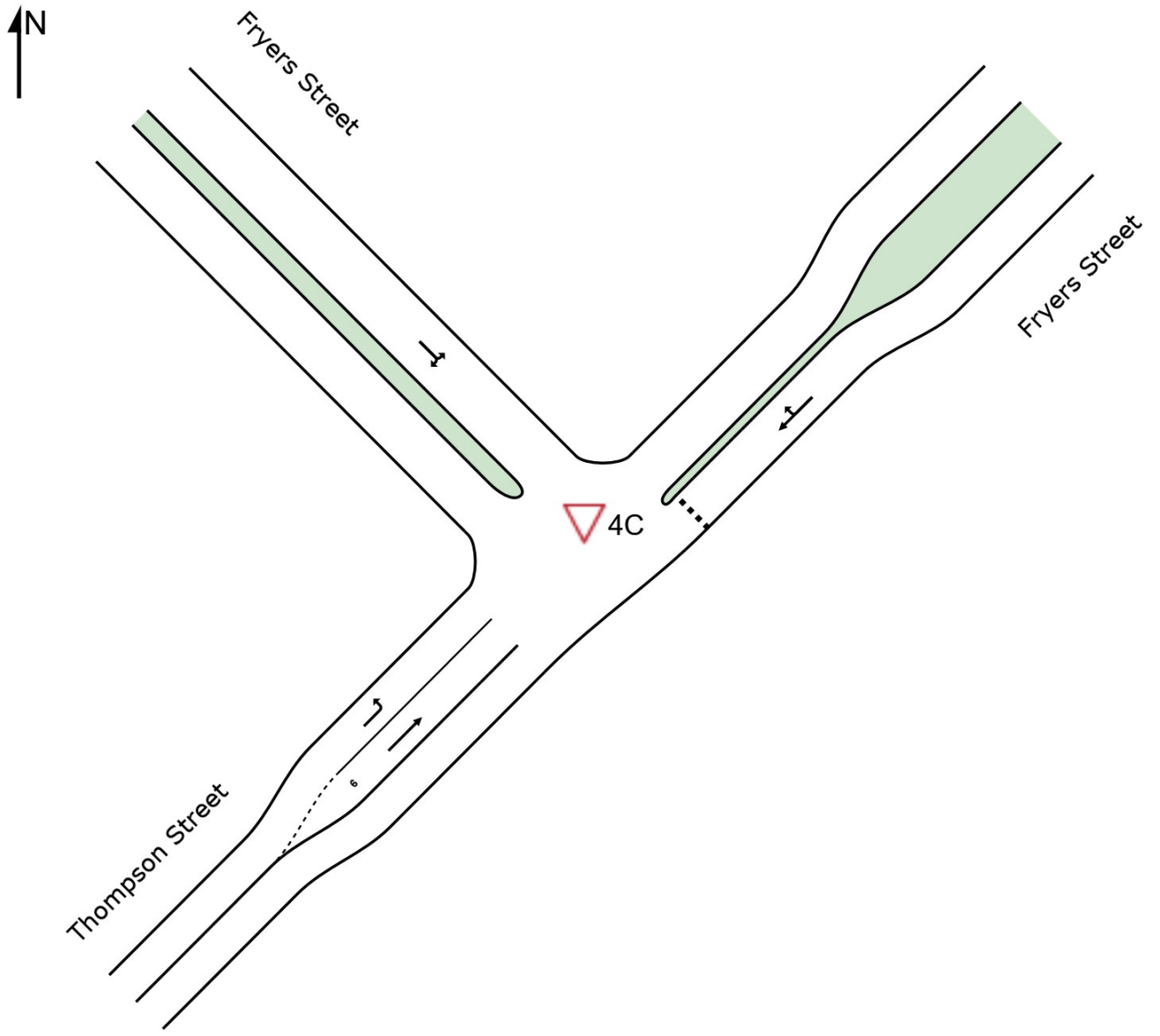
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Site: 4C [4C. Fryers Street/Thompson Street]

Network: 22 [4. Fryers Street/Skene Street/ Railway Parade/Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Fryers Street														
25	T1	5	5.0	5	5.0	1.167	195.5	LOS F	28.7	209.4	1.00	2.87	8.26	7.9
26	R2	227	5.0	227	5.0	1.167	208.0	LOS F	28.7	209.4	1.00	2.87	8.26	5.3
Approach		233	5.0	233	5.0	1.167	207.7	LOS F	28.7	209.4	1.00	2.87	8.26	5.3

NorthWest: Fryers Street														
27	L2	355	5.0	355	5.0	0.557	4.1	LOS A	4.6	33.4	0.16	0.50	0.16	47.0
29	R2	515	5.0	515	5.0	0.557	4.1	LOS A	4.6	33.4	0.16	0.50	0.16	42.7
Approach		869	5.0	869	5.0	0.557	4.1	NA	4.6	33.4	0.16	0.50	0.16	44.7
SouthWest: Thompson Street														
30	L2	435	5.0	435	5.0	0.234	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	42.0
31	T1	23	5.0	23	5.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		458	5.0	458	5.0	0.234	5.3	NA	0.0	0.0	0.00	0.55	0.00	43.5
All Vehicles		1560	5.0	1560	5.0	1.167	34.8	NA	28.7	209.4	0.24	0.87	1.32	19.6

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR SITE

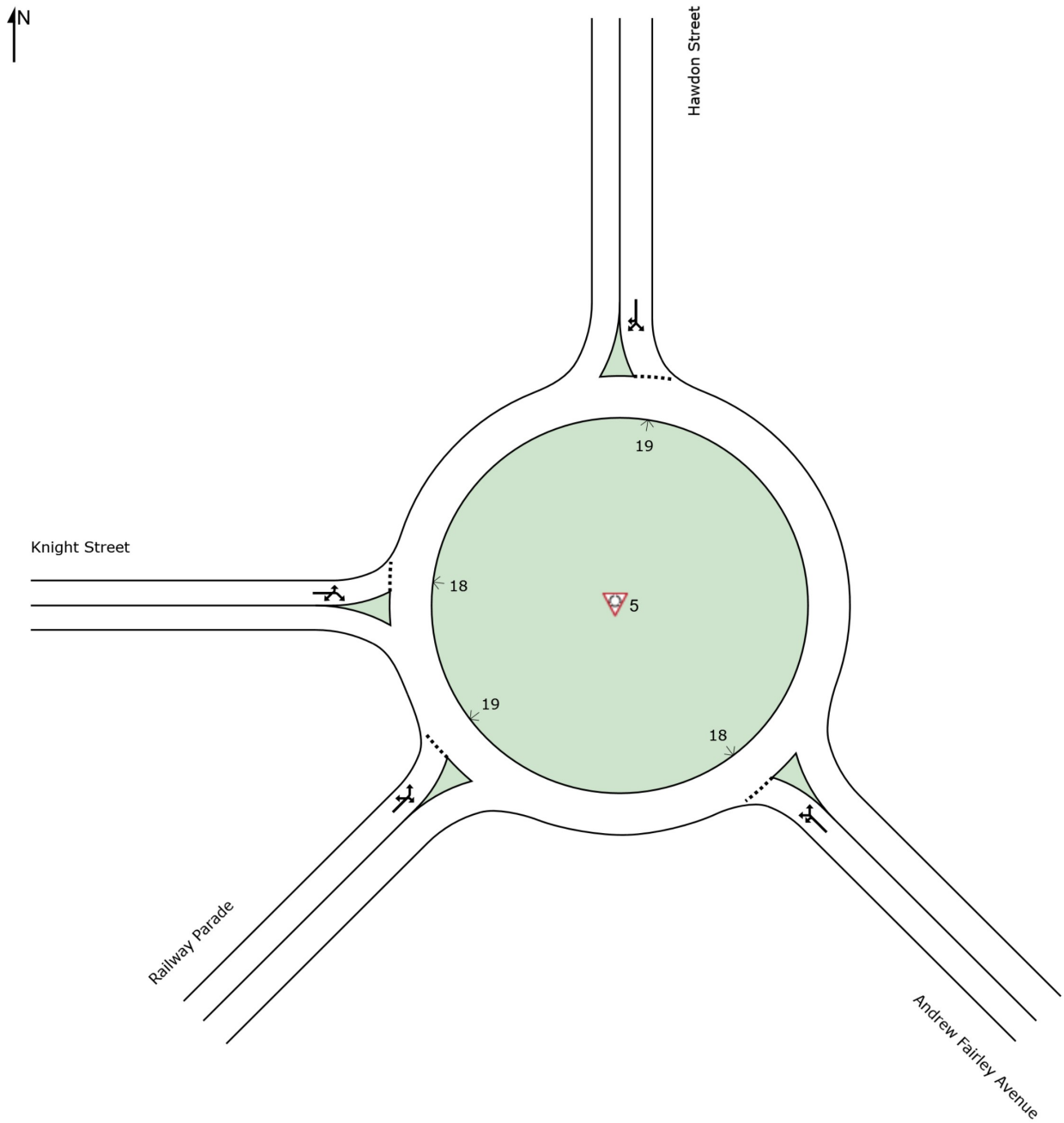
Project: 2. 2022 Do Nothing Volumes - SCHOOL PM

Template: GTA site layout and movement summary

Site: 5 [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	24	5.0	0.848	15.7	LOS B	13.2	96.7	1.00	1.22	1.59	45.8
21a	L1	234	5.0	0.848	15.4	LOS B	13.2	96.7	1.00	1.22	1.59	46.5
23a	R1	465	5.0	0.848	19.3	LOS B	13.2	96.7	1.00	1.22	1.59	46.3
Approach		723	5.0	0.848	17.9	LOS B	13.2	96.7	1.00	1.22	1.59	46.3
North: Hawdon Street												
7a	L1	347	5.0	0.776	7.9	LOS A	9.1	66.4	0.82	0.87	0.98	51.5
9a	R1	474	5.0	0.776	11.8	LOS B	9.1	66.4	0.82	0.87	0.98	51.2
9	R2	27	5.0	0.776	12.8	LOS B	9.1	66.4	0.82	0.87	0.98	51.6
Approach		848	5.0	0.776	10.2	LOS B	9.1	66.4	0.82	0.87	0.98	51.3
West: Knight Street												
10	L2	88	5.0	0.659	18.6	LOS B	7.0	50.9	0.99	1.17	1.46	43.8
12a	R1	239	5.0	0.659	22.2	LOS C	7.0	50.9	0.99	1.17	1.46	44.3
12b	R3	49	5.0	0.659	24.2	LOS C	7.0	50.9	0.99	1.17	1.46	44.9
Approach		377	5.0	0.659	21.6	LOS C	7.0	50.9	0.99	1.17	1.46	44.2
SouthWest: Railway Parade												
30b	L3	46	5.0	0.728	15.2	LOS B	8.4	61.2	1.00	1.16	1.41	46.9
30a	L1	363	5.0	0.728	14.7	LOS B	8.4	61.2	1.00	1.16	1.41	47.9
32	R2	62	5.0	0.728	19.6	LOS B	8.4	61.2	1.00	1.16	1.41	48.1
Approach		472	5.0	0.728	15.4	LOS B	8.4	61.2	1.00	1.16	1.41	47.8
All Vehicles		2420	5.0	0.848	15.3	LOS B	13.2	96.7	0.93	1.08	1.32	47.9

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

USER REPORT FOR SITE

Project: 3. 2022 Mitigation Scenarios Review - AM

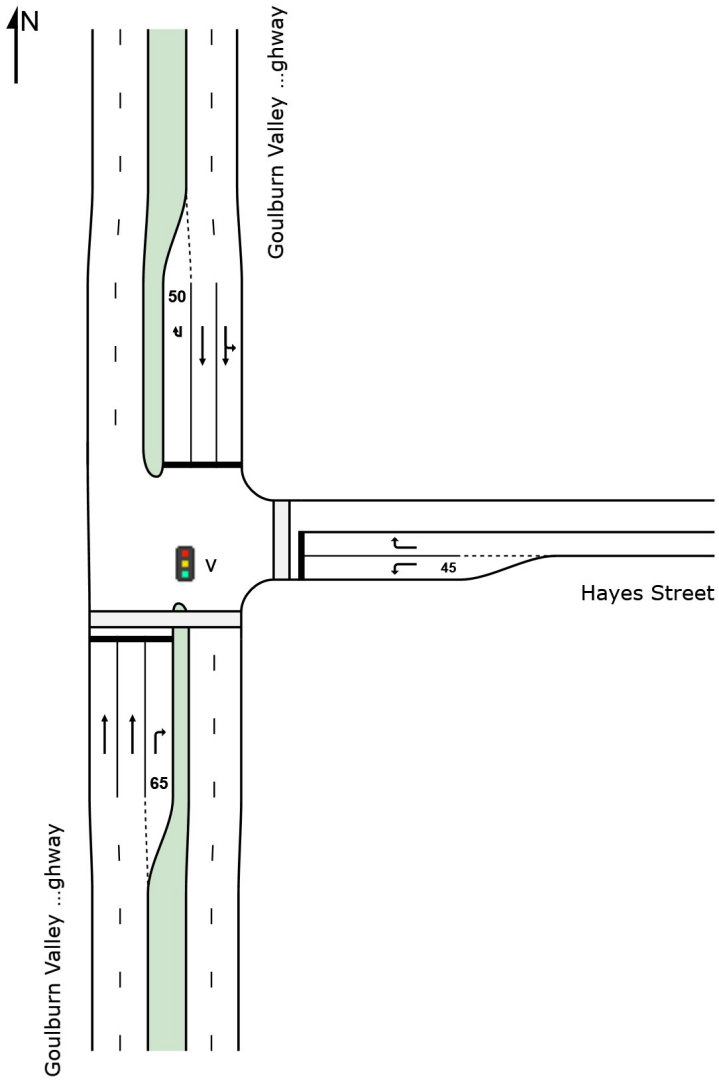
Template: GTA site layout and movement summary

Site: v [1. Goulbourn Valley Highway/Hayes Street]

2018 Goulburn Valley Highway & Hayes (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2*, C3*
Output Phase Sequence: A, B, C1, C2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
South: Goulburn Valley Highway												
2	T1	1347	5.0	0.659	13.3	LOS B	21.6	157.8	0.71	0.64	0.71	49.2
3	R2	221	5.0	0.477	36.7	LOS D	8.4	61.1	0.90	0.81	0.90	36.7
Approach		1568	5.0	0.659	16.6	LOS B	21.6	157.8	0.73	0.66	0.73	47.0
East: Hayes Street												
4	L2	223	5.0	0.308	21.6	LOS C	6.1	44.7	0.71	0.75	0.71	43.2
6	R2	20	5.0	0.073	41.2	LOS D	0.8	5.6	0.88	0.70	0.88	35.2
Approach		243	5.0	0.308	23.3	LOS C	6.1	44.7	0.73	0.75	0.73	42.4
North: Goulburn Valley Highway												
7	L2	72	5.0	0.470	27.8	LOS C	11.2	81.7	0.80	0.71	0.80	42.4
8	T1	612	5.0	0.470	22.2	LOS C	11.3	82.5	0.80	0.70	0.80	43.7
9u	U	1	5.0	0.012	51.1	LOS D	0.0	0.3	0.95	0.60	0.95	31.9
Approach		684	5.0	0.470	22.8	LOS C	11.3	82.5	0.80	0.70	0.80	43.5
All Vehicles		2496	5.0	0.659	19.0	LOS B	21.6	157.8	0.75	0.68	0.75	45.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - AM

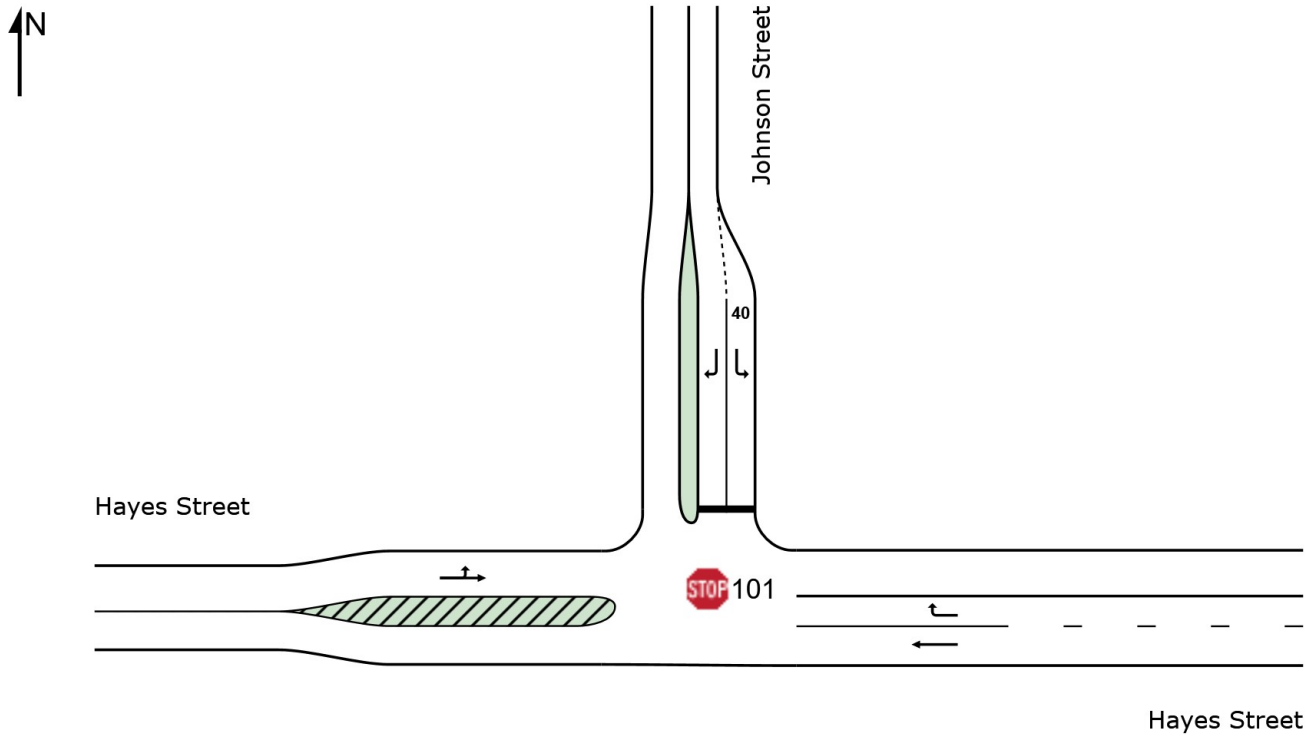
Template: GTA site layout and movement summary

Site: 101 [2A. Hayes Street/Johnson Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	205	5.0	205	5.0	0.103	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	394	5.0	394	5.0	0.300	6.1	LOS A	0.6	4.6	0.46	0.64	0.46	48.4
Approach		599	5.0	599	5.0	0.300	4.0	NA	0.6	4.6	0.30	0.42	0.30	50.7
North: Johnson Street														
7	L2	107	5.0	107	5.0	0.092	9.0	LOS A	0.1	1.1	0.30	0.88	0.30	47.5
9	R2	189	5.0	189	5.0	0.611	27.1	LOS D	1.4	10.1	0.86	1.18	1.50	37.3
Approach		297	5.0	297	5.0	0.611	20.6	LOS C	1.4	10.1	0.66	1.07	1.07	39.6
West: Hayes Street														
10	L2	118	5.0	118	5.0	0.146	5.6	LOS A	0.0	0.0	0.00	0.24	0.00	55.0
11	T1	177	5.0	177	5.0	0.146	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	52.6
Approach		295	5.0	295	5.0	0.146	2.2	NA	0.0	0.0	0.00	0.24	0.00	54.1

