University of Southern Queensland Faculty of Engineering and Surveying

A Practical Comparison of VISSIM and SIDRA for the Assessment of Development Impacts

A dissertation submitted by

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Abstract

This research project was devised to provide a comparison of the engineering uses of VISSIM and SIDRA (two traffic modelling programs) in the assessment of traffic-based development impacts. SIDRA is a micro-analytical traffic evaluation tool, whereas VISSIM is a multi-modal microsimulation traffic modelling software. The key objectives of the study were to compare the output results of SIDRA and VISSIM, particularly the key performance measures of delay and queue length, and to also investigate the potential advantages and disadvantages of using VISSIM to perform development impact assessments.

The key outcome of the model comparison was that SIDRA tended to calculate higher average delay statistics than VISSIM for intersections with low traffic demand and where some geometric negotiation is required. Further investigation identified that SIDRA automatically includes a geometric delay component within its calculation of average vehicle delay. By contrast, the equivalent statistic calculated by VISSIM ignores geometric delay (when coded using reduced speed areas) and incorporates only genuine control delay. This identifies a key difference between the methods used by each package to report a performance measure that is commonly assessed in TIAs.

No consistent trend was apparent in the comparison of queue length data generated by each package, although there was some evidence that VISSIM reported larger queues than SIDRA at over-saturated intersections.

In summary, SIDRA is likely to be more appropriate for projects with tight timeframes and smaller budgets. Assessments that require analysis of intersections with irregular geometry, or where multiple intersections are in close proximity to one another, are better conducted with a microsimulation model. The study concluded that the general modelling context needs to be identified before a choice of model is made. Consideration should be given to the network extents, intersection types, project budget and project timeframe.

i

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Table of Contents

Abst	tract		i
Ackı	nowle	dgements	iv
List	of Fig	jures	ix
List	of Ta	bles	xiv
1.	Intro	oduction	1
	1.1	Background	1
	1.2	Project Aims	2
	1.3	Specific Objectives	3
	1.4	Exclusions from Study	3
2. Literatu		rature Review	4
	2.1	Micro-Analytical and Microsimulation Traffic Models	4
	2.2	Comparisons of Micro-Analytical and Microsimulation	
		Traffic Modelling Software	5
	2.3	Methodologies for Model Comparisons	7
	2.4	SIDRA and VISSIM Calculation Methods	9
	2.5	Performance Criteria Guidelines	11
	2.6	Guidelines for Assessment of Traffic-Based	
		Development Impacts	12
	2.7	Summary	13
3.	Metl	nodology	15
	3.1	Transport Policy - The TIA Process	15
	32	Development Profile	15

	3.3	Data Collection	15
	3.4	Development of Existing Travel Demand	16
	3.5	Base Model Development	16
	3.6	Traffic Operation Assessment	18
	3.7	Model Comparison Results and Analysis	18
4.	Ass	essment Details	19
	4.1	Transport Policy - The TIA Process	19
	4.2	Development Profile	20
5.	Data	a Analysis	29
	5.1	Data Collection	29
	5.2	Development of Existing Travel Demand	32
6.	Bas	e Models / Calibration and Validation	34
	6.1	Development of Base VISSIM Models	34
	6.2	Development of Base SIDRA Models	47
7.	Futu	ure Year Traffic Operation Assessment	53
	7.1	Performance Criteria	53
	7.2	Development of Future Travel Demand	55
	7.3	Future Year VISSIM Models	56
	7.4	Future Year SIDRA Models	59
8.	Mod	lel Comparison Results and Analysis	65
	8.1	Analysis of Output Results	65
	8.2	Practical Application for TIAs	92
9.	Con	clusions	95

	9.1	Comparison of Model Outputs	95
	9.2	Recommendations for TIAs	97
	9.3	Further Work	98
List o	f Re	ferences	100
Ap	per	ndices	
Α	Р	roject Specification	104
В	T	raffic Count Data	106
С	In	creases in Traffic Volumes caused by Development	146
D	D	etailed Assessment of Network Peak Periods	148
Е	20	011 Base Network Counts	150
F	S	ignal Data	155
G	В	ase 2011 AM and PM Trip Matrices	163
Н	S	creenshot of Base VISSIM Model	168
1	D	etailed Turn Count Calibration Statistics - VISSIM	170
J	D	etailed Queue Length Validation Statistics - VISSIM	175
K	In	tersection Layouts for Base SIDRA Models	178
L	D	etailed Queue Length Validation Statistics - SIDRA	193
М	F	uture 2022 AM and PM Trip Matrices (Without	
	D	evelopment)	196
Ν	F	uture 2022 AM and PM Trip Matrices (With	
	D	evelopment)	201
0	20	022 AM and PM Peak VISSIM Results (Without	
	D	evelopment)	206
Р	20	022 AM and PM Peak VISSIM Results (With	
	D	evelopment)	215
Q	20	022 AM and PM Peak SIDRA Results (Without	
	D	evelopment)	224
R	20	022 AM and PM Peak SIDRA Results (With	
	D	evelopment)	253

S	2011 and 2022 AM and PM Peak VISSIM Results	
	(Existing Layouts for Model Comparison)	284
Т	2011 and 2022 AM and PM Peak SIDRA Results	
	(Existing Layouts for Model Comparison)	293
U	VISSIM Visualisation File	318

List of Figures

Figure 4.1	Development Site Locality Map	21
Figure 4.2	Zoning Map showing Development Trip Distribution	24
Figure 4.3	Model Extents and Intersection Locations	28
Figure 6.1	Scatter Plot - Turn Count Calibration - AM Peak LVs	39
Figure 6.2	Scatter Plot - Turn Count Calibration - AM Peak Buses	40
Figure 6.3	Scatter Plot - Turn Count Calibration - PM Peak LVs	40
Figure 6.4	Scatter Plot - Turn Count Calibration - PM Peak Buses	41
Figure 6.5	Travel Time Validation Routes	42
Figure 6.6	Travel Time Validation Graph - Clockwise Route - AM Peak	43
Figure 6.7	Travel Time Validation Graph - Anti- Clockwise Route - AM Peak	43
Figure 6.8	Travel Time Validation Graph - Clockwise Route - PM Peak	44
Figure 6.9	Travel Time Validation Graph - Anti-	11

Figure 6.10	VISSIM Queue Length Validation Graph - AM Peak	45
Figure 6.11	VISSIM Queue Length Validation Graph - PM Peak	46
Figure 6.12	SIDRA Queue Length Validation Graph - AM Peak	51
Figure 6.13	SIDRA Queue Length Validation Graph - PM Peak	52
Figure 7.1	Comparison of Matrix Totals	56
Figure 7.2	Existing VISSIM Coding for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection	57
Figure 7.3	2022 Required VISSIM Coding for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection	58
Figure 7.4	Existing SIDRA Layout for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection	61
Figure 7.5	2022 Required SIDRA Layout for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection	62
Figure 8.1	Existing SIDRA Layout for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection	68
Figure 8.2	Modelled Average Delay - Intersection 1 - Prelude Drive (South) Approach	68

Figure 8.3	Modelled Average Delay - Intersection 1 - Karawatha Drive (East) Approach	69
Figure 8.4	Modelled Average Delay - Intersection 1 - Lady Musgrave Drive (North) Approach	69
Figure 8.5	Modelled Average Delay - Intersection 1 - Karawatha Drive (West) Approach	70
Figure 8.6	Modelled Maximum Queue - Intersection 1	70
Figure 8.7	Existing SIDRA Layout for Karawatha Drive / Molokai Drive / Mountain Creek Shops Intersection	72
Figure 8.8	Modelled Average Delay - Intersection 2 - Shops (South) Approach	72
Figure 8.9	Modelled Average Delay - Intersection 2 - Karawatha Drive (East) Approach	73
Figure 8.10	Modelled Average Delay - Intersection 2 - Molakai Drive (North) Approach	73
Figure 8.11	Modelled Average Delay - Intersection 2 - Karawatha Drive (West) Approach	74
Figure 8.12	Modelled Maximum Queue - Intersection 2	74
Figure 8.13	Existing SIDRA Layout for Karawatha Drive / Bundilla Boulevard / WB Off Ramp / Seriata Way Intersection	76
Figure 8.14	Modelled Average Delay - Intersection 3 - Seriata Way (South) Approach	76

Figure 8.15	Modelled Average Delay - Intersection 3 -	
	Westbound Off Ramp (East) Approach	77
Figure 8.16	•	
	Karawatha Drive (North) Approach	77
Figure 8.17	Modelled Average Delay - Intersection 3 -	78
	Bundilla Boulevard (West) Approach	10
Figure 8.18	Modelled Maximum Queue - Intersection 3	78
Figure 8.19	Existing SIDRA Layout for Glenfields	
	Boulevard / Mountain Ash Drive / Birch Street Intersection	80
Figure 8.20	Modelled Average Delay Intersection 4	
rigule 6.20	Modelled Average Delay - Intersection 4 - Mountain Ash Drive (South) Approach	80
Figure 8.21	Modelled Average Delay - Intersection 4 -	
3	Glenfields Boulevard (East) Approach	81
Figure 8.22	Modelled Average Delay - Intersection 4 -	
	Birch Street (North) Approach	81
Figure 8.23	Modelled Average Delay - Intersection 4 -	
	Glenfields Boulevard (West) Approach	82
Figure 8.24	Modelled Maximum Queue - Intersection 4	82
Figure 8.25	Existing SIDRA Layout for Prelude Drive / EB	
	On Ramp Intersection	84
Figure 8.26	Modelled Average Delay - Intersection 5 -	
	Prelude Drive (South) Approach	84

Figure 8.27	Modelled Average Delay - Intersection 5 -	
	Prelude Drive (North) Approach	85
Figure 8.28	Modelled Maximum Queue - Intersection 5	85
Figure 8.29	Existing SIDRA Coding for Karawatha Drive /	
	Satinay Street Intersection	87
Figure 8.30	Modelled Average Delay - Intersection 6 -	
	Karawatha Drive (East) Approach	87
Figure 8.31	Modelled Average Delay - Intersection 6 -	
	Satinay Street (North) Approach	88
Figure 8.32	Modelled Average Delay - Intersection 6 -	
	Karawatha Drive (West) Approach	88
Figure 8.33	Modelled Maximum Queue - Intersection 6	89

List of Tables

Table 4.1	Development Trip Generation	23
Table 4.2	Opening Year Daily Traffic Volumes	26
Table 6.1	VISSIM Model Time Periods	35
Table 6.2	VISSIM Model Development Details	35
Table 6.3	VISSIM AM Peak Signal Cycle Validation Results	36
Table 6.4	VISSIM PM Peak Signal Cycle Validation Results	37
Table 6.5	Summary of VISSIM Calibration Statistics for Turn Counts	39
Table 6.6	Summary of VISSIM Travel Time Validation Statistics	43
Table 6.7	SIDRA Model Time Periods	47
Table 6.8	SIDRA Model Development Details	48
Table 6.9	SIDRA AM Peak Signal Cycle Validation Results	49
Table 6.10	SIDRA PM Peak Signal Cycle Validation Results	49
Table 7.1	LOS Criteria	54

Glossary of Terms and Abbreviations

ADT - Average Daily Traffic.

Austroads - The association of Australian and New Zealand road transport and traffic authorities (Austroads 2006).

Calibration - The process of changing parameter values in a model in order to achieve agreement between the simulation results and observed data (Austroads 2006).

Car-Following Behaviour - A series of algorithms that define the way vehicles interact with one another within a traffic model.

Cordon - The external boundary of a spatial model.

DOS - Degree of Saturation - the volume / capacity (v/c) ratio for an intersection, movement or approach.

DTMR - Department of Transport and Main Roads.

Dynamic Assignment - Time based assignment of vehicles to a model network using route choice calculations based on generalised costs, i.e. travel distance, travel time and other costs such as tolls etc.

EIGCA - European Institute of Golf Course Architects.

Gap Acceptance - Describes the completion of a vehicle's movement into a gap (TRB 2000).

GARID - Guidelines for Assessment of Road Impacts of Development.

GEH - Geoffrey E. Havers statistic - A standard measure of the "goodness of fit" between observed and modelled traffic flows.

HCM - Highway Capacity Manual.

INTEGRATION - A mesoscopic routing-oriented traffic model (Wang & Prevedouros 1997).

Kimber and Hollis Micro-analytical Method - An approximation method that allows the growth and decay of queues to be estimated (Sermpis 2007).

Lane Changing Behaviour - A series of algorithms that define the way vehicles change lanes within a microsimulation traffic model.

Lane Utilisation - The proportion of flows in each lane on the approach to an intersection.

LOS - Level of Service - A performance measure based on average delay per vehicle.

LVs - Light Vehicles.

Mesoscopic Model - Also referred to as a hybrid model, this type of model combines some microscopic components with analytical models (Austroads 2006).

Micro-analytical Model - A model that is based on equations that govern driver behaviour parameters, such as gap acceptance, car-following behaviour and platooning (Austroads 2006).

Microsimulation Model - A model based on the movement of individual vehicles (or entities, such as pedestrians) through a given network, where the

movement of these vehicles is traced over time and this provides a detailed simulation of vehicle-road interaction (Austroads 2006).

NAASRA - National Association of Australian State Road Authorities (predecessor of Austroads).

OD Matrix (Trip Matrix) - A symmetrical matrix that represents the travel demand for a network, where each cell signifies the number of trips between an "origin/destination pair".

Paramics - A microsimulation traffic model platform.

Platooning - Describes cyclical periods of bunched arriving vehicles at an intersection followed by periods of much lighter traffic flow (Austroads 2006).

Probabilistic - Describes events for which the rate of occurrence can be based on a probability function.

RODEL - An analytical roundabout design program.

RTA - Roads and Traffic Authority.

SCRC - Sunshine Coast Regional Council.

SIDRA - Signalised and Unsignalised Intersection Design Research Aid - A micro-analytical traffic evaluation tool that employs lane-by-lane and vehicle drive-cycle models in its estimates of capacity and performance characteristics of intersections (SIDRA Solutions 2010).

SIGSIM - A microsimulation traffic model that uses the mathematical model developed by Gipps (Sermpis 2007).

Stochastic - Describes a process that is statistically random.

TIA - Traffic Impact Assessment.

TRB - Transportation Research Board.

TRL - Transport Research Laboratory.

TSIS/CORSIM - A microsimulation that is a combination of the two microscopic simulations, NETSIM and FRESIM (Wang & Prevedouros 1997).

Validation - The process of comparing model outputs with observed data that is independent from the calibration procedure (Austroads 2006).

VAP - A module within VISSIM that allows Vehicle-Actuated Signal Control to be coded (PTV 2010).

VISSIM - A multi-modal microsimulation traffic modelling software that incorporates both car following behaviour and lane change logic in its simulation of traffic flow (PTV 2010).

VISUM - A mesoscopic software that integrates individual and public transport types in a single model.

WATSim - Wide Area Traffic Simulation - A microsimulation traffic model that extends NETSIM's applicability to freeway and ramp operations (Wang & Prevedouros 1997).

Wiedemann 74 Car Following Model - A model that is based on parameters that influence safe following distance and thus saturation flow rate (PTV 2010).

1. Introduction

This research project was devised to provide a comparison of the engineering applications of two traffic modelling programs for the assessment of traffic-based development impacts. The two software packages investigated as part of the research were SIDRA INTERSECTION and VISSIM. For the purposes of this dissertation, SIDRA INTERSECTION will be referred to herein as SIDRA.

SIDRA is a micro-analytical traffic evaluation tool that employs lane-by-lane and vehicle drive-cycle models in its estimates of capacity and performance characteristics of intersections (SIDRA Solutions 2010). SIDRA is capable of simulating some effects of upstream and downstream intersections within its calculations, however it is generally considered as a model for standalone intersections.

VISSIM is a multi-modal microsimulation traffic modelling software that incorporates both car following behaviour and lane change logic in its simulation of traffic flow (PTV 2010). Microsimulation models, like VISSIM, are network models, in that numerous intersections are modelled simultaneously, including the vehicular movements on road links between adjoining intersections.

1.1 Background

State and local road authorities are responsible for the safe and efficient management of their respective road networks. The *Local Government Act* 2009 (Queensland) states that a local government may require an entity that is proposing to conduct a prescribed activity to provide information to enable the local government to assess the impact of the activity on the local road network. After assessing the impact on the road network, the local authority may choose to do one of the following:

• give the entity direction about the use of the road to lessen the impact;

- require the entity to carry out works to lessen the impact; or
- require the entity to pay a contribution as compensation for the impact.

Likewise, the *Transport Infrastructure Act 1994* (Queensland) indicates that the state has similar power in managing the impacts of activities on state controlled roads. Therefore, measuring the impacts of development on local and state controlled roads is a common task in the traffic engineering and transport planning fields.

SIDRA is a commonly used tool for assessing these impacts. In some situations, assessing intersections independently may not be the most appropriate method for analysing performance characteristics and/or impacts of increased demand. This project was developed to investigate the potential advantages and disadvantages of utilising a microsimulation tool, namely VISSIM, for performing development impact assessments. The scope of the investigation involved undertaking a traffic impact assessment (TIA) using both SIDRA and VISSIM, focussing on the operational aspect of the analysis. Subsequently, the results from each approach were compared and then investigated to ultimately provide reasoning for variations in the output results from each package.

1.2 Project Aims

The broad aims of the project included:

- to use both micro-analytical and microsimulation traffic modelling tools for an assessment of traffic-based impacts of an arbitrary development proposal;
- to test signalised intersections, roundabouts and priority controlled intersections with each model to obtain a variety of results from which to base recommendations and research on;
- to compare the output results of each modelling package with an aim to identify reasoning for any variations in the results (which may also be

advantageous for practitioners and authorities who particularly want to identify the reasons for differences between the outputs of both packages in an arbitrary sense, e.g. when both SIDRA and a network model have been used for traffic analysis for a major infrastructure project);

- to identify the pros and cons of each traffic modelling software for the practical application of assessing development impacts; and
- to develop recommendations on which model might be most suitable for various sizes and types of applications of traffic-based development impact assessments.

1.3 Specific Objectives

The specific objectives of the project included:

- developing base models for the existing network configuration;
- calibrating and validating the models (against recommended guidelines), to provide a set of accurate base platform models that are representative of current conditions from which future forecast models could be developed;
- future year modelling to identify potential upgrades for the existing network required as a result of the development;
- analysing the output results of each package by identifying variations between the output results and researching the calculation methods of each package in an attempt to discover the reasons for the variations; and
- providing recommendations regarding the practical application of each software package for assessing traffic-based development impacts.

1.4 Exclusions from Study

It should be noted that due to time constraints, pedestrians were not included in the modelling process. The study addressed only the traffic operation assessment aspect of the TIA. All other aspects regularly conducted in a TIA were considered to be outside the scope of the project.

2. Literature Review

The key objectives of this research focussed on traffic simulation and analysis of model outputs. Although this study utilised a TIA as the basis for comparison of SIDRA and VISSIM, the comparison focussed on the outputs of the packages when performing assessment of traffic operations and the potential worth this research has for the engineering industry. Therefore it was essential to identify the current knowledge gap and to demonstrate the importance of the topic to the traffic engineering profession. Based on these broad objectives, the specific aims of the literature review included:

- to provide a brief overview of both micro-analytical and microsimulation traffic models:
- to determine the extent of research based on a comparison of microanalytical and microsimulation traffic modelling software;
- to identify methodologies that other researchers have adopted for their particular studies;
- to ascertain documented information regarding the calculation methods of SIDRA and VISSIM:
- to observe the current industry standard for performance criteria that could potentially be adopted in this study, i.e. intersection performance criteria, calibration and validation standards etc.; and
- to investigate current industry guidelines regarding the assessment of trafficbased development impacts.

2.1 Micro-Analytical and Microsimulation Traffic Models

An essential part of undertaking the proposed research was to develop a clear characterisation of both micro-analytical and microsimulation models, as well as their current recognised uses and limitations. The *Austroads Research Report The Use and Application of Microsimulation Traffic Models* (Austroads 2006) provided the following information regarding each modelling technique:

- Analytical modelling refers to a technique based on equations that govern driver behaviour parameters, such as gap acceptance, car-following behaviour and platooning. Complex micro-analytical models are formed by combining sub-models to analyse real-life traffic situations.
- Microsimulation modelling is based on the movement of individual vehicles (or entities, such as pedestrians) through a given network. The movement of these vehicles is traced over time, usually at small increments of a fraction of a second and this provides a detailed simulation of vehicle-road interaction.

Microsimulation traffic models require greater resources and calibration time when compared to micro-analytical models, however there are added benefits, including a real-time visual display providing clarity and enhanced understanding of the analysis, and greater flexibility, due to the range of problems that can potentially be modelled.

2.2 Comparisons of Micro-Analytical and Microsimulation Traffic Modelling Software

One of the key purposes of the literature review was to identify current knowledge gaps in the area of traffic modelling. For this research task, the specific knowledge gaps to be confirmed were:

- comparisons of model outputs for the assessment of unsignalised intersections, roundabouts and signalised intersections; and
- comparisons of SIDRA and VISSIM for use in assessing traffic-based development impacts.

A paper by Akcelik & Besley (2001) provided a broad comparative overview of the uses of micro-analytical and microsimulation traffic models. Recommendations on the future research required to improve the practicality of each type of model were discussed. The purpose of the paper however, was not to provide a detailed comparison of two specific software packages, such as SIDRA and VISSIM. Akcelik & Besley (2001) concluded that studies of the key traffic parameters used in each type of model should be undertaken. In addition, to improve the usefulness of microsimulation packages, Akcelik & Besley (2001) stated that options to calibrate the models in everyday engineering terms should be provided.

Akcelik (2004) provided a case study comparing some micro-analytic methods for determining the capacity of a single lane roundabout. The methods compared were the gap acceptance based Australian method (SIDRA, Austroads and NAASRA) and US *Highway Capacity Manual* (TRB 2000) method versus the linear regression based TRL (UK) method. The paper identified that the TRL (UK) model underestimates roundabout capacity for low circulating flows and overestimates capacity for high circulating flows, as it appears that this model was developed with a relatively small set of data points with low circulating flows. It also found that SIDRA was more reflective of the uniform style of roundabouts found in Australia and that there is a lack of sensitivity to demand flows in the TRL (UK) model.

A paper by Stanek & Milam (2004) identified that the output results from roundabout models can vary greatly. The paper compared results from SIDRA, VISSIM, RODEL and Paramics. The findings of the study were that SIDRA and RODEL did not measure multi-lane roundabout operations as accurately as VISSIM and Paramics, as they lacked sensitivity to the roadway geometry and gap acceptance characteristics. Although the microsimulation models provided more reasonable results, they required detailed calibration to do so.

Gagnon, et al. (2008) presented a case study on the calibration potential of various roundabout models. Included in this study, were SIDRA and VISSIM. It was found that VISSIM was the most versatile modelling package tested in regard to replicating observed site conditions. Stanek & Milam (2004) also

identified that microsimulation models are able to more closely represent site conditions through the calibration process than micro-analytical models can. Gagnon, et al. (2008) found that both SIDRA and VISSIM showed a large improvement in the output results once calibration had been undertaken. Further research on the calibration of roundabout models was undertaken by Akcelik (2005). This paper provided a case study on the calibration techniques for roundabouts and identified that roundabout models should not concentrate on capacity alone. Performance characteristics, such as delay and queue length etc. should also be considered. The paper provided various aspects regarding model calibration including driver behaviour characteristics, heavy vehicle factors and lane utilisation.

In lecture slides presented by Akcelik (2007) at the ARRB - Austroads Microsimulation Forum, some of the concerns regarding microsimulation models were provided, i.e. extensive data requirements, specialist users, speed of application for large models and a need for calibration and benchmarking. Akcelik (2007) identified that there is a real need for improvement of microsimulation models through better calibration techniques. The notes stated that the general modelling context needs to be clarified to form a basis for choosing one model over another.

2.3 Methodologies for Model Comparisons

A review of the methodologies adopted by researchers who had conducted model comparisons in the past was undertaken to provide a basis from which to develop a methodology for this project.

The majority of model comparison research used case studies to identify variances in results. Akcelik & Besley (2001) indicated that benchmarking should be undertaken through the development of case studies. This benchmarking allows the models to be compared more reasonably and against

real-life conditions rather than processes that compare estimates provided by different modelling techniques.

Wang & Prevedouros (1997) undertook a comparison of INTEGRATION (a mesoscopic model), TSIS/CORSIM (a combination of two microscopic models) and WATSim (a microscopic model). The comparison was conducted by assessing networks for three case studies.

Numerous papers provided clear outcomes relating to the calibration of models. Research undertaken by Akcelik & Besley (2001), Stanek & Milam (2004) and Gagnon et. al. (2008) concluded that detailed calibration provided much more useful results. This indicated that the calibration phase of this research project should be considered as one of the most critical processes in the study, to ensure that results will provide reliable outcomes and conclusions.

Sermpis (2007) undertook an assessment of the effect of geometry on the operational performance of signalised intersections. The study compared delay estimates calculated by SIGSIM, a microsimulation model, with the Kimber and Hollis micro-analytical method. The study found that there was a large variation between the results of each program. The study was undertaken using two types of junction; crossroads and T-junctions. For each junction type, two sets of movement were tested. The effects of traffic flow, lane width, turning radius, signal control strategy and the interaction between each were all tested.

Lo et. al. (1996) developed a framework for comparing dynamic traffic models. Although this paper is not directly related to the processes involved in this project, it does provide useful mechanisms for developing a robust comparison methodology. These comparison mechanisms included:

- a checklist of model functionality;
- development of a set of scenarios that will accentuate model differences and similarities; and

development of performance measures to use in the comparison.

The research was based on a defined set of five networks with 12 scenarios. The desired outcomes of the study were similar to the objectives of this study, in that the comparison of the models was not undertaken to determine which model is "better" per se, but rather to identify the general context in which each model may be most appropriate.

The outcomes of the study undertaken by Lo et. al. (1996) indicated that model comparisons should be based on a set of scenarios. Clearly, development of a clear set of criteria from which performance measures can be quantitatively or qualitatively compared is an important step in the comparison process and this is also supported by Bloomberg & Dale (2000). The comparison of INTEGRATION, TSIS/CORSIM and WATSim undertaken by Wang & Prevedouros (1997), provided a synopsis of the following measures output by each model:

- simulated volume (vph);
- average speed (km/h);
- average density (veh/km/ln);
- average travel time (s/veh); and
- average queue (veh).