All Vehicles	1191	5.0	1191	5.0	0.611	7.7	NA	1.4	10.1	0.32	0.54	0.42	47.2

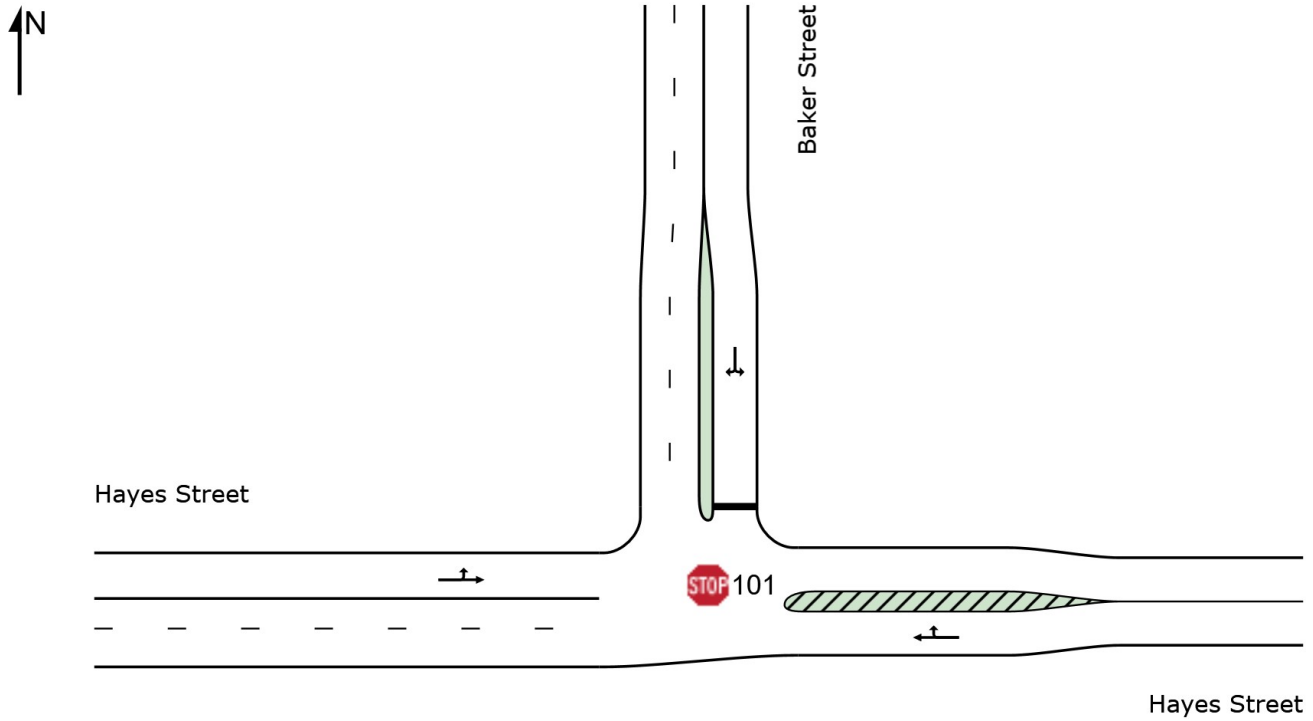
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 101 [2B. Hayes Street/Baker Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	514	5.0	514	5.0	0.274	0.1	LOS A	0.1	0.9	0.06	0.03	0.06	58.9
6	R2	28	5.0	28	5.0	0.274	7.0	LOS A	0.1	0.9	0.06	0.03	0.06	57.4
Approach		542	5.0	542	5.0	0.274	0.5	NA	0.1	0.9	0.06	0.03	0.06	58.7
North: Baker Street														
7	L2	6	5.0	6	5.0	0.201	9.1	LOS A	0.3	2.0	0.61	0.99	0.63	48.1
9	R2	84	5.0	84	5.0	0.201	14.9	LOS B	0.3	2.0	0.61	0.99	0.63	42.2
Approach		91	5.0	91	5.0	0.201	14.5	LOS B	0.3	2.0	0.61	0.99	0.63	42.8
West: Hayes Street														
10	L2	114	5.0	114	5.0	0.142	4.7	LOS A	0.0	0.0	0.00	0.23	0.00	54.0
11	T1	172	5.0	172	5.0	0.142	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	56.9
Approach		285	5.0	285	5.0	0.142	1.9	NA	0.0	0.0	0.00	0.23	0.00	55.7
All Vehicles		918	5.0	918	5.0	0.274	2.3	NA	0.3	2.0	0.10	0.19	0.10	55.7

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.
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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - AM

Template: GTA site layout and movement summary

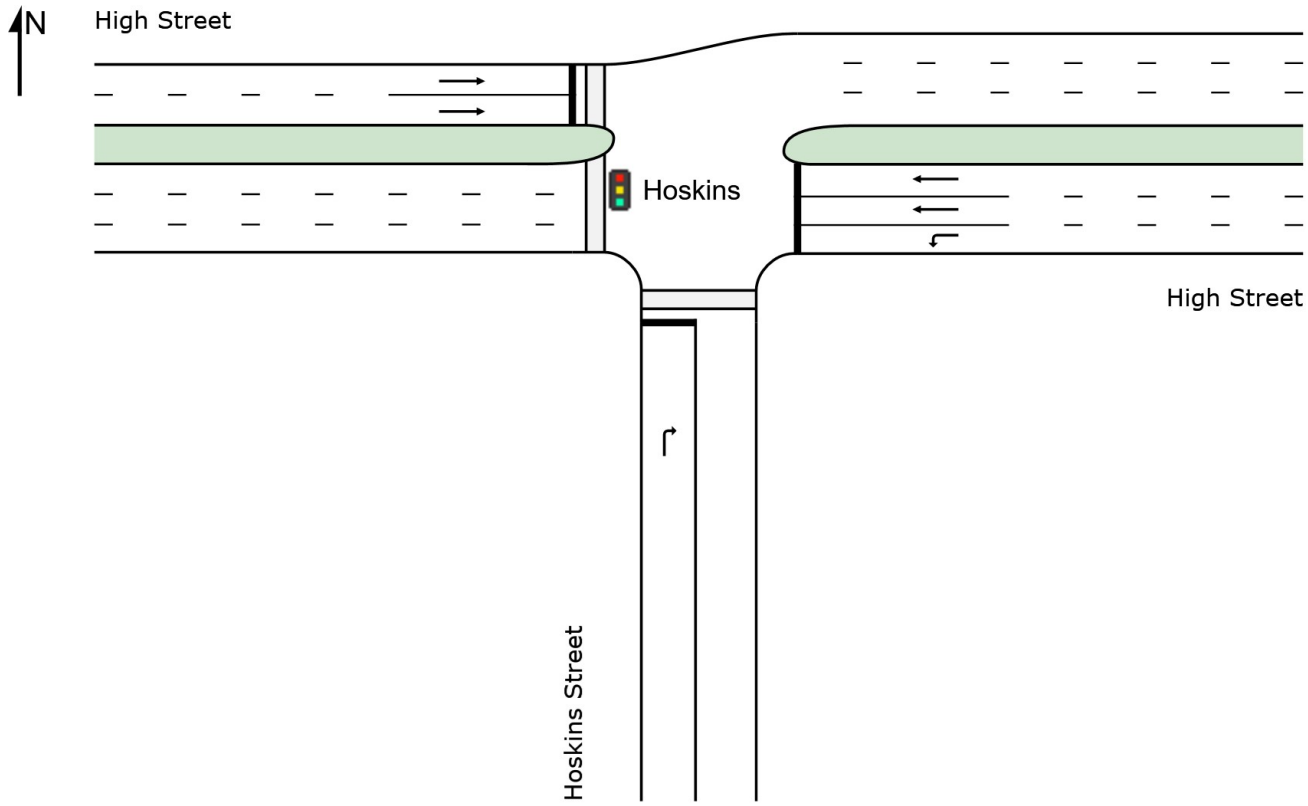
Site: Hoskins [3B. High Street/Hoskins Street]

Network: 10 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1, B3*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskins Street														
3	R2	193	5.0	193	5.0	0.423	37.8	LOS D	4.5	32.7	0.90	0.80	0.90	27.2
Approach		193	5.0	193	5.0	0.423	37.8	LOS D	4.5	32.7	0.90	0.80	0.90	27.2
East: High Street														

4	L2	486	5.0	486	5.0	0.433	14.8	LOS B	7.5	54.8	0.62	0.77	0.62	40.7
5	T1	547	5.0	547	5.0	0.229	0.9	LOS A	0.5	3.3	0.06	0.05	0.06	54.6
Approach		1034	5.0	1034	5.0	0.433	7.4	LOS A	7.5	54.8	0.32	0.39	0.32	43.2
West: High Street														
11	T1	455	5.0	455	5.0	0.285	18.3	LOS B	4.0	29.2	0.70	0.59	0.70	11.9
Approach		455	5.0	455	5.0	0.285	18.3	LOS B	4.0	29.2	0.70	0.59	0.70	11.9
All Vehicles		1681	5.0	1681	5.0	0.433	13.9	LOS B	7.5	54.8	0.49	0.49	0.49	33.3

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.

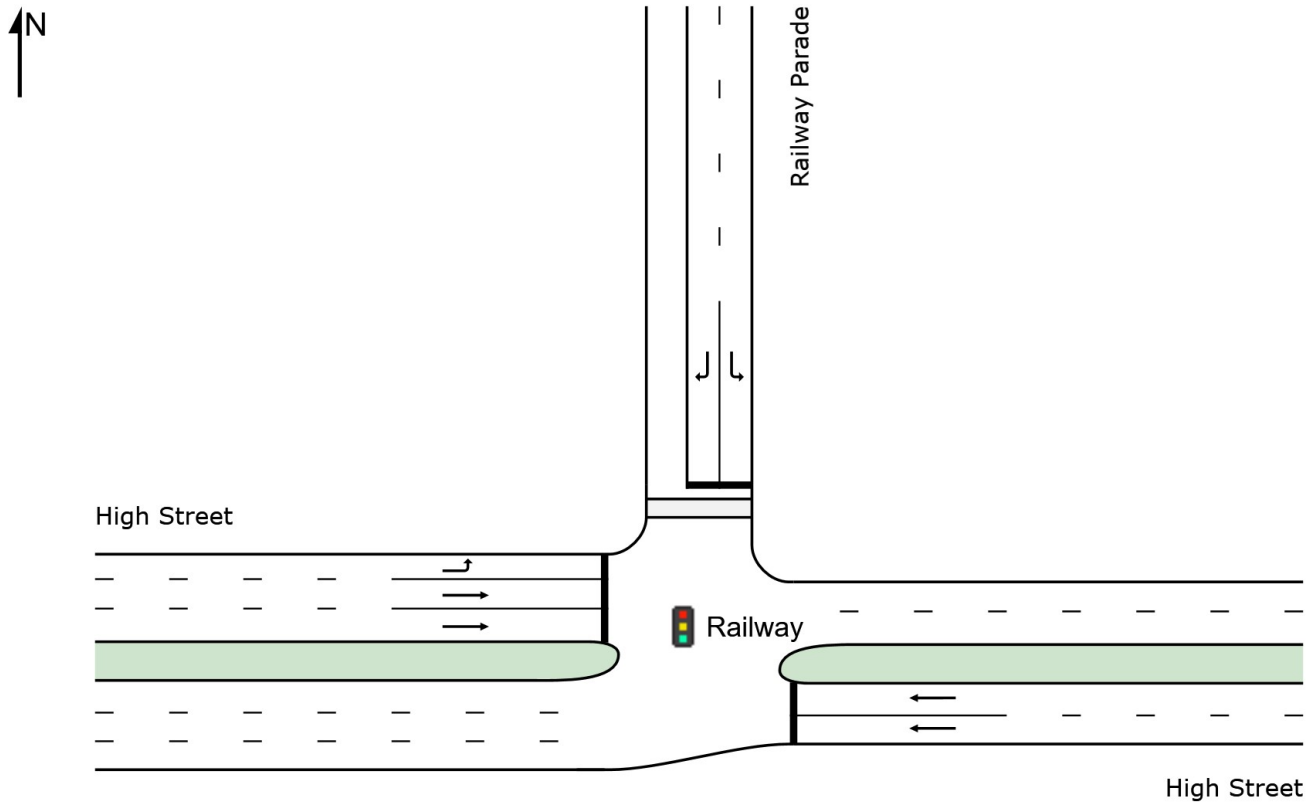
Site: Railway [3C. High Street/Railway Parade]

Network: 10 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1, B3*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	767	5.0	767	5.0	0.505	20.6	LOS C	8.0	58.7	0.79	0.68	0.79	11.9
Approach		767	5.0	767	5.0	0.505	20.6	LOS C	8.0	58.7	0.79	0.68	0.79	11.9
North: Railway Parade														
7	L2	15	5.0	15	5.0	0.022	24.9	LOS C	0.2	1.8	0.66	0.67	0.66	33.6
9	R2	266	5.0	266	5.0	0.497	29.7	LOS C	5.6	41.1	0.82	0.81	0.82	30.7
Approach		281	5.0	281	5.0	0.497	29.5	LOS C	5.6	41.1	0.82	0.80	0.82	30.8

West: High Street														
10	L2	128	5.0	128	5.0	0.148	30.3	LOS C	3.4	24.6	1.00	0.82	1.00	31.4
11	T1	519	5.0	519	5.0	0.273	4.0	LOS A	1.7	12.1	0.20	0.17	0.20	42.4
Approach		647	5.0	647	5.0	0.273	9.2	LOS A	3.4	24.6	0.36	0.30	0.36	36.3
All Vehicles		1696	5.0	1696	5.0	0.505	17.7	LOS B	8.0	58.7	0.63	0.56	0.63	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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - AM

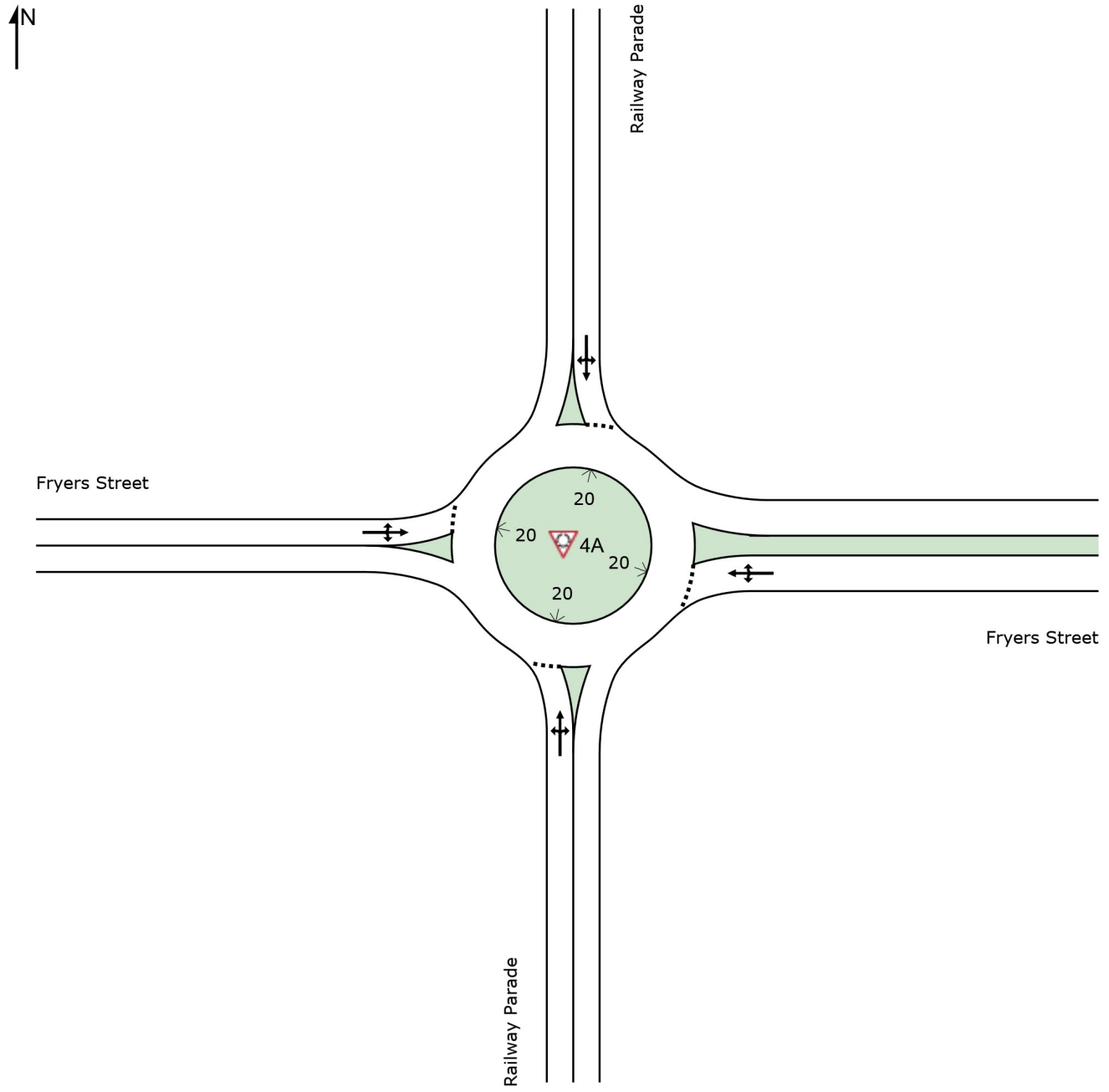
Template: GTA site layout and movement summary

Site: 4A [4A. Railway Parade Fryers Street Option 3]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Parade														
30	L2	66	5.0	66	5.0	0.381	12.5	LOS B	2.9	21.1	0.96	0.98	1.00	48.9
31	T1	107	5.0	107	5.0	0.381	12.7	LOS B	2.9	21.1	0.96	0.98	1.00	50.0
32	R2	6	5.0	6	5.0	0.381	17.3	LOS B	2.9	21.1	0.96	0.98	1.00	42.7
Approach		180	5.0	180	5.0	0.381	12.8	LOS B	2.9	21.1	0.96	0.98	1.00	49.5
East: Fryers Street														
21	L2	12	5.0	12	5.0	0.776	5.4	LOS A	3.4	24.9	0.81	0.84	0.96	48.1
22	T1	619	5.0	617	5.0	0.776	6.0	LOS A	3.4	24.9	0.81	0.84	0.96	50.1
23	R2	243	5.0	242	5.0	0.776	9.8	LOS A	3.4	24.9	0.81	0.84	0.96	49.9
Approach		874	5.0	871[N1]	5.0	0.776	7.0	LOS A	3.4	24.9	0.81	0.84	0.96	50.0
North: Railway Parade														
24	L2	237	5.0	237	5.0	0.571	8.5	LOS A	5.2	38.2	0.81	0.85	0.91	46.3
25	T1	189	5.0	189	5.0	0.571	8.6	LOS A	5.2	38.2	0.81	0.85	0.91	52.5
26	R2	79	5.0	79	5.0	0.571	13.3	LOS B	5.2	38.2	0.81	0.85	0.91	52.4
Approach		505	5.0	505	5.0	0.571	9.3	LOS A	5.2	38.2	0.81	0.85	0.91	50.4
West: Fryers Street														
27	L2	63	5.0	63	5.0	0.500	6.7	LOS A	3.8	27.6	0.71	0.70	0.71	51.9
28	T1	365	5.0	365	5.0	0.500	6.9	LOS A	3.8	27.6	0.71	0.70	0.71	47.4
29	R2	60	5.0	60	5.0	0.500	11.5	LOS B	3.8	27.6	0.71	0.70	0.71	53.1
Approach		488	5.0	488	5.0	0.500	7.4	LOS A	3.8	27.6	0.71	0.70	0.71	49.3
All Vehicles		2047	5.0	2044[N1]	5.0	0.776	8.2	LOS A	5.2	38.2	0.80	0.82	0.89	49.9