2.4 SIDRA and VISSIM Calculation Methods

Essentially, the most useful resources for determination of the calculation methods for each software will be the user manuals provided by the respective software publishers.

The SIDRA INTERSECTION User Guide (SIDRA Solutions 2010) is a comprehensive manual that provides guidance on the inputs and outputs of the

model. The output guide provides information on the capacity, delay and queuing theory used in the program, as well as intersection analysis methods.

The VISSIM 5.20 User Manual (PTV 2010) also provides details about the way data is output from VISSIM. The format of most evaluation data from VISSIM is controlled by the user.

The Guide to Traffic Management Part 2: Traffic Theory (Austroads 2008) provides the theoretical background to traffic behaviour. Information regarding the stochastic nature of traffic behaviour is provided, as well as calculation processes for probabilistic aspects of traffic flow. The theory behind the following aspects was explained:

- queuing;
- gap acceptance;
- car following behaviour;
- bunching and overtaking; and
- platoon dispersion.

The Austroads Research Report The Use and Application of Microsimulation Traffic Models (Austroads 2006) provided a commentary on the fundamentals of microsimulation models. The following key concepts, as applied to microsimulation models, were discussed:

- randomness and generation of vehicles; and
- vehicle interactions: car-following and lane changing behaviours.

The report outlined the stochastic nature of microsimulation models, in that traffic generation and driver-vehicle characteristics are developed from statistical distributions using random numbers. These behaviours include gap acceptance, vehicle length distribution, acceleration and deceleration characteristics, speed choice and driver aggressiveness. It should be noted

that these input parameters are set by the user and can vary from one region of the model to another, i.e. motorway behaviour to urban road behaviour. The report also described the demand input methods of microsimulation traffic models. The most common demand input is via an origin-destination (OD) matrix.

2.5 Performance Criteria Guidelines

The industry accepted performance criteria adopted for this project formed the basis for assessing intersection operation with each model. These criteria provided a threshold for identifying the need for provision of mitigation strategies to failing intersections.

The key intersection performance criteria assessed in the analysis included:

- level of service (LOS) measure of average vehicle delay; and
- queue length.

The degree of saturation (DOS), or the volume / capacity (v/c) ratio for each movement has not been considered in the assessment because it is not generally calculated with VISSIM as it is a complex, time-consuming process.

Both the *Highway Capacity Manual* (TRB 2000) and the *Guide to Traffic Generating Development* (RTA 2002) provided LOS performance guidelines that are industry recognised standards for performance assessment. These recommendations were assessed to identify the most appropriate set of guidelines to adopt for this project.

The Austroads Research Report The Use and Application of Microsimulation Traffic Models (Austroads 2006) provided guidance on the development of a microsimulation model, as well as model auditing techniques. These were of use for error-checking and assessment of model adequacy. This report also

provided details on calibration and validation procedures and criteria. A more detailed report on the development and calibration of a microsimulation traffic model is published by the RTA (2009). This report is specific to Paramics (rather than VISSIM), however the details regarding calibration and validation were directly applicable to this project.

The Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads 2009c) provided information on conducting the following relevant surveys:

- traffic volume surveys;
- speed surveys;
- travel time, queuing and delay surveys; and
- origin-destination surveys.

2.6 Guidelines for Assessment of Traffic-Based Development Impacts

Many authorities within Australia provide guidelines for methods on the assessment of traffic-based development impacts.

The Guide to Traffic Management Part 12: Traffic Impacts of Development (Austroads 2009b) is a general guide designed to help traffic practitioners identify and manage the potential impacts of development on the road system. It provides a clear set of procedures that Austroads recommend be undertaken when performing TIAs and of particular relevance to this project, provides a checklist of tasks relating to the assessment of traffic operations on roads. This included capacity and level of service performance criteria for road links and intersections, as well as example traffic generation rates that can be adopted.

The Guidelines for Assessment of Road Impacts of Development (GARID) (Queensland Government Department of Main Roads 2006), is a guideline

published by the Queensland state roads authority. It clearly provides the information required by the Department of Transport and Main Roads (DTMR) when the lodgement of a development application triggers the need for a TIA referrable to the authority. The information provided in this guideline is very similar to that in the *Guide to Traffic Management Part 12: Traffic Impacts of Development* (Austroads 2009b), including a stepwise methodology for conducting an assessment, as well as some standard traffic operation performance criteria.

Although it is not an Australian reference, the *Urban Planning Affairs Traffic Impact Assessment Guide for Developers* (Kingdom of Bahrain Ministry of Municipalities & Agriculture Urban Planning Affairs n.d.) is a detailed guideline for preparing a TIA.

2.7 Summary

The literature review provided a characterisation of micro-analytical and microsimulation models.

Sourcing research papers that compare different traffic models allowed the knowledge gap to be more clearly identified. A large amount of research regarding roundabout capacity methods has been undertaken in the past. The majority of model comparisons has been undertaken for roundabout or signalised intersection case studies, with limited research data comparing the results for priority controlled intersections. The only papers that directly compared the outputs of SIDRA with VISSIM were based on roundabout models, and this research focussed on the calibration methods required for each. No case studies were found using both models for assessing development impacts.

The use of case studies for benchmarking model results was supported by Akcelik & Besley (2001). This notion supports the use of a development impact

assessment as a basis for comparing the outputs from SIDRA and VISSIM. Previous studies identified that calibration of models is critical for developing reasonable results and reliable outcomes. This confirmed that the calibration / validation phase of this project was important to ensure a robust analysis. Review of the methodologies adopted by other researchers who had undertaken model comparisons found that testing models for a range of scenarios is also important. A set of criteria should be established for quantitatively or qualitatively assessing the outputs from each model.

The user manuals for each piece of software are detailed sources of information that were used for identifying the calculation methods of each package. Austroads also provide a number of industry guidelines that give theoretical background on traffic theory and applications.

Guidelines published by Austroads, the TRB, the RTA and the Queensland Government Department of Main Roads were used as guidance for developing a methodology that is robust and in accordance with industry recognised recommendations. Performance criteria for this assessment were chosen from these guides. All aspects of the TIA process were not undertaken, as that was not the direct purpose of this research, however the general recommendations provided in the aforementioned sources in regards to assessment of traffic operation impacts were adopted.

The outcomes of the literature review included identifying a distinct knowledge gap when it comes to comparing SIDRA and VISSIM outputs for all intersection types. Although there is a lot of research for roundabout models, there is a need for determining the differences between these models when simulating signalised and priority controlled intersections. The amount of information regarding comparisons of SIDRA and VISSIM for assessing development impacts is negligible. The proposed study endeavoured to fill this knowledge gap, by using a development impact assessment as the basis for comparing outputs from these modelling packages.

3. Methodology

The project was undertaken using the following methodology:

3.1 Transport Policy - The TIA Process

This phase included:

- review of current statutory requirements for developers to provide documentation to local governments and state roads authorities assessing the potential road / traffic impacts caused by their proposals; and
- justified choice of guidelines to follow with respect to a methodology for assessing the impacts of the chosen development.

3.2 Development Profile

The development profile defined the following pertinent details:

- the land use, size, timing and location of the chosen development site;
- the traffic generated by the proposed development;
- the expected distribution of trips generated by the development; and
- the network that was assessed in this study.

3.3 Data Collection

The data collection stage of the project involved:

- collection of turn counts at key intersections;
- observation of queue lengths at all key intersections to be modelled;
- surveying of travel times over key routes within the network; and
- collection of signal phasing and timing for all signalised intersections within the network.

3.4 Development of Existing Travel Demand

AM and PM peak hour trip matrices for the defined network were developed as follows:

- initial AM and PM peak hour trip matrices were developed by estimating existing trip distribution based on total cordon volumes (determined from count data at external points of the network) and the proportional attraction of destination zones;
- adjustment of intersection counts was undertaken to develop a balanced network count; and
- the initial trip matrices and the set of balanced counts were used to develop base 2011 AM and PM peak hour trip matrices using the matrix estimation process within VISUM (a mesoscopic modelling software).

3.5 Base Model Development

3.5.1 VISSIM Models

Development of the base VISSIM models involved:

- coding of base VISSIM models (details included network geometry, vehicle inputs, network speed information, priority rules, data collection points, signal data etc.);
- calibration of the base models (to ensure that the criteria detailed in the bullet points further below were met), by:
 - adjusting the network trip matrix for demand calibration;
 - adjusting model parameters, such as critical gaps at points of priority,
 signal settings and other link and driver characteristics;
 - visual observation of the model to ensure that simulated behaviour and operational network characteristics are realistic;

- calibration/validation of the models against the following criteria:
 - modelled flows at all intersections were checked against turn counts using the GEH statistic, with at least 85% of all counts requiring a GEH value of less than 5.0 in accordance with Austroads (2006) and the RTA (2009);
 - in accordance with the RTA (2009), modelled travel times along key routes in the network were checked against surveyed times, with at least 85% of the routes needing to be within 60 seconds or 15% of the observed measurements (whichever is greatest);
 - maximum queue lengths on approaches to key intersections in the network were compared to observed maximum queue lengths, aiming to achieve reasonably close results (it should be noted that queuing is subjective in nature); and
- models were run using five designated starting seeds (those recommended by the RTA (2009) for Paramics models) and the validation reported the average of the five runs.

3.5.2 SIDRA Models

Development of the base SIDRA models involved:

- coding of base SIDRA models (details included intersection geometry, existing demand, vehicle path and movement data, priorities and gap acceptance behaviour, signal phasing and timing etc.);
- calibration of the base models against observed queues, by checking that maximum queues being generated by SIDRA were generally representative of observed maximum queues (by adjustment of gap acceptance behaviour, signal timesettings etc.).

3.6 Traffic Operation Assessment

The assessment stage of the project included:

- development of future year forecast trip matrices (with and without the proposed development) to align with the planning horizon for the development;
- development of future year models, based on the forecast travel demand;
- analysing the outputs of both models at key intersections within the defined network (based on no development);
- analysing the outputs of both models at key intersections within the defined network (based on the increased traffic volumes caused by the development); and
- assessment of future upgrades required as a result of the development.

3.7 Model Comparison Results and Analysis

This phase involved:

- comparing the output results of both modelling packages using a quantitative comparison of outputs for the following performance measures for all movements on the key modelled intersections:
 - average delay (s/veh);
 - maximum queue length (m);
- outlining any other noticeable variances between the outputs from each model;
- attempting to justify the reasoning for any variances in the models through research on the calculation methods of each software; and
- providing a qualitative assessment of each model's practical application for TIAs.

4. Assessment Details

Section 4.1 below provides a brief overview of the TIA process. The industry guidelines for undertaking a TIA that were adopted for this project are also discussed.

This project was undertaken as a case study using an arbitrary development proposal. Section 4.2 below provides the development profile. The development profile outlines pertinent details regarding the proposal, including land use and size, timing / staging, expected trip generation, estimated trip distribution and the defined network for this assessment.

4.1 Transport Policy - The TIA Process

State and local road authorities are responsible for the safe and efficient management of their respective road networks. As a result, developers are generally required to demonstrate that:

- the increase in traffic on the network resulting from their proposal will not cause adverse impacts on the network; or
- the adverse impacts can be mitigated through infrastructure upgrades (or provision of contributions to compensate the authority for the impacts).

Engineering consultants are commonly commissioned by developers to undertake such assessments. The assessments are used to determine the extent of the network that may be impacted by the development. The actual impacts are quantified through a process of assigning the additional development generated trips to the network and undertaking traffic modelling to observe network and intersection performance with and without the development. SIDRA is a commonly used modelling tool for this process.

Two Australian documents commonly adopted as guides for assessing traffic-based development impacts are *GARID* (Queensland Government Department of Main Roads 2006) and the *Guide to Traffic Management Part 12: Traffic Impacts of Development* (Austroads 2009b). These guides provide similar detail and outline the steps required to conduct a TIA, as well as providing performance criteria that are recommended for the assessment. For the purposes of this project, all phases of the TIA have not been addressed, as the key focus of the study is the traffic operation assessment phase of the TIA.

4.2 Development Profile

The development profile defined the following pertinent details:

- the land use, size, timing and location of the chosen development site;
- the traffic generated by the proposed development;
- the expected distribution of trips generated by the development; and
- the network that was assessed in this study.

4.2.1 Development Details

The arbitrary development proposal adopted for this project was a 36 hole golf course with an on-site practice facility to be located in Mountain Creek on the Sunshine Coast.

The locality of the site is provided in Figure 4.1 below:

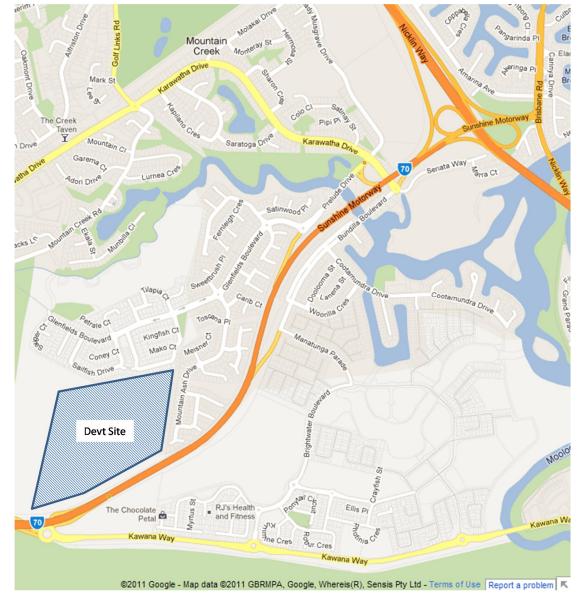


Figure 4.1 Development Site Locality Map

(Google maps, Australia 2011)

The site is accessed from Mountain Ash Drive, which is located at the southern end of the Glenfields residential subdivision. For the purposes of the assessment, it was assumed that the opening year for the golf course would be 2012. Based on the recommendations provided in *GARID* (Queensland Government Department of Main Roads 2006), the planning horizon for the

traffic operation assessment was assumed to be 2022, i.e. ten years following completion of the ultimate development.

4.2.2 Development Trip Generation

Trip generation rates for the proposed development were sourced from *Trip Generation*, 7th *Edition* (ITE 2003). This source is a well-regarded industry reference (used in Australia) that provides daily and peak hour trip generation rates for various land uses based on studies undertaken throughout the United States.

For golf courses, the ITE (2003) provides daily and peak hour trip generation rates for weekdays and weekends, which are based on one of the following:

- the land area of the golf course;
- the number of employees at the course; or
- the number of holes at the course.

For the purposes of this assessment, the rates based on the number of holes were adopted. Golf courses generally comprise 9 or 18 holes, each consisting of a teeing ground, fairway and green with a flagstick and cup. Some championship courses have two courses of 18 holes to allow players to vary the course they are playing on and to aide in maintenance. The proposed facility also has a driving range, for which the rates were based on the number of tees at the range. Range tees refer to the number of positions that players can practice hitting balls from. The EIGCA (2011) suggests that typically, an 18 hole golf course with practice facility will require land area of between 60 and 90 hectares. For the facility described in this study, an indicative site area of 120 to 150 hectares would be required.

Based on the recommendations provided in *Trip Generation*, 7th *Edition* (ITE 2003), the total number of daily and peak hour trips generated by the

development are provided in Table 4.1 below. The directional distribution of these trips, i.e. in/out of the development site, and the peak hour percentages were also provided in the source.

Table 4.1 Development Trip Generation

Generator		Golf Course (Holes)	Driving Range (Tees)	TOTAL
No. of Unit	s	36	30	
Daily	Daily Generation Rate (Trips/Unit)	35.74	12.5	
Traffic	Total Daily Trips	1287	375	1662
	Proportion Daily Trips In	50%	50%	
	Total Daily Trips In	643	188	831
	Proportion Daily Trips Out	50%	50%	
	Total Daily Trips Out	643	188	831
AM Peak	AM Peak Hour %	8.42%	10.00%	
Hour Traffic	Total AM Peak Hour Trips	108	38	146
,	Proportion AM Peak Hour Trips In	47%	55%	
	Total AM Peak Hour Trips In	51	21	72
	Proportion AM Peak Hour Trips Out	53%	45%	
	Total AM Peak Hour Trips Out	57	17	74
PM Peak	PM Peak Hour %	9.96%	10.00%	
Hour Traffic	Total PM Peak Hour Trips	128	38	166
'	Proportion PM Peak Hour Trips In	43%	45%	
	Total PM Peak Hour Trips In	55	17	72
	Proportion PM Peak Hour Trips Out	57%	55%	
	Total PM Peak Hour Trips Out	73	21	94

4.2.3 Development Trip Distribution

The distribution of the development generated trips in the external network was developed by assessing the attractiveness of the surrounding strategic and residential zones. This was based on the observed trip volumes at the

boundary cordons of the network following the data collection phase of the study.

Figure 4.2 below shows the zoning for the network (which has its extents determined in section 4.2.4 below) and the distribution of the development generated trips.

Zone %In %Out %In %Out 13.24% 0.00% Zone %In %Out 16 0.65% 0.65% Zone <u>%In</u> 0.00% 0.11% 0.11% <u>Zone</u> <u>%In</u> <u>%Out</u> 22 7.94% 2.36% 0.00% 5.58% %In %Out <u>Zone %In %Out</u> 8 0.16% 0.16% 0.29% 0.29% 3.43% 3.43% <u>Zone</u> <u>%In</u> <u>%Out</u> 5 0.22% 0.22% 0.37% 0.37%

Figure 4.2 Zoning Map showing Development Trip Distribution

(Google maps, Australia 2011)

4.2.4 Defined Network for Assessment

The recommendations provided in *GARID* (Queensland Government Department of Main Roads 2006) and the *Guide to Traffic Management Part 12: Traffic Impacts of Development* (Austroads 2009b) were used as a basis for determining the extents of the network to be assessed. These guides indicate that impacts should be assessed where the development will increase the existing average daily traffic (ADT) volumes by 5% or more.

Daily traffic volumes for roads in the vicinity of the development were collected from the DTMR traffic census website and SCRC (Sunshine Coast Regional Council). The majority of the count data collected included weekly volume counts. This data was used for daily volumes and for determining the peak period of the network. For a summary of the traffic data collected during this study, refer to Appendix B.

A full strategic assessment of future land uses and expected growth was outside the scope of this study. Therefore, the count data provided by DTMR and SCRC was projected to the development opening year (2012) using an annual growth rate of 2% per annum for all roads. This growth rate was also adopted for further future forecasts undertaken later in the assessment.

Appendix C shows the assessment of traffic increases caused by the proposed development. This is summarised in Table 4.2 below:

Table 4.2 Opening Year Daily Traffic Volumes

Road Link		Foreca	ast ADT	(2012)	
	Total Without Devt	Devt Traffic Split	Devt Traffic	Total With Devt	% Inc due to Devt
Mountain Ash Dr (South of Devt Access)	1,071	2.27%	38	1,109	3.52%
Mountain Ash Dr (Devt Access to Siris St)	1,071	97.73%	1,624	2,695	151.63%
Mountain Ash Dr (Siris St to Berrigan PI)	1,647	96.51%	1,604	3,251	97.35%
Mountain Ash Dr (Berrigan PI to Glenfields Blvd)	1,851	96.07%	1,596	3,448	86.23%
Glenfields Blvd (Mountain Ash Dr to Lacebark St)	5,355	88.61%	1,472	6,827	27.50%
Glenfields Blvd (Lacebark St to Parklea Esp)	5,426	88.29%	1,467	6,893	27.03%
Glenfields Blvd (Parklea Esp to Prelude Dr)	6,666	85.29%	1,417	8,083	21.26%
Prelude Dr (Glenfields Blvd to EB On Ramp)	8,318	79.71%	1,324	9,643	15.92%
Prelude Dr (EB On Ramp to Karawatha Dr)	13,535	66.47%	1,105	14,640	8.16%
Karawatha Dr (Prelude Dr to Bundilla Blvd)	10,435	23.76%	395	10,829	3.78%
Karawatha Dr (Prelude Dr to Satinay St)	11,327	35.13%	584	11,911	5.15%
Karawatha Dr (Satinay St to Saratoga Dr)	11,016	33.87%	563	11,579	5.11%
Karawatha Dr (Saratoga Dr to Sharon Crs)	10,700	32.56%	541	11,241	5.06%
Karawatha Dr (Sharon Crs to Molakai Dr)	10,358	31.37%	521	10,879	5.03%
Karawatha Dr (South of Molakai Dr)	13,296	27.33%	454	13,750	3.42%

Based on a threshold increase of 5%, the following sections of road (including associated intersections) were included in the assessment:

- Mountain Ash Drive (Development Access to Glenfields Boulevard);
- Glenfields Boulevard (Mountain Ash Drive to Prelude Drive);
- Prelude Drive (Glenfields Boulevard to Karawatha Drive); and
- Karawatha Drive (Prelude Drive to Molakai Drive).

In regards to intersections, the network comprises:

- two signalised intersections;
- five roundabouts; and
- eight priority controlled intersections.

It should be noted that the southern end of Karawatha Drive (between Prelude Drive and Bundilla Boulevard) was also included in the assessment as the northbound lane of this link forms the approach to the Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection, which is one of the major intersections in the Mountain Creek area. The Karawatha Drive / Bundilla Boulevard / Sunshine Motorway Westbound Off Ramp / Seriata Way intersection is located only 200m upstream of the Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection, so the model boundary was extended to incorporate this to assess queue encroachments.

The modelling extents and all modelled intersections are shown in Figure 4.3 below:



Figure 4.3 Model Extents and Intersection Locations

(Google maps, Australia 2011)

5. Data Analysis

This phase of the project involved the collection and analysis of all data to be used in the development of models for this assessment. Section 5.1 below outlines the data that was collected and section 5.2 below summarises the process used to develop the existing travel demand for the defined network.

5.1 Data Collection

As stated in section 4.2.4 above, the initial data collection phase involved requesting weekly volume counts from DTMR and SCRC for the key road links within the defined network. This data was used for the following purposes:

- to assess the locations in the network potentially impacted by the proposed development's traffic (as discussed in section 4.2.4 above); and
- to determine the AM and PM peak periods for the defined network.

The peak periods were determined by summing the hourly volumes at locations in the network where counts of duration greater than or equal to 12 hours had been recorded. The detailed assessment of the peak periods is provided in Appendix D. The peak periods for the defined network for which the modelling was based were:

- AM peak hour 8:00am 9:00am; and
- PM peak hour 4:00pm 5:00pm.

Following determination of the network peak, intersection counts, queue length surveys and travel time surveys were conducted during these periods.

5.1.1 Intersection Counts

Existing turn counts were collected from the DTMR traffic census website for the following intersections:

- Glenfields Boulevard / Prelude Drive / Sunshine Motorway Eastbound Off Ramp intersection;
- Prelude Drive / Sunshine Motorway Eastbound On Ramp intersection; and
- Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection.

To develop a full set of turn counts that included all of the key intersections within the defined network, AM and PM peak hour turn count surveys were undertaken at the following locations:

- Mountain Ash Drive / Berrigan Place intersection;
- Glenfields Boulevard / Mountain Ash Drive / Birch Street intersection;
- Glenfields Boulevard / Parklea Esplanade / Greenway Place intersection;
- Karawatha Drive / Bundilla Boulevard / Sunshine Motorway Westbound Off Ramp / Seriata Way intersection; and
- Karawatha Drive / Molakai Drive intersection.

The observed proportion of heavy vehicles was fairly low at all surveyed intersections (< 4%) and the majority of these vehicles were buses. Therefore, for the purposes of this assessment, all heavy vehicles were modelled as buses.

It should also be noted that there were other minor intersections within the model extents that service a small number of allotments. The volume of turning vehicles using these intersections during the peak periods was fairly low. Therefore, their volumes were ultimately determined through the balancing process.

Appendix E provides maps showing network-wide intersection counts for the following scenarios:

- 2011 base AM peak period LVs;
- 2011 base AM peak period Buses;
- 2011 base PM peak period LVs; and
- 2011 base PM peak period Buses.

5.1.2 Queue Length Surveys

Queue length surveys were conducted on the approaches to each of the key intersections nominated in section 5.1.1 above. These surveys recorded maximum queue lengths, which were used as a basis for validation.

The observed maximum queue lengths at each intersection are graphed against modelled maximum queues in the calibration and validation statistics provided in section 6 below.

5.1.3 Travel Time Surveys

In accordance with recommendations by Austroads (2006) and the RTA (2009), network travel times were used as one of the key validation statistics for the microsimulation model. Travel time surveys were conducted along key routes in the network, which are shown in Figure 6.5 further below.

The observed travel times are plotted against the modelled travel times in the calibration and validation statistics provided in section 6 below.

5.1.4 Signal Data Collection

The defined network for this study included two signalised intersections, both of which are under actuated control. DTMR provided the following data for each of these intersections:

- signal plans and phasing;
- phase timesettings, including minimum and maximum green times etc.; and
- intersection cycle analysis statistics, including measured minimum, average and maximum phase times during peak periods on a given day.

This signal data and timesettings were used as inputs for both models. The intersection cycle analysis statistics were used for validating phase and cycle times calculated using the models. All signal data provided by DTMR is presented in Appendix F.

5.2 Development of Existing Travel Demand

The existing travel demand for the defined AM and PM peak hour periods for the network was initially developed in the form of AM and PM peak hour trip matrices. The matrices were developed as follows:

- initial AM and PM peak hour trip matrices were developed by estimating existing trip distribution based on total cordon volumes and the proportional attraction of destination zones:
- intersection counts were adjusted to develop a balanced network count; and
- the initial trip matrices and the set of balanced counts were used to develop base 2011 AM and PM peak hour trip matrices using a matrix estimation process in VISUM.

The developed matrices were based on a network consisting of 23 comprising strategic, residential, education and shopping areas. The base 2011 AM and PM peak hour trip matrices for LVs and buses are provided in Appendix G.

5.2.1 Application to Models

The VISSIM model was developed using dynamic assignment. This method involves assigning trip matrices to the model. The model then calculates routes

from the origin zones to the destination zones based on generalised costs, i.e. travel distance, travel time and other costs such as tolls etc. (PTV 2010). This allows specific intersection turn volumes to be output following assignment of the matrices. Conversely, SIDRA requires input of turn volumes directly into the model for each specific intersection.

The base 2011 peak hour trip matrices were used as direct inputs to the VISSIM model. As the basis for this study was comparing the outputs from the two levels of model, the turn volumes at each intersection output from VISSIM were directly entered into the SIDRA models (rather than directly assigning the observed turn volumes). This was considered to be a more reasonable approach to ensure that comparisons between the models were conducted from the same base level.

6. Base Models / Calibration and Validation

This phase of the study involved development of both sets of base year models, through a process of model coding, calibration and validation. As identified by Gagnon, et al. (2008) and Stanek & Milam (2004), detailed calibration is paramount to ensure that both models provide reasonable results. Therefore, the calibration and validation phase was considered very important for this project, where a comparison of each model's results would ultimately be undertaken.

6.1 Development of Base VISSIM Models

Sections 6.1.1 to 6.1.7 below provide details regarding the development of the base VISSIM models. Refer to Appendix H for a screenshot of the base VISSIM model network.

6.1.1 Model Details

The base year 2011 AM and PM peak VISSIM models were coded using a scaled Google Earth satellite image as the background. It should be noted that this imagery was taken prior to provision of minor upgrades at the Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection. The upgrades included an additional lane on the western approach and some slight amendments to linemarking. These changes were incorporated in to the models based upon site visits and observations.

The VISSIM models were based on a one hour evaluation period with a 15 minute warm-up period. The warm-up period was used to populate the model with traffic prior to the evaluation period. The modelled time periods are as shown in Table 6.1 below:

Table 6.1 VISSIM Model Time Periods

Peak Period	Warm-Up Period	Evaluation Period
AM Peak Period	7:45am - 8:00am	8:00am - 9:00am
PM Peak Period	3:45pm - 4:00pm	4:00pm - 5:00pm

Other details regarding the development of the VISSIM models are provided in Table 6.2 below:

Table 6.2 VISSIM Model Development Details

Model Attribute	Description
Network Geometry	Horizontal alignment throughout the network was based on the Google Earth satellite imagery. Vertical alignment was not considered significant and thus was not coded in the models.
Vehicle Inputs	VISSIM vehicle defaults were applied for LVs (cars) and buses. A distribution of 6 types of car was adopted, with varying properties for length, power, mass, acceleration etc.
Network Speeds	Desired speed distributions throughout the network were based on posted speed limits. Speed reduction areas were coded in locations where geometry affects desirable speeds.
Priority Rules	Critical gap and headway values were coded in accordance with the recommendations in the <i>Guide to Road Design Part 4A:</i> Unsignalised and Signalised Intersections (Austroads 2009a).
Driver Behaviour	Driving behaviour was based on the default "Urban (motorised)" VISSIM behaviour parameter. This is based on the "Wiedemann 74" car following model.
Assignment Procedure	Vehicles were assigned to the network using dynamic assignment. As the model is linear, there is no route choice and therefore a single iteration of the assignment was sufficient.
Starting Seeds	Models were run using the following five starting seeds: 560, 28, 7771, 86524 and 2849 (those recommended by the RTA (2009) for Paramics models).

6.1.2 Signal Development

The signalised intersections within the network are under actuated control. VAP (Vehicle-Actuated Signal Control) code was developed for both intersection signal controllers in VISSIM. Intersection cycle analysis data was provided by DTMR. This data was used to validate that the modelled phase and cycle times were representative of observed times.

The validation results are provided in Table 6.3 and Table 6.4 below:

Table 6.3 VISSIM AM Peak Signal Cycle Validation Results

Intersection		Phase	SG ID	Observed Avg. Phase Time (s)	VISSIM Avg. Phase Time (s)
	₩	SC7156 - A	2-1	29.5	26.7
	∳	SC7156 - D	2-5	26.1	23.3
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	┿	SC7156 - E	2-6	29.5	37.3
	†	SC7156 - F	2-3	19.5	20.8
		TOTAL		104.6	108.0
		SC7189 - A	1-1	40.8	29.2
Karawatha Dr / Molakai Dr / Mountain Creek Shops	ネ	SC7189 - B	1-3	17.1	20.7
	4	SC7189 - C	1-4	13.9	20.3
		TOTAL		71.8	70.3

Table 6.4 VISSIM PM Peak Signal Cycle Validation Results

Intersection		Phase	SG ID	Observed Avg. Phase Time (s)	VISSIM Avg. Phase Time (s)
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	→	SC7156 - A	2-1	27.8	26.6
	4	SC7156 - D	2-5	26.2	24.6
	┿	SC7156 - E	2-6	30.5	33.1
	†	SC7156 - F	2-3	20.2	20.4
	TOTAL			104.7	104.7
		SC7189 - A	1-1	43.1	31.2
Karawatha Dr / Molakai Dr / Mountain Creek Shops	-\$↓	SC7189 - B	1-3	15.4	21.4
	4	SC7189 - C	1-4	13.4	17.2
		TOTAL		71.9	69.8

It should be noted that the observed phase times shown in Table 6.3 and Table 6.4 above taken from the data provided by DTMR were not recorded on the same day that count data, queue length observations and travel time surveys were conducted. Therefore it was not expected that modelled phase times would directly match those provided in the intersection cycle analysis data provided by DTMR.

6.1.3 Calibration and Validation Process

Calibration and validation is a process whereby outputs from the model are compared to observed sets of data to ensure that the model is adequately representing network operation and observed behaviour. These datasets included those used to build the model, i.e. intersection turn counts, and independent datasets that were not used in the model building process, i.e. queue lengths and travel times.

Additionally, visual inspection of the model formed an important part of the calibration process, to assess queue build-up, vehicular progression, potential vehicle conflict points and the clearance of queues at signalised intersections.

6.1.4 Calibration - Turn Counts

The Austroads Research Report The Use and Application of Microsimulation Traffic Models (Austroads 2006) and the Paramics Microsimulation Modelling - RTA Manual (RTA 2009) provide guidance on industry accepted procedures for calibration of turn counts.

Both manuals suggest that modelled turn flows at intersections be checked against observed turn counts using the GEH statistic. The formula used to calculate the GEH statistic is provided below:

$$GEH = \sqrt{\frac{(V_o - V_a)^2}{0.5 \times (V_o + V_a)}}$$

where

 V_o = observed traffic volume (vph)

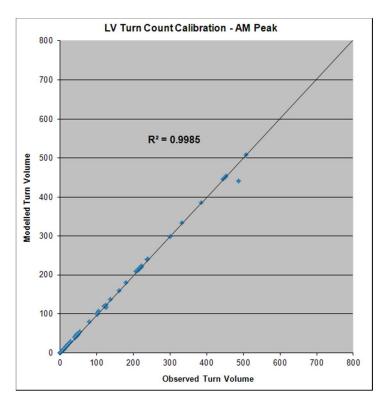
 V_a = assigned traffic volume (vph)

Demand calibration is achieved when at least 85% of all counts have a GEH value of less than 5.0. The detailed turn count calibration statistics for the VISSIM models are presented in Appendix I. For additional confidence in the results of the travel demand calibration, a scatter graph of the observed counts was plotted against the modelled turn volumes for both LVs and buses for both peak periods. Then the R^2 value was calculated for these datasets. A summary of the calibration statistics for turn counts is provided in Table 6.5 below. Further below, the AM peak hour and PM peak hour scatter plots showing the observed counts plotted against the modelled turn volumes for both LVs and buses are presented in Figure 6.1 to Figure 6.4.

Table 6.5 Summary of VISSIM Calibration Statistics for Turn Counts

Time Period	Vehicles	Total Number of Counts	Proportion with GEH<5	R ² Value
AM Peak Hour	LVs	66	100%	0.9985
_	Buses	66	100%	0.9987
PM Peak Hour	LVs	66	100%	0.9999
	Buses	66	100%	0.9992

Figure 6.1 Scatter Plot - Turn Count Calibration - AM Peak LVs





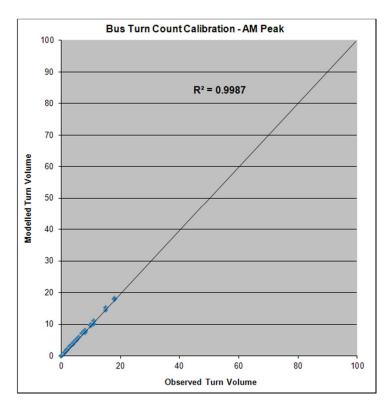
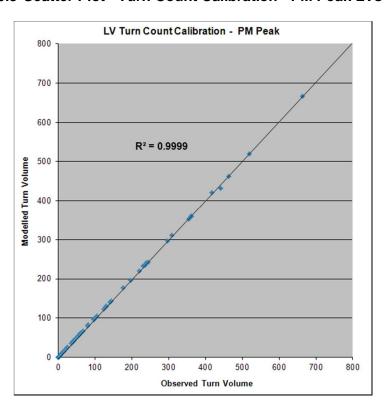


Figure 6.3 Scatter Plot - Turn Count Calibration - PM Peak LVs



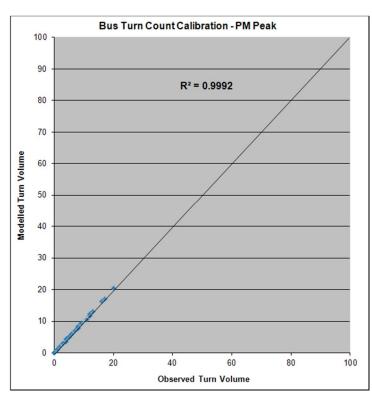


Figure 6.4 Scatter Plot - Turn Count Calibration - PM Peak Buses

The results of the turn count calibration are well above the minimum requirements outlined in industry guidelines for model calibration. The high level of calibration was to be expected as the model has no route choice.

6.1.5 Validation - Travel Times

The VISSIM models were validated by comparing modelled travel times with surveyed travel times along key routes in the network. This was to ensure that the model was replicating observed levels of delay. The routes that were used for the validation are shown in Figure 6.5 below. These routes have been described as the "clockwise route" and the "anti-clockwise route" for the purposes of this study.

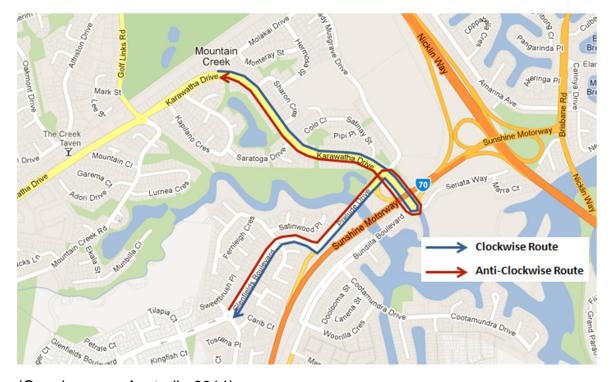


Figure 6.5 Travel Time Validation Routes

(Google maps, Australia 2011)

The RTA (2009) indicates that at least 85% of the routes need to have modelled travel times within 60 seconds or 15% of the observed measurements (whichever is greatest).

A summary of the travel time validation statistics is provided in Table 6.6 below. Further below, the travel time validation graphs for the AM peak hour and PM peak hour models are presented in Figure 6.6 to Figure 6.9.

Table 6.6 Summary of VISSIM Travel Time Validation Statistics

Time Period	Route	Observed Avg Travel Time (s)	Modelled Avg Travel Time (s)	Absolute Difference (s)	Percentage Difference (s)	Validated?
AM	Clockwise	236	223	-13	-6%	YES
Peak Hour	Anti-Clockwise	282	280	-2	-1%	YES
PM	Clockwise	248	224	-24	-10%	YES
Peak Hour	Anti-Clockwise	267	279	12	4%	YES

Figure 6.6 Travel Time Validation Graph - Clockwise Route - AM Peak

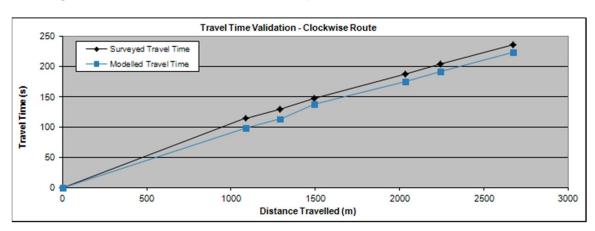
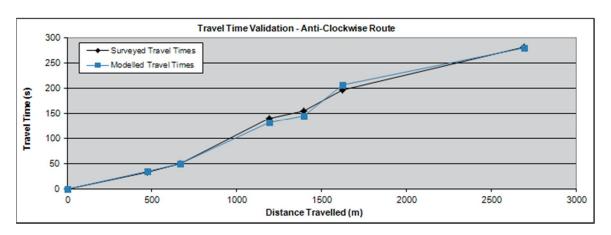


Figure 6.7 Travel Time Validation Graph - Anti-Clockwise Route - AM Peak



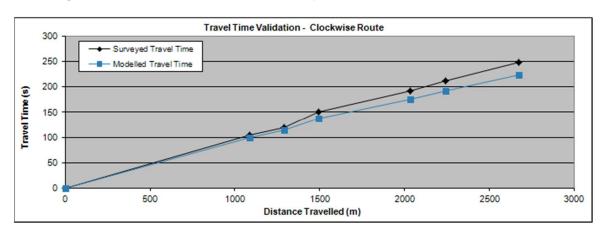
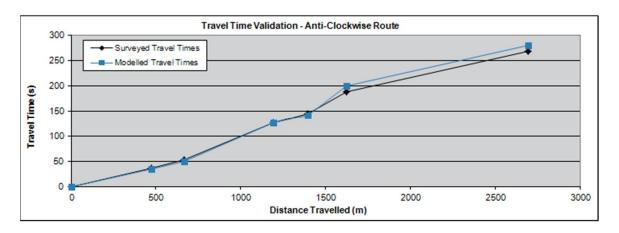


Figure 6.8 Travel Time Validation Graph - Clockwise Route - PM Peak

Figure 6.9 Travel Time Validation Graph - Anti-Clockwise Route - PM Peak



The results show that the model is adequately replicating the observed travel times along the key routes assessed.

6.1.6 Validation - Queue Lengths

Observed maximum queue lengths at key intersections within the network were compared to modelled maximum queue lengths to provide additional confidence that the model was adequately representing site conditions. As identified by Transport for London (2010), the definition of a queue can be somewhat ambiguous and therefore difficult to standardise. The comparison of modelled queues with observed queues was therefore taken as a secondary phase of

validation to the travel time validation. It should also be noted that the matrices were not time profiled as some count data did not provide this level of detail, so it was expected that observed maximum queues would generally be slightly larger than modelled maximum queues.

Appendix J contains detailed queue length validation statistics for the VISSIM models, which compared observed maximum queues with modelled maximum queues for all key intersections in the network.

Graphs showing observed maximum queues against modelled maximum queues for the AM peak hour and PM peak hour respectively are provided in Figure 6.10 and Figure 6.11 below. For brevity, only intersections with a reasonable amount of queuing (maximum queues greater than 25m) have been presented in Figure 6.10 and Figure 6.11.

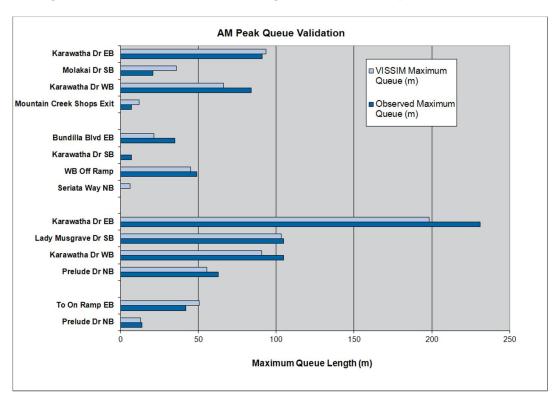


Figure 6.10 VISSIM Queue Length Validation Graph - AM Peak

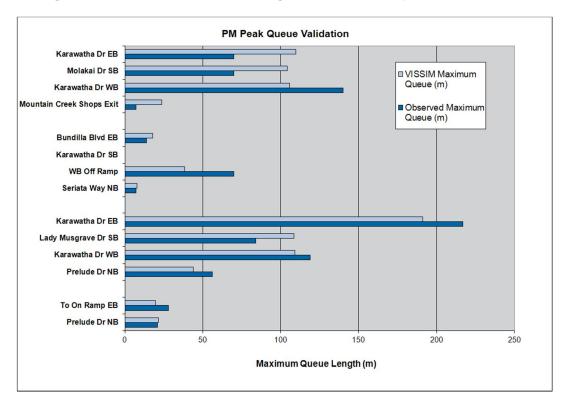


Figure 6.11 VISSIM Queue Length Validation Graph - PM Peak

The results of this assessment showed that the modelled queues are broadly representative of the observed maximum queues throughout the network. The visual inspection of the model confirmed that the clearance of queues exhibited by the model is also representative of the operation observed on site.

6.1.7 Summary

The results of the calibration and validation of the VISSIM models showed that based on industry recommendations, the models were adequately replicating observed network operation and therefore appropriate tools to be taken forward to the next phase of modelling.

6.2 Development of Base SIDRA Models

Sections 6.2.1 to 6.2.5 below provide details regarding the development of the base SIDRA models. Refer to Appendix K for intersection layouts for each of the base SIDRA models.

6.2.1 Model Details

Coding for the base year 2011 AM and PM peak SIDRA models was based on the Google Earth satellite imagery used as the background for the VISSIM models. As discussed in section 6.1.1 above for the VISSIM models, the SIDRA models for the Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection incorporated the upgrades that were provided after the imagery was taken.

The SIDRA models were based on a one hour evaluation period that aligned with the evaluation period for the VISSIM models, as shown in Table 6.7 below:

Table 6.7 SIDRA Model Time Periods

Peak Period	Evaluation Period		
AM Peak Period	8:00am - 9:00am		
PM Peak Period	4:00pm - 5:00pm		

Other details regarding the development of all SIDRA models created during the study are provided in Table 6.8 below:

Table 6.8 SIDRA Model Development Details

Model Attribute	Description
Intersection Geometry	Horizontal alignment throughout the network was based on the Google Earth satellite imagery. Vertical alignment was not considered significant and thus was not coded in the models.
Vehicle Inputs	SIDRA vehicle defaults were applied for LVs (cars). Vehicle length and queue space for HVs (buses) were increased to 11.5m and 14.5m respectively to align with the VISSIM model vehicles.
Speed Data	Approach and exit cruise speeds for all SIDRA models were based on posted speed limits. Intersection negotiation speeds were generally calculated by the program.
Gap Acceptance Data	Critical gap and headway values were coded in accordance with the recommendations in the <i>Guide to Road Design Part 4A:</i> Unsignalised and Signalised Intersections (Austroads 2009a).

6.2.2 Signal Development

The SIDRA models for the signalised intersections were developed using the actuated signal analysis method. The average cycle times provided in the intersection cycle analysis data were entered directly into the SIDRA models. The program then calculated the phase times based on the input total cycle time. Similar to the VISSIM models, the modelled phase times were then compared to the intersection cycle analysis data provided by DTMR.

The validation results are provided in Table 6.9 and Table 6.10 below:

Table 6.9 SIDRA AM Peak Signal Cycle Validation Results

Intersection		Phase	SG ID	Observed Avg. Phase Time (s)	SIDRA Phase Time (s)
	♣	SC7156 - A	2-1	29.5	29.0
	∳	SC7156 - D	2-5	26.1	25.0
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	╬	SC7156 - E	2-6	29.5	31.0
	1	SC7156 - F	2-3	19.5	19.0
	TOTAL			104.6	104.0
		SC7189 - A	1-1	40.8	40.0
Karawatha Dr / Molakai Dr / Mountain Creek Shops	→	SC7189 - B	1-3	17.1	20.0
	↓	SC7189 - C	1-4	13.9	12.0
		TOTAL		71.8	72.0

Table 6.10 SIDRA PM Peak Signal Cycle Validation Results

Intersection		Phase	SG ID	Observed Avg. Phase Time (s)	SIDRA Phase Time (s)
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	♣	SC7156 - A	2-1	27.8	34.0
	₽	SC7156 - D	2-5	26.2	25.0
	†	SC7156 - E	2-6	30.5	32.0
	1	SC7156 - F	2-3	20.2	14.0
		TOTAL		104.7	105.0
		SC7189 - A	1-1	43.1	34.0
Karawatha Dr / Molakai Dr / Mountain Creek Shops	→	SC7189 - B	1-3	15.4	26.0
	↓	SC7189 - C	1-4	13.4	12.0
		TOTAL		71.9	72.0

It should be noted that the observed phase times shown in Table 6.9 and Table 6.10 above taken from the data provided by DTMR were not recorded on the same day that count data and queue length observations were conducted. Therefore it was not expected that modelled phase times would directly match those provided in the intersection cycle analysis data provided by DTMR.

6.2.3 Calibration and Validation Process

The SIDRA base models were calibrated by adjusting gap acceptance parameters and signal timesettings to ensure that the 100th percentile queues were broadly representative of the observed maximum queues.

Travel demand calibration was not required, as intersection demand is a direct input to SIDRA. To ensure a direct comparison with VISSIM, the turn volumes output by VISSIM (average of five seeds) were used as direct inputs into the SIDRA models.

6.2.4 Validation - Queue Lengths

As identified in section 6.2.3 above, the 100th percentile queue lengths were output from the SIDRA models to allow direct comparison with the observed maximum queue lengths at all key intersections within the network. This was considered to be the best method for validating the SIDRA models with the data collected for this study.

Appendix L contains detailed queue length validation statistics for the SIDRA models, which compared observed maximum queues with modelled maximum queues for all key intersections in the network.

Graphs showing observed maximum queues against modelled maximum queues for the AM peak hour and PM peak hour respectively are provided in Figure 6.12 and Figure 6.13 below. For brevity, only intersections with a

reasonable amount of queuing (maximum queues greater than 25m) have been presented in Figure 6.12 and Figure 6.13.

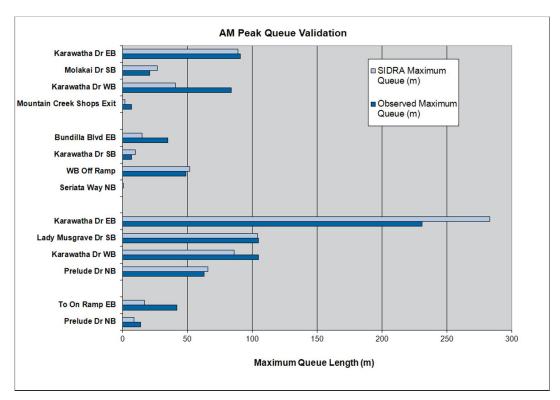


Figure 6.12 SIDRA Queue Length Validation Graph - AM Peak

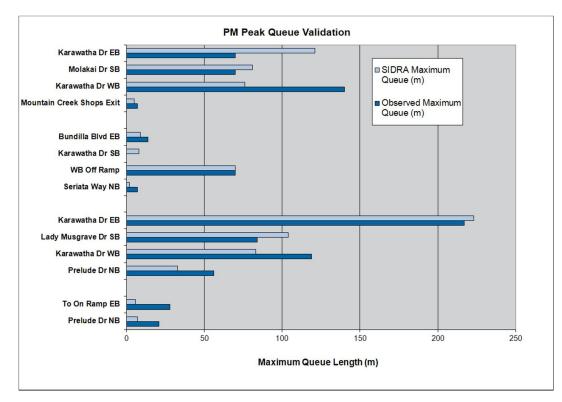


Figure 6.13 SIDRA Queue Length Validation Graph - PM Peak

The results of this assessment showed that following calibration, the modelled queues output by SIDRA were adequately representative of the observed maximum queues throughout the network.

6.2.5 Summary

The results of the calibration and validation of the SIDRA models showed that the models were adequately replicating observed intersection operation and therefore appropriate to take forward to the next phase of modelling.

7. Future Year Traffic Operation Assessment

The key assessment phase of a TIA involves future year modelling (with and without the additional development generated traffic) to determine the impact of the proposed development on the network over a pre-determined planning horizon; generally 10 years following completion of the proposed development. As identified in section 4.2.1 above, the planning horizon adopted for this assessment was for the year 2022.

For this study, the calibrated and validated base models (VISSIM and SIDRA) were taken forward for use in the future year traffic operation assessment. Upgrades required as a result of the development were determined using both modelling strategies. This upgraded network then formed the basis of the comparison of modelling outputs.

7.1 Performance Criteria

The performance measures used to assess the operational performance of intersections within the network using both the VISSIM and SIDRA models were as follows:

- level of service (LOS) measure of average vehicle delay; and
- queue length.

Additionally, visual inspection of the VISSIM models was undertaken to identify potential issues with merging, queue build-up, vehicular conflicts and clearance of queues.

7.1.1 Level of Service (LOS)

For the purposes of this assessment, the *HCM* (TRB 2000) method for assessing LOS was adopted for the VISSIM and SIDRA models as it is more conservative than the criteria recommended by the RTA (2002). The *HCM*

(TRB 2000) method recommends lower thresholds for priority controlled intersections compared to signalised intersections, because drivers perceive higher traffic volumes and greater levels of delay at signalised intersections. It should be noted that the *HCM* (TRB 2000) method does not provide thresholds to apply to roundabouts, however, the default method used in SIDRA adopts the same criteria as those applied to signalised intersections (SIDRA Solutions 2010). A summary of the adopted LOS criteria is provided in Table 7.1 below:

Table 7.1 LOS Criteria

LOS	Average Delay per Vehicle (secs)		
	Signalised Intersections	Roundabouts	Sign Controlled Intersections
Α	00 < d ≤ 10	$00 < d \le 10$	00 < d ≤ 10
В	10 < d ≤ 20	10 < d ≤ 20	10 < d ≤ 15
С	20 < d ≤ 35	20 < d ≤ 35	15 < d ≤ 25
D	35 < d ≤ 55	35 < d ≤ 55	25 < d ≤ 35
E	55 < d ≤ 80	55 < d ≤ 80	35 < d ≤ 50
F	80 < d	80 < d	50 < d

The threshold level of delay for individual vehicular movements adopted for this study was LOS D. This is in accordance with the recommendations provided in the *Guide to Traffic Generating Development* (RTA 2002), which states that if an intersection reaches LOS E, it is operating outside the tolerable limits of driver delay.