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

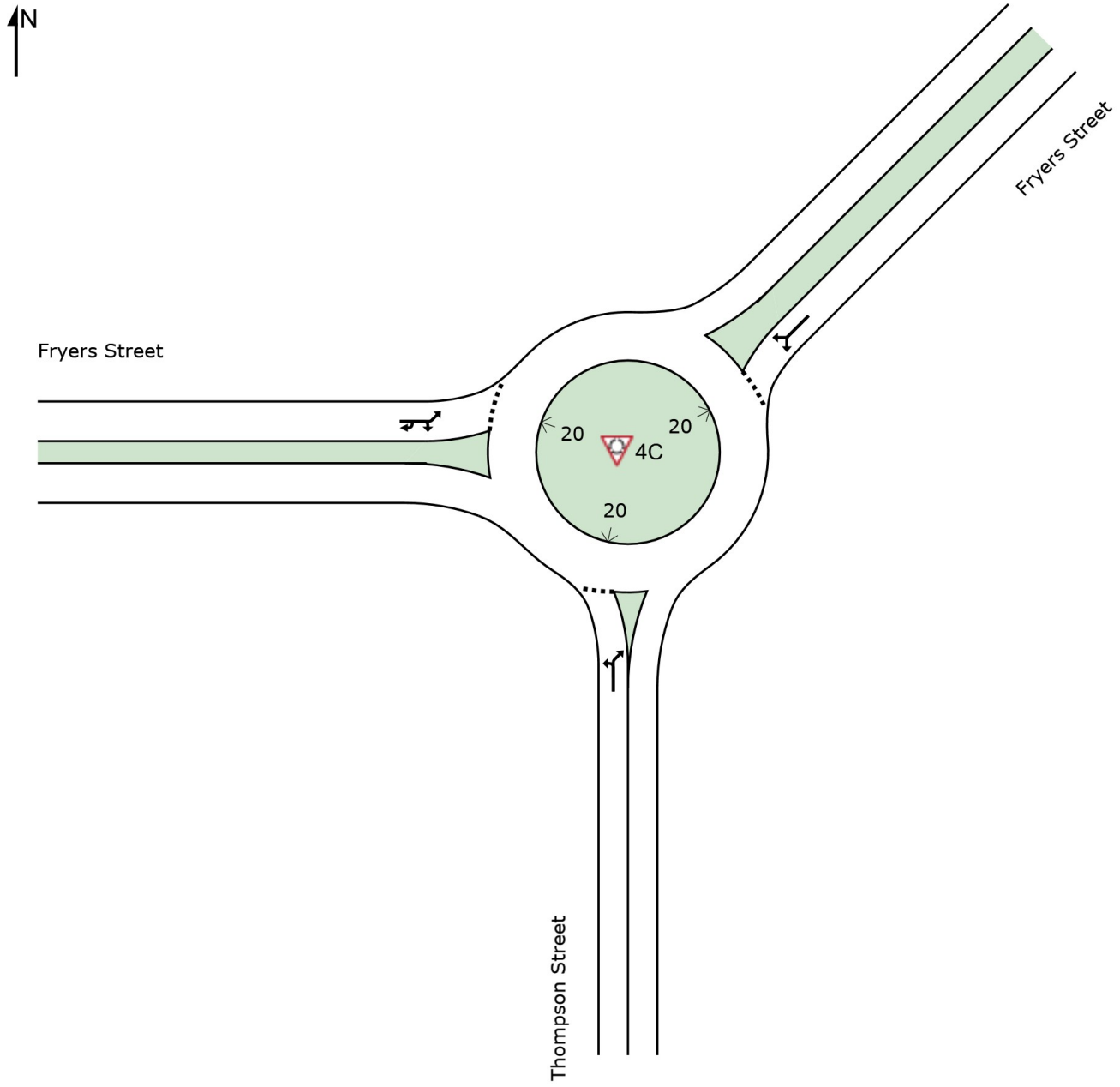
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Site: 4C [4C. Thompson Street Fryers Street Option 3]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Thompson Street														

30	L2	238	5.0	238	5.0	0.608	9.8	LOS A	2.6	19.0	0.76	0.89	0.94	45.4
3a	R1	7	5.0	7	5.0	0.608	13.7	LOS B	2.6	19.0	0.76	0.89	0.94	51.5
Approach		245	5.0	245	5.0	0.608	10.0	LOS A	2.6	19.0	0.76	0.89	0.94	45.7
NorthEast: Fryers Street														
24a	L1	59	5.0	59	5.0	1.244	236.3	LOS F	97.8	713.7	1.00	5.70	11.38	12.3
26a	R1	632	5.0	632	5.0	1.244	240.3	LOS F	97.8	713.7	1.00	5.70	11.38	7.1
Approach		691	5.0	691	5.0	1.244	240.0	LOS F	97.8	713.7	1.00	5.70	11.38	7.6
West: Fryers Street														
10a	L1	215	0.0	215	0.0	0.360	1.6	LOS A	2.3	16.0	0.06	0.60	0.06	53.4
29	R2	389	0.0	389	0.0	0.360	5.8	LOS A	2.3	16.0	0.06	0.60	0.06	54.0
29u	U	4	0.0	4	0.0	0.360	7.9	LOS A	2.3	16.0	0.06	0.60	0.06	26.1
Approach		608	0.0	608	0.0	0.360	4.3	LOS A	2.3	16.0	0.06	0.60	0.06	53.8
All Vehicles		1544	3.0	1544	3.0	1.244	110.6	LOS F	97.8	713.7	0.59	2.93	5.26	14.0

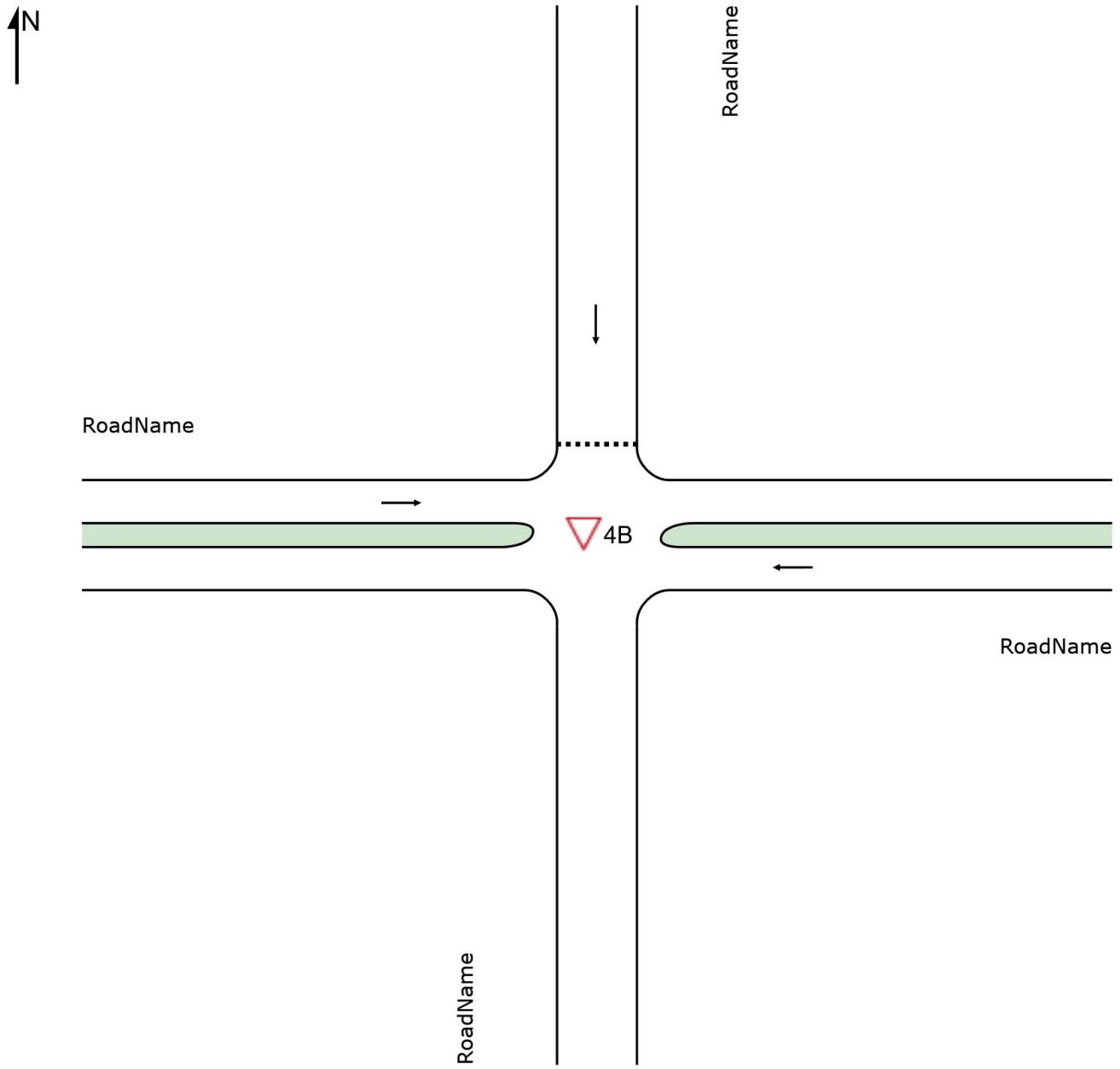
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4B [4B. Railway Crossing Representation]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: RoadName														
5	T1	874	5.0	846	5.0	0.412	0.0	LOS A	4.8	34.8	0.00	0.00	0.00	59.9

Approach		874	5.0	846[N1]	5.0	0.412	0.0	NA	4.8	34.8	0.00	0.00	0.00	59.9
North: RoadName														
8	T1	1	0.0	1	0.0	0.006	24.1	LOS C	0.0	0.1	0.88	0.91	0.88	42.4
Approach		1	0.0	1	0.0	0.006	24.1	LOS C	0.0	0.1	0.88	0.91	0.88	42.4
West: RoadName														
11	T1	608	5.0	608	5.0	0.329	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		608	5.0	608	5.0	0.329	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		1483	5.0	1456[N1]	5.1	0.412	0.0	NA	4.8	34.8	0.00	0.00	0.00	59.2

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.

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

USER REPORT FOR SITE

Project: 3. 2022 Mitigation Scenarios Review - AM

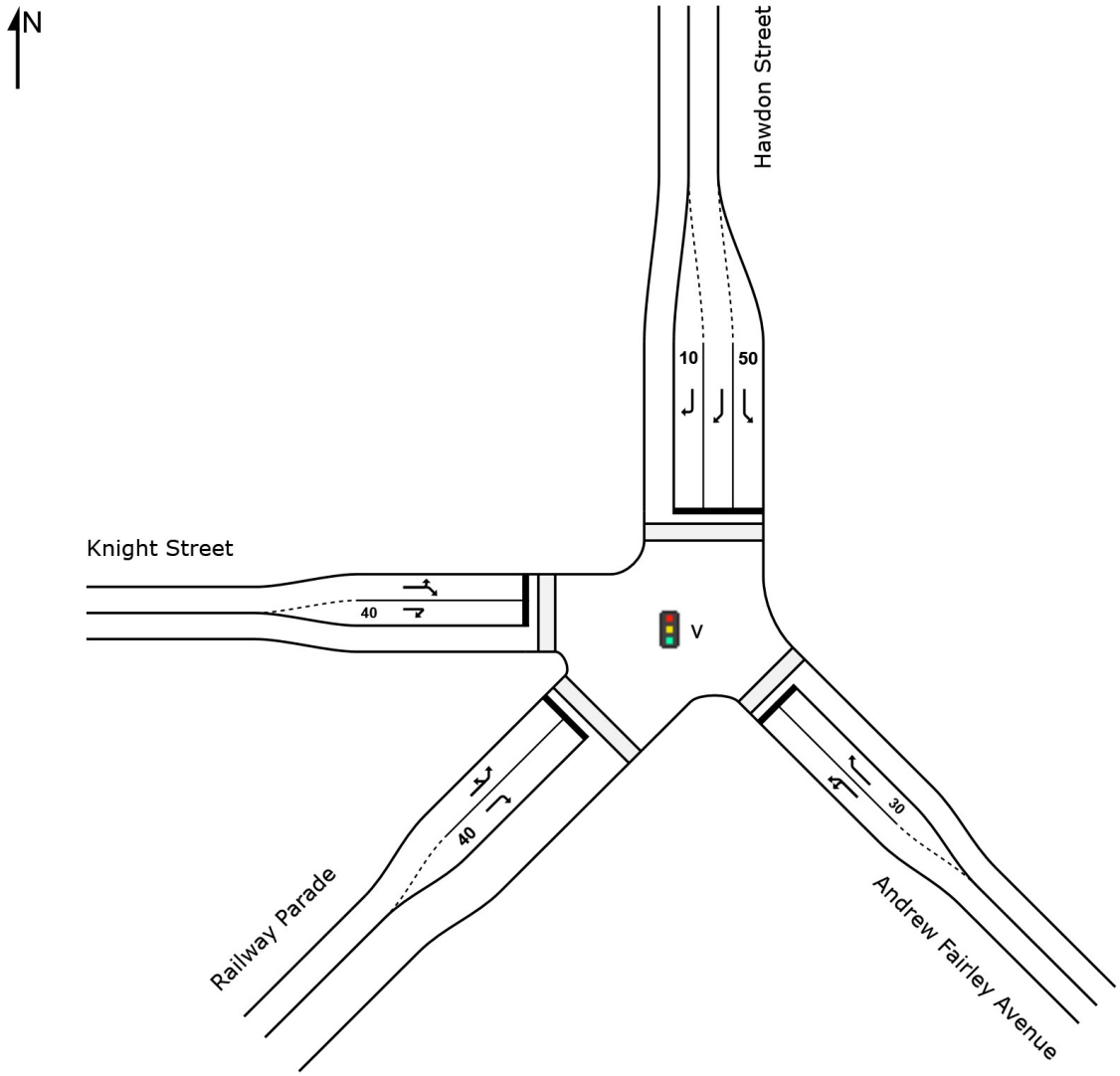
Template: GTA site layout and movement summary

Site: v [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D, D1*, D2*
Output Phase Sequence: A, B, C, D, D2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	31	5.0	0.817	54.4	LOS D	8.0	58.1	1.00	0.95	1.30	25.2
21a	L1	134	5.0	0.817	53.2	LOS D	8.0	58.1	1.00	0.95	1.30	25.5
23a	R1	136	5.0	0.672	49.2	LOS D	6.2	44.9	1.00	0.84	1.10	26.2
Approach		300	5.0	0.817	51.5	LOS D	8.0	58.1	1.00	0.90	1.21	25.8
North: Hawdon Street												
7a	L1	280	5.0	0.244	13.5	LOS B	5.5	40.5	0.49	0.71	0.49	42.7
9a	R1	519	5.0	0.936	56.0	LOS E	28.4	207.0	0.92	1.09	1.37	31.1
9	R2	53	5.0	0.131	36.1	LOS D	1.9	13.7	0.84	0.73	0.84	36.8
Approach		852	5.0	0.936	40.8	LOS D	28.4	207.0	0.78	0.94	1.05	33.7
West: Knight Street												
10	L2	41	5.0	0.899	60.3	LOS E	11.0	80.1	1.00	1.06	1.49	29.9
12a	R1	167	5.0	0.899	59.1	LOS E	11.0	80.1	1.00	1.06	1.49	23.8
12b	R3	3	5.0	0.017	44.5	LOS D	0.1	0.9	0.90	0.64	0.90	34.0
Approach		212	5.0	0.899	59.1	LOS E	11.0	80.1	1.00	1.06	1.48	25.4
SouthWest: Railway Parade												
30b	L3	5	5.0	0.946	71.4	LOS E	22.8	166.4	1.00	1.13	1.85	27.7
30a	L1	382	5.0	0.946	69.4	LOS E	22.8	166.4	1.00	1.13	1.85	27.7
32	R2	17	5.0	0.139	50.9	LOS D	0.7	5.4	0.97	0.69	0.97	25.8
Approach		404	5.0	0.946	68.6	LOS E	22.8	166.4	1.00	1.11	1.82	27.7
All Vehicles		1767	5.0	0.946	51.2	LOS D	28.4	207.0	0.89	0.99	1.30	29.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

USER REPORT FOR SITE

Project: 3. 2022 Mitigation Scenarios Review - PM

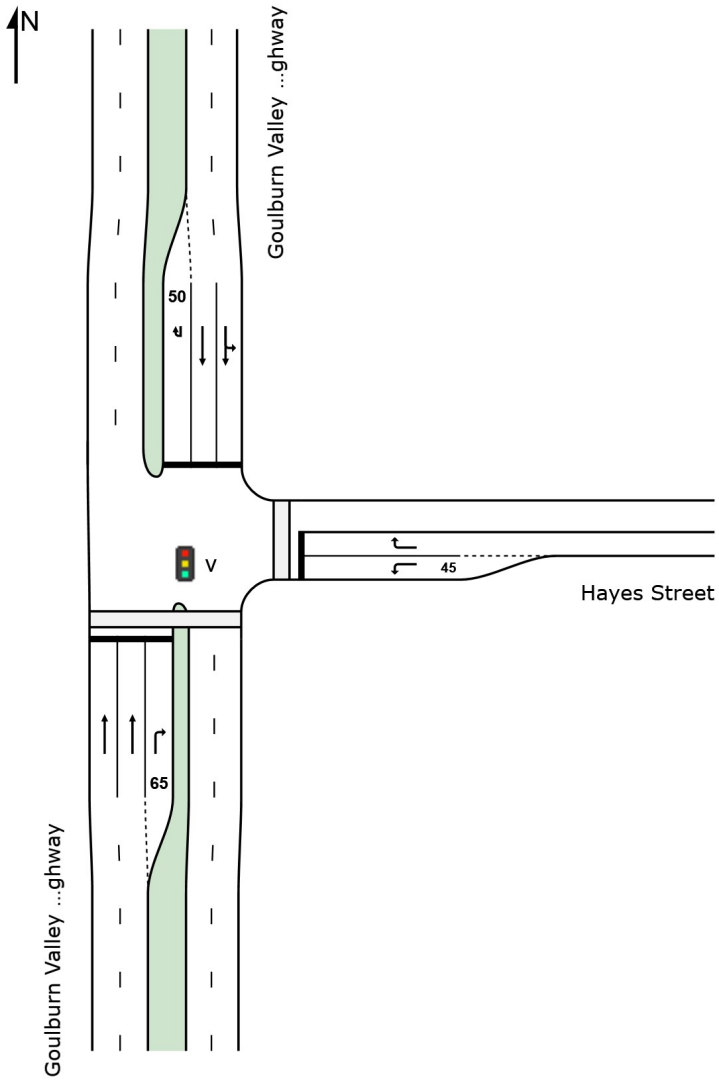
Template: GTA site layout and movement summary

Site: v [1. Goulbourn Valley Highway/Hayes Street]

2018 Goulburn Valley Highway & Hayes (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2*, C3*
Output Phase Sequence: A, B, C1, C2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
South: Goulburn Valley Highway												
2	T1	893	5.0	0.490	17.2	LOS B	13.3	97.2	0.73	0.64	0.73	46.8
3	R2	125	5.0	0.622	49.4	LOS D	5.6	40.8	1.00	0.81	1.05	32.6
Approach		1018	5.0	0.622	21.1	LOS C	13.3	97.2	0.76	0.66	0.77	44.4
East: Hayes Street												
4	L2	400	5.0	0.643	27.4	LOS C	13.5	98.3	0.89	0.83	0.89	40.5
6	R2	29	5.0	0.068	33.9	LOS C	1.0	7.3	0.80	0.70	0.80	37.9
Approach		429	5.0	0.643	27.8	LOS C	13.5	98.3	0.88	0.82	0.88	40.3
North: Goulburn Valley Highway												
7	L2	44	5.0	0.635	26.4	LOS C	18.0	131.0	0.83	0.74	0.83	43.4
8	T1	1013	5.0	0.635	20.8	LOS C	18.0	131.3	0.83	0.74	0.83	44.6
9u	U	1	5.0	0.010	49.7	LOS D	0.0	0.3	0.94	0.60	0.94	32.3
Approach		1058	5.0	0.635	21.1	LOS C	18.0	131.3	0.83	0.74	0.83	44.5
All Vehicles		2505	5.0	0.643	22.3	LOS C	18.0	131.3	0.81	0.72	0.81	43.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - PM