7.1.2 Queue Length

As identified in section 6.2.3 above, the 100th percentile queue lengths were output from the SIDRA models. This allowed direct comparison with the maximum queues output by VISSIM. Assessment of queue lengths was made

to identify any locations with excessive queuing and encroachment on upstream intersections.

7.2 Development of Future Travel Demand

7.2.1 Without Development

Future year trip matrices were firstly developed for the year 2022, based on future demand without the proposed development. This was achieved by applying a uniform growth factor of 2% per annum (over 11 years from 2011 to 2022) to all origin-destination pairs for each of the 2011 base matrices, i.e. AM peak and PM peak matrices for LVs and buses. This was considered to be a reasonable approximation of growth that could be sustained in an area such as Mountain Creek, where the majority of land is residential housing with minimal room for large-scale development.

The future 2022 AM and PM peak hour trip matrices for LVs and buses for the "without development" scenario are provided in Appendix M.

7.2.2 With Development

Trip matrices for the "with development" scenario were developed by adding the development generated trips to the 2022 "without development" trip matrices. The trip generation for the proposed development and its assumed distribution were discussed in sections 4.2.2 and 4.2.3 above.

The future 2022 AM and PM peak hour trip matrices for LVs and buses for the "with development" scenario are provided in Appendix N.

A comparison of the matrix totals for the 2011 base year, 2022 forecast without the development generated traffic and the 2022 forecast with the development generated traffic is provided in Figure 7.1 below:

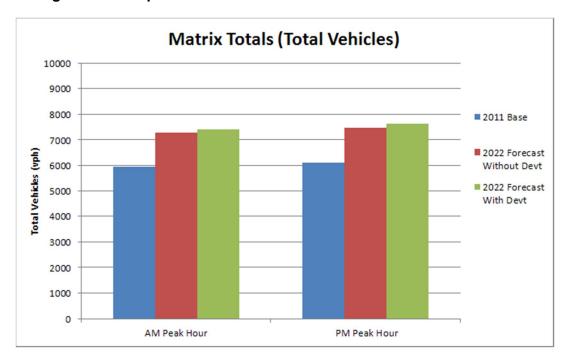


Figure 7.1 Comparison of Matrix Totals

7.3 Future Year VISSIM Models

The 2011 base VISSIM models were taken forward to use as the future models. The 2022 trip matrices were assigned to the VISSIM models to test the network subject to a 2022 travel demand without the additional development generated traffic and following that, with the additional development generated traffic.

7.3.1 Without Development

Key findings of the VISSIM modelling undertaken for the "without development" scenario are provided below:

The Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection required the following upgrades (highlighted as the difference between

Figure 7.2 and Figure 7.3 below) to reduce queuing and vehicle delay to a satisfactory level:

- provision of an additional right turn lane (60m storage) from Karawatha
 Drive (west) to Prelude Drive;
- provision of an additional exit lane on Prelude Drive (one lane continuing south along Prelude Drive and the other exiting towards the Sunshine Motorway);
- adjustment of line marking (VISSIM connectors) to permit through movements on both lanes on the Lady Musgrave Drive approach; and
- adjustment of signals to split phasing with fixed time control to accommodate the shared line marking discussed above.

Figure 7.2 Existing VISSIM Coding for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection

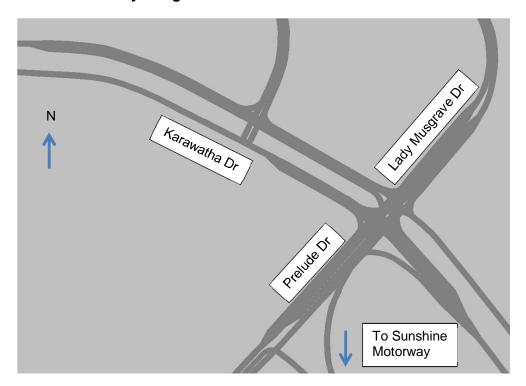
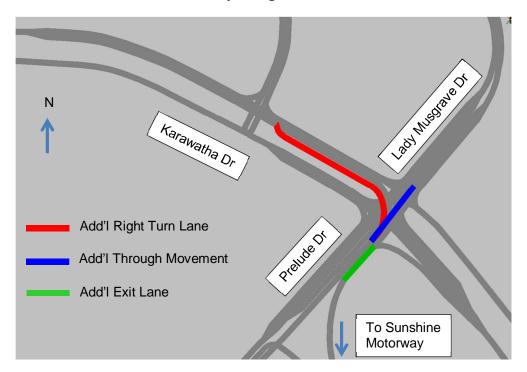


Figure 7.3 2022 Required VISSIM Coding for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection



- The Karawatha Drive / Molakai Drive / Mountain Creek Shops intersection required the following adjustments to reduce queuing and vehicle delay to a satisfactory level:
 - adjustment of actuated signal timesettings.

All other intersections within the network operated satisfactorily with the assigned 2022 trip demand. The detailed "without development" VISSIM results for queues, delay and LOS at all intersections in both the AM and PM peaks are provided in Appendix O. This data has been extracted from the final models including the upgrades suggested above.

7.3.2 With Development

The "with development" scenario modelling was undertaken by assigning the "with development" trip matrices to the models developed for the "without development" scenario described in section 7.3.1 above. The key outcome of

this phase of the modelling was to determine the upgrades that would be required as a result of the proposed development.

Key findings of the VISSIM modelling undertaken for the "with development" scenario are provided below:

- The Karawatha Drive / Molakai Drive / Mountain Creek Shops intersection required the following upgrades to reduce queuing and vehicle delay to a satisfactory level:
 - adjustment of actuated signal timesettings.

All other intersections within the future network operated satisfactorily with the assigned 2022 trip demand including the additional trips generated by the development. The detailed "with development" VISSIM results for queues, delay and LOS at all intersections in both the AM and PM peaks are provided in Appendix P. This data has been extracted from the final models including the upgrades suggested above.

The VISSIM modelling undertaken suggested that based on a network that operates satisfactorily without the development generated trips, the impact caused by the development is negligible.

7.4 Future Year SIDRA Models

The 2011 calibrated SIDRA models were taken forward to use as the future models. The 2022 volumes extracted from the future VISSIM models (for both the "without development" and "with development" scenarios) were input directly into the SIDRA models to ensure that performance could be directly compared to that output by VISSIM.

7.4.1 Without Development

Key findings of the SIDRA modelling undertaken for the "without development" scenario are provided below:

- The Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection required the following upgrades (highlighted as the difference between Figure 7.4 and Figure 7.5 below) to reduce queuing and vehicle delay to a satisfactory level:
 - provision of an additional right turn lane (60m storage) from Karawatha
 Drive (west) to Prelude Drive;
 - extension of the existing short exit lane on Karawatha Drive (west) from 60m to 200m;
 - provision of an additional exit lane on Prelude Drive (one lane continuing south along Prelude Drive and the other exiting towards the Sunshine Motorway);
 - adjustment of line marking to permit through movements on both lanes on the Lady Musgrave Drive approach along with realignment of the lanes to incorporate a 30m long left turn slip lane;
 - extension of the existing short exit lane on Lady Musgrave Drive from 60m to 200m; and
 - adjustment of signal control to fixed time (optimised to 80sec cycle time in both peak hours) and adjustment to signal phasing (it should be noted that although pedestrians were not modelled, the amended phase times have been reviewed to ensure that minimum clearance times etc. for pedestrians can be achieved).

Figure 7.4 Existing SIDRA Layout for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection

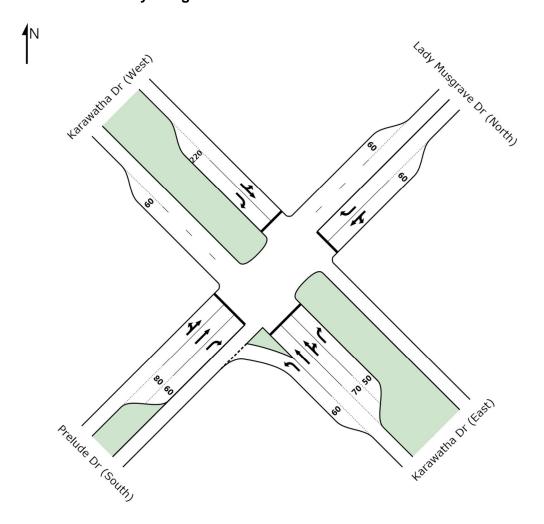
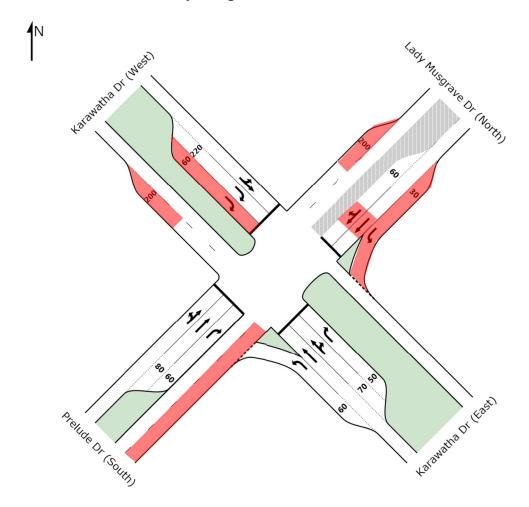


Figure 7.5 2022 Required SIDRA Layout for Karawatha Drive / Prelude

Drive / Lady Musgrave Drive Intersection



The Karawatha Drive / Satinay Street intersection had its capacity adjusted to ensure that the effects of blockage caused by the downstream Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection were appropriately incorporated. It should be noted that the reduction in capacity of particular lanes showed DOS values of between 0.8 and 1.0 in some instances, however increased delay and queuing were not evident. Since DOS was not directly considered in this study, no upgrades were provided at this intersection. Discussion regarding the unusual results output by SIDRA for this intersection is provided in section 8.1.7 below.

One of the key considerations made in modelling the Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection was the lane utilisation (or proportion of flow in each lane) on each approach upstream of the Prelude Drive exit lanes. These exit lanes diverge from one another approximately 30m downstream of the intersection (which can be seen in the VISSIM screenshot shown in Figure 7.3). It is expected that vehicles will already be using the appropriate upstream lane on their approach to the intersection and thus the upstream lane utilisation was based on the proportion of vehicles travelling to each destination. This was also factored in to the Karawatha Drive / Satinay Street intersection models to ensure that the effects of unbalanced lane utilisation on queuing and downstream blockage were taken into account. It should be noted that this is automatically taken into account by VISSIM due to each vehicle having its own origin and destination.

All other intersections within the network operated satisfactorily with the assigned 2022 trip demand. The detailed "without development" SIDRA results for queues, delay and LOS at all intersections in both the AM and PM peaks are provided in Appendix Q. This data has been extracted from the final models including the upgrades suggested above.

7.4.2 With Development

The "with development" scenario modelling was undertaken by assigning the 2022 "with development" volumes extracted from the future VISSIM models to the SIDRA models developed for the "without development" scenario described in section 7.4.1 above. The key outcome of this phase of the SIDRA modelling was to determine the upgrades that would be required as a result of the proposed development.

It was found that based on the outputs of SIDRA, all intersections within the future network operated satisfactorily with the assigned 2022 trip demand

including the additional trips generated by the development. The detailed "with development" SIDRA results for queues, delay and LOS at all intersections in both the AM and PM peaks are provided in Appendix R. This data has been extracted from the final models including the upgrades suggested above.

The SIDRA modelling undertaken suggested that based on a network that operates satisfactorily without the development generated trips, the impact caused by the development is negligible.

8. Model Comparison Results and Analysis

One of the key project objectives was to compare the output results of VISSIM and SIDRA with an aim to identify reasoning for any variations in the results. Secondary to this, the project objectives also included undertaking a qualitative comparison of each model's practical usefulness for undertaking TIAs.

8.1 Analysis of Output Results

Bloomberg & Dale (2000) indicated that an important step in the comparison process is development of a clear set of criteria from which performance measures can be quantitatively or qualitatively compared. Lo et. al. (1996) developed a framework for comparing dynamic traffic models and this indicated that it is important to develop a set of scenarios that will accentuate model differences and similarities.

Based on these recommendations, the analysis of output results for this study was based on a selection of intersections from the network that were chosen to highlight key observations made during the study. The assessed intersections have been numbered as shown below:

- 1. Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection;
- 2. Karawatha Drive / Molakai Drive / Mountain Creek Shops intersection;
- Karawatha Drive / Bundilla Boulevard / Sunshine Motorway Westbound Off Ramp / Seriata Way intersection;
- 4. Glenfields Boulevard / Mountain Ash Drive / Birch Street intersection;
- 5. Prelude Drive / Sunshine Motorway Eastbound On Ramp intersection; and
- 6. Karawatha Drive / Satinay Street intersection.

This selection included the two modelled signalised intersections, two roundabouts and two priority controlled intersections. The roundabouts chosen

exhibit slightly different behaviour to one another, in that one involves reasonably high demand with traffic exiting from a motorway and the other is located at the heart of the Glenfields residential subdivision with relatively low traffic demand. The two priority controlled intersections also differ quite significantly, where one provides access to the motorway and only has a departure lane on the minor leg and the other has a median storage area for crossing vehicles and suffers from blockage caused by queues from the nearby downstream intersection. This selection of intersections for analysis of the model outputs was deemed to be a good representation of the type of intersections within the network and would allow key performance measures output by each model to be compared to each other.

Austroads (2009b) indicates that the operational performance of an intersection is generally assessed against average delay, queuing and DOS. The model comparison carried out by Wang & Prevedouros (1997) used queue lengths as one of the key comparison measures. Sermpis (2007) compared the delay estimates calculated by SIGSIM, a microsimulation model, with the Kimber and Hollis micro-analytical method. In line with these methodologies, this project compared model outputs for average delay and queue lengths. It should also be noted that the comparison of queue lengths has been undertaken based on the modelled maximum queue to align with the default output from VISSIM.

The results in sections 8.1.1 to 8.1.6 below have been structured according to the assessed intersections shown above, as this allowed intersection-specific results to be observed. The results have been presented with graphs showing modelled average delay for each movement at the intersections and modelled maximum queues on each approach to the intersections. Results are based on the following scenarios with the detailed VISSIM outputs provided in Appendix S and the detailed SIDRA outputs provided in Appendix T:

- 2011 AM peak base calibrated VISSIM model;
- 2011 AM peak base calibrated SIDRA model;

- ▶ 2022 AM peak VISSIM model "without development" demand and intersection configuration based on 2011 base model;
- 2022 AM peak SIDRA model "without development" demand and intersection configuration based on 2011 base model;
- 2011 PM peak base calibrated VISSIM model;
- 2011 PM peak base calibrated SIDRA model;
- 2022 PM peak VISSIM model "without development" demand and intersection configuration based on 2011 base model; and
- ▶ 2022 PM peak SIDRA model "without development" demand and intersection configuration based on 2011 base model.

These scenarios were chosen for the following reasons:

- to allow direct comparison between VISSIM and SIDRA models for the same demand and intersection configuration; and
- to identify how the results from each model change as the demand is increased without any other changes, i.e. intersection configuration.

8.1.1 Intersection 1

Figure 8.2 to Figure 8.5 below show the comparisons of modelled average delay on all movements at intersection 1. Figure 8.6 below shows the comparison of modelled queues at intersection 1. As a reference, the SIDRA layout for the base intersection configuration is provided in Figure 8.1 below.

Figure 8.1 Existing SIDRA Layout for Karawatha Drive / Prelude Drive / Lady Musgrave Drive Intersection

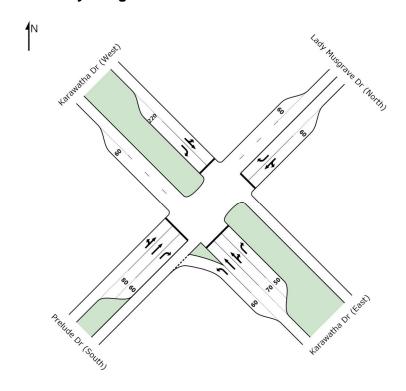


Figure 8.2 Modelled Average Delay - Intersection 1 - Prelude Drive (South) Approach

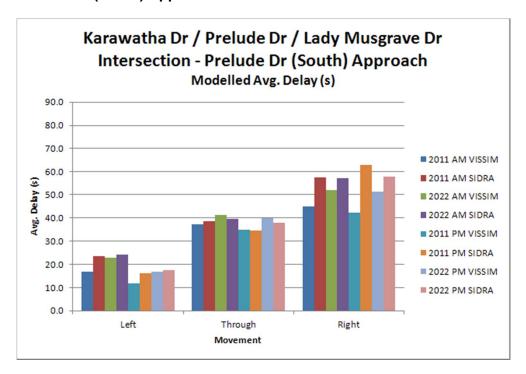


Figure 8.3 Modelled Average Delay - Intersection 1 - Karawatha Drive (East) Approach

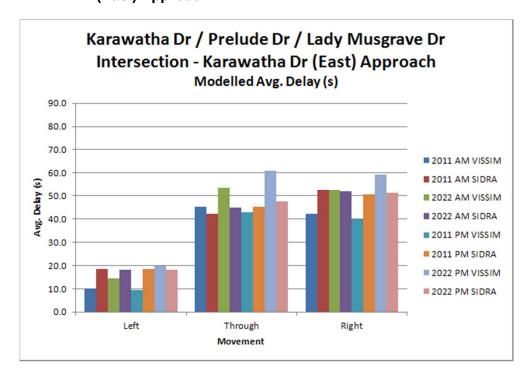


Figure 8.4 Modelled Average Delay - Intersection 1 - Lady Musgrave

Drive (North) Approach

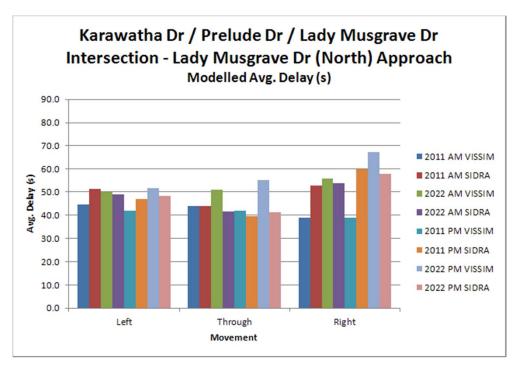


Figure 8.5 Modelled Average Delay - Intersection 1 - Karawatha Drive (West) Approach

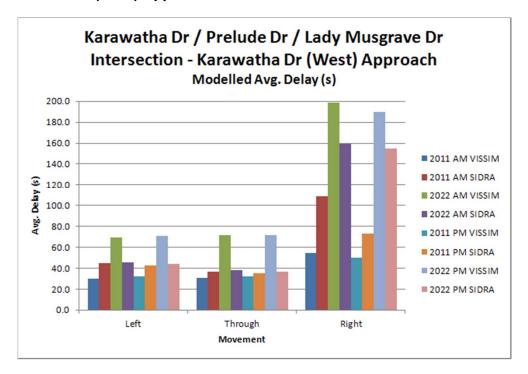
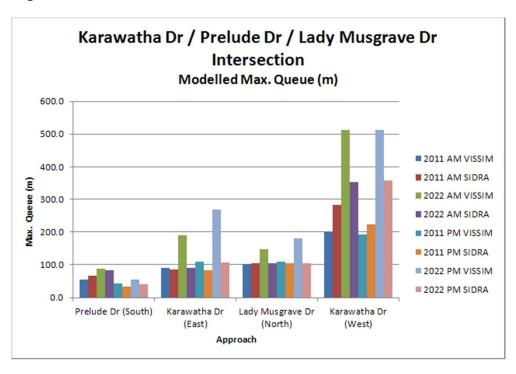


Figure 8.6 Modelled Maximum Queue - Intersection 1



Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 1:

- The majority of cases showed that SIDRA generally output higher delay than VISSIM for the left turn and right turn type movements, particularly for the 2011 modelling. This was not evident when the demand increased, i.e. 2022 modelling, where the VISSIM results generally showed higher average delay than the SIDRA results.
- There were no discernible differences in the modelling of through movement delay, however, as seen in the results for left and right turn movement delay, VISSIM calculated a larger increase in delay between the 2011 and 2022 modelling.
- Some of the SIDRA results showed a decrease in average delay between the 2011 and 2022 modelling.
- The results for queuing at intersection 1 showed a much larger increase in queue lengths calculated by VISSIM between 2011 and 2022 compared to the increase output by SIDRA.

8.1.2 Intersection 2

Figure 8.8 to Figure 8.11 below show the comparisons of modelled average delay on all movements at intersection 2. Figure 8.12 below shows the comparison of modelled queues at intersection 2. As a reference, the SIDRA layout for the base intersection configuration is provided in Figure 8.7 below.

Figure 8.7 Existing SIDRA Layout for Karawatha Drive / Molokai Drive / Mountain Creek Shops Intersection

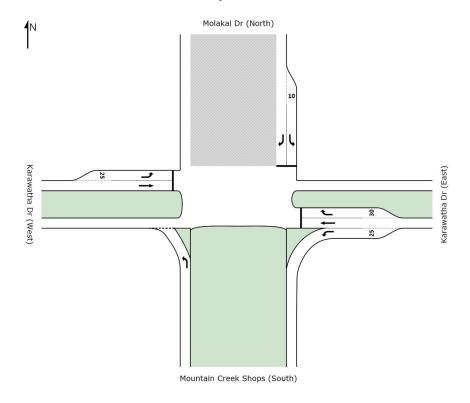


Figure 8.8 Modelled Average Delay - Intersection 2 - Shops (South)

Approach

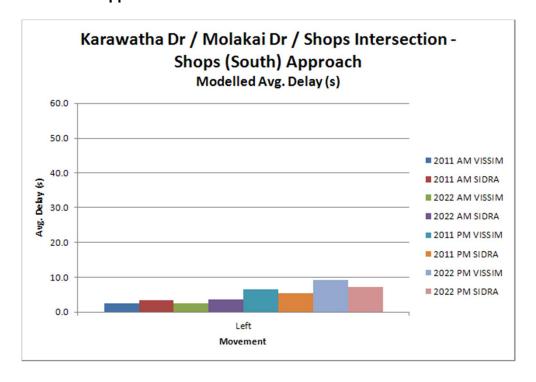


Figure 8.9 Modelled Average Delay - Intersection 2 - Karawatha Drive (East) Approach

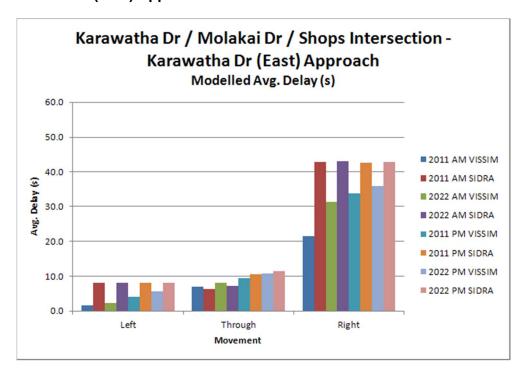


Figure 8.10 Modelled Average Delay - Intersection 2 - Molakai Drive (North) Approach

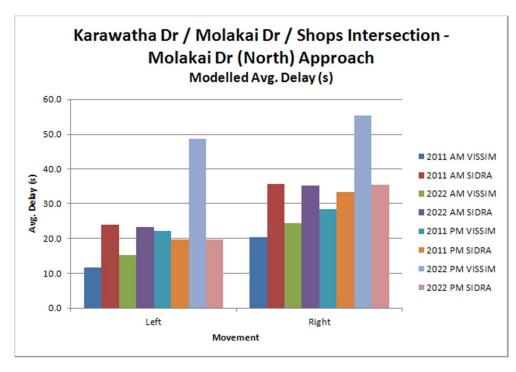


Figure 8.11 Modelled Average Delay - Intersection 2 - Karawatha Drive (West) Approach

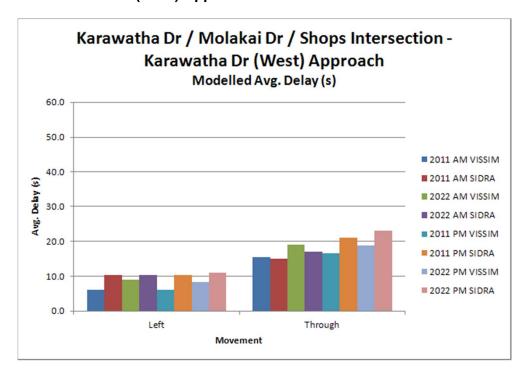
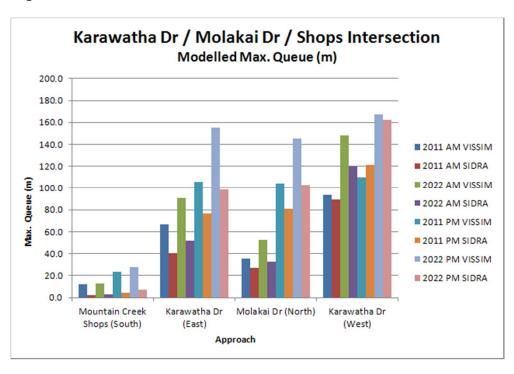


Figure 8.12 Modelled Maximum Queue - Intersection 2



Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 2:

- As seen in the analysis of intersection 1, the majority of cases showed that SIDRA generally output higher delay than VISSIM for the left turn and right turn type movements, particularly for the 2011 modelling. As found in the modelling for intersection 1, the VISSIM results showed a larger increase in delay than SIDRA as the demand on these movements increased.
- Results for delay on the through movements of intersection 2 did not show notable differences between each model.
- The results for queuing at intersection 1 showed a much larger increase in queue lengths calculated by VISSIM between 2011 and 2022 compared to the increase output by SIDRA. This trend was not as discernible for intersection 2, however generally, the queue lengths calculated by VISSIM were some 20-30m longer than those calculated with SIDRA.

8.1.3 Intersection 3

Figure 8.14 to Figure 8.17 below show the comparisons of modelled average delay on all movements at intersection 3. Figure 8.18 below shows the comparison of modelled queues at intersection 3. As a reference, the SIDRA layout for the base intersection configuration is provided in Figure 8.13 below.

Figure 8.13 Existing SIDRA Layout for Karawatha Drive / Bundilla Boulevard / WB Off Ramp / Seriata Way Intersection

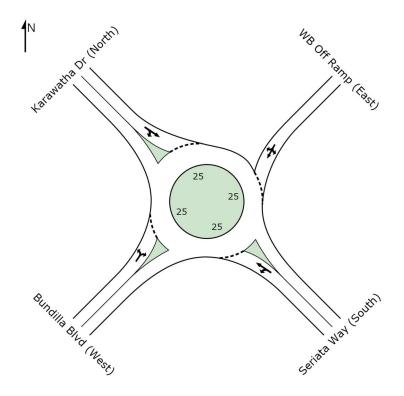


Figure 8.14 Modelled Average Delay - Intersection 3 - Seriata Way (South) Approach

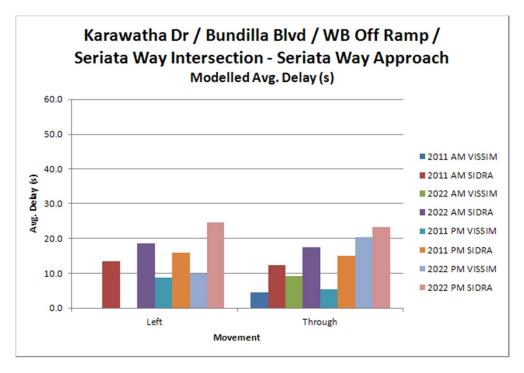


Figure 8.15 Modelled Average Delay - Intersection 3 - Westbound
Off Ramp (East) Approach

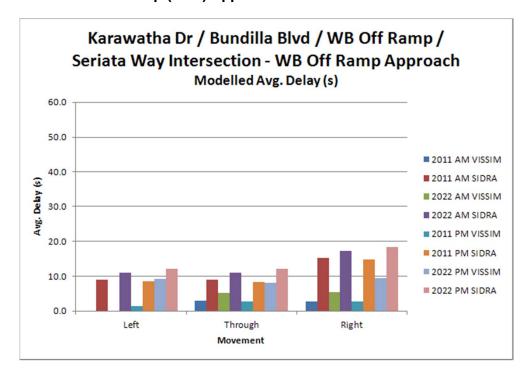


Figure 8.16 Modelled Average Delay - Intersection 3 - Karawatha Drive (North) Approach

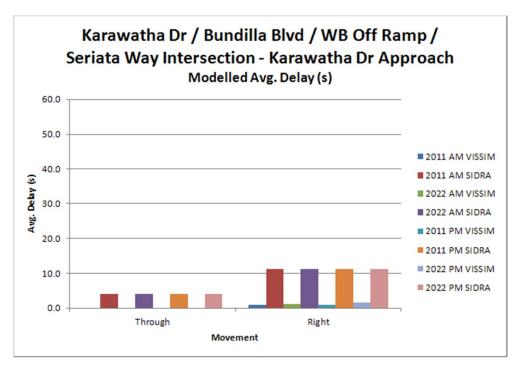


Figure 8.17 Modelled Average Delay - Intersection 3 - Bundilla Boulevard (West) Approach

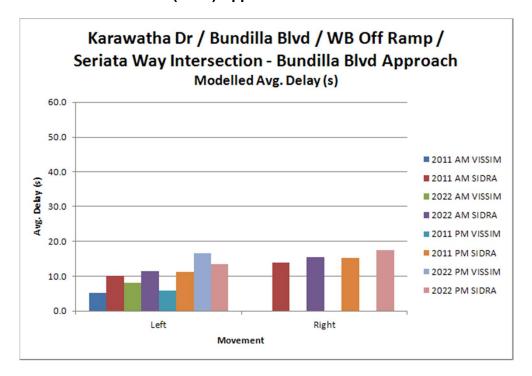
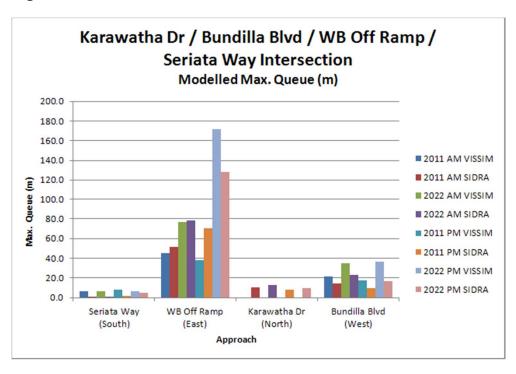


Figure 8.18 Modelled Maximum Queue - Intersection 3



Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 3:

- The results for this four-way roundabout showed that for almost all scenarios, SIDRA output higher delay than VISSIM for all movements.
- Generally, consistent increases in delay with each model were observed as demand increased (from 2011 volumes to 2022 volumes).
- No obvious trends or notable differences were observed in the queuing results for intersection 3.

8.1.4 Intersection 4

Figure 8.20 to Figure 8.23 below show the comparisons of modelled average delay on all movements at intersection 4. Figure 8.24 below shows the comparison of modelled queues at intersection 4. As a reference, the SIDRA layout for the base intersection configuration is provided in Figure 8.19 below.

Figure 8.19 Existing SIDRA Layout for Glenfields Boulevard /
Mountain Ash Drive / Birch Street Intersection

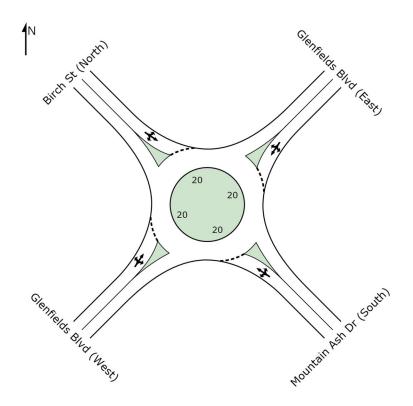


Figure 8.20 Modelled Average Delay - Intersection 4 - Mountain Ash Drive (South) Approach

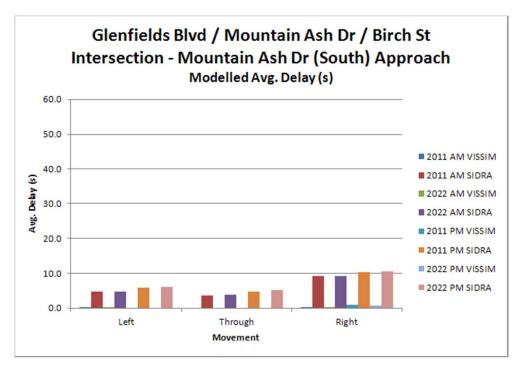


Figure 8.21 Modelled Average Delay - Intersection 4 - Glenfields Boulevard (East) Approach

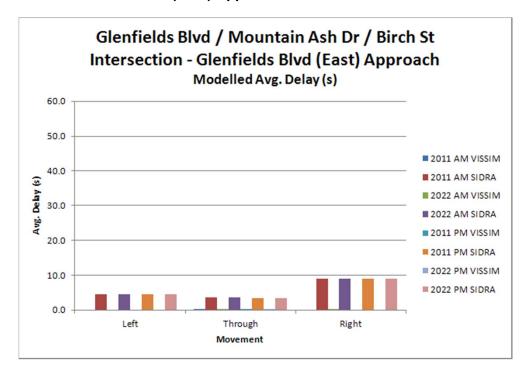


Figure 8.22 Modelled Average Delay - Intersection 4 - Birch Street (North) Approach

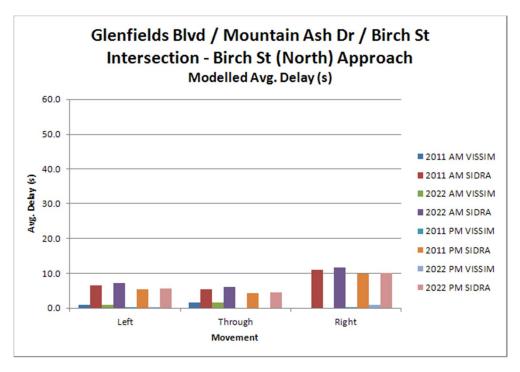


Figure 8.23 Modelled Average Delay - Intersection 4 - Glenfields

Boulevard (West) Approach

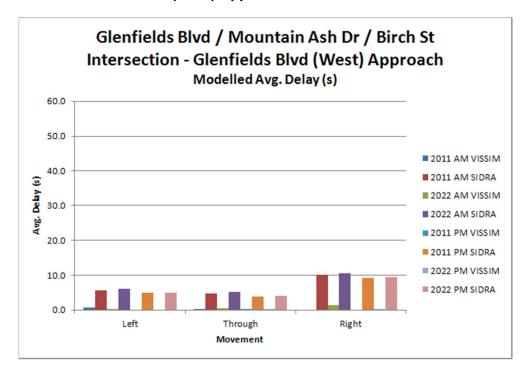
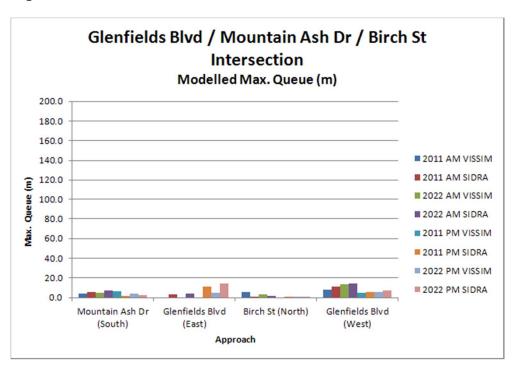


Figure 8.24 Modelled Maximum Queue - Intersection 4



Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 4:

- The results for this four-way roundabout showed that for all scenarios, SIDRA output higher delay than VISSIM for all movements.
- No obvious trends or notable differences between the models were observed in the queuing results for intersection 4.
- It should be noted that some of the modelled queue lengths decreased from the 2011 modelling to the 2022 modelling. This is a result of the increase in traffic on the roundabout blocking conflicting movements.

8.1.5 Intersection 5

Figure 8.26 to Figure 8.27 below show the comparisons of modelled average delay on all movements at intersection 5. Figure 8.28 below shows the comparison of modelled queues at intersection 5. As a reference, the SIDRA layout for the base intersection configuration is provided in Figure 8.25 below.

Figure 8.25 Existing SIDRA Layout for Prelude Drive / EB On Ramp Intersection

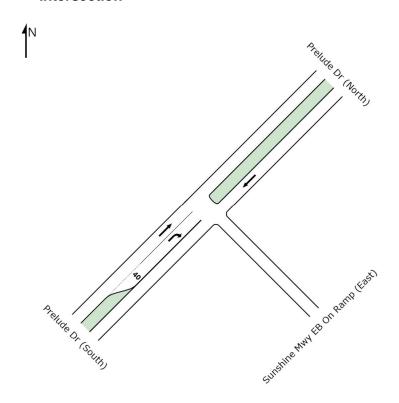


Figure 8.26 Modelled Average Delay - Intersection 5 - Prelude Drive (South) Approach

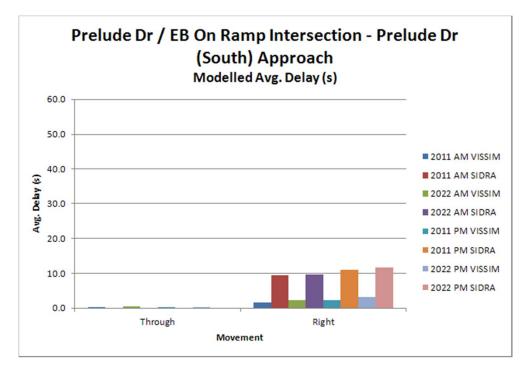


Figure 8.27 Modelled Average Delay - Intersection 5 - Prelude Drive (North) Approach

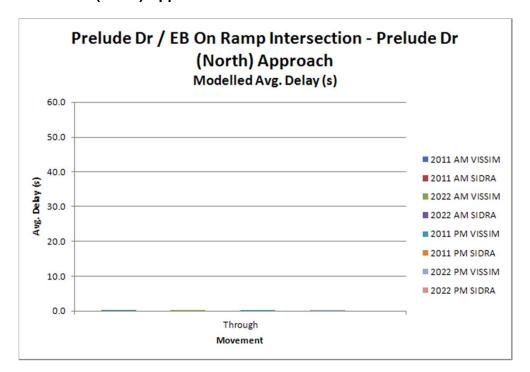
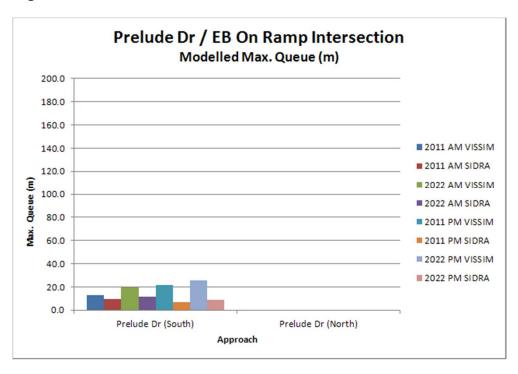


Figure 8.28 Modelled Maximum Queue - Intersection 5



Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 5:

- Average delay for the right turn priority controlled movement was clearly higher with SIDRA in all scenarios.
- The queue lengths calculated with VISSIM for the right turn movement were greater than those calculated with SIDRA, although the absolute differences were low (approximately 10-20m).

8.1.6 Intersection 6

Figure 8.30 to Figure 8.32 below show the comparisons of modelled average delay on all movements at intersection 6. Figure 8.33 below shows the comparison of modelled queues at intersection 6. As a reference, a screenshot from the VISSIM model (rather than the SIDRA model, due to the complexity of the SIDRA layout) showing the base intersection configuration is provided in Figure 8.29 below.

It should be noted that this intersection has a complex arrangement and it was chosen for the comparative analysis for this reason. The layout has a staged median crossing for vehicles entering and leaving Satinay Street. Also, Satinay Street is subject to blockage caused by the downstream Karawatha Drive / Prelude Drive / Lady Musgrave Drive intersection. Due to the blockage issues, "Keep Clear" linemarking is provided across the eastbound lanes of Karawatha Drive, which did provide issues for modelling. These issues are further discussed in the analysis summary in section 8.1.7 below.

Figure 8.29 Existing SIDRA Coding for Karawatha Drive / Satinay Street Intersection

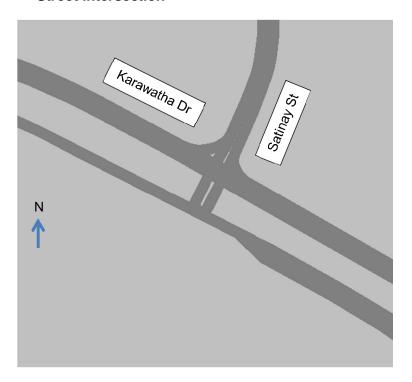


Figure 8.30 Modelled Average Delay - Intersection 6 - Karawatha Drive (East) Approach

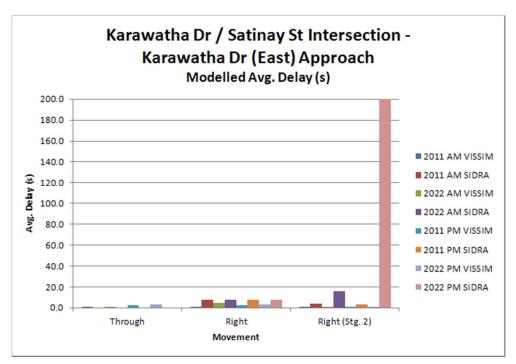


Figure 8.31 Modelled Average Delay - Intersection 6 - Satinay Street (North) Approach

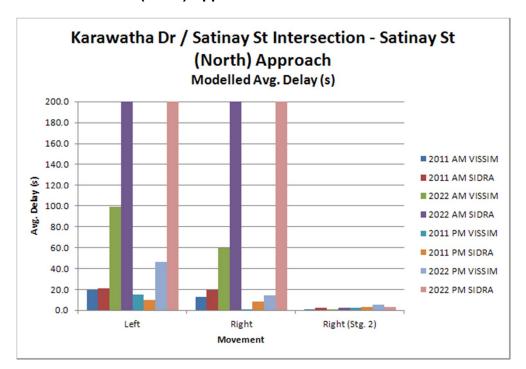
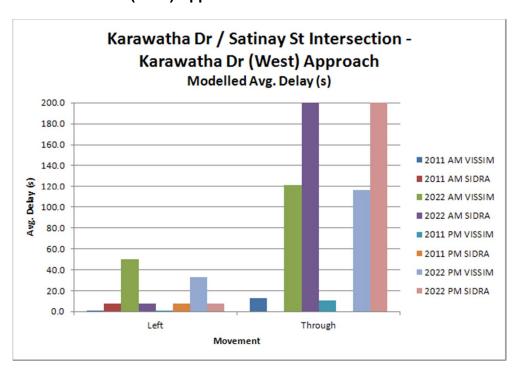


Figure 8.32 Modelled Average Delay - Intersection 6 - Karawatha Drive (West) Approach



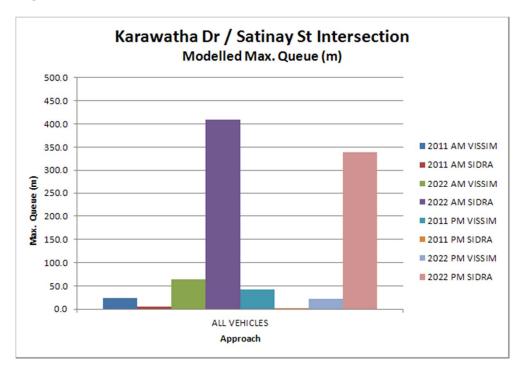


Figure 8.33 Modelled Maximum Queue - Intersection 6

Analysis of the results has highlighted the following key findings in regards to delay and queuing at intersection 6:

- In SIDRA, the downstream blockage was modelled using a capacity reduction for the affected lanes (SIDRA Solutions 2009). Analysis of the model results showed that the delay calculated by SIDRA increased exponentially once the demand exceeded the capacity of the movement.
- As for the delay results, it was found that queue lengths calculated by SIDRA increased exponentially once the demand on movements affected by downstream lane blockage exceeded the calculated capacity of the movement.

8.1.7 Summary / Conclusions

The comparative analysis of model outputs was conducted in a way that highlighted differences in the model results for specific intersection types, i.e. signalised intersections, roundabouts and priority controlled intersections. The

key performance measures used in the comparative analysis were average delay and queue lengths.

The analysis of signalised intersections highlighted the following key findings:

- for left turn and right turn movements, SIDRA calculated higher delay than VISSIM:
- as demand increased on these movements, the calculated increase in delay with VISSIM was higher than the increase calculated by SIDRA;
- no notable differences were observed for the delay calculated on through movements:
- the results where SIDRA showed a decrease in average delay between the 2011 and 2022 modelling was a consequence of SIDRA re-optimising the phase times to manage the additional demand; and
- for the over saturated intersection, the increase in queue lengths was much higher in the VISSIM results than the SIDRA results.

The analysis of roundabouts highlighted the following key findings:

- for all movements at the roundabouts, SIDRA calculated higher delay than VISSIM (it should be noted that neither of the tested intersections were over saturated); and
- no obvious trends or significant differences were observed regarding queue length results from either model.

The analysis of the priority controlled intersections highlighted the following key findings:

 SIDRA calculated higher delay than VISSIM for priority controlled movements at intersections with standard geometry;

- for intersections with standard geometry, the queue lengths calculated with VISSIM were slightly larger than those calculated using SIDRA (although the absolute differences were only 10-20m); and
- delays and queue lengths calculated by SIDRA for the intersection with downstream blockage increased exponentially once the demand exceeded the calculated capacity of the movement.

Essentially, the key outcome of the comparison was that SIDRA will calculate higher average delay than VISSIM at intersections with low traffic demand where some geometric negotiation is required, i.e. left and right turn movements at signalised and priority controlled intersections, and all movements at roundabouts. This result was not evident when demand increased, moreover, at intersections that were observed to operate over capacity, the delay calculated by VISSIM was greater than that output by SIDRA in a lot of cases. However, it should be noted that when additional capacity was provided at a failing intersection, the calculated VISSIM delay reduced more than SIDRA, i.e. the SIDRA models required more extensive upgrades than the VISSIM model.

This issue was investigated by assessing the delay definitions in the *SIDRA INTERSECTION User Guide* (SIDRA Solutions 2010). The guide states that the intersection control delay (d_{ic}) calculated by the program incorporates both stop line delay and geometric delay. This was compared to the methods used in VISSIM. The *VISSIM 5.20 User Manual* (PTV 2010) identified that the total delay for each vehicle calculated by the program is the difference of the theoretical travel time and the real travel time (taking into account reduced speed areas as being part of the theoretical travel time). This indicates that geometric delay is not incorporated into the VISSIM calculation, which explains why SIDRA outputs higher delay, particularly when demand is low. This issue is less evident at intersections with higher demand because geometric delay is proportionally less and stop-line delay becomes more critical. However, it should be noted that when additional upgrades were provided at intersections that were failing, the calculated SIDRA delay did not reduce as much as in

VISSIM. This was most likely due to the increase in geometric delay calculated by SIDRA, as vehicles then required larger negotiation distances.

It was also found that some SIDRA results for the signalised intersections showed higher delay in the 2011 modelling than in the 2022 modelling. This was a consequence of SIDRA re-optimising the signal phase times to manage the additional demand.

No discernible differences were found regarding queue lengths. It was noted that generally, at intersections operating over capacity, the queue lengths calculated by VISSIM were larger than those calculated by SIDRA.

The analysis results for the complex arrangement of the Karawatha Drive / Satinay Street intersection showed some unusual results from SIDRA. Where downstream lane blockage was modelled (using lane capacity reductions), SIDRA showed very low delay and short queue lengths when the v/c ratios were less than 1.0. Conversely, when the demand increased and the proportion time of downstream blockage also increased, delays and queue lengths increased exponentially. Due to the complex nature of this intersection, it appeared that VISSIM simulated the behaviour and performance at that location more appropriately. This is supported by Austroads (2009c), who suggest that simulation is a more appropriate analysis method for complex intersection configurations.

8.2 Practical Application for TIAs

Stanek & Milam (2004) indicated that microsimulation models are able to more closely represent site conditions than micro-analytical models can, however they require detailed calibration to be able to produce reasonable results. The importance of calibration for both modelling techniques is supported by Gagnon, et al. (2008) who found that both SIDRA and VISSIM showed a large improvement in the output results once calibration had been undertaken. In this

project, it was found that both models were able to be calibrated and validated to reasonably replicate network operation in most cases. Intersections with complex configurations were more difficult to calibrate and model with SIDRA, particularly where sustained periods of downstream blockage were evident. This indicates that VISSIM could potentially be more beneficial to use for TIAs that involve intersections with complex arrangements, particularly if upstream and downstream intersection impacts need to be determined.

The use of the microsimulation model for visually assessing downstream lane blockage, the dispersion of queues and the effects of platooning was very beneficial during the calibration stage. The visualisation generated by VISSIM could be used to great benefit for TIAs as the actual impacts caused by the development can be physically observed. Future models with the additional development generated trips can be compared to models that exclude the additional trips. Although pedestrian and public transport modelling was excluded from this study, they can also be modelled using VISSIM. Visualisation of the interaction of pedestrians with public transport modes, as well as their effects on intersection operation could be very beneficial when assessing large-scale developments where public transport is of great importance. An example 3-D visualisation model created for the network assessed in this project is provided on the CD attached in Appendix U.

This project found that assessments requiring analysis of complex intersection arrangements, i.e. with blockage issues, irregular lane arrangements or busy intersections in close proximity to one another, could benefit from microsimulation modelling. Additionally, assessments that require larger network type analyses could benefit from the microsimulation's ability to output network statistics and to identify broader network issues that may be a result of the proposed development.

A disbenefit of using VISSIM for a TIA is the time and cost to develop and run the models. It is estimated that development of the VISSIM models for this

project took approximately twice as long as development of the SIDRA models. As suggested by Akcelik (2007), other issues with microsimulation models are the extensive data requirements, specialist users required and the speed of application for large models.

Due to the additional time taken in developing a microsimulation model, SIDRA is likely to be more appropriate for projects with tight timeframes and smaller budgets. Assessments that incorporate standard intersection configurations and a smaller number of intersections to model will generally benefit from using SIDRA, as modelling timeframes and costs can be minimised, and satisfactory results can still be achieved.

Akcelik (2007) stated that the general modelling context needs to be clarified to form a basis for choosing one model over another. The modelling undertaken during this study supports this statement. The choice of model to adopt for undertaking a TIA should generally be made on a project-to-project basis, following consideration of the network extents, intersection types, project budget and project timeframe.

9. Conclusions

This research project provided a comparison of the engineering uses of SIDRA and VISSIM; two traffic modelling programs. The project was undertaken as a TIA case study, assessing the traffic-based impacts of an arbitrary development proposal. The defined network for the study included:

- two signalised intersections;
- five roundabouts; and
- eight priority controlled intersections.

The key objectives of the study were to compare the output results of SIDRA and VISSIM, particularly the key performance measures of delay and queue length, and to also investigate the potential advantages and disadvantages of utilising VISSIM for performing development impact assessments.

Generally, the research undertaken and the results of the modelling undertaken showed that calibration and validation should be considered a necessity for both levels of modelling. Both SIDRA and VISSIM were able to be calibrated reasonably well so that the base models replicated existing network operation.

9.1 Comparison of Model Outputs

In line with the methodologies adopted by other researchers in the field, this project compared model outputs for average delay and queue lengths. A key consideration was to develop a set of scenarios that would accentuate model differences and similarities. The intersections adopted for the detailed assessment included two signalised intersections, two roundabouts and two priority controlled intersections, each exhibiting different geometry and observed behaviour, and various levels of traffic demand. This selection of intersections for analysis of the model outputs was deemed to be a good representation of

the type of intersections within the network and allowed key performance measures to be compared to each other.

The key outcome of the comparison was that SIDRA calculated higher average delay than VISSIM at intersections with low traffic demand where some geometric negotiation is required, i.e. left and right turn movements at signalised and priority controlled intersections, and all movements at roundabouts. Further investigation identified that SIDRA includes a geometric delay component in its calculations of average vehicle delay. However, reduced speed areas coded into VISSIM (for negotiating turns etc.) are not included in the calculation of delay in VISSIM.