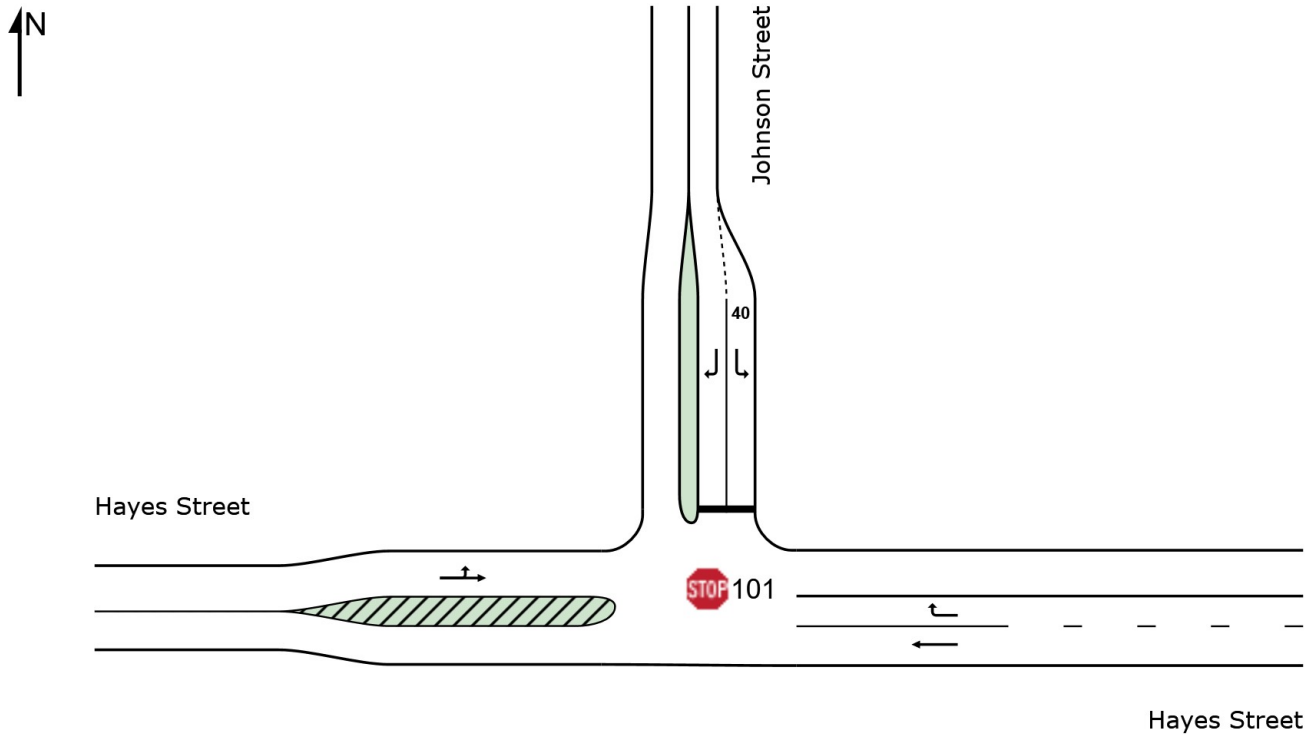
Template: GTA site layout and movement summary

Site: 101 [2A. Hayes Street/Johnson Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	271	5.0	271	5.0	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	221	5.0	221	5.0	0.153	5.5	LOS A	0.3	2.2	0.34	0.57	0.34	48.9
Approach		492	5.0	492	5.0	0.153	2.5	NA	0.3	2.2	0.15	0.26	0.15	52.9
North: Johnson Street														
7	L2	228	5.0	228	5.0	0.179	8.7	LOS A	0.3	2.4	0.23	0.89	0.23	47.7
9	R2	186	5.0	186	5.0	0.432	18.0	LOS C	0.9	6.6	0.72	1.09	1.02	42.3
Approach		415	5.0	415	5.0	0.432	12.9	LOS B	0.9	6.6	0.45	0.98	0.59	44.6
West: Hayes Street														
10	L2	105	5.0	105	5.0	0.103	5.6	LOS A	0.0	0.0	0.00	0.30	0.00	54.3
11	T1	100	5.0	100	5.0	0.103	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	50.9
Approach		205	5.0	205	5.0	0.103	2.9	NA	0.0	0.0	0.00	0.30	0.00	53.4

All Vehicles	1112	5.0	1112	5.0	0.432	6.4	NA	0.9	6.6	0.24	0.54	0.29	49.0

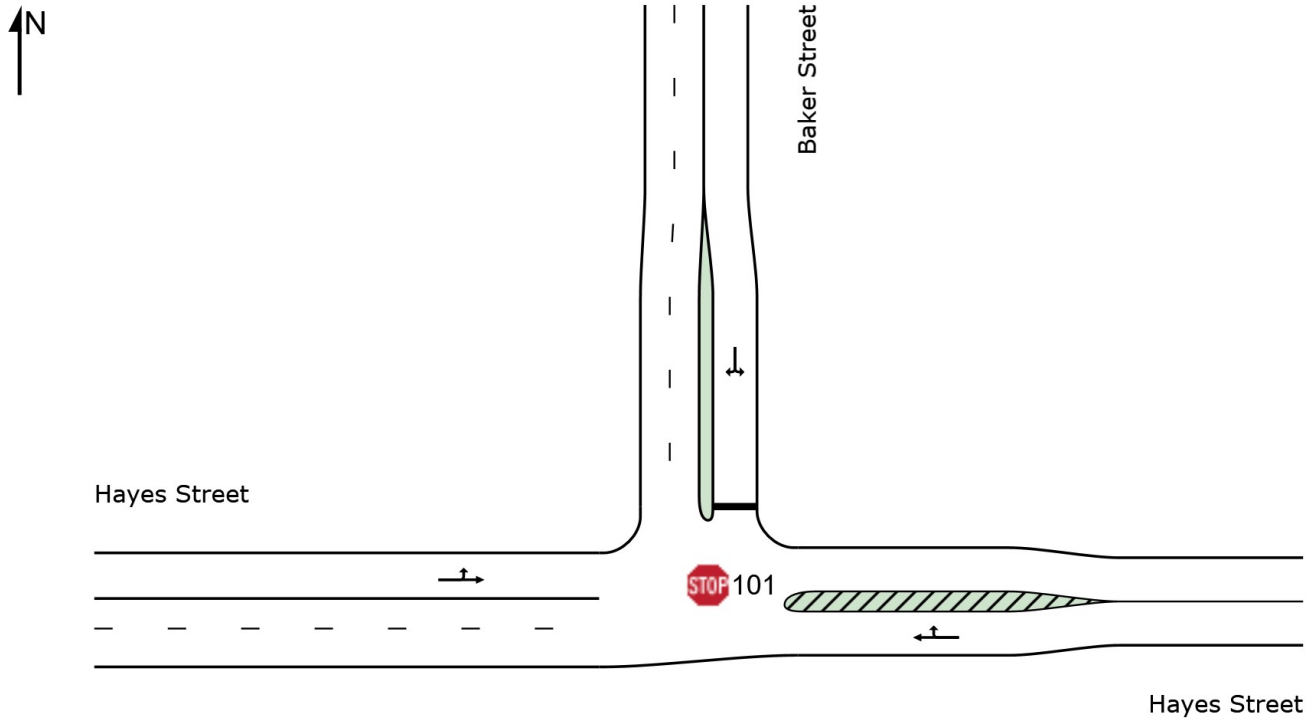
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 101 [2B. Hayes Street/Baker Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	453	5.0	453	5.0	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	1	5.0	1	5.0	0.223	7.2	LOS A	0.0	0.0	0.00	0.00	0.00	57.9
Approach		454	5.0	454	5.0	0.223	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Baker Street														
7	L2	1	5.0	1	5.0	0.086	9.5	LOS A	0.1	0.8	0.62	1.00	0.62	48.5
9	R2	38	5.0	38	5.0	0.086	14.1	LOS B	0.1	0.8	0.62	1.00	0.62	42.7
Approach		39	5.0	39	5.0	0.086	14.0	LOS B	0.1	0.8	0.62	1.00	0.62	43.0
West: Hayes Street														
10	L2	40	5.0	40	5.0	0.161	4.7	LOS A	0.0	0.0	0.00	0.07	0.00	55.9
11	T1	288	5.0	288	5.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.0
Approach		328	5.0	328	5.0	0.161	0.6	NA	0.0	0.0	0.00	0.07	0.00	58.6
All Vehicles		821	5.0	821	5.0	0.223	0.9	NA	0.1	0.8	0.03	0.08	0.03	58.3

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - PM

Template: GTA site layout and movement summary

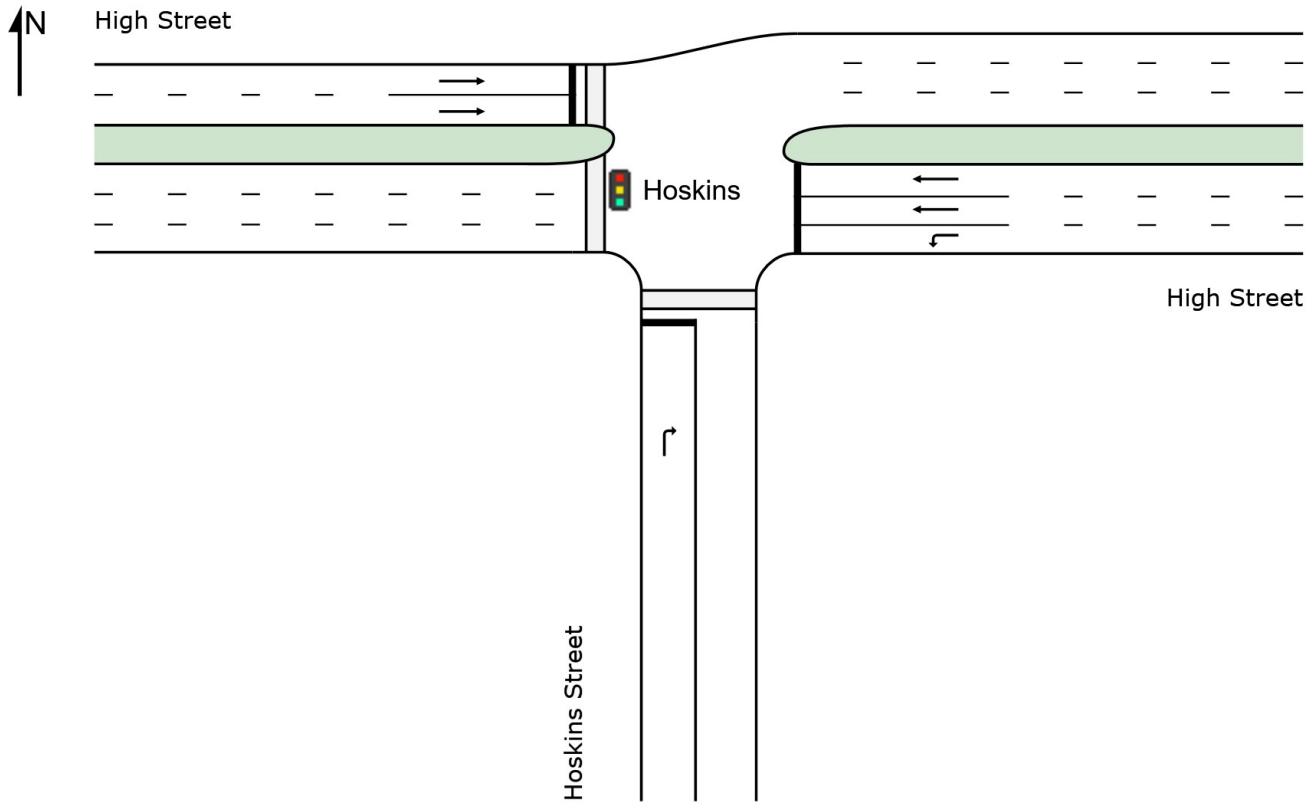
Site: Hoskins [3B. High Street/Hoskins Street]

Network: 10 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1, B3*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskins Street														
3	R2	143	5.0	143	5.0	0.347	38.8	LOS D	3.3	24.4	0.90	0.78	0.90	26.8
Approach		143	5.0	143	5.0	0.347	38.8	LOS D	3.3	24.4	0.90	0.78	0.90	26.8
East: High Street														

4	L2	234	5.0	234	5.0	0.201	12.2	LOS B	2.9	21.2	0.50	0.71	0.50	42.8
5	T1	868	5.0	868	5.0	0.351	1.8	LOS A	2.0	15.0	0.11	0.10	0.11	50.2
Approach		1102	5.0	1102	5.0	0.351	4.0	LOS A	2.9	21.2	0.19	0.23	0.19	46.1
West: High Street														
11	T1	756	5.0	756	5.0	0.353	11.3	LOS B	5.5	39.8	0.58	0.51	0.58	17.3
Approach		756	5.0	756	5.0	0.353	11.3	LOS B	5.5	39.8	0.58	0.51	0.58	17.3
All Vehicles		2001	5.0	2001	5.0	0.353	9.2	LOS A	5.5	39.8	0.39	0.37	0.39	33.6

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.

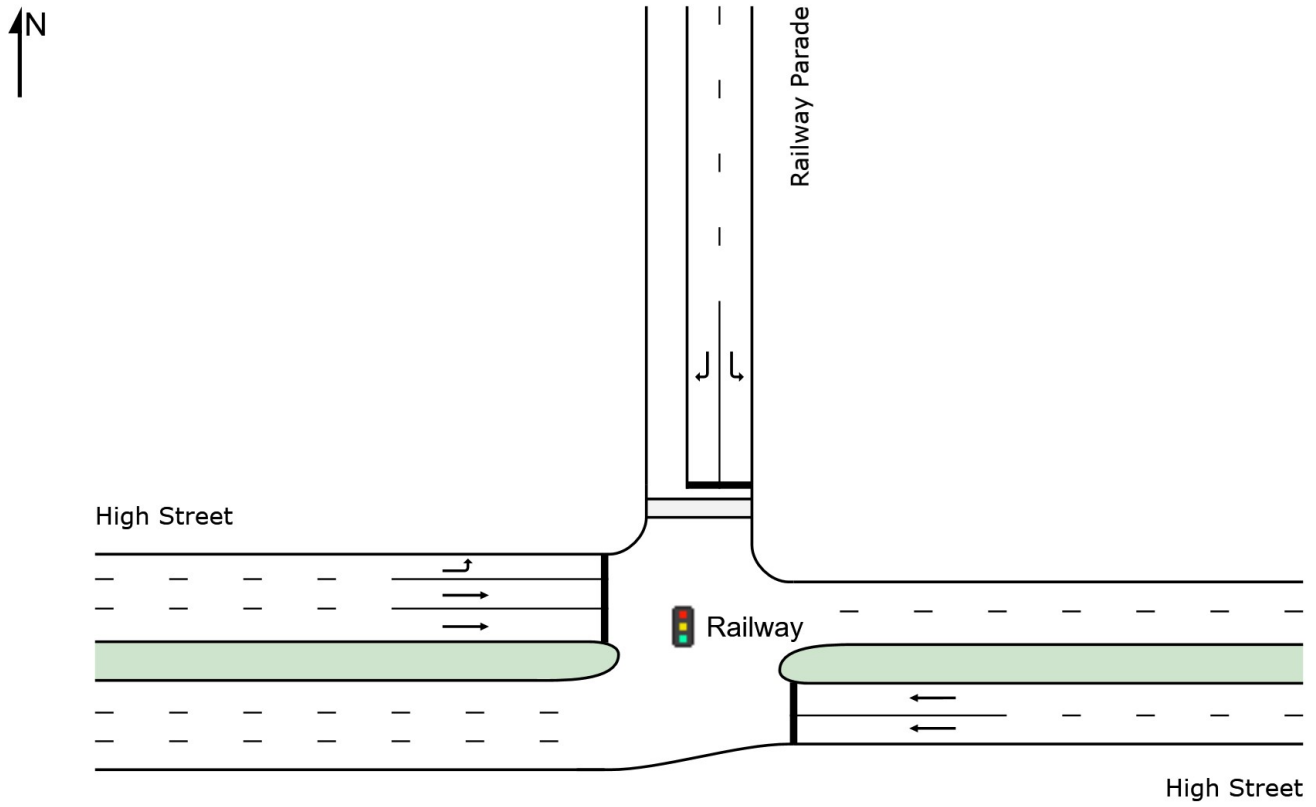
Site: Railway [3C. High Street/Railway Parade]

Network: 10 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1, B3*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	925	5.0	925	5.0	0.432	11.9	LOS B	7.2	52.2	0.62	0.54	0.62	17.9
Approach		925	5.0	925	5.0	0.432	11.9	LOS B	7.2	52.2	0.62	0.54	0.62	17.9
North: Railway Parade														
7	L2	144	5.0	144	5.0	0.358	38.1	LOS D	3.3	24.4	0.89	0.78	0.89	27.8
9	R2	177	5.0	177	5.0	0.439	38.8	LOS D	4.2	30.6	0.91	0.80	0.91	26.7
Approach		321	5.0	321	5.0	0.439	38.5	LOS D	4.2	30.6	0.90	0.79	0.90	27.2

West: High Street														
10	L2	34	5.0	34	5.0	0.030	21.7	LOS C	0.9	6.3	1.00	0.76	1.00	36.0
11	T1	865	5.0	865	5.0	0.354	3.2	LOS A	3.4	24.6	0.19	0.17	0.19	45.2
Approach		899	5.0	899	5.0	0.354	3.8	LOS A	3.4	24.6	0.22	0.19	0.22	43.7
All Vehicles		2145	5.0	2145	5.0	0.439	12.5	LOS B	7.2	52.2	0.49	0.43	0.49	28.5

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - PM

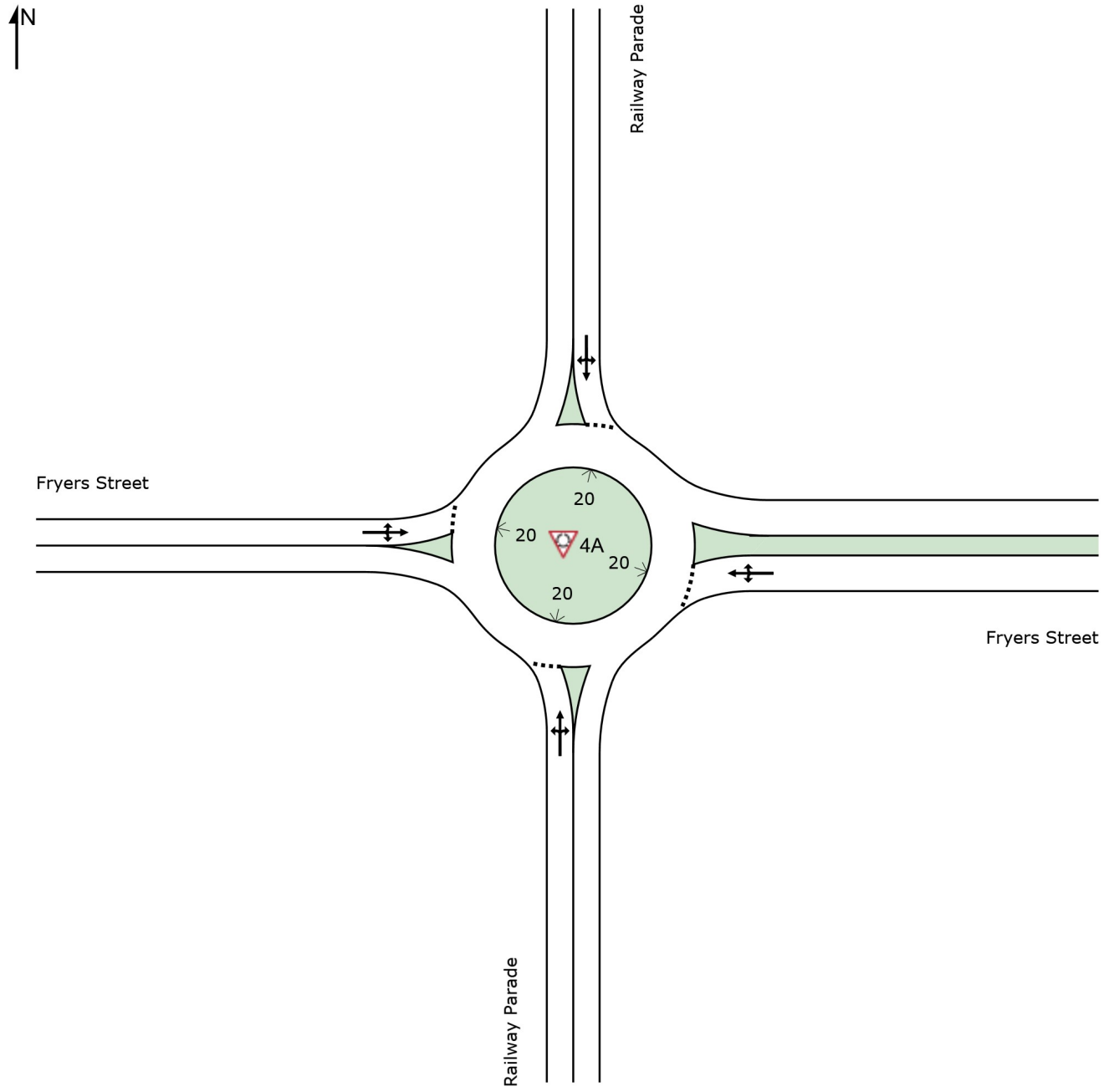
Template: GTA site layout and movement summary

Site: 4A [4A. Railway Parade Fryers Street Option 3]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Parade														
30	L2	52	5.0	52	5.0	0.201	9.4	LOS A	1.3	9.5	0.80	0.81	0.80	51.0
31	T1	74	5.0	74	5.0	0.201	9.6	LOS A	1.3	9.5	0.80	0.81	0.80	52.2
32	R2	5	5.0	5	5.0	0.201	14.2	LOS B	1.3	9.5	0.80	0.81	0.80	45.9
Approach		131	5.0	131	5.0	0.201	9.7	LOS A	1.3	9.5	0.80	0.81	0.80	51.6
East: Fryers Street														
21	L2	17	5.0	17	5.0	0.573	2.6	LOS A	3.4	24.9	0.54	0.63	0.54	51.2
22	T1	465	5.0	465	5.0	0.573	3.1	LOS A	3.4	24.9	0.54	0.63	0.54	53.5
23	R2	201	5.0	201	5.0	0.573	6.9	LOS A	3.4	24.9	0.54	0.63	0.54	53.3
Approach		683	5.0	683	5.0	0.573	4.3	LOS A	3.4	24.9	0.54	0.63	0.54	53.4
North: Railway Parade														
24	L2	217	5.0	217	5.0	0.433	7.0	LOS A	3.1	22.5	0.72	0.76	0.72	47.2
25	T1	59	5.0	59	5.0	0.433	7.1	LOS A	3.1	22.5	0.72	0.76	0.72	53.1
26	R2	113	5.0	113	5.0	0.433	11.8	LOS B	3.1	22.5	0.72	0.76	0.72	53.0
Approach		388	5.0	388	5.0	0.433	8.4	LOS A	3.1	22.5	0.72	0.76	0.72	50.6
West: Fryers Street														
27	L2	92	5.0	92	5.0	0.478	6.1	LOS A	3.5	25.6	0.62	0.65	0.62	52.2
28	T1	332	5.0	332	5.0	0.478	6.2	LOS A	3.5	25.6	0.62	0.65	0.62	47.9
29	R2	91	5.0	91	5.0	0.478	10.8	LOS B	3.5	25.6	0.62	0.65	0.62	53.4
Approach		514	5.0	514	5.0	0.478	7.0	LOS A	3.5	25.6	0.62	0.65	0.62	50.3
All Vehicles		1716	5.0	1716	5.0	0.573	6.4	LOS A	3.5	25.6	0.62	0.68	0.62	51.5

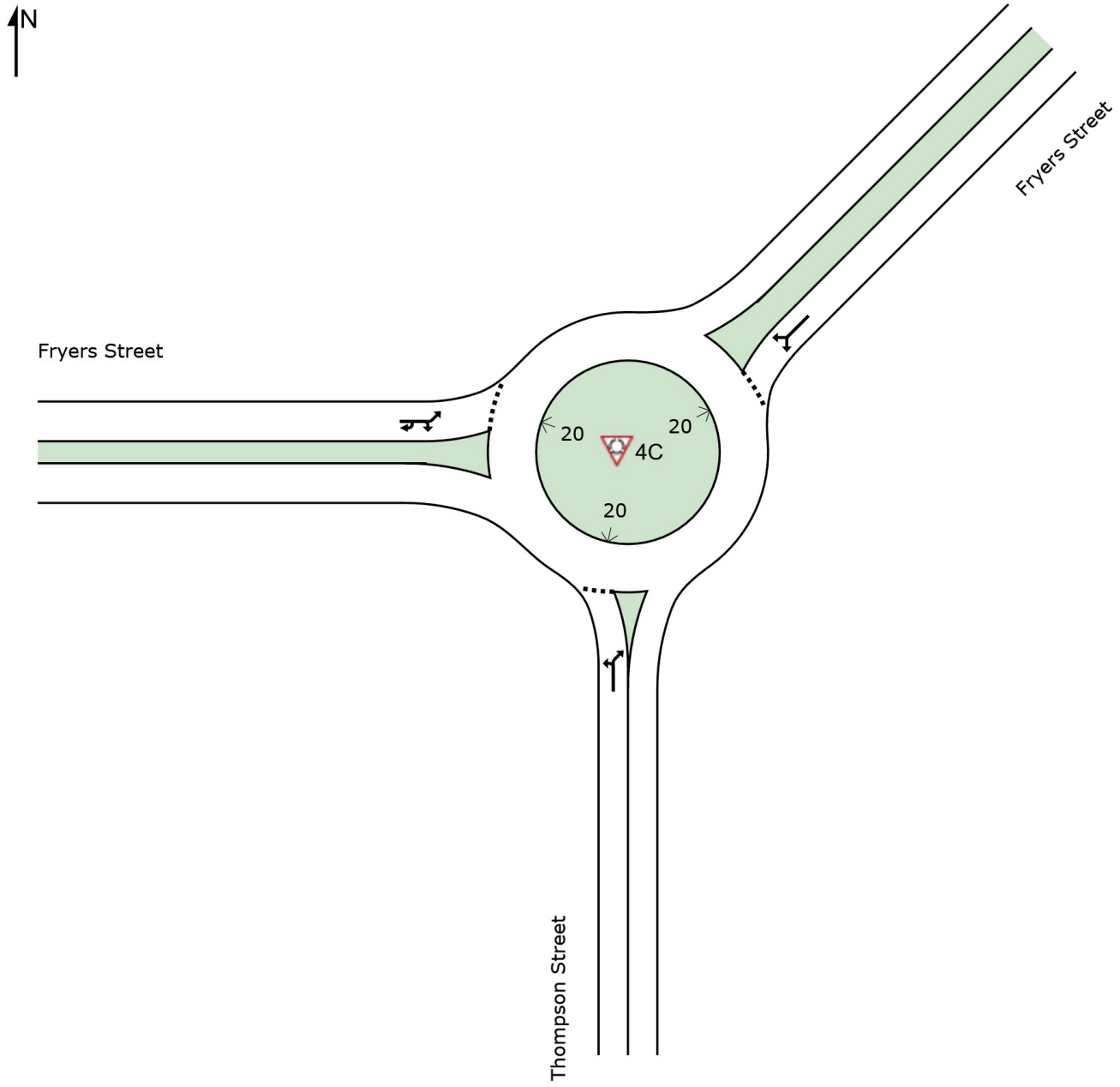
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4C [4C. Thompson Street Fryers Street Option 3]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Thompson Street														

30	L2	340	5.0	340	5.0	0.368	6.2	LOS A	2.3	16.9	0.62	0.67	0.62	49.6
3a	R1	3	5.0	3	5.0	0.368	10.0	LOS A	2.3	16.9	0.62	0.67	0.62	54.1
Approach		343	5.0	343	5.0	0.368	6.2	LOS A	2.3	16.9	0.62	0.67	0.62	49.7
NorthEast: Fryers Street														
24a	L1	7	5.0	7	5.0	0.366	6.3	LOS A	1.9	14.1	0.57	0.75	0.57	51.7
26a	R1	340	5.0	340	5.0	0.366	10.2	LOS B	1.9	14.1	0.57	0.75	0.57	45.7
Approach		347	5.0	347	5.0	0.366	10.2	LOS B	1.9	14.1	0.57	0.75	0.57	46.0
West: Fryers Street														
10a	L1	106	0.0	106	0.0	0.320	1.6	LOS A	1.8	12.8	0.03	0.64	0.03	52.6
29	R2	444	0.0	444	0.0	0.320	5.8	LOS A	1.8	12.8	0.03	0.64	0.03	53.2
29u	U	3	0.0	3	0.0	0.320	7.8	LOS A	1.8	12.8	0.03	0.64	0.03	25.2
Approach		554	0.0	554	0.0	0.320	5.0	LOS A	1.8	12.8	0.03	0.64	0.03	53.0
All Vehicles		1244	2.8	1244	2.8	0.368	6.8	LOS A	2.3	16.9	0.34	0.68	0.34	50.0

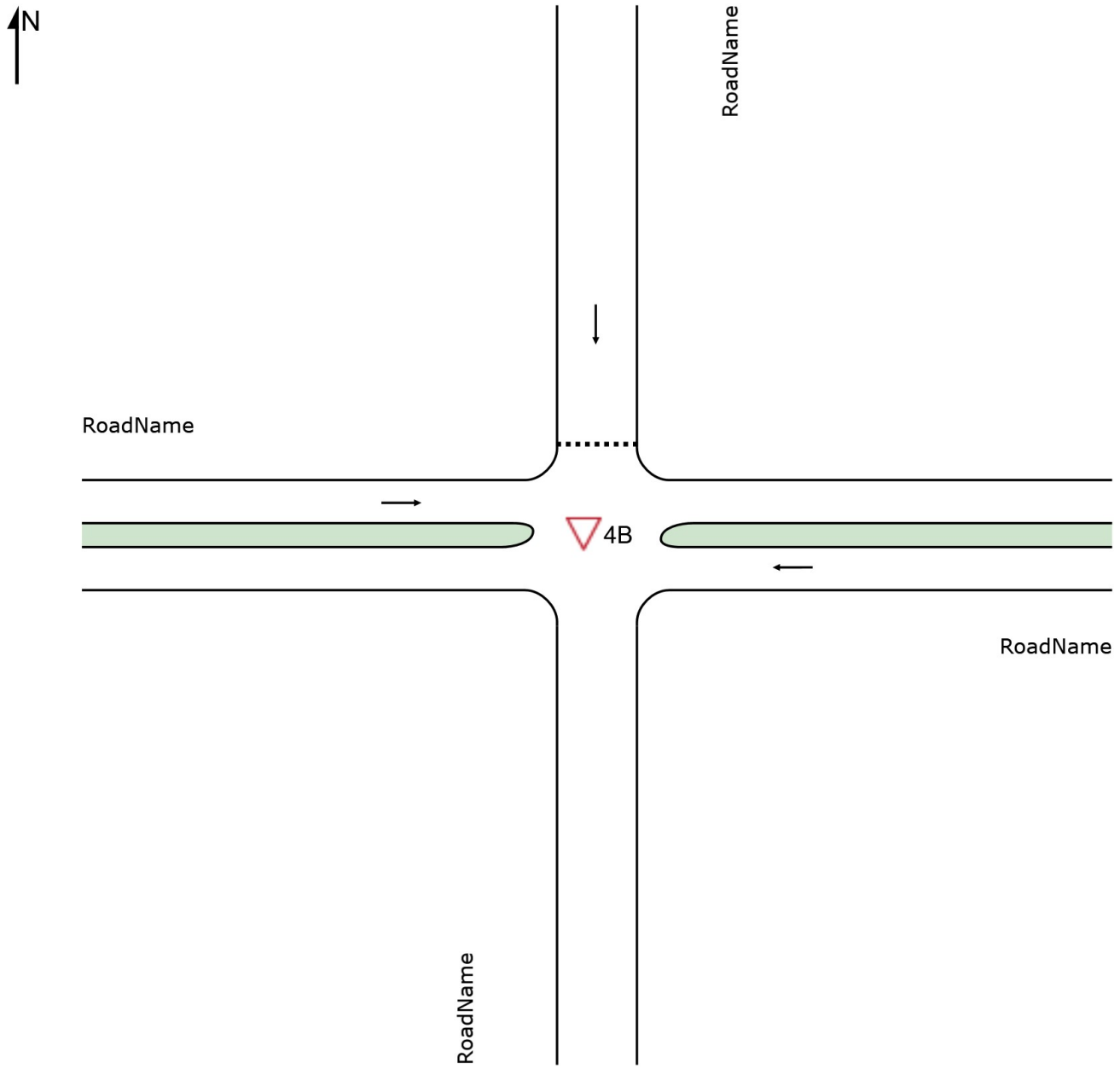
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4B [4B. Railway Crossing Representation]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: RoadName														
5	T1	683	5.0	683	5.0	0.332	0.0	LOS A	0.5	3.4	0.00	0.00	0.00	59.9

Approach		683	5.0	683	5.0	0.332	0.0	NA	0.5	3.4	0.00	0.00	0.00	59.9
North: RoadName														
8	T1	1	0.0	1	0.0	0.004	16.2	LOS C	0.0	0.1	0.80	0.80	0.80	46.7
Approach		1	0.0	1	0.0	0.004	16.2	LOS C	0.0	0.1	0.80	0.80	0.80	46.7
West: RoadName														
11	T1	554	5.0	554	5.0	0.276	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		554	5.0	554	5.0	0.276	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		1238	5.0	1238	5.0	0.332	0.0	NA	0.5	3.4	0.00	0.00	0.00	59.3

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.

USER REPORT FOR SITE

Project: 3. 2022 Mitigation Scenarios Review - PM

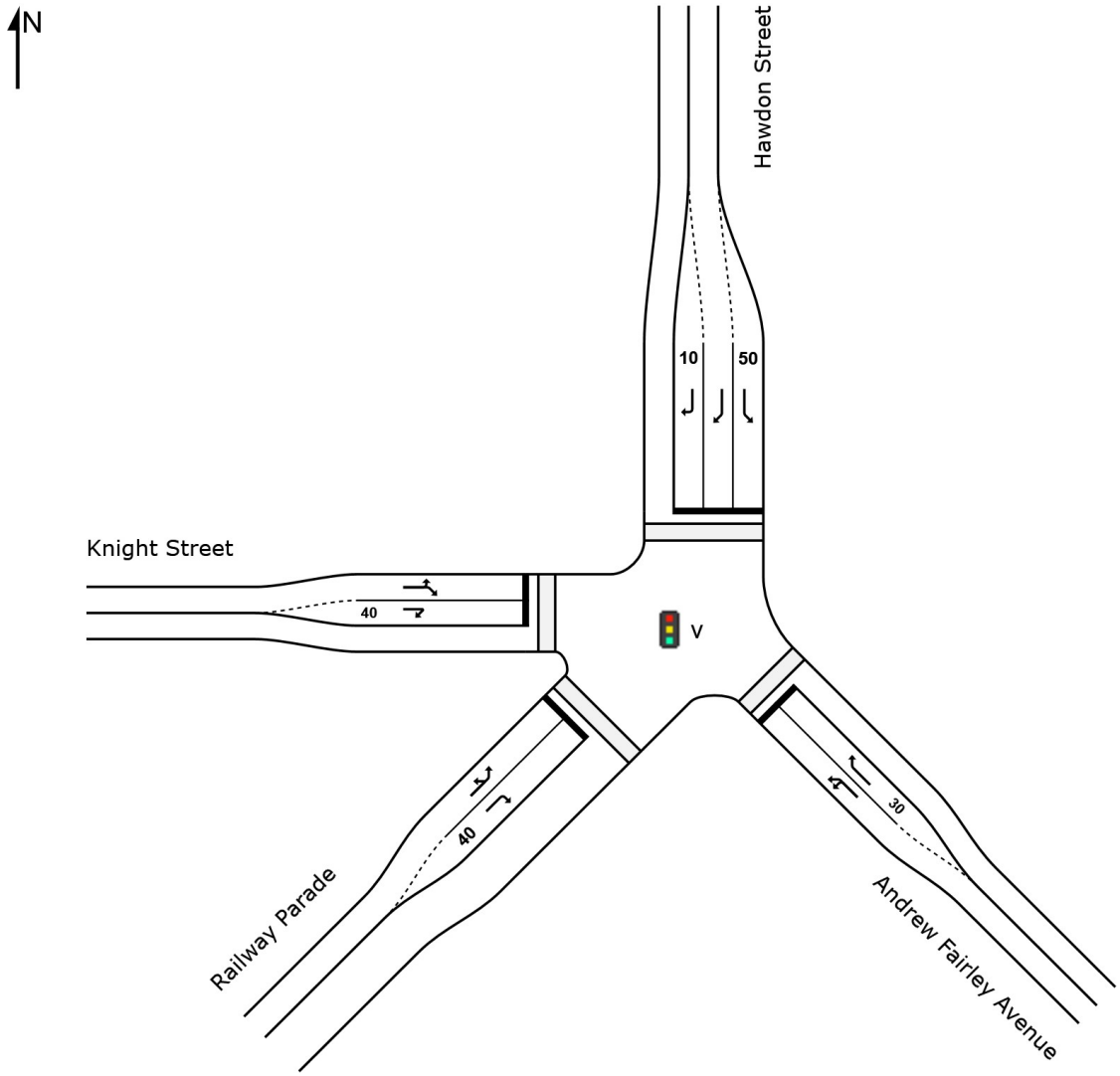
Template: GTA site layout and movement summary

Site: v [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D, D1*, D2*
Output Phase Sequence: A, B, C, D, D2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	14	5.0	1.022	101.9	LOS F	13.7	100.2	1.00	1.30	2.09	16.7
21a	L1	178	5.0	1.022	100.7	LOS F	13.7	100.2	1.00	1.30	2.09	16.8
23a	R1	118	5.0	0.583	47.9	LOS D	5.2	38.0	1.00	0.80	1.02	26.6
Approach		309	5.0	1.022	80.6	LOS F	13.7	100.2	1.00	1.11	1.68	19.6
North: Hawdon Street												
7a	L1	123	5.0	0.107	12.7	LOS B	2.2	16.1	0.44	0.68	0.44	43.3
9a	R1	329	5.0	0.494	27.2	LOS C	11.0	80.1	0.81	0.78	0.81	41.1
9	R2	23	5.0	0.058	35.4	LOS D	0.8	5.9	0.82	0.70	0.82	37.0
Approach		476	5.0	0.494	23.9	LOS C	11.0	80.1	0.71	0.75	0.71	41.3
West: Knight Street												
10	L2	28	5.0	0.717	49.5	LOS D	7.5	55.0	1.00	0.87	1.13	32.8
12a	R1	137	5.0	0.717	48.3	LOS D	7.5	55.0	1.00	0.87	1.13	26.7
12b	R3	23	5.0	0.122	45.8	LOS D	0.9	6.9	0.92	0.71	0.92	33.6
Approach		188	5.0	0.717	48.2	LOS D	7.5	55.0	0.99	0.85	1.11	28.7
SouthWest: Railway Parade												
30b	L3	34	5.0	1.042	100.6	LOS F	27.9	203.6	1.00	1.24	2.04	19.9
30a	L1	387	5.0	1.042	98.6	LOS F	27.9	203.6	1.00	1.24	2.04	19.9
32	R2	19	5.0	0.157	51.0	LOS D	0.8	6.1	0.97	0.70	0.97	25.8
Approach		440	5.0	1.042	96.7	LOS F	27.9	203.6	1.00	1.22	2.00	20.1
All Vehicles		1414	5.0	1.042	62.2	LOS E	27.9	203.6	0.90	0.99	1.38	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

USER REPORT FOR SITE

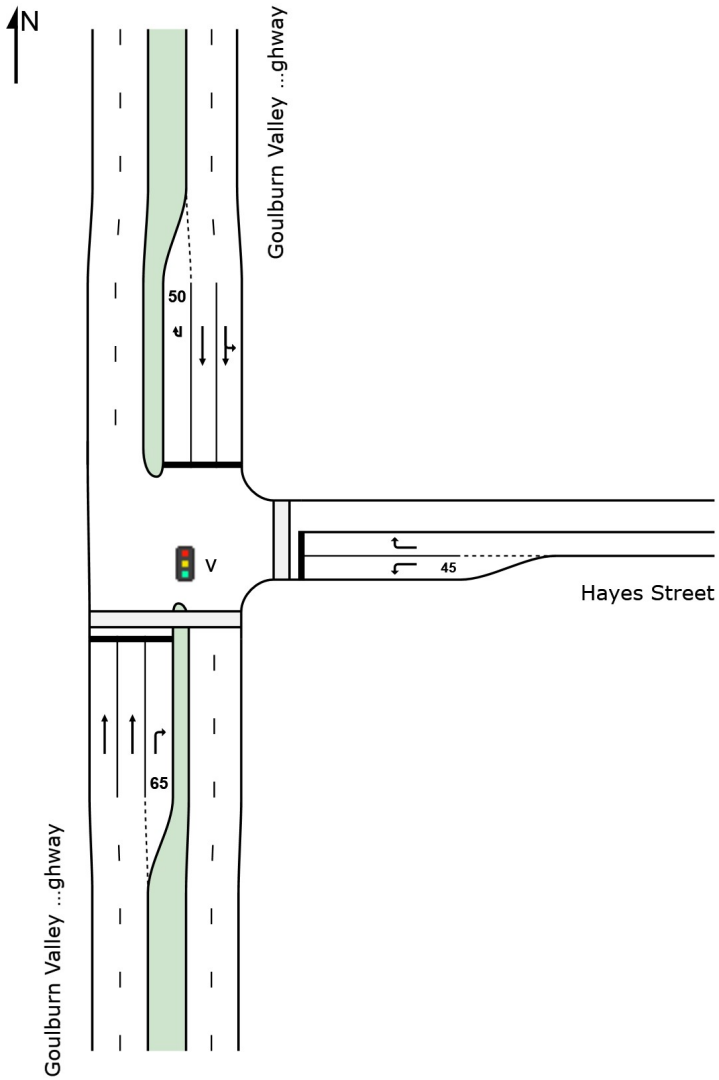
Project: 3. 2022 Mitigation Scenarios Review - SCHOOL PM | **Template: GTA site layout and movement summary**