It was found that when demand increased, this difference was not as prominent. At this point, the geometric delay became proportionally less, and stop-line delay became more critical. It should also be noted that when additional upgrades, i.e. additional turn lanes etc., were provided at intersections that were failing, the reduction in delay calculated by SIDRA was less than that calculated by the upgraded VISSIM model. This was most likely due to the increase in geometric delay calculated by SIDRA, as vehicles then required larger distances to negotiate turn movements at the upgraded intersections.

No discernible trends were identified between the models for queue lengths. Although, the queue lengths calculated by VISSIM at over saturated intersections, were generally larger than those calculated by SIDRA.

One of the studied intersections had a number of constraints that highlighted some key differences. The intersection featured complex geometry and was subject to blockage caused by a congested downstream intersection. The extreme results output by the SIDRA model as the intersection became further saturated in the future forecast modelling, showed that VISSIM simulated the behaviour and performance at that location more appropriately. This is

supported by Austroads (2009c), who suggest that simulation is a more appropriate analysis method for complex intersection configurations.

9.2 Recommendations for TIAs

The results of the comparative analysis undertaken in this project showed that it was more beneficial to model complex intersections using VISSIM rather than SIDRA. The use of the microsimulation model for visually assessing downstream lane blockage, the dispersion of queues and the effects of platooning was very beneficial during the calibration stage. For actuated signal control, the VAP module in VISSIM also provides more flexibility to allow the controller to skip phases and lengthen and shorten phases as required.

A 3-D visualisation model was developed with VISSIM for the network assessed in this study, which allowed the actual impacts caused by the development to be physically observed. This is another benefit of using a microsimulation tool for undertaking TIAs.

Additionally, assessments that require larger network type analyses could benefit from the microsimulation's ability to output network statistics and to identify broader network issues that may be a result of the proposed development.

The time for developing the VISSIM models for this study was approximately twice that for development of the SIDRA models. This time (and subsequent cost) issue is a disbenefit of using a microsimulation tool for TIAs. The microsimulation model also required more extensive data for development compared to the SIDRA model. A further benefit of SIDRA is its ability to automatically optimise signal phase times when applying the fixed time control method. Manual adjustment of phase times in VISSIM has time and cost implications.

Microsimulation traffic models require greater resources and calibration time when compared to micro-analytical models, however the benefit of a real-time visual display enhances understanding of the analysis and allows greater flexibility to allow the modeller to simulate a range of problems.

In summary, SIDRA is likely to be more appropriate for projects with tight timeframes and smaller budgets. Assessments that require analysis of intersections with irregular geometry, or where multiple intersections are in close proximity to one another, are better conducted with a microsimulation model.

This study has concluded that the general modelling context needs to be identified before a choice of model is made. Consideration should be given to the network extents, intersection types, project budget and project timeframe.

9.3 Further Work

Due to time constraints on this project, pedestrians were excluded from the modelling. This project could be expanded to include the effects of pedestrians and to compare the output results from each model in regard to pedestrian performance measures.

A comparison of each model's outputs regarding merge/weave performance would also be beneficial.

Time profiling of trip matrices was not undertaken in this study. Profiled trip matrices can have a significant effect on queue development. Further investigation comparing each model's ability to simulate this effect would be very beneficial for the modelling of dense urban networks. It would also be beneficial to compare the model results for assessing dense urban networks where signal offsets are being used.

As development of SIDRA continues, it is likely that the effect of nearby adjacent intersections will be enhanced. Further comparison with microsimulation models will be beneficial to the traffic engineering industry.

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Legislation

Local Government Act 2009 (Queensland).

Transport Infrastructure Act 1994 (Queensland).

Appendix A Project Specification

University of Southern Queensland

FACULTY OF ENGINEERING AND SURVEYING

ENG4111 / ENG4112 Research Project PROJECT SPECIFICATION

FC	PR:	Anthony Samuel Allan FICHERA								
TO	PIC:	A PRACTICAL COMPARISON OF VISSIM AND SIDRA FOR THE ASSESSMENT OF DEVELOPMENT IMPACTS								
SU	PERVISORS:	Dr. Soma Kathirgamalingam Bill Thew (GHD and Adjunct Professor USC) Jon Hunt (GHD)								
SP	ONSORSHIP:	GHD								
ENROLMENT:		ENG4111 (Semester 1, 2011) ENG4112 (Semester 2, 2011)								
PR	OJECT AIM:	To compare the output results of each traffic modelling software, attempting to identify the reasoning for any variations and to develop recommendations on which package is most suitable for applications in assessing development impacts.								
PR	OGRAMME:	Issue A - 13 March 2011								
1.		view of current transport planning methods and policies and examine how this relates to nsport modelling processes.								
2.		nceptual layout for a proposed development at a site that has nearby roundabouts, olled and signalised intersections.								
3.	INTERSECT distribution, in	traffic impact assessment for the development using both VISSIM and SIDRA ON for modelling purposes. This process will include traffic generation, traffic ntersection count, queue length and travel time surveys, model coding, calibration and ersection analysis and assessment of future infrastructure requirements.								
4.	Identify anom	alies in the results (comparing both modelling packages).								
5.	Undertake re	search in to the calculation methods of both packages to justify the variances.								
As	time permits:									
6.	Identify the p	ros and cons of each package in the application of assessing development impacts.								
7.		recommendations on which package is best suited to what level of modelling and in what size / type of development to assess.								
AG	REED:									
		(Student) , (Supervisors)								

Appendix B Traffic Count Data

145002125 -- English (ENA)

Datasets:

Site: [145002] Glenfields Blvd 145m north of Lacebark St south bound lane <50>

Direction: 3 - South bound, A hit first. **Lane:** 0

Survey Duration: 0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010

Zone:

File: Glenfields Blvd 145002-100514.EC0 (Plus)

Identifier: S0780ME4 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default (v3.21 - 15275)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Default Profile

Scheme: Vehicle classification (AustRoads94)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 91005 / 91114 (99.88%)

Weekly Vehicle Counts

145002125

Site: 145002.0.0S

Description: Glenfields Blvd 145m north of Lacebark St south bound lane <50>

Filter time: 0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	05 Apr	06 Apr	07 Apr	08 Apr	09 Apr	10 Apr	11 Apr	1 - 5	1 - 7
Hour									
0000-0100	*	*	*	*	*	*	25	*	25.0
0100-0200	*	*	*	*		*	14	*	14.0
0200-0300	*	*	*	*	*	*	15	*	15.0
0300-0400	*	*	*	*	*	*	5	*	5.0
0400-0500							15	*	15.0
0500-0600	*	*	*	*	*	*	10	*	10.0
0600-0700	*	*	*	*	*	*	19	*	19.0
0700-0800	*	*	*	*	*	*	48	*	48.0
0800-0900	*	*	*	*	*	*	85	*	85.0
0900-1000	*	*	*	*	*	*	129	*	129.0
1000-1100	*	*	*	*	*	*	168	*	168.0
1100-1200	*	*	*	*	*	*	191<	*	191.0<
1200-1300	*	*	*	*	*	*	201	*	201.0
1300-1400	*	*	*	*	*	*	199	*	199.0
1400-1500	*	*	*	*	*	*	205	*	205.0
1500-1600	*	*	*	*	*	*	215	*	215.0
1600-1700	*	*	*	*	*	*	234<	*	234.0<
1700-1800	*	*	*	*	*	*	165	*	165.0
1800-1900	*	*	*	*	*	*	128	*	128.0
1900-2000	*	*	*	*	*	*	74	*	74.0
2000-2100	*	*	*	*	*	*	62	*	62.0
2100-2200	*	*	*	*	*	*	35	*	35.0
2200-2300	*	*	*	*	*	*	26	*	26.0
2300-2400	*	*	*	*	*	*	11	*	11.0
Totals _									
0700-1900	*	*	*	*	*	*	1968	*	1968.0
0600-2200	*	*	*	*	*	*	2158	*	2158.0
0600-0000	*	*	*	*	*	*	2195	*	2195.0
0000-0000	*	*	*	*	*	*	2279	*	2279.0
AM Peak	*	*	*	*	*	*	1100		
	*	*	*	*	*	*	191		

* - No data.

145002125

Site: 145002.0.0S

Description: Glenfields Blvd 145m north of Lacebark St south bound lane <50>

0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010 Vehicle classification (AustRoads94) Filter time:

Scheme:

Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Filter:

	Mon 12 Apr	Tue 13 Apr	Wed 14 Apr	Thu 15 Apr	Fri 16 Apr	Sat 17 Apr	Sun 18 Apr	Average 1 - 5	s 1 - 7
Hour	12 Apr	13 Apr	14 Apr	15 Apr	10 Apr	I/ Apr	To Apr	1 - 5	1 - /
0000-0100	7	4	10	7	9	20	37 l	7.4	13.4
0100-0100	2	3	1	1	9	10	16	3.2	6.0
0200-0300	1	3	1	1	3	4	17	1.8	4.3
0300-0400	5	1	2	2	2	5	11	2.4	4.0
0400-0500	2	10	6	7	8	4	5	6.6	6.0
0500-0600	14	16	12	12	12	20	9	13.2	13.6
0600-0700	47	35	49	55	45	47	19	46.2	42.4
0700-0800	80	122	100	78	117	94	46	99.4	91.0
0800-0900	103	132	139	109	134	138	79	123.4	119.1
0900-1000	116	123	138	116	113	184	130	121.2	131.4
1000-1100	132	155<	131	145	140	190	167	140.6	151.4
1100-1200	143<	149	144<	156<	159<	233<	232<	150.2<	173.7<
1200-1300	191	159	153	150	178	217	176	166.2	174.9
1300-1400	161	180	183	176	211	240	180	182.2	190.1
1400-1500	198	200	181	178	238	239	202	199.0	205.1
1500-1600	255	300	300	276	294	199	210	285.0	262.0
1600-1700	334	343	349	341	345	215	246<	342.4	310.4
1700-1800	396<	361<	388<	366<	364<	242<	217	375.0<	333.4<
1800-1900	199	246	241	286	245	181	138	243.4	219.4
1900-2000	112	125	130	144	117	90	75	125.6	113.3
2000-2100	79	78	88	110	96	82	48	90.2	83.0
2100-2200	48	65	72	82	90	68	35	71.4	65.7
2200-2300	22	35	42	33	59	81	21	38.2	41.9
2300-2400	12	15	14	19	35	42	14	19.0	21.6
Totals _									
0700-1900	2308	2470	2447	2377	2538	2372	2023	2428.0	2362.1
0600-2200	2594	2773	2786	2768	2886	2659	2200	2761.4	2666.6
0600-0000	2628	2823	2842	2820	2980	2782	2235	2818.6	2730.0
0000-0000	2659	2860	2874	2850	3023	2845	2330	2853.2	2777.3
AM Peak	1100	1000	1100	1100	1100	1100	1100		
	143	155	144	156	159	233	232		
PM Peak	1700 396	1700 361	1700 388	1700 366	1700 364	1700 242	1600 246		

^{* -} No data.

145002125

Site: 145002.0.0S

Description: Glenfields Blvd 145m north of Lacebark St south bound lane <50>

0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010 Vehicle classification (AustRoads94) Filter time:

Scheme:

Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
**	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	1 - 5	1 - 7
Hour	2	-	0	4	1.0	0.2	00	F 0	
0000-0100	3	7	9	4	12	23	20	7.0	11.1
0100-0200	0	3	0	7	4	12	22	2.8	6.9
0200-0300	2	1	4	2	4	10	8	2.6	4.4
0300-0400	1	3 7	0	0	0	5	6	0.8	2.1
0400-0500	6	=	4	4	5	10	15	5.2	7.3
0500-0600	15	13	15	17	22	14	4	16.4	14.3
0600-0700 0700-0800	40	47 95	57 115	39 97	53 104	30 67	38	47.2	43.4
	102						44	102.6	89.1
0800-0900	115	126 131	160 133	136 119	129 134	130 162	81 117	133.2 128.2	125.3
0900-1000	124								131.4
1000-1100	133<		160<	144<	159<	161	160	149.0<	152.3
1100-1200	130	164<	144	126	156	227<	160<	144.0	158.1<
1200-1300 1300-1400	130	126 155	171 159	139	177	232 223	189	148.6	166.3
1400-1500	164 161	155 174	159 179	171 203	174 220	223 196	145 156	164.6 187.4	170.1
									184.1
1500-1600	270	298	282	264	299	227	163	282.6	257.6
1600-1700	334	367	378	361	375	231	193<	363.0	319.9
1700-1800	416<		409<	397<	395<	274<	180	398.0<	349.1<
1800-1900	215	251	209	268	251	158	147	238.8	214.1
1900-2000	94	111	131	148	142	84	91	125.2	114.4
2000-2100	91	78	86	98	97	66	81	90.0	85.3
2100-2200	75 22	58	60	74	85	92	58	70.4	71.7
2200-2300	33	32	33	53	61	78	45	42.4	47.9
2300-2400	9	12	13	13	38	37	30	17.0	21.7
Totals _									
0000 1000	0004	0.400	0.400	0.405	0553	0000	1025	0440	0215 6
0700-1900	2294	2409	2499	2425	2573	2288	1735	2440.0	2317.6
0600-2200	2594	2703	2833	2784	2950	2560	2003	2772.8	2632.4
0600-0000	2636	2747	2879	2850	3049	2675	2078	2832.2	2702.0
0000-0000	2663	2781	2911	2884	3096	2749	2153	2867.0	2748.1
AM Peak	1000	1100	1000	1000	1000	1100	1100		
	133	164	160	144	159	227	160		
PM Peak	1700	1700	1700	1700	1700	1700	1600		
	416	373	409	397	395	274	193		

^{* -} No data.

145002125

Site: 145002.0.0S

Glenfields Blvd 145m north of Lacebark St south bound lane <50> **Description:**

0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010 Vehicle classification (AustRoads94) Filter time:

Scheme:

Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	01 May	02 May	1 - 5	1 - 7
Hour									
0000-0100	15	6	7	8	17	29	27	10.6	15.6
0100-0200	10	0	1	1	2	8	12	2.8	4.9
0200-0300	5	1	0	1	2	4	7	1.8	2.9
0300-0400	5	0	2	2	4	5	9	2.6	3.9
0400-0500	6	9	9	4	6	9	9	6.8	7.4
0500-0600	2	17	12	10	15	10	5	11.2	10.1
0600-0700	17	50	43	60	51	31	20	44.2	38.9
0700-0800	29	99	108	88	92	80	42	83.2	76.9
0800-0900	72	121	122	129	145<	110	74	117.8	110.4
0900-1000	129	151	131	137	128	145	124	135.2	135.0
1000-1100	150	161<	133	166<	141	173	123	150.2	149.6
1100-1200	206<	135	134<	137	142	208<	184<	150.8<	163.7<
1200-1300	191	178	167	154	169	230	185	171.8	182.0
1300-1400	180	172	163	160	218	212	167	178.6	181.7
1400-1500	203	187	194	187	192	223	168	192.6	193.4
1500-1600	246	287	302	318	309	214	178	292.4	264.9
1600-1700	256<	395<	344	353	368<	200	215<	343.2	304.4
1700-1800	211	393	403<	373<	365	254<	203	349.0<	314.6<
1800-1900	143	239	227	255	223	163	158	217.4	201.1
1900-2000	79	92	129	152	136	96	77	117.6	108.7
2000-2100	52	105	89	92	100	57	58	87.6	79.0
2100-2200	50	60	94	97	95	89	59	79.2	77.7
2200-2300	17	37	42	47	62	70	43	41.0	45.4
2300-2400	12	16	20	16	40	33	21	20.8	22.6
							ĺ		
Totals _									
0700-1900	2016	2518	2428	2457	2492	2212	1821	2382.2	2277.7
0600-2200	2214	2825	2783	2858	2874	2485	2035	2710.8	2582.0
0600-0000	2243	2878	2845	2921	2976	2588	2099	2772.6	2650.0
0000-0000	2286	2911	2876	2947	3022	2653	2168	2808.4	2694.7
							j		
AM Peak	1100	1000	1100	1000	0800	1100	1100		
	206	161	134	166	145	208	184		
PM Peak	1600	1600	1700	1700	1600	1700	1600		
	256	395	403	373	368	254	215		

^{* -} No data.

145002125

Site: 145002.0.0S

Description: Glenfields Blvd 145m north of Lacebark St south bound lane <50>

Filter time: 0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
***	03 May	04 May	05 May	06 May	07 May	08 May	09 May	1 - 5	1 - 7
Hour	1.6	2	0	4	0	0.6	0.2	0 0	10 5
0000-0100	16	3	8	4	9	26	23	8.0	12.7
0100-0200	5	3	3	3	0	8	11	2.8	4.7
0200-0300	4	3	0	2	2	8	9	2.2	4.0
0300-0400	1	0	0	1	2	6	6	0.8	2.3
0400-0500	6	6	5	4	7	7	9	5.6	6.3
0500-0600	8	15	19	14	18	9	5	14.8	12.6
0600-0700	12	36	51	58	40	26	13	39.4	33.7
0700-0800	45	108	103	114	115	69	42	97.0	85.1
0800-0900	86	118	132	136	131	97	94	120.6	113.4
0900-1000	120	124	117	130	117	157	148	121.6	130.4
1000-1100	169	153<	138	146<	153	232<	181	151.8	167.4<
1100-1200	185<	125	143<	145	163<	207	188<	152.2<	165.1
1200-1300	172	165	175	149	180	232	168	168.2	177.3
1300-1400	185	181	193	169	182	242<	182	182.0	190.6
1400-1500	184	195	186	177	192	206	174	186.8	187.7
1500-1600	177	286	309	301	352	239	228	285.0	270.3
1600-1700	207<	395	348	362	354	235	242<	333.2	306.1
1700-1800	176	399<	382<	394<	408<	227	225	351.8<	315.9<
1800-1900	122	225	234	250	271	176	141	220.4	202.7
1900-2000	67	101	120	161	154	88	79	120.6	110.0
2000-2100	55	74	92	118	115	65	62	90.8	83.0
2100-2200	43	61	76	86	87	77	37	70.6	66.7
2200-2300	20	27	28	39	65	59	31	35.8	38.4
2300-2400	7	14	17	17	32	47	8	17.4	20.3
Totals _									
0700-1900	1828	2474	2460	2473	2618	2319	2013	2370.6	2312.1
0600-2200	2005	2746	2799	2896	3014	2575	2204	2692.0	2605.6
0600-0000	2032	2787	2844	2952	3111	2681	2243	2745.2	2664.3
0000-0000	2072	2817	2879	2980	3149	2745	2306	2779.4	2706.9
							į		
AM Peak	1100	1000	1100	1000	1100	1000	1100		
	185	153	143	146	163	232	188		
PM Peak	1600 207	1700 399	1700 382	1700 394	1700 408	1300 242	1600 242		

^{* -} No data.

145002125

Site: 145002.0.0S

Description: Glenfields Blvd 145m north of Lacebark St south bound lane <50>

Filter time: 0:00 Sunday, 11 April 2010 => 14:19 Friday, 14 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	10 May	11 May	12 May	13 May	14 May	15 May	16 May	1 - 5	1 - 7
Hour			_	_			*		
0000-0100	4	6	7	5	6	*	*	5.6	5.6
0100-0200	1	2	3	4	3	*	*	2.6	2.6
0200-0300	3	0	1	1	1	*	*	1.2	1.2
0300-0400	2 6	3 7	0 6	1	1 3	*	*	1.4	1.4
0400-0500		· ·		6		*	*	5.6	5.6
0500-0600 0600-0700	16	18	18	18	18 50	*	*	17.6	17.6
0700-0700	43 75	38 99	38 104	51 115	97	*	*	44.0 98.0	44.0 98.0
0800-0800	137	110	112	128	126	*	*	122.6	122.6
0900-1000	137	130	132	115	124	*	*	126.6	122.6
1000-1100	144<	130 138<	152<	140<	151	*	*	145.0<	145.0<
1100-1100	131	125	132	128	151 153<	*	*	133.8	133.8
1200-1200	147	158	132	164	160	*	*	153.6	153.6
1300-1400	171	184	160	163	29	*	*	141.4	141.4
1400-1500	196	191	196	197	0	*	*	156.0	156.0
1500-1600	307	286	298	290	*	*	*	295.3	295.3
1600-1700	354	360	371	356	*	*	*	360.3	360.3
1700-1800	386<	409<	377<	379<	*	*	*	387.8<	387.8<
1800-1900	224	210	251	272	*	*	*	239.3	239.3
1900-2000	127	101	140	127	*	*	*	123.8	123.8
2000-2100	100	73	84	113	*	*	*	92.5	92.5
2100-2200	56	73	82	88	*	*	*	74.8	74.8
2200-2300	30	33	25	29	*	*	*	29.3	29.3
2300-2400	7	17	13	15	*	*	*	13.0	13.0
Totals _	·								
0700-1900	2404	2400	2423	2447	*	*	*	2359.3	2359.3
0600-2200	2730	2685	2767	2826	*	*	*	2694.3	2694.3
0600-0000	2767	2735	2805	2870	*	*	*	2736.6	2736.6
0000-0000	2799	2771	2840	2905	*	*	*	2770.6	2770.6
AM Peak	1000	1000	1000	1000	1100	*	*		
	144	138	152	140	153	*	*		
PM Peak	1700	1700	1700	1700	*	*	*		
	386	409	377	379	*	*	*		

^{* -} No data.

108018136 -- English (ENA)

Datasets:

Site: [108018] Karawatha Dve east of Golf Links Rd west bound lane <60>

Direction: 4 - West bound, A hit first. **Lane:** 0

Survey Duration: 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010

Zone:

File: Karawatha Dve 108018-100505.EC0 (Plus) Identifier: 2226KS19 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default (v3.21 - 15275)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Default Profile

Scheme: Vehicle classification (AustRoads94)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 100656 / 100687 (99.97%)

Weekly Vehicle Counts

108018136

Site: 108018.0.0W

Description: Karawatha Dve east of Golf Links Rd west bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr	18 Apr	1 - 5	1 - 7
Hour									
0000-0100	*	*	*	11	7	31	41	9.0	22.5
0100-0200	*	*	*	5	8	10	27	6.5	12.5
0200-0300	*	*	*	3	5	7	20	4.0	8.8
0300-0400	*	*	*	2	5	8	24	3.5	9.8
0400-0500	*	*	*	19	13	10	6	16.0	12.0
0500-0600	*	*	*	35	47	28	22	41.0	33.0
0600-0700	*	*	*	134	130	91	45	132.0	100.0
0700-0800	*	*	*	389	405	161	95	397.0	262.5
0800-0900	*	*	*	445<	505<	269	158	475.0<	344.3<
0900-1000	*	*	*	324	315	285	256	319.5	295.0
1000-1100	*	*	*	329	328	403<	306	328.5	341.5
1100-1200	*	*	*	304	342	391	327<	323.0	341.0
1200-1300	*	*	*	312	360	405<	322	336.0	349.8
1300-1400	*	*	*	377	436	399	315	406.5	381.8
1400-1500	*	*	*	439	462	323	312	450.5	384.0
1500-1600	*	*	*	471	524	326	313	497.5	408.5
1600-1700	*	*	*	589<	577<	360	377<	583.0<	475.8<
1700-1800	*	*	*	543	497	317	268	520.0	406.3
1800-1900	*	*	*	336	332	247	175	334.0	272.5
1900-2000	*	*	*	188	159	130	89	173.5	141.5
2000-2100	*	*	*	121	116	121	84	118.5	110.5
2100-2200	*	*	*	114	85	89	40	99.5	82.0
2200-2300	*	*	*	45	69	100	27	57.0	60.3
2300-2400	*	*	*	23	47	85	10	35.0	41.3
Totals _									
0700-1900	*	*	*	4858	5083	3886	3224	4970.5	4262.8
0600-2200	*	*	*	5415	5573	4317	3482	5494.0	4696.8
0600-0000	*	*	*	5483	5689	4502	3519	5586.0	4798.3
0000-0000	*	*	*	5558	5774	4596	3659	5666.0	4896.8
							į		
AM Peak	*	*	*	0800	0800	1000	1100		
	*	*	*	445	505	403	327		

 PM Peak
 *
 *
 *
 1600
 1600
 1200
 1600

 *
 *
 *
 589
 577
 405
 377

* - No data.

108018136

Site: 108018.0.0W

Description: Karawatha Dve east of Golf Links Rd west bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	:s
	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	1 - 5	1 - 7
Hour									
0000-0100	1	7	10	11	13	25	55	8.4	17.4
0100-0200	6	1	4	2	14	12	36	5.4	10.7
0200-0300	3		4	3	8	9	10	4.0	5.6
0300-0400	1		5	1	3	11	14	2.2	5.1
0400-0500	17	17	11	11	11	15	21	13.4	14.7
0500-0600	46	53	52	35	40	29	16	45.2	38.7
0600-0700	124		139	131	126	102	62	131.0	117.0
0700-0800	382		419	362	397	149	123	390.2	317.6
0800-0900	489		528<	514<	495<	241	146	508.8<	418.7<
0900-1000	302		321	310	347	329	211	319.0	305.0
1000-1100	341		364	373	360	346	257	363.2	345.6
1100-1200	310	293	309	302	337	387<	296<	310.2	319.1
1200-1300	302		287	263	333	437<	332<	295.2	320.7
1300-1400	361		364	391	388	380	308	376.4	367.1
1400-1500	404		472	450	499	350	260	453.6	411.1
1500-1600	534		561	564<	542	387	242	550.6	483.1
1600-1700	601	< 645<	633<	563	602<	356	297	608.8<	528.1<
1700-1800	505	477	537	557	538	336	286	522.8	462.3
1800-1900	313	282	281	336	369	221	199	316.2	285.9
1900-2000	137	188	171	212	211	124	104	183.8	163.9
2000-2100	98	126	114	137	115	67	95	118.0	107.4
2100-2200	81	78	82	99	107	83	77	89.4	86.7
2200-2300	40	43	27	44	76	67	53	46.0	50.0
2300-2400	13	25	22	19	72	56	39	30.2	35.1
m-4-1-									
Totals _									
0700-1900	4844	4963	5076	4985	5207	3919	2957	5015.0	4564.4
0600-2200	5284		5582	5564	5766	4295	3295	5537.2	5039.4
0600-0000	5337	5558	5631	5627	5914	4418	3387	5613.4	5124.6
0000-0000	5411	5639	5717	5690	6003	4519	3539	5692.0	5216.9
	0000	0000	0000	0000	0000	1100	1100		
AM Peak	0800	0800	0800	0800	0800	1100	1100		
	489	518	528	514	495	387	296		
PM Peak	1600	1600	1600	1500	1600	1200	1200		
	601	645	633	564	602	437	332		

^{* -} No data.