Site: v [1. Goulbourn Valley Highway/Hayes Street]

2018 Goulburn Valley Highway & Hayes (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2*, C3*
Output Phase Sequence: A, B, C1, C2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
South: Goulburn Valley Highway												
2	T1	838	5.0	0.380	11.0	LOS B	9.9	71.9	0.58	0.51	0.58	50.8
3	R2	172	5.0	0.710	49.1	LOS D	7.8	56.7	1.00	0.86	1.12	32.6
Approach		1009	5.0	0.710	17.4	LOS B	9.9	71.9	0.65	0.57	0.67	46.4
East: Hayes Street												
4	L2	205	5.0	0.403	29.6	LOS C	6.9	50.1	0.85	0.78	0.85	39.5
6	R2	7	5.0	0.027	40.7	LOS D	0.3	2.0	0.87	0.66	0.87	35.4
Approach		213	5.0	0.403	30.0	LOS C	6.9	50.1	0.85	0.78	0.85	39.4
North: Goulburn Valley Highway												
7	L2	9	5.0	0.679	23.3	LOS C	21.4	155.9	0.81	0.73	0.81	45.3
8	T1	1293	5.0	0.679	17.7	LOS B	21.4	155.9	0.81	0.73	0.81	46.5
9u	U	1	5.0	0.012	51.1	LOS D	0.0	0.3	0.95	0.60	0.95	31.9
Approach		1303	5.0	0.679	17.7	LOS B	21.4	155.9	0.81	0.73	0.81	46.4
All Vehicles		2525	5.0	0.710	18.7	LOS B	21.4	155.9	0.75	0.67	0.76	45.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - SCHOOL PM

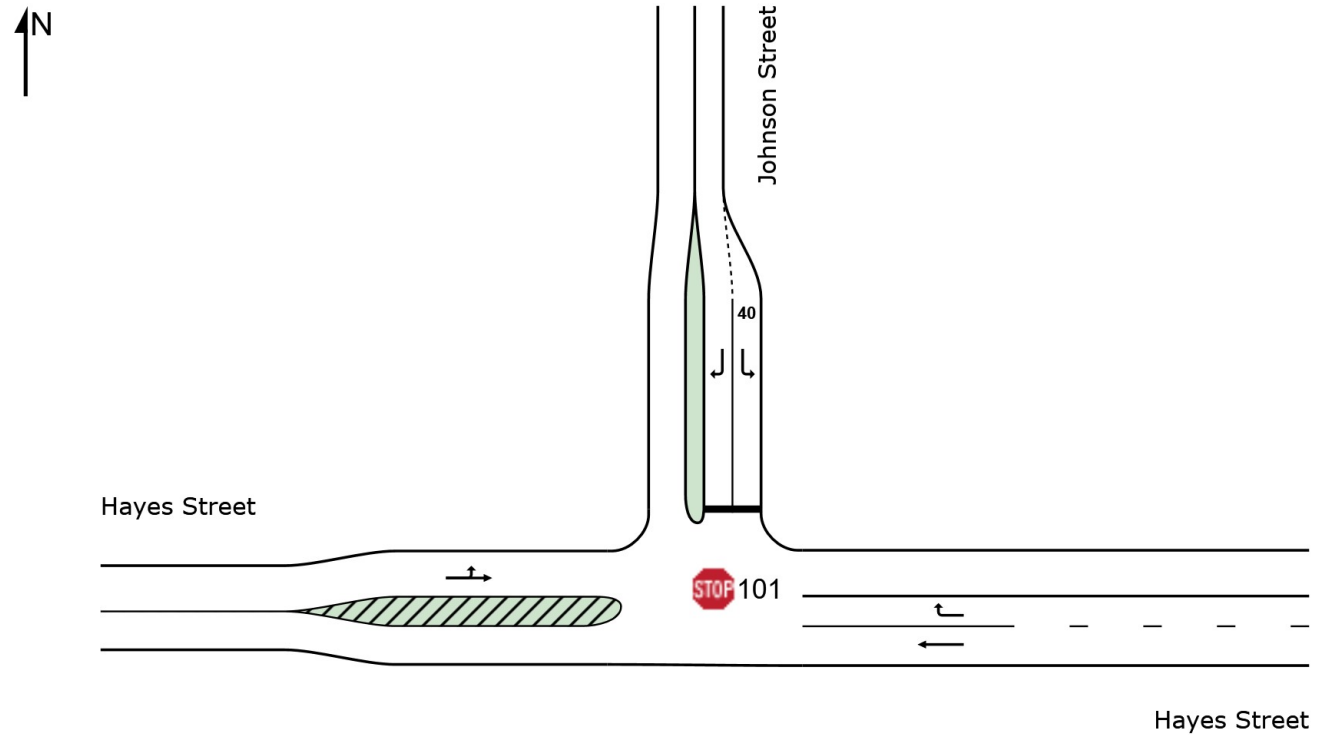
Template: GTA site layout and movement summary

Site: 101 [2A. Hayes Street/Johnson Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	186	5.0	186	5.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	311	5.0	311	5.0	0.237	6.0	LOS A	0.5	3.5	0.44	0.63	0.44	48.5
Approach		497	5.0	497	5.0	0.237	3.8	NA	0.5	3.5	0.28	0.40	0.28	51.0
North: Johnson Street														
7	L2	245	5.0	245	5.0	0.201	8.9	LOS A	0.4	2.7	0.29	0.88	0.29	47.5
9	R2	178	5.0	178	5.0	0.465	20.2	LOS C	1.0	7.1	0.77	1.11	1.13	41.0
Approach		423	5.0	423	5.0	0.465	13.7	LOS B	1.0	7.1	0.49	0.98	0.64	43.9
West: Hayes Street														
10	L2	157	5.0	157	5.0	0.149	5.6	LOS A	0.0	0.0	0.00	0.31	0.00	54.2
11	T1	142	5.0	142	5.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	50.7
Approach		299	5.0	299	5.0	0.149	2.9	NA	0.0	0.0	0.00	0.31	0.00	53.3

All Vehicles	1219	5.0	1219	5.0	0.465	7.0	NA	1.0	7.1	0.28	0.58	0.34	48.4

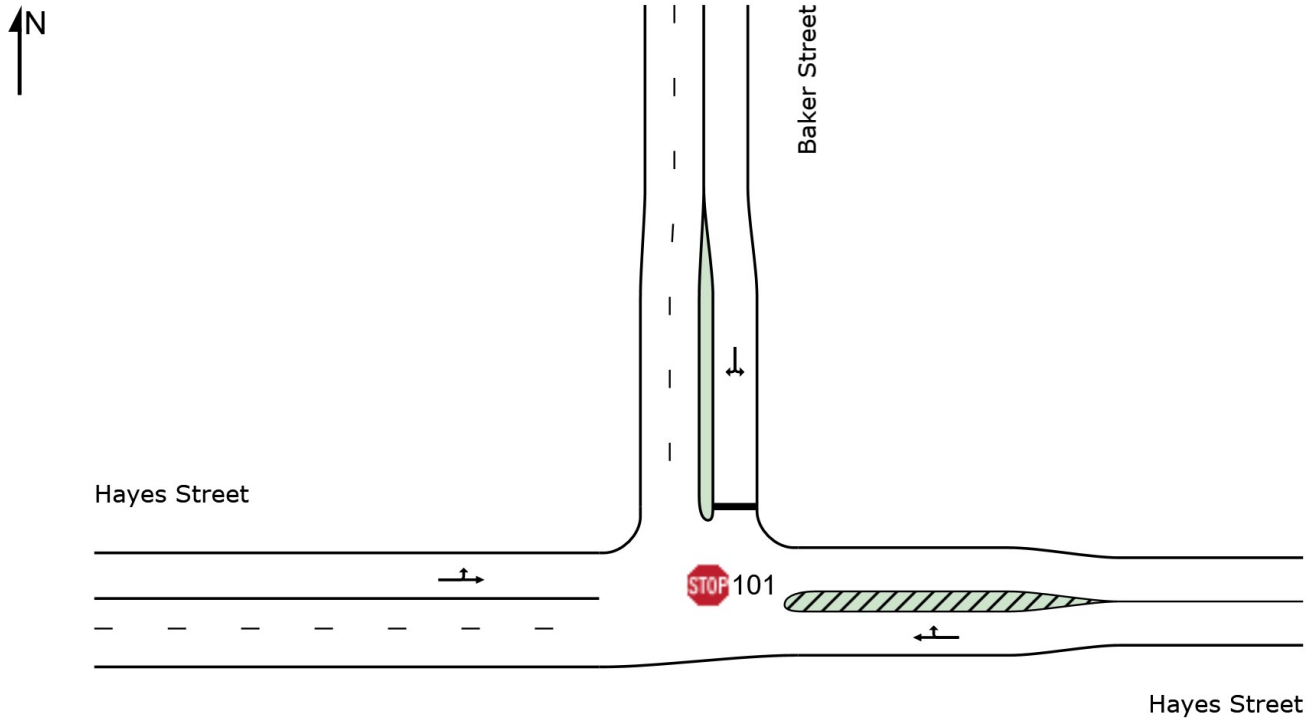
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

Site: 101 [2B. Hayes Street/Baker Street]

Network: 5 [2. Hayes Street/Johnson Street/ Baker Street]

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

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Hayes Street														
5	T1	441	5.0	441	5.0	0.219	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	59.8
6	R2	3	5.0	3	5.0	0.219	7.5	LOS A	0.0	0.1	0.01	0.00	0.01	57.8
Approach		444	5.0	444	5.0	0.219	0.1	NA	0.0	0.1	0.01	0.00	0.01	59.8
North: Baker Street														
7	L2	2	5.0	2	5.0	0.136	10.0	LOS A	0.2	1.3	0.65	1.00	0.65	48.0
9	R2	56	5.0	56	5.0	0.136	14.9	LOS B	0.2	1.3	0.65	1.00	0.65	42.0
Approach		58	5.0	58	5.0	0.136	14.8	LOS B	0.2	1.3	0.65	1.00	0.65	42.4
West: Hayes Street														
10	L2	36	5.0	36	5.0	0.190	4.7	LOS A	0.0	0.0	0.00	0.05	0.00	56.1
11	T1	353	5.0	353	5.0	0.190	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.2
Approach		388	5.0	388	5.0	0.190	0.4	NA	0.0	0.0	0.00	0.05	0.00	58.9
All Vehicles		891	5.0	891	5.0	0.219	1.2	NA	0.2	1.3	0.05	0.09	0.05	57.9

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR NETWORK SITE

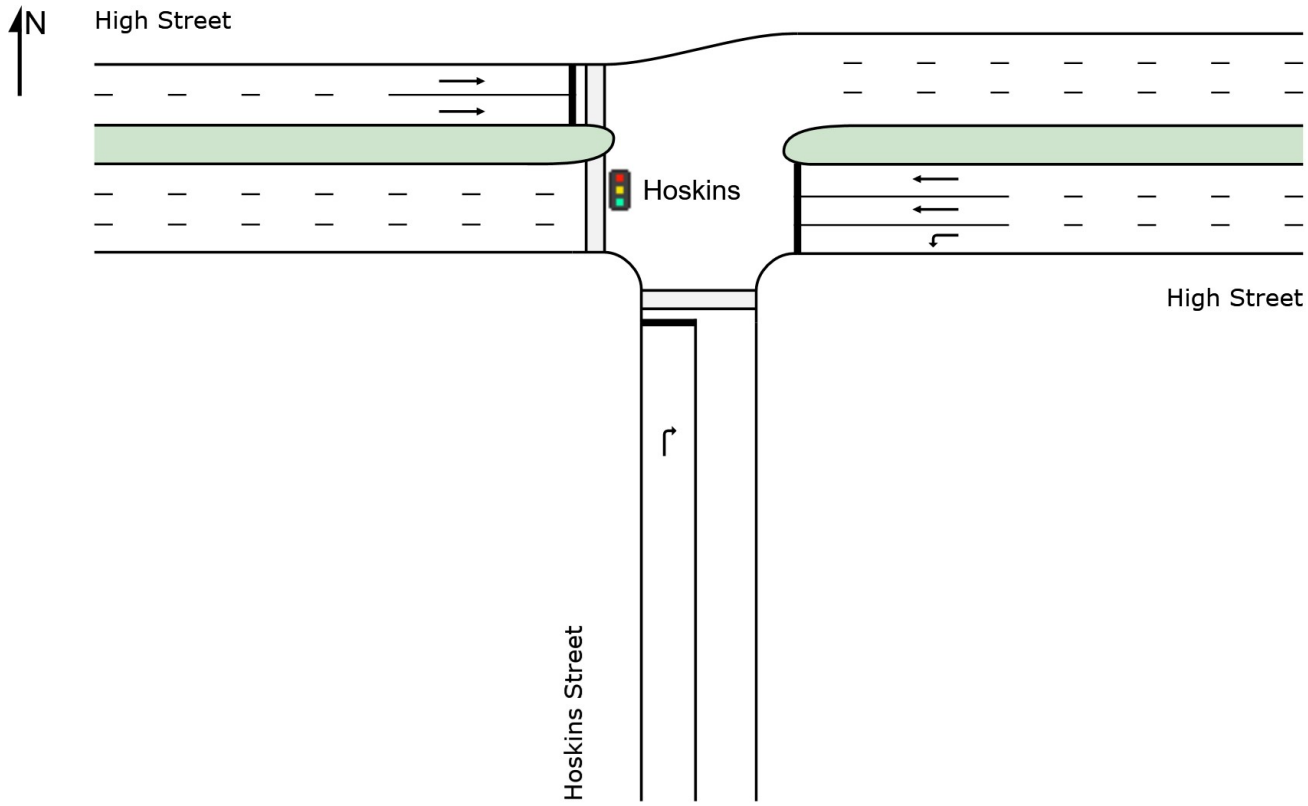
Project: 3. 2022 Mitigation Scenarios Review - SCHOOL PM | **Template: GTA site layout and movement summary**

Site: Hoskins [3B. High Street/Hoskins Street] | **Network: 10 [3. High Street/Hoskins Street/ Railway Parade]**

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hoskins Street														
3	R2	373	5.0	373	5.0	0.638	35.3	LOS D	8.8	64.1	0.92	0.84	0.92	28.2
Approach		373	5.0	373	5.0	0.638	35.3	LOS D	8.8	64.1	0.92	0.84	0.92	28.2
East: High Street														

4	L2	412	5.0	412	5.0	0.409	17.0	LOS B	6.7	48.7	0.65	0.77	0.65	39.1
5	T1	1018	5.0	1018	5.0	0.476	1.1	LOS A	1.4	10.4	0.08	0.07	0.08	53.4
Approach		1429	5.0	1429	5.0	0.476	5.7	LOS A	6.7	48.7	0.24	0.27	0.24	43.6
West: High Street														
11	T1	844	5.0	844	5.0	0.464	16.3	LOS B	7.6	55.4	0.71	0.62	0.71	13.1
Approach		844	5.0	844	5.0	0.464	16.3	LOS B	7.6	55.4	0.71	0.62	0.71	13.1
All Vehicles		2646	5.0	2646	5.0	0.638	13.2	LOS B	8.8	64.1	0.49	0.46	0.49	31.4

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.

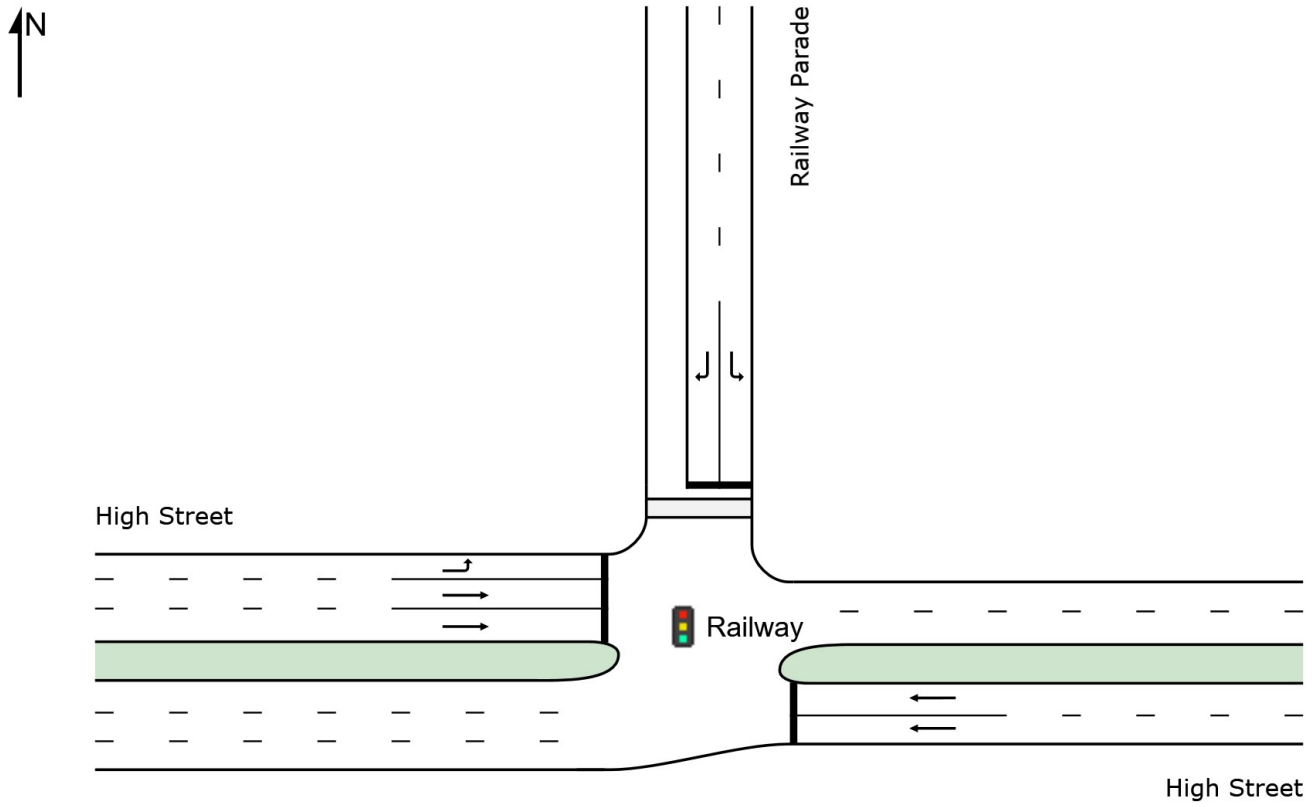
Site: Railway [3C. High Street/Railway Parade]

Network: 10 [3. High Street/Hoskins Street/ Railway Parade]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Midland Hwy - Hoskin and Railway - General AM]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1, B2*, B3*
Output Phase Sequence: A, B1
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High Street														
5	T1	1197	5.0	1197	5.0	0.660	18.7	LOS B	12.5	91.1	0.81	0.73	0.81	12.8
Approach		1197	5.0	1197	5.0	0.660	18.7	LOS B	12.5	91.1	0.81	0.73	0.81	12.8
North: Railway Parade														
7	L2	162	5.0	162	5.0	0.298	31.9	LOS C	3.4	24.7	0.81	0.77	0.81	30.3
9	R2	233	5.0	233	5.0	0.465	33.6	LOS C	5.2	37.7	0.86	0.80	0.86	28.8
Approach		395	5.0	395	5.0	0.465	32.9	LOS C	5.2	37.7	0.84	0.79	0.84	29.4

West: High Street														
10	L2	131	5.0	131	5.0	0.133	26.6	LOS C	3.4	24.6	1.00	0.82	1.00	33.2
11	T1	1086	5.0	1086	5.0	0.505	7.4	LOS A	7.7	56.2	0.38	0.34	0.38	33.9
Approach		1217	5.0	1217	5.0	0.505	9.4	LOS A	7.7	56.2	0.44	0.39	0.44	33.7
All Vehicles		2808	5.0	2808	5.0	0.660	16.7	LOS B	12.5	91.1	0.66	0.59	0.66	25.1