108018136

Site: 108018.0.0W

Description: Karawatha Dve east of Golf Links Rd west bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	01 <u>May</u>	02 <u>May</u>	1 - 5	1 - 7
Hour									
0000-0100	16	4	6	12	13	29	38	10.2	16.9
0100-0200	6	3	4	5	4	10	23	4.4	7.9
0200-0300	13	2	2	7	5	6	14	5.8	7.0
0300-0400	6	1	4	2	3	10	11	3.2	5.3
0400-0500	11	20	14	16	10	13	9	14.2	13.3
0500-0600	19	37	45	40	48	35	21	37.8	35.0
0600-0700	45	137	152	162	169	77	52	133.0	113.4
0700-0800	91	387	379	391	367	181	97	323.0	270.4
0800-0900	144	535<	467<	520<	504<	268	191	434.0<	375.6<
0900-1000	265	285	367	306	324	318	255	309.4	302.9
1000-1100	307	369	404	370	364	369	272	362.8	350.7
1100-1200	379<	342	318	323	339	417<	303<	340.2	345.9
1200-1300	358	297	329	302	319	367<	286	321.0	322.6
1300-1400	323	383	363	387	369	360	312	365.0	356.7
1400-1500	324	436	460	449	490	326	297	431.8	397.4
1500-1600	361<	590	569	550	568	340	317	527.6	470.7
1600-1700	353	640<	640<	591<	587<	343	328<	562.2<	497.4<
1700-1800	317	556	557	539	512	336	297	496.2	444.9
1800-1900	199	292	354	323	330	221	185	299.6	272.0
1900-2000	124	182	180	208	191	153	110	177.0	164.0
2000-2100	73	130	165	135	117	113	69	124.0	114.6
2100-2200	64	79	93	103	93	103	56	86.4	84.4
2200-2300	28	41	38	46	75	66	42	45.6	48.0
2300-2400	9	22	13	19	44	54	38	21.4	28.4
Totals _									
0700-1900	3421	5112	5207	5051	5073	3846	3140	4772.8	4407.1
0600-2200	3727	5640	5797	5659	5643	4292	3427	5293.2	4883.6
0600-0000	3764	5703	5848	5724	5762	4412	3507	5360.2	4960.0
0000-0000	3835	5770	5923	5806	5845	4515	3623	5435.8	5045.3
AM Peak	1100	0800	0800	0800	0800	1100	1100		
	379	535	467	520	504	417	303		
PM Peak	1500	1600	1600	1600	1600	1200	1600		
	361	640	640	591	587	367	328		

^{* -} No data.

108018136

Site: 108018.0.0W

Description: Karawatha Dve east of Golf Links Rd west bound lane <60> 0:00 Thursday, 15 April 2010 => 9:09 Wednesday, 5 May 2010 Filter time:

Scheme:

Vehicle classification (AustRoads94) Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	03 May	04 May	05 May	06 May	07 May	08 May	09 May	1 - 5	1 - 7
Hour		_							
0000-0100	12	7	3	*	*	*	*	7.3	7.3
0100-0200	16	1	1	*	*	*	*	6.0	6.0
0200-0300	11	3	2		*		*	5.3	5.3
0300-0400	8	3	2	*	*	*	*	4.3	4.3
0400-0500	5	15	18	*	*	*	*	12.7	12.7
0500-0600	21	37	56	*	*	*	*	38.0	38.0
0600-0700	40	129	15	*	*	*	*	61.3	61.3
0700-0800	68	443	0	*	*	*	*	170.3	170.3
0800-0900	183	528<	0	*	*	*	*	237.0	237.0
0900-1000	201	369	0	*	*	*	*	190.0	190.0
1000-1100	278<	389	*	*	*	*	*	333.5<	333.5<
1100-1200	272	335	*	*	*	*	*	303.5	303.5
1200-1300	311	297	*	*	*	*	*	304.0	304.0
1300-1400	264	417	*	*	*	*	*	340.5	340.5
1400-1500	286	476	*	*	*	*	*	381.0	381.0
1500-1600	350<	570	*	*	*	*	*	460.0<	460.0<
1600-1700	266	648<	*	*	*	*	*	457.0	457.0
1700-1800	257	537	*	*	*	*	*	397.0	397.0
1800-1900	165	293	*	*	*	*	*	229.0	229.0
1900-2000	71	182	*	*	*	*	*	126.5	126.5
2000-2100	60	104	*	*	*	*	*	82.0	82.0
2100-2200	53	65	*	*	*	*	*	59.0	59.0
2200-2300	22	45	*	*	*	*	*	33.5	33.5
2300-2400	10	14	*	*	*	*	*	12.0	12.0
Totals _									
0700-1900	2901	5302	*	*	*	*	*	3802.8	3802.8
0600-2200	3125	5782	*	*	*	*	*	4131.7	4131.7
0600-0000	3157	5841	*	*	*	*	*	4177.2	4177.2
0000-0000	3230	5907	*	*	*	*	*	4250.8	4250.8
	3230	3307						1230.0	1230.0
AM Peak	1000	0800	*	*	*	*	*		
	278	528	*	*	*	*	*		
PM Peak	1500	1600	*	*	*	*	*		
	350	648	*	*	*	*	*		

^{* -} No data.

108017135 -- English (ENA)

Datasets:

Site: [108017] Karawatha Dve east of Golf Links Rd east bound lane <60>

Direction: 2 - East bound, A hit first. **Lane:** 0

Survey Duration: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Zone:

File: Karawatha Dve 108017-100505.EC0 (Plus) **Identifier:** 2334BZYN MC56-6 [MC55] (c)Microcom 02/03/01

Algorithm: Factory default (v3.21 - 15275)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Default Profile

Scheme: Vehicle classification (AustRoads94)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 105153 / 105186 (99.97%)

Weekly Vehicle Counts

108017135

Site: 108017.0.0E

Description: Karawatha Dve east of Golf Links Rd east bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr	18 Apr	1 - 5	1 - 7
Hour									
0000-0100	*	*	*	7	21	23	38	14.0	22.3
0100-0200	*	*	*	7	3	15	17	5.0	10.5
0200-0300	*	*	*	3	3	6	17	3.0	7.3
0300-0400	*	*	*	3	4	2	15	3.5	6.0
0400-0500	*	*	*	27	22	16	16	24.5	20.3
0500-0600	*	*	*	68	80	55	23	74.0	56.5
0600-0700	*	*	*	181	169	124	62	175.0	134.0
0700-0800	*	*	*	519	559	202	129	539.0	352.3
0800-0900	*	*	*	771<	748<	309	181	759.5<	502.3<
0900-1000	*	*	*	358	381	381	289	369.5	352.3
1000-1100	*	*	*	341	426	399<	326	383.5	373.0
1100-1200	*	*	*	316	317	391	355<	316.5	344.8
1200-1300	*	*	*	358	415	428<	350<	386.5	387.8
1300-1400	*	*	*	337	391	389	276	364.0	348.3
1400-1500	*	*	*	547	529<	358	293	538.0	431.8
1500-1600	*	*	*	489	489	353	325	489.0	414.0
1600-1700	*	*	*	567<	524	348	342	545.5<	445.3<
1700-1800	*	*	*	513	471	345	278	492.0	401.8
1800-1900	*	*	*	345	317	243	156	331.0	265.3
1900-2000	*	*	*	198	147	148	99	172.5	148.0
2000-2100	*	*	*	125	131	91	66	128.0	103.3
2100-2200	*	*	*	81	107	78	41	94.0	76.8
2200-2300	*	*	*	42	60	88	23	51.0	53.3
2300-2400	*	*	*	13	35	71	11	24.0	32.5
Totals									
0700-1900	*	*	*	5461	5567	4146	3300	5514.0	4618.5
0600-2200	*	*	*	6046	6121	4587	3568	6083.5	5080.5
0600-0000	*	*	*	6101	6216	4746	3602	6158.5	5166.3
0000-0000	*	*	*	6216	6349	4863	3728	6282.5	5289.0
AM Dools	*	*	*	0000	0000	1000	1100		
AM Peak	*	*	*	0800	0800	1000 399	1100		
	^	^	^	771	748	399	355		

 PM Peak
 *
 *
 *
 1600
 1400
 1200
 1200

 *
 *
 *
 *
 567
 529
 428
 350

* - No data.

108017135

Site: 108017.0.0E

Description: Karawatha Dve east of Golf Links Rd east bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	1 - 5	1 - 7
Hour	_	_		_					
0000-0100	6	7	13	6	10	38	46	8.4	18.0
0100-0200	3	2	2	8	5	10	23	4.0	7.6
0200-0300	5	1	2	3	8	9	16	3.8	6.3
0300-0400	3	3	9	5	4	10	9	4.8	6.1
0400-0500	21	22	17	20	26	24	46	21.2	25.1
0500-0600	74	85	90	78	101	51	40	85.6	74.1
0600-0700	158	191	175	160	163	105	61	169.4	144.7
0700-0800	528	570	594	557	522	190	126	554.2	441.0
0800-0900	727<	773<	778<	798<	728<	299	158	760.8<	608.7<
0900-1000	353	374	363	377	377	360	263	368.8	352.4
1000-1100	396	371	384	393	410	381	324	390.8	379.9
1100-1200	304	297	308	312	340	421<	331<	312.2	330.4
1200-1300	310	347	361	328	377	406<	340<	344.6	352.7
1300-1400	295	337	321	369	385	399	276	341.4	340.3
1400-1500	511	543	544	571<	562<	361	260	546.2	478.9
1500-1600	476	513	549<	496	520	371	270	510.8	456.4
1600-1700	555<	544<	537	546	552	329	310	546.8<	481.9<
1700-1800	470	520	485	523	527	320	241	505.0	440.9
1800-1900	302	294	320	361	336	214	184	322.6	287.3
1900-2000	141	170	168	181	189	122	91	169.8	151.7
2000-2100	106 76	121	111	146	136	78 94	73	124.0	110.1
2100-2200		56 30	68	91	111	94 75	70	80.4	80.9
2200-2300 2300-2400	31 7	39	40 15	47	94	75 48	60	50.2	55.1 26.6
2300-2400	/	17	15	18	55	48	26	22.4	20.0
Totals									
_									
0700-1900	5227	5483	5544	5631	5636	4051	3083	5504.2	4950.7
0600-2200	5708	6021	6066	6209	6235	4450	3378	6047.8	5438.1
0600-0000	5746	6077	6121	6274	6384	4573	3464	6120.4	5519.9
0000-0000	5858	6197	6254	6394	6538	4715	3644	6248.2	5657.1
AM Peak	0800	0800	0800	0800	0800	1100	1100		
	727	773	778	798	728	421	331		
PM Peak	1600	1600	1500	1400	1400	1200	1200		
IM FCGN	555	544	549	571	562	406	340		

^{* -} No data.

108017135

Site: 108017.0.0E

Description: Karawatha Dve east of Golf Links Rd east bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	01 May	02 May	1 - 5	1 - 7
Hour									
0000-0100	13	0	4	9	12	31	34	7.6	14.7
0100-0200	9	0	3	8	5	10	24	5.0	8.4
0200-0300	6	0	4	4	1	6	7	3.0	4.0
0300-0400	5	0	3	6	7	4	7	4.2	4.6
0400-0500	9	0	21	15	21	15	10	13.2	13.0
0500-0600	32	0	78	75	84	55	27	53.8	50.1
0600-0700	92	0	164	165	158	103	74	115.8	108.0
0700-0800	102	0	550	531	469	199	130	330.4	283.0
0800-0900	182	0	772<	788<	734<	352	188	495.2<	430.9<
0900-1000	310	0	433	405	381	363	279	305.8	310.1
1000-1100	358	81	331	367	398	351	336	307.0	317.4
1100-1200	404<	305<	361	316	370	428<	347<	351.2	361.6
1200-1300	341	348	354	370	376	392<	345<	357.8	360.9
1300-1400	363<	355	333	354	383	358	267	357.6	344.7
1400-1500	322	512	535	544	552<	356	314	493.0<	447.9<
1500-1600	260	566<	541	532	489	300	322	477.6	430.0
1600-1700	0	539	588<	554<	542	353	327	444.6	414.7
1700-1800	0	545	533	505	478	356	272	412.2	384.1
1800-1900	0	313	370	368	331	233	171	276.4	255.1
1900-2000	0	171	221	189	191	139	119	154.4	147.1
2000-2100	0	131	135	123	121	115	70	102.0	99.3
2100-2200	0	74	119	88	118	93	63	79.8	79.3
2200-2300	0	45	55	45	71	68	44	43.2	46.9
2300-2400	0	20	16	17	44	47	35	19.4	25.6
Totals									
0700-1900	2642	3564	5701	5634	5503	4041	3298	4608.8	4340.4
0600-2200	2734	3940	6340	6199	6091	4491	3624	5060.8	4774.1
0600-0000	2734	4005	6411	6261	6206	4606	3703	5123.4	4846.6
0000-0000	2808	4005	6524	6378	6336	4727	3812	5210.2	4941.4
AM Peak	1100	1100	0800	0800	0800	1100	1100		
Am reak	404	305	772	788	734	428	347		
	404	300	114	700	/34	140	34/ 		
PM Peak	1300	1500	1600	1600	1400	1200	1200		
	363	566	588	554	552	392	345		

^{* -} No data.

108017135

Site: 108017.0.0E

Description: Karawatha Dve east of Golf Links Rd east bound lane <60> Filter time: 0:00 Thursday, 15 April 2010 => 8:45 Wednesday, 5 May 2010

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
Hour	03 May	04 May	05 May	06 May	07 May	08 <u>May</u>	09 May	1 - 5	1 - 7
0000-0100	15	5	8	*	*	*	*	9.3	9.3
0100-0100	16	5 4	3	*	*	*	*	9.3 7.7	9.3 7.7
0200-0300	8	1	2	*	*	*	*	3.7	3.7
0300-0400	9	2	8	*	*	*	*	6.3	6.3
0400-0500	8	14	16	*	*	*	*	12.7	12.7
0500-0600	21	72	76	*	*	*	*	56.3	56.3
0600-0700	64	168	34	*	*	*	*	88.7	88.7
0700-0800	114	567	0	*	*	*	*	227.0	227.0
0800-0900	201	768<	0	*	*	*	*	323.0	323.0
0900-1000	237	394	*	*	*	*	*	315.5	315.5
1000-1100	281<	419	*	*	*	*	*	350.0<	350.0<
1100-1200	275	331	*	*	*	*	*	303.0	303.0
1200-1300	344<	349	*	*	*	*	*	346.5	346.5
1300-1400	258	369	*	*	*	*	*	313.5	313.5
1400-1500	287	587<	*	*	*	*	*	437.0<	437.0<
1500-1600	273	544	*	*	*	*	*	408.5	408.5
1600-1700	298	561	*	*	*	*	*	429.5	429.5
1700-1800	232	526	*	*	*	*	*	379.0	379.0
1800-1900	148	338	*	*	*	*	*	243.0	243.0
1900-2000	79	142	*	*	*	*	*	110.5	110.5
2000-2100	59	94	*	*	*	*	*	76.5	76.5
2100-2200	37	60	*	*	*	*	*	48.5	48.5
2200-2300	21	33	*	*	*	*	*	27.0	27.0
2300-2400	12	15	*	*	*	*	*	13.5	13.5
Totals _									
0700-1900	2948	5753	*	*	*	*	*	4075.5	4075.5
0600-2200	3187	6217	*	*	*	*	*	4399.7	4399.7
0600-0000	3220	6265	*	*	*	*	*	4440.2	4440.2
0000-0000	3297	6363	*	*	*	*	*	4536.2	4536.2
AM Peak	1000	0800	*	*	*	*	*		
	281	768	*	*	*	*	*		
PM Peak	1200	1400	*	*	*	*	*		
	344	587	*	*	*	*	*		

^{* -} No data.

108016134 -- English (ENA)

Datasets:

Site: [108016] Karawatha Dve west of Golf Links Rd west bound lane <60>

Direction: 4 - West bound, A hit first. **Lane:** 0

Survey Duration: 0:00 Friday, 11 March 2011 => 10:41 Thursday, 24 March 2011

Zone:

File: Karawatha Dve 108016-110324.EC0 (Plus)

Identifier: S773CMSX MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default (v3.21 - 15275)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Friday, 11 March 2011 => 10:41 Thursday, 24 March 2011

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Default Profile

Scheme: Vehicle classification (AustRoads94)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 54410 / 54473 (99.88%)

Weekly Vehicle Counts

108016134

Site: 108016.0.0W

Description: Karawatha Dve west of Golf Links Rd west bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:41 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	<u>Sun</u>	Average	s
	07 Mar	08 Mar	09 Mar	10 Mar	11 Mar	12 Mar	13 Mar	1 - 5	1 - 7
Hour									
0000-0100	*	*	*	*	9	32	40	9.0	27.0
0100-0200	*	*	*	*	7	11	16	7.0	11.3
0200-0300	*	*	*	*	0	7	15	0.0	7.3
0300-0400	*	*	*	*	3	7	13	3.0	7.7
0400-0500	*	*	*	*	15	12	13	15.0	13.3
0500-0600	*	*	*	*	51	27	9	51.0	29.0
0600-0700	*	*	*	*	118	68	49	118.0	78.3
0700-0800	*	*	*	*	297	165	95	297.0	185.7
0800-0900	*	*	*	*	381<	259	167	381.0<	269.0
0900-1000	*	*	*	*	315	303	255	315.0	291.0
1000-1100	*	*	*	*	303	354	303	303.0	320.0
1100-1200	*	*	*	*	289	383<	332<	289.0	334.7<
1200-1300	*	*	*	*	293	383<	327	293.0	334.3
1300-1400	*	*	*	*	359	363	268	359.0	330.0
1400-1500	*	*	*	*	457	370	319	457.0	382.0
1500-1600	*	*	*	*	537<	364	357<	537.0<	419.3<
1600-1700	*	*	*	*	535	364	346	535.0	415.0
1700-1800	*	*	*	*	514	360	317	514.0	397.0
1800-1900	*	*	*	*	330	222	154	330.0	235.3
1900-2000	*	*	*	*	188	132	105	188.0	141.7
2000-2100	*	*	*	*	127	102	90	127.0	106.3
2100-2200	*	*	*	*	114	91	49	114.0	84.7
2200-2300	*	*	*	*	55	77	23	55.0	51.7
2300-2400	*	*	*	*	55	44	11	55.0	36.7
Totals									
			*		4.5.1.0	2000	2040	4610.0	2012 2
0700-1900	*	*	*	*	4610	3890	3240	4610.0	3913.3
0600-2200	*	*	*	*	5157	4283	3533	5157.0	4324.3
0600-0000	*			*	5267	4404	3567	5267.0	4412.7
0000-0000	*	*	*	*	5352	4500	3673	5352.0	4508.3
AM Dools	*	*	*	*	0000	1100	1100		
AM Peak	*	*	*	*	0800	1100	1100		
	*	*	*	*	381	383	332		

 PM Peak
 *
 *
 *
 *
 1500
 1200
 1500

 *
 *
 *
 *
 *
 537
 383
 357

* - No data.

Weekly Vehicle Counts

108016134

Site: 108016.0.0W

Description: Karawatha Dve west of Golf Links Rd west bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:41 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	14 Mar	15 Mar	16 Mar	17 Mar	18 Mar	19 Mar	20 Mar	1 - 5	1 - 7
Hour	_	_	_		_		_		
0000-0100	8	8	9	12	0	33	34	7.4	14.9
0100-0200	4	3	5	9	0	11	22	4.2	7.7
0200-0300	1	1	4	3	0	8	11	1.8	4.0
0300-0400	3	2	8	2	0	7	15	3.0	5.3
0400-0500	16	19	16	12	3	6	3	13.2	10.7
0500-0600	54	52	53	64	8	14	20	46.2	37.9
0600-0700	106	148	121	133	17	66	46	105.0	91.0
0700-0800	302	334	322	311	34	145	81	260.6	218.4
0800-0900	367<	391<	412<	394<	19	223	127	316.6<	276.1<
0900-1000	281	288	271	260	21	289	189	224.2	228.4
1000-1100	292	301	313	324	24	352	270	250.8	268.0
1100-1200	270	266	288	291	97<	414<	306<	242.4	276.0
1200-1300	234	298	304	152<	318	405<	316	261.2	289.6
1300-1400	325	313	328	17	345	338	297	265.6	280.4
1400-1500	356	371	350	26	428	361	290	306.2	311.7
1500-1600	450	492	484	18	486	338	303	386.0	367.3
1600-1700	544	566<	585<	32	554<	324	364<	456.2<	424.1<
1700-1800	546<	521	563	19	495	339	295	428.8	396.9
1800-1900	305	378	403	14	322	195	141	284.4	251.1
1900-2000	161	178	208	4	198	116	102	149.8	138.1
2000-2100	113	132	145	3	134	91	63	105.4	97.3
2100-2200	70	94	83	1	100	80	40	69.6	66.9
2200-2300	39	36	40	3	61	66	24	35.8	38.4
2300-2400	14	13	16	0	45	50	17	17.6	22.1
m-+-1-									
Totals _									
0700-1900	4272	4519	4623	1858	3143	3723	2979	3683.0	3588.1
0600-2200	4722	5071	5180	1999	3592	4076	3230	4112.8	3981.4
0600-0000	4775	5120	5236	2002	3698	4192	3271	4166.2	4042.0
0000-0000	4861	5205	5331	2104	3709	4271	3376	4242.0	4122.4
	0000	0000	0000	0000	1100	1100	1100		
AM Peak	0800	0800	0800	0800	1100	1100	1100		
	367	391	412	394	97	414	306		
PM Peak	1700	1600	1600	1200	1600	1200	1600		
	546	566	585	152	554	405	364		

^{* -} No data.

Weekly Vehicle Counts

108016134

Site: 108016.0.0W

Description: Karawatha Dve west of Golf Links Rd west bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:41 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	21 Mar	22 Mar	23 Mar	24 Mar	25 Mar	26 Mar	27 Mar	1 - 5	1 - 7
Hour	0	0	_	11	*	*	*		4 0
0000-0100	2	0	6	11	*	*	*	4.8	4.8
0100-0200	7	0	5	2	*	*	*	3.5	3.5
0200-0300	1 1	0	6	3	*	*	*	2.5	2.5
0300-0400	_	0	8	2	*	*	*	2.8	2.8
0400-0500	14	0	12	10	*	*	*	9.0	9.0
0500-0600	55	17 46	43	73	*	*	*	47.0	47.0
0600-0700	120	30	112	23	*	*	*	75.3	75.3
0700-0800	307 345<	30 49	338 381<	0	*	*	*	168.8 193.8	168.8 193.8
0800-0900 0900-1000	3 45< 267	270	290	0	*	*	*	193.8	206.8
	304	270 289 <		0	*	*	*		206.8
1000-1100 1100-1200	304 278	289< 270	291 280	· *	*	*	*	221.0 276.0 <	271.0 276.0<
1200-1200	278 290<	270	280 305	*	*	*	*	276.0	276.0
1300-1300	290< 190	290 307	305	*	*	*	*	295.0	295.0 271.3
1400-1500	190	307	362	*	*	*	*	271.3	271.3
1500-1600	28	309 455	36∠ 501	*	*	*	*	229.3 328.0	328.0
1600-1600	28 25	455 547	600<	*	*	*	*	328.0 3 90.7 <	328.0 390.7 <
1700-1700	25 15	578<	549	*	*	*	*	390.7	380.7
1800-1900	16	354	381	*	*	*	*	250.3	250.3
1900-1900	10	206	234	*	*	*	*	150.0	150.0
2000-2100	2	132	234 147	*	*	*	*	150.0 93.7	93.7
2100-2100	11	83	77	*	*	*	*	93.7 57.0	93.7 57.0
2200-2300	2	38	39	*	*	*	*	37.0 26.3	26.3
2300-2400	2	20	21	*	*	*	*	14.3	14.3
2300-2400	2	20	21					T#.2	14.3
Totals _									
0700-1900	2082	3748	4595	*	*	*	*	 3211.6	3211.6
0600-2200	2225	4215	5165	*	*	*	*	3587.5	3587.5
0600-0000	2229	4273	5225	*	*	*	*	3628.2	3628.2
0000-0000	2309	4290	5305	*	*	*	*	3697.7	3697.7
AM Peak	0800	1000	0800	*	*	*	*		
	345	289	381	*	*	*	*		
PM Peak	1200	1700	1600	*	*	*	*		
	290	578	600	*	*	*	*		

^{* -} No data.