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

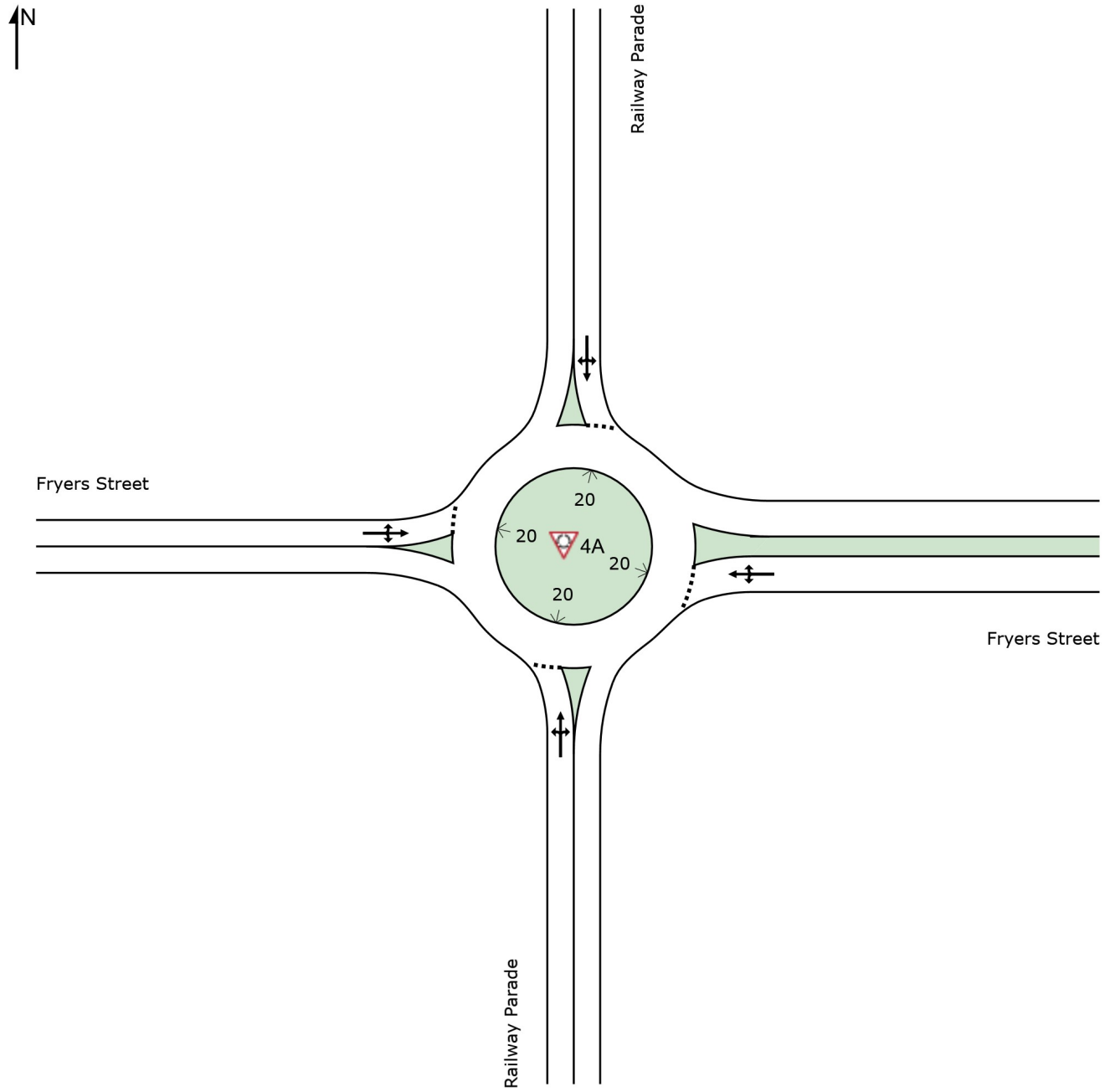
USER REPORT FOR NETWORK SITE

Project: 3. 2022 Mitigation Scenarios Review - SCHOOL PM | **Template: GTA site layout and movement summary**

Site: 4A [4A. Railway Parade Fryers Street Option 3] | **Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]**

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Parade														
30	L2	42	5.0	42	5.0	0.256	8.6	LOS A	1.7	12.4	0.79	0.80	0.79	51.6
31	T1	127	5.0	127	5.0	0.256	8.9	LOS A	1.7	12.4	0.79	0.80	0.79	52.8
32	R2	7	5.0	7	5.0	0.256	13.5	LOS B	1.7	12.4	0.79	0.80	0.79	46.8
Approach		177	5.0	177	5.0	0.256	9.0	LOS A	1.7	12.4	0.79	0.80	0.79	52.3
East: Fryers Street														
21	L2	3	5.0	3	5.0	0.589	3.0	LOS A	3.4	24.9	0.60	0.72	0.62	49.7
22	T1	299	5.0	299	5.0	0.589	3.6	LOS A	3.4	24.9	0.60	0.72	0.62	51.9
23	R2	372	5.0	372	5.0	0.589	7.4	LOS A	3.4	24.9	0.60	0.72	0.62	51.7
Approach		674	5.0	674	5.0	0.589	5.7	LOS A	3.4	24.9	0.60	0.72	0.62	51.8
North: Railway Parade														
24	L2	308	5.0	308	5.0	0.605	9.0	LOS A	6.0	43.8	0.85	0.87	0.98	46.4
25	T1	201	5.0	201	5.0	0.605	9.1	LOS A	6.0	43.8	0.85	0.87	0.98	52.6
26	R2	21	5.0	21	5.0	0.605	13.8	LOS B	6.0	43.8	0.85	0.87	0.98	52.5
Approach		531	5.0	531	5.0	0.605	9.2	LOS A	6.0	43.8	0.85	0.87	0.98	49.8
West: Fryers Street														
27	L2	59	5.0	59	5.0	0.560	9.4	LOS A	5.0	36.3	0.81	0.88	0.94	50.7
28	T1	349	5.0	349	5.0	0.560	9.5	LOS A	5.0	36.3	0.81	0.88	0.94	45.5
29	R2	74	5.0	74	5.0	0.560	14.1	LOS B	5.0	36.3	0.81	0.88	0.94	51.8
Approach		482	5.0	482	5.0	0.560	10.2	LOS B	5.0	36.3	0.81	0.88	0.94	47.8
All Vehicles		1863	5.0	1863	5.0	0.605	8.2	LOS A	6.0	43.8	0.75	0.81	0.82	50.2

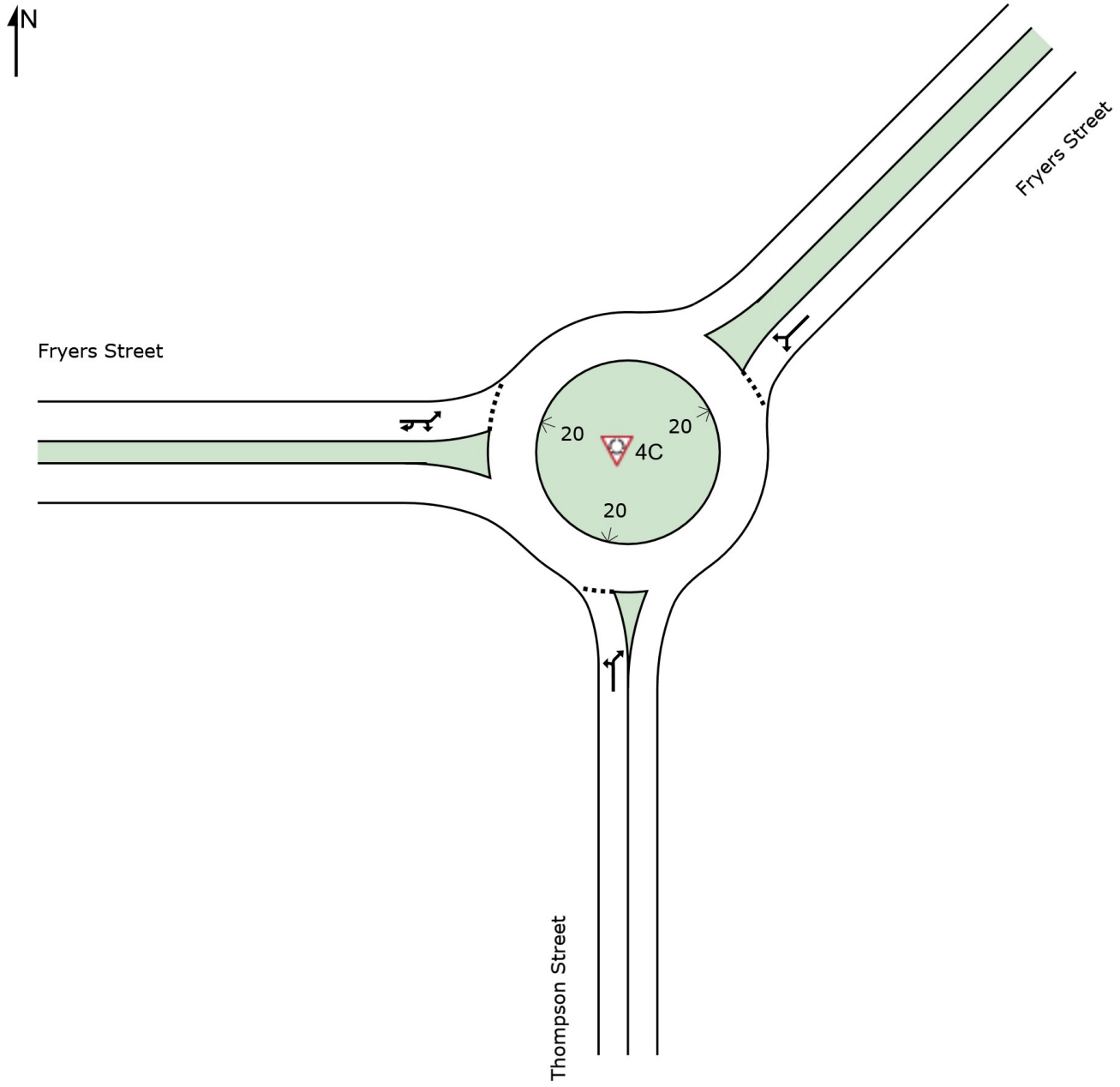
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4C [4C. Thompson Street Fryers Street Option 3]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Thompson Street														

30	L2	367	5.0	367	5.0	0.386	5.9	LOS A	2.5	18.2	0.60	0.65	0.60	49.7
3a	R1	3	5.0	3	5.0	0.386	9.8	LOS A	2.5	18.2	0.60	0.65	0.60	54.2
Approach		371	5.0	371	5.0	0.386	6.0	LOS A	2.5	18.2	0.60	0.65	0.60	49.7
NorthEast: Fryers Street														
24a	L1	5	5.0	5	5.0	0.353	7.0	LOS A	1.9	13.7	0.62	0.78	0.62	51.2
26a	R1	306	5.0	306	5.0	0.353	10.9	LOS B	1.9	13.7	0.62	0.78	0.62	45.0
Approach		312	5.0	312	5.0	0.353	10.9	LOS B	1.9	13.7	0.62	0.78	0.62	45.2
West: Fryers Street														
10a	L1	109	0.0	109	0.0	0.384	1.6	LOS A	2.4	16.6	0.04	0.65	0.04	52.4
29	R2	556	0.0	556	0.0	0.384	5.8	LOS A	2.4	16.6	0.04	0.65	0.04	53.0
29u	U	1	0.0	1	0.0	0.384	7.9	LOS A	2.4	16.6	0.04	0.65	0.04	25.0
Approach		666	0.0	666	0.0	0.384	5.1	LOS A	2.4	16.6	0.04	0.65	0.04	52.9
All Vehicles		1348	2.5	1348	2.5	0.386	6.7	LOS A	2.5	18.2	0.33	0.68	0.33	50.1

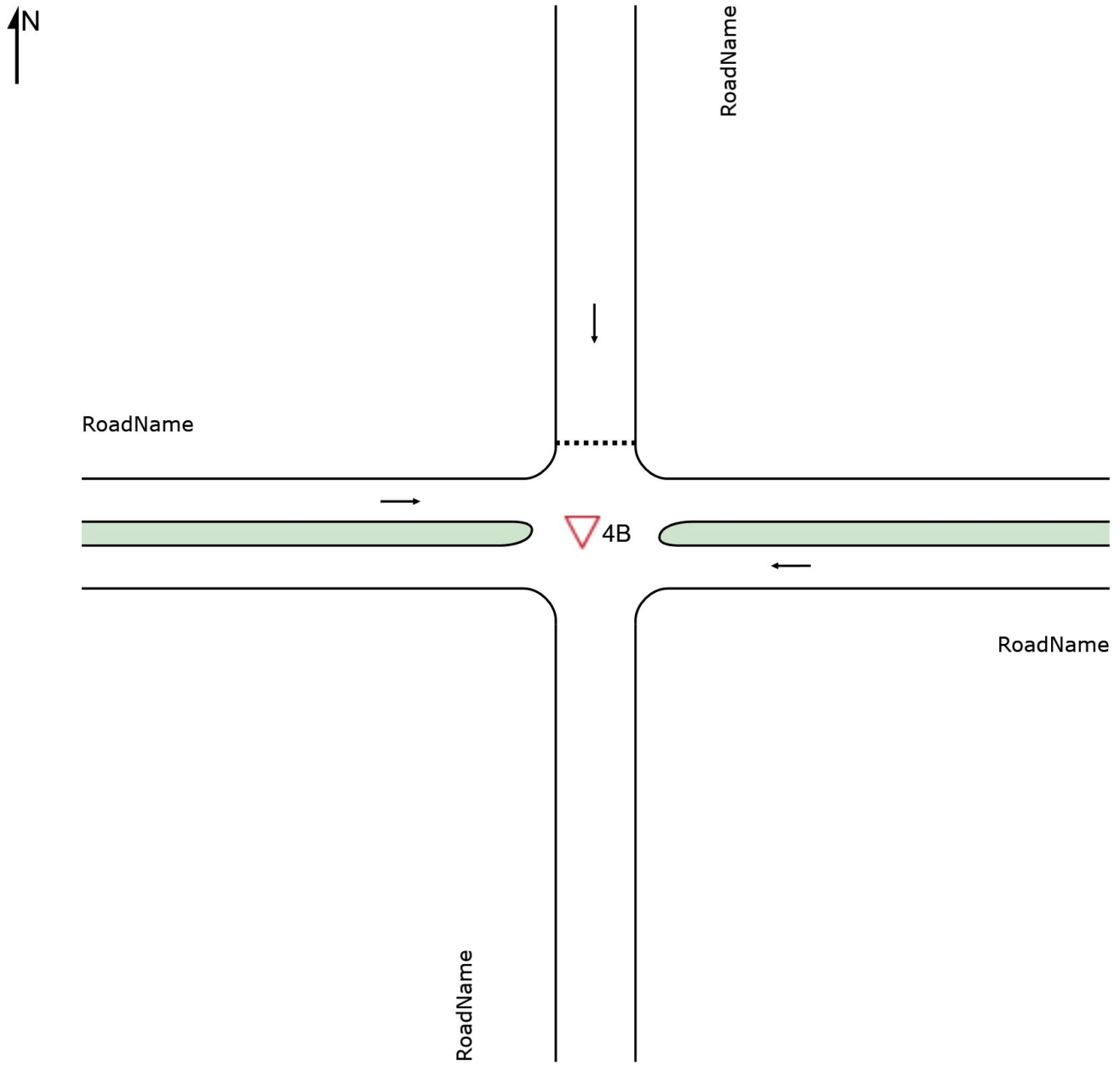
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Site: 4B [4B. Railway Crossing Representation]

Network: 22 [4. Fryers Street/Railway Parade/ Thompson Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: RoadName														
5	T1	674	5.0	674	5.0	0.328	0.0	LOS A	1.0	7.3	0.00	0.00	0.00	59.9

Approach		674	5.0	674	5.0	0.328	0.0	NA	1.0	7.3	0.00	0.00	0.00	59.9
North: RoadName														
8	T1	1	0.0	1	0.0	0.005	18.4	LOS C	0.0	0.1	0.83	0.83	0.83	45.4
Approach		1	0.0	1	0.0	0.005	18.4	LOS C	0.0	0.1	0.83	0.83	0.83	45.4
West: RoadName														
11	T1	665	5.0	665	5.0	0.361	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		665	5.0	665	5.0	0.361	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		1340	5.0	1340	5.0	0.361	0.0	NA	1.0	7.3	0.00	0.00	0.00	59.3

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

USER REPORT FOR SITE

Project: 3. 2022 Mitigation Scenarios Review - SCHOOL PM

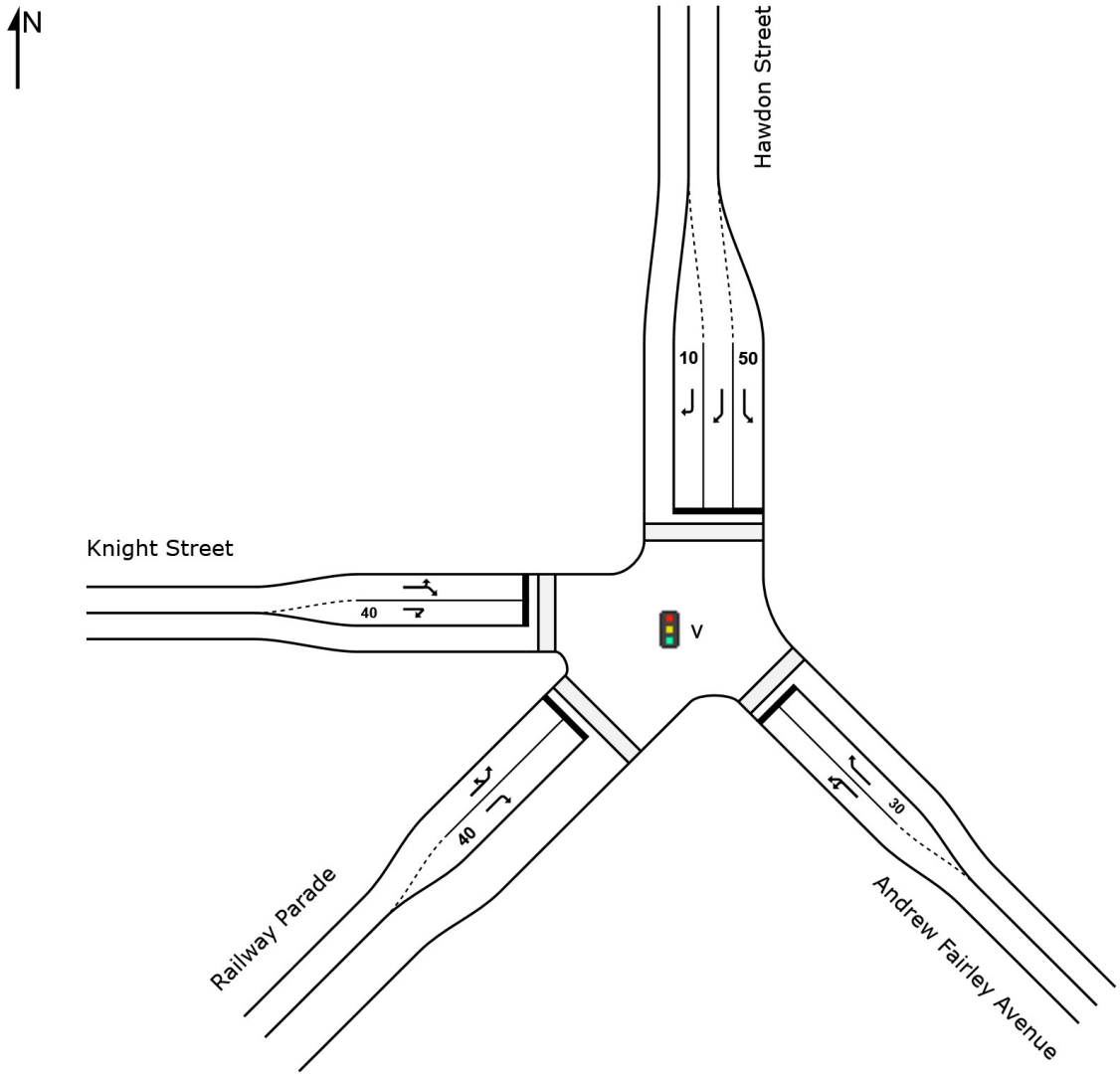
Template: GTA site layout and movement summary

Site: v [5. Knight Street/Railway Parade]

2018 Railway Parade & Knight Street (AM)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D, D1*, D2*
Output Phase Sequence: A, B, C, D, D2*
(* Variable Phase)

Site Layout



Movement Performance - Vehicles

Mov	Turn	Demand Flows	Deg.	Average	Level of	95% Back of Queue	Prop.	Effective	Aver. No.	Average

ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
SouthEast: Andrew Fairley Avenue												
21	L2	22	5.0	0.811	54.1	LOS D	7.9	57.5	1.00	0.94	1.29	25.3
21a	L1	141	5.0	0.811	52.9	LOS D	7.9	57.5	1.00	0.94	1.29	25.6
23a	R1	133	5.0	0.656	48.9	LOS D	6.0	43.7	1.00	0.83	1.08	26.3
Approach		296	5.0	0.811	51.2	LOS D	7.9	57.5	1.00	0.89	1.20	25.9
North: Hawdon Street												
7a	L1	221	5.0	0.193	13.2	LOS B	4.2	30.8	0.47	0.70	0.47	43.0
9a	R1	380	5.0	0.576	28.0	LOS C	13.1	95.6	0.83	0.80	0.83	40.8
9	R2	9	5.0	0.024	35.0	LOS C	0.3	2.4	0.81	0.67	0.81	37.2
Approach		611	5.0	0.576	22.8	LOS C	13.1	95.6	0.70	0.76	0.70	41.3
West: Knight Street												
10	L2	34	5.0	1.113	166.7	LOS F	24.8	181.0	1.00	1.61	2.59	15.7
12a	R1	220	5.0	1.113	165.6	LOS F	24.8	181.0	1.00	1.61	2.59	11.3
12b	R3	21	5.0	0.111	45.7	LOS D	0.9	6.2	0.92	0.71	0.92	33.7
Approach		275	5.0	1.113	156.5	LOS F	24.8	181.0	0.99	1.54	2.46	12.8
SouthWest: Railway Parade												
30b	L3	67	5.0	1.546	529.1	LOS F	111.0	810.4	1.00	2.23	4.73	5.9
30a	L1	543	5.0	1.546	527.1	LOS F	111.0	810.4	1.00	2.23	4.73	5.9
32	R2	60	5.0	0.497	52.8	LOS D	2.7	20.1	1.00	0.75	1.00	25.3
Approach		671	5.0	1.546	484.8	LOS F	111.0	810.4	1.00	2.10	4.40	6.2
All Vehicles		1852	5.0	1.546	214.5	LOS F	111.0	810.4	0.90	1.38	2.38	11.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

D. OPINION OF PROBABLE COSTS

D

V171580: Hayes Street / Goulburn Valley Highway intersection works
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-01-P2 dated 17/02/2020 (Concept Layout)

	Hayes Street / Goulburn Valley Highway intersection works					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.2	Earthworks	190	m^3	$ 40.00	$ 7,600.00	
1.3	Subgrade improvement	385	m^2	$ 60.00	$ 23,100.00	
1.4	Service proving works	1	Item	$ 20,000.00	$ 20,000.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	235	m^2	$ 180.00	$ 42,300.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	3130	m^2	$ 60.00	$ 187,800.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	250	Lm	$ 90.00	$ 22,500.00	
3.2	Pedestrian & Cycle Paths	140	m^2	$ 110.00	$ 15,400.00	
3.3	Concrete median works	180	m^2	$ 120.00	$ 21,600.00	
3.4	Pram ramp works	4	Item	$ 2,100.00	$ 8,400.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes	30	Lm	$ 200.00	$ 6,000.00	
4.2	Drainage - pits	2	Item	$ 2,100.00	$ 4,200.00	
4.3	Drainage – Sub-soil drainage	130	Lm	$ 65.00	$ 8,450.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	4	Item	$ 1,800.00	$ 7,200.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals - New	1	Item	$ 400,000.00	$ 400,000.00	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	320	m^2	$ 60.00	$ 19,200.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting	2	Item	$ 12,500.00	$ 25,000.00	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 6,000.00	$ 6,000.00	
8.2	Regulatory Signage	1	Item	$ 5,000.00	$ 5,000.00	
9.0	**OTHER**					
9.1	Telstra nad communication services relocation/ Protection works	*1*	Item	*$ 100,000.00*	*$ 100,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.2	*Gas services relocation/Protection works*	*1*	*Item*	*$ 25,000.00*	*$ 25,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 80,000.00*	*$ 80,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.4	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 30,000.00*	*$ 30,000.00*	*This is a broad level estimate only, subject to verification by authority*
	SUB-TOTAL WORKS				**$ 1,079,750.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 10,797.50	
10.2	VicRoads Fees	3.25	%		$ 35,091.88	
10.3	Traffic Management	5	%		$ 53,987.50	
10.4	Environmental Management	1	%		$ 10,797.50	
10.5	Survey/Design	10	%		$ 107,975.00	
10.6	Supervision & Project Management	9	%		$ 97,177.50	
10.7	Site Establishment	2.5	%		$ 26,993.75	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 431,900.00	
	SUB-TOTAL DELIVERY				**$ 774,720.63**	
11	**TOTAL ESTIMATED COST**				**$ 1,854,470.63**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

DRAFT

V171580: Hayes Street / John Street intersection works
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-02-P1 dated 29/11/2019 (Concept Layout)

	Hayes Street / John Street intersection works					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 6,000.00	$ 6,000.00	
1.2	Earthworks	50	m^3	$ 40.00	$ 2,000.00	
1.3	Subgrade improvement	120	m^2	$ 60.00	$ 7,200.00	
1.4	Service proving works	1	Item	$ 3,500.00	$ 3,500.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	60	m^2	$ 180.00	$ 10,800.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	1450	m^2	$ 60.00	$ 87,000.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	75	Lm	$ 90.00	$ 6,750.00	
3.2	Pedestrian & Cycle Paths	60	m^2	$ 110.00	$ 6,600.00	
3.3	Concrete median works	80	m^2	$ 120.00	$ 9,600.00	
3.4	Pram ramp works	4	Item	$ 2,100.00	$ 8,400.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes		Lm	$ 200.00	$ -	
4.2	Drainage - pits		Item	$ 2,100.00	$ -	
4.3	Drainage – Sub-soil drainage	50	Lm	$ 65.00	$ 3,250.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	1	Item	$ 1,800.00	$ 1,800.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals		Item	$ 180,000.00	$ -	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	120	m^2	$ 60.00	$ 7,200.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting		Item	$ 12,500.00	$ -	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 4,000.00	$ 4,000.00	
8.2	Regulatory Signage	1	Item	$ 3,000.00	$ 3,000.00	
9.0	**OTHER**					
9.1	Telstra services relocation/ Protection works	*1*	Item		$ -	This is a broad level estimate only, subject to verification by authority
9.2	*Gas services relocation/Protection works*	*1*	*Item*		$ -	This is a broad level estimate only, subject to verification by authority
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*		$ -	This is a broad level estimate only, subject to verification by authority
9.4	*Electrical services relocation/Protection works*	*1*	*Item*		$ -	This is a broad level estimate only, subject to verification by authority
	SUB-TOTAL WORKS				**$ 167,100.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 1,671.00	
10.2	VicRoads Fees	3.25	%		$ 5,430.75	
10.3	Traffic Management	5	%		$ 8,355.00	
10.4	Environmental Management	1	%		$ 1,671.00	
10.5	Survey/Design	15	%		$ 25,065.00	
10.6	Supervision & Project Management	9	%		$ 15,039.00	
10.7	Site Establishment	2.5	%		$ 4,177.50	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 66,840.00	
	SUB-TOTAL DELIVERY				**$ 128,249.25**	
11	**TOTAL ESTIMATED COST**				**$ 295,349.25**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

DRAFT

V171580: Midland HWY/Hoskin St/Railway Pde/Thompson St intersections works
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-03-P1 dated 29/11/2019 (Concept Layout)

	Midland HWY/Hoskin St/Railway Pde/Thompson St intersections work					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 35,000.00	$ 35,000.00	
1.2	Earthworks	680	m^3	$ 40.00	$ 27,200.00	
1.3	Subgrade improvement	1100	m^2	$ 60.00	$ 66,000.00	
1.4	Service proving works	1	Item	$ 40,000.00	$ 40,000.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	850	m^2	$ 180.00	$ 153,000.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	3650	m^2	$ 60.00	$ 219,000.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	410	Lm	$ 90.00	$ 36,900.00	
3.2	Pedestrian & Cycle Paths	190	m^2	$ 110.00	$ 20,900.00	
3.3	Concrete median works	750	m^2	$ 120.00	$ 90,000.00	
3.4	Pram ramp works	6	Item	$ 2,100.00	$ 12,600.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes	20	Lm	$ 200.00	$ 4,000.00	
4.2	Drainage - pits	4	Item	$ 2,100.00	$ 8,400.00	
4.3	Drainage – Sub-soil drainage	820	Lm	$ 65.00	$ 53,300.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	4	Item	$ 1,800.00	$ 7,200.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals - POS - North St	1	Item	$ 180,000.00	$ 180,000.00	
5.2	Traffic Signals - Hoskin St/ Midland HWY	1	Item	$ 350,000.00	$ 350,000.00	
5.3	Traffic Signals - Railway Parade	1	Item	$ 400,000.00	$ 400,000.00	
5.4	Traffic Signals - Rail link	1	Item	$ 250,000.00	$ 250,000.00	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	200	m^2	$ 60.00	$ 12,000.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting	3	Item	$ 12,500.00	$ 37,500.00	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 12,000.00	$ 12,000.00	
8.2	Regulatory Signage	1	Item	$ 8,000.00	$ 8,000.00	
9.0	**OTHER**					
9.1	Telstra and communication services relocation/ Protection works	*1*	Item	*$ 150,000.00*	*$ 150,000.00*	This is a broad level estimate only, subject to verification by authority
9.2	*Gas services relocation/Protection works*	*1*	*Item*	*$ 25,000.00*	*$ 25,000.00*	This is a broad level estimate only, subject to verification by authority
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 150,000.00*	*$ 150,000.00*	This is a broad level estimate only, subject to verification by authority
9.4	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 80,000.00*	*$ 80,000.00*	This is a broad level estimate only, subject to verification by authority
	SUB-TOTAL WORKS				**$ 2,428,000.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 24,280.00	
10.2	VicRoads Fees	3.25	%		$ 78,910.00	
10.3	Traffic Management	5	%		$ 121,400.00	
10.4	Environmental Management	1	%		$ 24,280.00	
10.5	Survey/Design	10	%		$ 242,800.00	
10.6	Supervision & Project Management	9	%		$ 218,520.00	
10.7	Site Establishment	2.5	%		$ 60,700.00	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 971,200.00	
	SUB-TOTAL DELIVERY				**$ 1,742,090.00**	
11	**TOTAL ESTIMATED COST**				**$ 4,170,090.00**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V171580: Fryers St Railway Pde Thompson St intersections works
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-09-P1 dated 04/03/2020 (Concept Layout)

	Fryers St Railway Pde Thompson St intersections work					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 10,000.00	$ 10,000.00	
1.2	Earthworks	420	m^3	$ 40.00	$ 16,800.00	
1.3	Subgrade improvement	780	m^2	$ 60.00	$ 46,800.00	
1.4	Service proving works	1	Item	$ 35,000.00	$ 35,000.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	680	m^2	$ 180.00	$ 122,400.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	2680	m^2	$ 60.00	$ 160,800.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	480	Lm	$ 90.00	$ 43,200.00	
3.2	Pedestrian & Cycle Paths	220	m^2	$ 110.00	$ 24,200.00	
3.3	Concrete median works	160	m^2	$ 120.00	$ 19,200.00	
3.4	Pram ramp works	4	Item	$ 2,100.00	$ 8,400.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes	60	Lm	$ 200.00	$ 12,000.00	
4.2	Drainage - pits	6	Item	$ 2,100.00	$ 12,600.00	
4.3	Drainage – Sub-soil drainage	780	Lm	$ 65.00	$ 50,700.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	8	Item	$ 1,800.00	$ 7,200.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals	1	Item	$ 180,000.00	$ 180,000.00	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	360	m^2	$ 60.00	$ 21,600.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting	8	Item	$ 12,500.00	$ 100,000.00	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 6,000.00	$ 6,000.00	
8.2	Regulatory Signage	1	Item	$ 4,500.00	$ 4,500.00	
9.0	**OTHER**					
9.1	Telstra services relocation/ Protection works	*1*	Item	*$ 800,000.00*	*$ 800,000.00*	This is a broad level estimate only, subject to verification by authority
9.2	*Gas services relocation/Protection works*	*1*	*Item*		$ -	This is a broad level estimate only, subject to verification by authority
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	This is a broad level estimate only, subject to verification by authority
9.4	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 120,000.00*	*$ 120,000.00*	This is a broad level estimate only, subject to verification by authority
	SUB-TOTAL WORKS				**$ 1,851,400.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 18,514.00	
10.2	VicRoads Fees	3.25	%		$ 60,170.50	
10.3	Traffic Management	5	%		$ 92,570.00	
10.4	Environmental Management	1	%		$ 18,514.00	
10.5	Survey/Design	10	%		$ 185,140.00	
10.6	Supervision & Project Management	9	%		$ 166,626.00	
10.7	Site Establishment	2.5	%		$ 46,285.00	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 740,560.00	
	SUB-TOTAL DELIVERY				**$ 1,328,379.50**	
11	**TOTAL ESTIMATED COST**				**$ 3,179,779.50**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

DRAFT

V171580: Knight St Hawdon St Railway Pde Andrew Fairley Ave intersections works
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-05-P1 dated 29/11/2019 (Concept Layout)

	Knight St Hawdon St Railway Pde Andrew Fairley Ave intersections work					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 40,000.00	$ 40,000.00	
1.2	Earthworks	550	m^3	$ 40.00	$ 22,000.00	
1.3	Subgrade improvement	720	m^2	$ 60.00	$ 43,200.00	
1.4	Service proving works	1	Item	$ 35,000.00	$ 35,000.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	680	m^2	$ 180.00	$ 122,400.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	4590	m^2	$ 60.00	$ 275,400.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	260	Lm	$ 90.00	$ 23,400.00	
3.2	Pedestrian & Cycle Paths	60	m^2	$ 110.00	$ 6,600.00	
3.3	Concrete median works	45	m^2	$ 120.00	$ 5,400.00	
3.4	Pram ramp works	8	Item	$ 2,100.00	$ 16,800.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes	20	Lm	$ 200.00	$ 4,000.00	
4.2	Drainage - pits	2	Item	$ 2,100.00	$ 4,200.00	
4.3	Drainage – Sub-soil drainage	540	Lm	$ 65.00	$ 35,100.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	4	Item	$ 1,800.00	$ 7,200.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals	1	Item	$ 450,000.00	$ 450,000.00	
5.2	Railway crossing - Andrew Fairley Avenue	1	Item	$ 750,000.00	$ 750,000.00	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	420	m^2	$ 60.00	$ 25,200.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting	7	Item	$ 12,500.00	$ 87,500.00	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 12,000.00	$ 12,000.00	
8.2	Regulatory Signage	1	Item	$ 10,000.00	$ 10,000.00	
9.0	**OTHER**					
9.1	Telstra services relocation/ Protection works	*1*	Item	*$ 150,000.00*	*$ 150,000.00*	This is a broad level estimate only, subject to verification by authority
9.2	*Gas services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	This is a broad level estimate only, subject to verification by authority
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 100,000.00*	This is a broad level estimate only, subject to verification by authority
9.4	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	This is a broad level estimate only, subject to verification by authority
	SUB-TOTAL WORKS				**$ 2,325,400.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 23,254.00	
10.2	VicRoads Fees	3.25	%		$ 75,575.50	
10.3	Traffic Management	5	%		$ 116,270.00	
10.4	Environmental Management	1	%		$ 23,254.00	
10.5	Survey/Design	10	%		$ 232,540.00	
10.6	Supervision & Project Management	9	%		$ 209,286.00	
10.7	Site Establishment	2.5	%		$ 58,135.00	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 930,160.00	
	SUB-TOTAL DELIVERY				**$ 1,668,474.50**	
11	**TOTAL ESTIMATED COST**				**$ 3,993,874.50**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

DRAFT

V171580: Knight St Hawdon St Railway Pde Andrew Fairley Ave intersections works - Option
Civil Construction
Date 19/03/2020

Basis of Estimate
This cost estimate is based on GTA drawing V171580-07-P1 dated 14/02/2019 (Concept Layout)

	Knight St Hawdon St Railway Pde Andrew Fairley Ave intersections work - option					
Item	**Description**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.0	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation	1	Item	$ 45,000.00	$ 45,000.00	
1.2	Earthworks	820	m^3	$ 40.00	$ 32,800.00	
1.3	Subgrade improvement	1210	m^2	$ 60.00	$ 72,600.00	
1.4	Service proving works	1	Item	$ 35,000.00	$ 35,000.00	
2.0	**ROAD PAVEMENT**					
2.1	Asphalt Pavement - 750mm depth pavement for primary arterial road	1020	m^2	$ 180.00	$ 183,600.00	Narrow Widening - Deep strength asphalt pavement
2.2	Asphalt re-sheet works	4740	m^2	$ 60.00	$ 284,400.00	Type V asphalt
3.0	**CONCRETE WORKS**					
3.1	Kerb and Channel	320	Lm	$ 90.00	$ 28,800.00	
3.2	Pedestrian & Cycle Paths	180	m^2	$ 110.00	$ 19,800.00	
3.3	Concrete median works	90	m^2	$ 120.00	$ 10,800.00	
3.4	Pram ramp works	8	Item	$ 2,100.00	$ 16,800.00	DDA requirements
4.0	**DRAINAGE**					
4.1	Drainage - pipes	40	Lm	$ 200.00	$ 8,000.00	
4.2	Drainage - pits	4	Item	$ 2,100.00	$ 8,400.00	
4.3	Drainage – Sub-soil drainage	670	Lm	$ 65.00	$ 43,550.00	Pavement interface also require SSD
4.4	Drainage – Sub-soil drainage pits/Flushout riser	4	Item	$ 1,800.00	$ 7,200.00	
5.0	**TRAFFIC**					
5.1	Traffic Signals	1	Item	$ 500,000.00	$ 500,000.00	
5.2	Railway crossing - Andrew Fairley Avenue	1	Item	$ 750,000.00	$ 750,000.00	
6.0	**LANDSCAPE**					
6.1	Landscaping - batter and back of kerb works	480	m^2	$ 60.00	$ 28,800.00	
7.0	**STREET LIGHTING**					
7.1	Street Lighting	10	Item	$ 12,500.00	$ 125,000.00	Intersection and median lights
8.0	**MISCELLANEOUS**					
8.1	Line marking	1	Item	$ 14,000.00	$ 14,000.00	
8.2	Regulatory Signage	1	Item	$ 10,000.00	$ 10,000.00	
9.0	**OTHER**					
9.1	Telstra services relocation/ Protection works	*1*	Item	*$ 800,000.00*	*$ 800,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.2	*Gas services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.3	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 100,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.4	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 150,000.00*	*$ 150,000.00*	*This is a broad level estimate only, subject to verification by authority*
	SUB-TOTAL WORKS				**$ 3,324,550.00**	
10.00	**DELIVERY**					
10.1	Council Fees	1	%		$ 33,245.50	
10.2	VicRoads Fees	3.25	%		$ 108,047.88	
10.3	Traffic Management	5	%		$ 166,227.50	
10.4	Environmental Management	1	%		$ 33,245.50	
10.5	Survey/Design	10	%		$ 332,455.00	
10.6	Supervision & Project Management	9	%		$ 299,209.50	
10.7	Site Establishment	2.5	%		$ 83,113.75	
10.8	Contingency - Overall (Item 1.1 to 9.4)	40	%		$ 1,329,820.00	
	SUB-TOTAL DELIVERY				**$ 2,385,364.63**	
11	**TOTAL ESTIMATED COST**				**$ 5,709,914.63**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 40% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept Functional layout
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA Consultants cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

DRAFT

GTAconsultants

www.gta.com.au