108015132 -- English (ENA)

Datasets:

Site: [108015] Karawatha Dve west of Golf Links Rd east bound lane <60>

Direction: 2 - East bound, A hit first. **Lane:** 0

Survey Duration: 0:00 Friday, 11 March 2011 => 10:46 Thursday, 24 March 2011

Zone:

File: Karawatha Dve 108015-110324.EC0 (Plus)

Identifier: CT47CCKC MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default (v3.21 - 15275)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Friday, 11 March 2011 => 10:46 Thursday, 24 March 2011

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway) **Name:** Default Profile

Scheme: Vehicle classification (AustRoads94)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 65165 / 65245 (99.88%)

Weekly Vehicle Counts

108015132

Site: 108015.0.0E

Description: Karawatha Dve west of Golf Links Rd east bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:46 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	07 Mar	08 Mar	09 Mar	10 Mar	11 Mar	12 Mar	13 Mar	1 - 5	1 - 7
Hour									
0000-0100	*	*	*	*	8	17	28	8.0	17.7
0100-0200	*	*	*	*	1	7	15	1.0	7.7
0200-0300	*	*	*	*	0	7	13	0.0	6.7
0300-0400	*	*	*	*	6	6	9	6.0	7.0
0400-0500	*	*	*	*	18	15	17	18.0	16.7
0500-0600	*	*	*	*	102	54	41	102.0	65.7
0600-0700	*	*	*	*	159	134	98	159.0	130.3
0700-0800	*	*	*	*	419	223	133	419.0	258.3
0800-0900	*	*	*	*	726<	312	234	726.0<	424.0<
0900-1000	*	*	*	*	383	393	311	383.0	362.3
1000-1100	*	*	*	*	313	427<	380<	313.0	373.3
1100-1200	*	*	*	*	289	418	347	289.0	351.3
1200-1300	*	*	*	*	312	346<	339<	312.0	332.3
1300-1400	*	*	*	*	316	322	290	316.0	309.3
1400-1500	*	*	*	*	432	330	300	432.0	354.0
1500-1600	*	*	*	*	501<	311	304	501.0<	372.0<
1600-1700	*	*	*	*	494	323	282	494.0	366.3
1700-1800	*	*	*	*	411	292	237	411.0	313.3
1800-1900	*	*	*	*	302	203	144	302.0	216.3
1900-2000	*	*	*	*	150	115	91	150.0	118.7
2000-2100	*	*	*	*	113	100	60	113.0	91.0
2100-2200	*	*	*	*	83	73	43	83.0	66.3
2200-2300	*	*	*	*	40	69	22	40.0	43.7
2300-2400	*	*	*	*	42	44	7	42.0	31.0
Totals _									
0700-1900	*	*	*	*	4898	3900	3301	4898.0	4033.0
0600-2200	*	*	*	*	5403	4322	3593	5403.0	4439.3
0600-0000	*	*	*	*	5485	4435	3622	5485.0	4514.0
0000-0000	*	*	*	*	5620	4541	3745	5620.0	4635.3
AM Peak	*	*	*	*	0800	1000	1000		
	*	*	*	*	726	427	380		

 PM Peak
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 *
 *
 1500
 1200
 1200

 *
 *
 *
 *
 *
 501
 346
 339

* - No data.

Weekly Vehicle Counts

108015132

Site: 108015.0.0E

Description: Karawatha Dve west of Golf Links Rd east bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:46 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
***	14 Mar	15 Mar	16 Mar	17 Mar	18 Mar	19 Mar	20 Mar	1 - 5	1 - 7
Hour	1.1	7	0	4	0	2.2	37 l	7 0	141
0000-0100	11	7	9	4	8	23	- 1	7.8	14.1
0100-0200 0200-0300	0	2 2	0 0	2 3	3 5	9	21	1.4	5.3
	1 3	3	10		5 5	5 10	8 13	2.2	3.4
0300-0400 0400-0500	23	23	18	3 25	22	15	13	4.8	6.7
0500-0500	23 85	23 96	94	133	95	58	24	22.2 100.6	19.9 83.6
0600-0600	85 173	220	94 191	207	200	123	63 l	198.2	168.1
0700-0700	173 424	444	460	436	200 416	209	88 88	436.0	353.9
0800-0900	642<	651<	674<	721<	657<	310	214	669.0<	552.7<
0900-1000	335	322	355	384	393	375	214	357.8	351.1
1000-1100	307	335	333	337	342	382	335<	337.8	338.7
1100-1100	256	335 275	333 306	337 297	266	386<	311	280.0	299.6
1200-1300	260	275	300	282	300	366<	295	286.2	299.6
1300-1400	256	273	302	303	346	338	271	296.6	298.9
1400-1500	382	389	395	415	431	329	271	402.4	373.9
1500-1600	444	471<	441	484	492	288	302	466.4	417.4
1600-1700	449<	469	484<	484<	492	282	314<	477.0<	425.9<
1700-1800	382	469	465	470	386	258	231	434.4	380.1
1800-1900	249	265	313	301	286	186	133	282.8	247.6
1900-1900	133	144	168	191	176	117	72	162.4	143.0
2000-2100	89	148	110	107	110	73	60 l	112.8	99.6
2100-2200	55	49	73	59	82	74	29	63.6	60.1
2200-2300	30	29	26	28	52	60	22	33.0	35.3
2300-2400	15	9	7	21	39	36	9	18.2	19.4
2500 2100	13	,	,	21	3,5	30	, , , , , , , , , , , , , , , , , , ,	10.2	10.1
Totals _									
0700-1900	4386	4650	4833	4914	4814	3709	3064	4719.4	4338.6
0600-2200	4836	5211	5375	5478	5382	4096	3288	5256.4	4809.4
0600-0000	4881	5249	5408	5527	5473	4192	3319	5307.6	4864.1
0000-0000	5004	5382	5539	5697	5611	4312	3435	5446.6	4997.1
AM Peak	0800	0800	0800	0800	0800	1100	1000		
	642	651	674	721	657	386	335		
PM Peak	1600	1500	1600	1600	1600	1200	1600		
	449	471	484	484	499	366	314		

^{* -} No data.

Weekly Vehicle Counts

108015132

Site: 108015.0.0E

Description: Karawatha Dve west of Golf Links Rd east bound lane <60> Filter time: 0:00 Friday, 11 March 2011 => 10:46 Thursday, 24 March 2011

Scheme: Vehicle classification (AustRoads94)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
***	21 Mar	22 Mar	23 Mar	24 Mar	25 Mar	26 Mar	27 Mar	1 - 5	1 - 7
Hour	0	_	-	1.1	*	*	*		6 3
0000-0100	2	5	7	11	*	*	*	6.3	6.3
0100-0200	3	2	3	3	*	*	*	2.8	2.8
0200-0300	0	0 2	1	3	*	*	*	1.0	1.0
0300-0400	4		4	1	*	*	*	2.8	2.8
0400-0500	19	19	24	21	*	*	*	20.8	20.8
0500-0600	95	109	103	136	*	*	*	110.8	110.8
0600-0700	180	229	186	83	*	*	*	169.5	169.5
0700-0800	418	474	454	0	*	*	*	336.5	336.5
0800-0900	665		643<	0	*	*	*	500.8<	500.8<
0900-1000	324	356	358	0	*	*	*	259.5	259.5
1000-1100	291	304	342	0	*	*	*	234.3	234.3
1100-1200	274	268	298	*	*	*	*	280.0	280.0
1200-1300	256 270	275 290	300 271	*	*	*	*	277.0	277.0
1300-1400				*	*	*	*	277.0	277.0
1400-1500	387	386	375	*	*	*	*	382.7	382.7
1500-1600	437		480	*	*	*	*	459.0	459.0
1600-1700	415	473<	528<	*	*	*	*	472.0<	472.0<
1700-1800	415	438	460	*	*	*	*	437.7	437.7
1800-1900	241	296	283	*	*	*	*	273.3	273.3
1900-2000	149	151	165	*	*	*	*	155.0	155.0
2000-2100	91	117	106	*	*	*	*	104.7	104.7
2100-2200	61	62	81	*	*	*	*	68.0	68.0
2200-2300	21	33	35	*	*	*	*	29.7	29.7
2300-2400	20	19	13	*	*	*	*	17.3	17.3
Totals _									
0700-1900	4393	4715	4792	*	*	*	*	4189.7	4189.7
0600-2200	4874	5274	5330	*	*	*	*	4686.8	4686.8
0600-0000	4915	5326	5378	*	*	*	*	4733.8	4733.8
0000-0000	5038	5463	5520	*	*	*	*	4878.1	4878.1
AM Peak	0800	0800	0800	*	*	*	*		
	665	695	643	*	*	*	*		
PM Peak	1500	1600	1600	*	*	*	*		
	437	473	528	*	*	*	*		

^{* -} No data.

		Volume Clas	ssified Count	sheet								_	
LOCATION: DATE:	PRELUDE I	DR / GLENFIEL 29/07/08	LDS DR					PRELUDE DR		7		RD 150A OFF RA	MP
WEATHER:	FINE	25,01,00									ļ		
COUNTER	I				ı /	N		I		GLENFIELDS DR			I
ROAD	 	PREL	UDE DR			GLENFI	ELDS DR			RD 150A	OFF RAMP		 TOTAL
1/4 hr ENDING	┆ ⇔	7	\triangleright	PEDS	¦ <=	F	P	PEDS I	厂	\Leftrightarrow	٨	PEDS	TRAFFIC 1/4 hr
	+				+				·				+
6:45 am	0	7	0	0	61	0	0	0	1	9	0	0	78
7:00 am 7:15 am	0 0	15 18	0	0	64 56	0	0	0 0	4 1	13 26	0	0 0	96 101
7:30 am	i 0	34	0	0	I 70	0	0	0 1	3	22	0	0	129
7:45 am	i ö	10	ő	ő	83	Ö	ő	ŏi	3	19	Ö	ő	1115
8:00 am	0	21	0	0	131	0	0	0	5	59	0	0	216
8:15 am	0	24	0	0	128	0	0	0	4	51	0	0	207
8:30 am	0	22	0	0	172	0	0	0 [2	57	0	0	253
8:45 am	0	30	0	0	87	0	0	0	7	36	0	0	160
9:00 am	0	45	3	0	66	0	0	0	6	35	0	0	155
9:15 am 9:30 am	0 0	27 30	0	0 0	55 43	0 0	0	0 0	8 2	20 18	0	0	110 93
9:45 am	U 0	30 45	0	0	43 49	0	0	0 1	3	13	0	0	1110
10:00 am) 0 0	31	0	0	57	Ö	0	0 1	9	19	0	Ö	116
10:15 am	i ŏ	32	ő	Ö	44	Ö	ő	ŏi	3	20	Ö	Ö	99
10:30 am	0	31	2	0	40	0	1	0	6	25	0	0	105
10:45 am	0	22	0	0	39	0	0	0	7	27	0	0	95
11:00 am	0	29	0	0	51	0	0	0	8	14	0	0	102
11:15 am	0	22	0	0	22	0	0	0	17	14	0	0	75
11:30 am	0	32	0	0	42	0	0	0	5	20	0	0	99
11:45 am	0 0	28 24	0 1	0 0	35 28	0 0	0	0 0	4 6	13 18	0 0	0	80
12:00 pm 12:15 pm	U 0	24	0	0	l 28	0	0	0	6	11	0	0	77 71
12:30 pm) 0 0	25	1	0	29	Ö	0	0	4	18	0	0	77
12:45 pm	i ŏ	17	Ö	Ö	26	Ö	Ö	ő	6	11	ő	Ö	60
13:00 pm	0	42	0	0	48	0	0	0	5	17	0	0	112
13:15 pm	0	53	1	0	j 44	0	0	0	9	26	0	0	133
13:30 pm	0	44	0	0	37	0	1	0	10	12	0	0	104
13:45 pm	0	44	0	0	33	0	0	0	3	19	0	0	99
14:00 pm	0 0	42 42	3 4	0 0	51 52	0	0	0 0	4 9	22 20	0	0	122
14:15 pm 14:30 pm	U 0	32	2	0	52 47	0	0	0 1	8	39	0	0	127 128
14:45 pm)	45	0	0	69	0	0	0	6	29	0	0	149
15:00 pm	i ŏ	81	2	Ö	67	ő	ő	ŏi	15	32	Ö	ő	1 197
15:15 pm	0	101	5	Ō	60	Ō	1	o i	10	23	0	Ö	200
15:30 pm	0	67	1	0	43	0	0	0 j	16	44	0	0	171
15:45 pm	0	55	1	0	61	0	0	0	17	38	0	0	172
16:00 pm	0	74	0	0	70	0	0	0 [22	47	0	0	213
16:15 pm 16:30 pm	0	76 89	2	0	42 66	0	0	0	17 18	24 44	0	0	161 218
16:45 pm	0	74	0	0	i 64	0	0	0 1	18	47	0	0	203
17:00 pm	0	85	1	Ö	54	0	0	0 1	29	42	0	0	211
17:15 pm	0	88	2	0	43	0	0	0	27	50	0	0	210
17:30 pm	0	147	3	0	68	0	0	o j	31	56	0	0	305
17:45 pm	0	130	0	0	44	0	0	0	17	64	0	0	255
18:00 pm	0	97	1	0	65	0	0	0	16	39	0	0	218
18:15 pm	0	58	1	0	42	0	0	0 [18	26	0	0	145
18:30 pm	0	58	0	0	56	0	0	0	16	26	0	0	156
					l +								l +
TOTALS	0	2269	37	0	2734	0	3	0	471	1374	0	0	
%Truck/Bus	0.0	1.9			1.8	0.0			1.3	2.5			[[
%Articulated	0.0	0.0			0.0	0.0			0.0	2.4			į
, and tioulated	0.0	0.0			0.0	0.0			0.0	2.4			i

Sidra Input												
AM PEAK:	0	97	0	0	518	0	0	0	18	203	0	0
PM PEAK:	0	462	6	0	220	0	0	0	91	209	0	0

0.0

0.0

0.0

0.0

%Road Train

COMMENTS:

0.0

0.0

Volume Classified Count sheet LOCATION: DATE: PRELUDE DR / RD 150A ON RAMP Tuesday FINE 29/07/08 WEATHER: COUNTER PRELUDE DR TOTAL TRAFFIC ROAD RD 150A ON RAMP PRELUDE Ł 仁 J \bigcirc \Leftrightarrow \triangleleft 虏 P \Rightarrow ENDING PEDS PEDS PEDS 1/4 hr 44 41 80 88 77 121 29 35 31 71 78 79 145 153 10 14 19 154 168 0 0 0 0 0 7:00 am 7:15 am 209 309 297 364 7:15 am 7:30 am 7:45 am 8:00 am 8:15 am 8:30 am 8:45 am 174 223 233 377 472 405 105 146 26 40 34 98 72 48 40 37 44 57 51 32 29 33 45 33 45 36 38 54 54 64 81 76 54 58 9:00 am 9:15 am 9:30 am 9:45 am 325 217 212 214 175 93 107 111 121 116 124 115 99 100 92 62 84 74 104 93 109 87 93 104 83 105 118 148 148 152 131 9:45 am 10:00 am 10:15 am 10:30 am 10:45 am 11:00 am 225 227 232 212 193 11:00 am 11:15 am 11:30 am 11:45 am 12:00 pm 12:15 pm 12:30 pm 12:30 pm 183 187 140 178 158 196 220 256 194 192 227 199 13:00 pm 13:15 pm 13:15 pm 13:45 pm 14:00 pm 14:15 pm 14:30 pm 14:45 pm 15:00 pm 15:15 pm 15:30 pm 15:45 pm 16:15 pm 16:15 pm 16:30 pm 228 270 330 324 290 313 317 407 343 82 90 81 83 65 70 92 89 66 48 69 28 32 38 36 38 0 0 0 0 0 0 126 188 135

313 281 319

342 318 285

246 234

0

120

105 70

5623

3.0

0.2

0.0

63 67

2379

2.2

0.0

0.0

COMMENTS:

16:30 pm 16:45 pm 17:00 pm 17:15 pm 17:30 pm 17:45 pm 18:00 pm

18:15 pm 18:30 pm

TOTALS

%Truck/Bus

%Articulated

%Road Train

30 28

1516

2.2

0.0

0.0

2982

2.3

1.2

0.0

0

0

0

0.0

0.0

0.0

Sidra Input 470 336 781 596 AM PEAK: PM PEAK: 258 134 109 314

0.0

0.0

0.0

		Volume	Classified	Count s	neet											LADY	MUSGRAV	E DRIVE			
LOCATION: DATE: WEATHER:		/ATHA DI y 21/10	RIVE / PRE	LUDE DR	NE									KARAWAT	HA DRIVE				KAR AWA	п	
	PINE				~	,										Pi	RELUDE D	RIVE			
COUNTER						N 					 					 					
ROAD 1/4 hr			AWATHA I			 .		LUDE DI	_		l I	KARI	AWATHA I			l In		MUSGRAVI	_		Total Traff
ENDING	<u></u>			\$	PEDS	;	Î		(P)	PEDS	; F		<u></u>	<u>e</u>	PEDS	¦ 🖺	Û	- (1		PEDS	1/4 h
6:15 am	1	7	34	0	2	 5	1	17	0	0	 30	15	5	0	0	 0	2	0	0	0	1117
6:30 am 6:45 am	2	16 21	30 50	0	1	13 12	6 7	11 31	0	0	20	14 32	5 12	0	0	1 3	4 5	0	0	0	122
7:00 am	5	25	57	0	0	1 12	20	23	0	0	45	37	30	0	0	9	7	2	0	0	272
7:15 am	4	22	41	0	2	6	38	18	0	0	38	40	43	0	0	0	28	0	0		278
7:30 am 7:45 am	3 2	25 21	73 71	0	0 2	10	51 26	10 21	0	0	42 50	40 51	87 30	0	0	6 2	76 44	5 4	0	0	428 346
8:00 am	4	29	102	0	0	23	30	26	o	ő	55	47	37	o	o	2	16	2	0	o	373
8:15 am 8:30 am	19 7	46 45	134 138	0	0	36	44 83	59 71	0	0	63 30	57 77	56 87	0	0	7 16	22 42	3	0	0	546 630
8:45 am	10	40	101	0	0	1 15	54	31	0	0	48	54	57	0	0	1 17	89	20	0	1	536
9:00 am	12	21	114	2	0	22	33	23	0	0	44	51	37	0	0	9	58	5	0	0	431
9:15 am 9:30 am	4 0	17 11	65 62	0	0	14 15	14 13	5 8	0	0	32 53	35 38	19 13	0	0	1 3	36 17	11 6	0	0	253
9:45 am	3	5	60	0	4	114	4	13	0	0	62	52	12	0	0	3	21	3	0	0	253
10:00 am	2	21	63	0	10	26	18	9	0	0		62	28	0	0	1	22	3	0		296
10:15 am 10:30 am	2	13 18	72 66	0	3	3 10	29 22	8	0	0	45 30	60 74	24 34	0	0	7 11	50 61	5 14	0	1	318
10:45 am	4	12	63	0	1	15	9	10	o	0	38	74	13	o	o	6	17	2	o	o	263
11:00 am	0	13	78	1	0	12	9	14	0	0	39	68	10	0	0	4	10	4	0	0	262
11:15 am 11:30 am	1 6	11	48 38	0	0	17 15	4	10 11	0	0	44 36	44 47	13 9	0	0	0	19 8	4 0	0	•	215
11:45 am	2	10	64	0	ó	7	11	7	0	o	50	43	13	0	o	7	16	4	o		234
12:00 pm	2	7	49	1	0	16	4	5	0	0	52	56	7	1	0	4	11	5	0	0	220
12:15 pm 12:30 pm	2	13 21	57 71	0	0 1	19 2	24 11	16 10	0	0	27 36	62 58	12 23	0	0	3 1	28 24	2	0	0	265
12:45 pm	3	9	35	ō	Ó	4	8	13	ō	0	41	46	15	0	ō	8	11	1	ō	0	194
13:00 pm	2	12	70	0	0	13	14	15	0	0	33	70	48	0	0	5 I 6	13	2	0		297
13:15 pm 13:30 pm	1	11 18	63 42	0	2	14 13	13 7	13 7	0	0	38 56	53 47	34 14	0	0	1 0	72 20	8	0	0	327
13:45 pm	2	11	48	ō	0	18	4	12	0	0	56	40	17	0	ō	5	28	3	0	0	244
14:00 pm	4	20 11	57 66	0	0	13 18	8 11	12 13	0	0	66 50	64 69	17 18	0	0	5 2	22 32	1	0	0	289
14:15 pm 14:30 pm	5	9	57	0	0	18	18	7	0	0	50 49	81	39	1	0	2	13	1	0		298
14:45 pm	7	14	81	0	0	11	36	23	0	0	50	79	54	0	0	7	36	7	0	-	405
15:00 pm 15:15 pm	10	33 29	112 85	0	3	18 22	37 11	24 28	0	0	48 74	83 70	32 14	0	0	21	75 64	6 5	0	1	499 414
15:30 pm	4	18	84	1	0	28	20	17	0	0	72	65	19	0	0	7	19	2	0		356
15:45 pm	1	19	75	1	2	33	9	20	0	0	73	90	30	2	0	5	25	1	0	0	384
16:00 pm 16:15 pm	5 11	21 30	82 127	0	0	31	19 47	15 16	0	0	54 65	87 93	30 56	0	0	14 15	43 60	6 11	0	0	407 557
16:30 pm	5	19	106	0	10	28	24	9	0	0	81	112	34	0	0	17	97	6	0	3	538
16:45 pm	1 4	26	97	0	0	36	16	19	0	0	57	101	21	0	0	16	44	5	0		439
17:00 pm 17:15 pm	1	24 20	112 78	0	1	34	30 5	24 18	0	0	108	111 110	19 28	0	0	15 7	43 22	4 5	0	0	529 439
17:30 pm	3	28	95	1	1	37	14	28	0	0	113	105	18	0	0	5	29	7	0	0	483
17:45 pm 18:00 pm	1 4	21 15	84 71	0 1	1 0	29 29	12 18	14 13	0	0	108 91	86 75	20 29	1 0	0	3	18 11	4 6	0		401 365
 + ALS	181	919	3528	9	57	 913	950	836		0	 2571	3025	1322	9	0	+ 304	1530	205		9	 +
ck/Bus I	1.7	1.4	2.9	1		2.4	1.7	2.9	•	·	3.0	2.8	2.3		Ĭ	1.6	3.3	3.4	•	-	İ
iculated	0.6	0.1	0.1			0.6	0.1	4.0			0.1	0.1	0.0			0.0	0.0	0.0			i I
ad Train	0.0	0.0	0.0			0.0	0.0	0.0			0.0	0.0	0.0			0.0	0.0	0.0			İ
COMMENTS:																					
ra Input																					
EAK:	48	152 99	487 442	2	0	105	214 117	184	0	0	185	239	237	0	0	49	211	30	0	3	

CLASSIFIED TRAFFIC COUNT - 3 WAY INTERSECTION

Mountain Ash Dr

Berrigan Pl

Location: Mountain Creek

Day and Date: Thursday, 21 July 2011

Intersecting Roads: Mountain Ash Dr / Berrigan PI

Weather: Fine

Time: 8:00pm - 9:00am

Recorded By: Anthony Fichera / Andrew Fichera

	N	<i>I</i> 11	N	12	N	/ 13	N	14	N	<i>I</i> 15	N	<i>1</i> 6
					Į Į							- -
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	23	0	0	0	0	0	4	0	1	0	9	0
8:15 - 8:30am	43	2	0	0	0	0	8	0	1	0	10	0
8:30 - 8:45am	42	0	0	0	0	0	7	0	1	0	13	0
8:45 - 9:00am	30	0	0	0	0	0	5	0	1	0	12	0
Totals	138	2	0	0	0	0	24	0	4	0	44	0
Total Vehicles	1	40		0		0	2	24		4	2	14
% HV	1	%	0	%	0	%	0	%	0	1%	0	%
MAXIMUM QUEUE LENGTH (veh)			0				1				0	

CLASSIFIED TRAFFIC COUNT - 3 WAY INTERSECTION

Mountain Ash Dr

Berrigan Pl

Location:

Thursday, 21 July 2011

Mountain Creek

Day and Date: Intersecting Roads:

Mountain Ash Dr / Berrigan Pl

Weather: Fine

Time: 4:00pm - 5:00pm

Recorded By: Anthony Fichera / Andrew Fichera

	N	Л1	N	Л2	N	/ 13	N	Л4	P	M5	N	<i>1</i> 6
		<u>L</u>			K			<u> </u>			1	
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
4:00 - 4:15pm	10	0	0	0	0	0	1	0	2	0	20	0
4:15 - 4:30pm	11	0	0	0	0	0	1	0	1	0	23	0
4:30 - 4:45pm	7	0	0	0	0	0	1	0	1	0	19	0
4:45 - 5:00pm	14	0	0	0	0	0	3	0	2	0	35	0
Totals	42	0	0	0	0	0	6	0	6	0	97	0
Total Vehicles		4 2		0		0		6		6	9	97
% HV	0)%	0	1%	0	%	0	1%	()%	0	1%
MAXIMUM QUEUE LENGTH (veh)			0		·		1		· ————		0	

Glenfields Blvd Glenfields Blvd Glenfields Blvd Glenfields Blvd

MAXIMUM QUEUE LENGTH (veh)

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Thursday, 21 July 2011

Intersecting Roads: Glenfields Blvd / Mountain Ash Dr / Birch St

Weather: Fine

Time: 8:00am - 9:00am

Recorded By: Anthony Fichera / Andrew Fichera

Note: 15-min survey factored to an hour using observed data from upstream intersections

0

				_							- t	
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	0	0	0	0	26	0	10	0	10	1	2	0
8:15 - 8:30am	1	0	0	0	50	2	11	0	11	1	2	0
8:30 - 8:45am	0	0	0	0	48	0	14	0	14	2	2	0
8:45 - 9:00am	0	0	0	0	37	0	10	0	10	1	2	0
Totals	1	0	0	0	161	2	45	0	45	5	8	0
Total Vehicles		1		0	,	163		1 5		50		8
%HV	()%	0	%		1%	()%	1	0%		0%

Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	5	0	0	0	0	0	0	0	30	2	0	0
8:15 - 8:30am	6	0	0	0	0	0	1	0	57	4	0	0
8:30 - 8:45am	6	0	0	0	0	0	1	0	54	1	1	0
8:45 - 9:00am	5	0	1	0	0	0	0	0	58	1	1	0
Totals	22	0	1	0	0	0	2	0	199	8	2	0
Total Vehicles		22		1		0		2	2	207		2
%HV		0%	C)%		0%		0%		4%		0%

Glenfields Blvd Glenfields Blvd Glenfields Blvd

MAXIMUM QUEUE LENGTH (veh)

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Thursday, 21 July 2011

Intersecting Roads: Glenfields Blvd / Mountain Ash Dr / Birch St

Weather: Fine

Time: 4:00pm - 5:00pm

Recorded By: Anthony Fichera / Andrew Fichera

Note: 15-min survey factored to an hour using observed data from upstream intersections

	1		 	_							<u></u>	
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
4:00 - 4:15pm	0	0	0	0	10	0	20	0	50	2	3	0
4:15 - 4:30pm	0	0	0	0	13	0	24	0	56	3	4	0
4:30 - 4:45pm	0	0	0	0	8	0	19	0	45	1	3	0
4:45 - 5:00pm	0	0	0	0	17	0	35	0	85	3	5	0
Totals	0	0	0	0	48	0	98	0	236	9	15	0
Total Vehicles		0		0		48	,	98	2	245		15
%HV	(0%	0	%	(0%	()%	4	1%		0%

Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
4:00 - 4:15pm	1	0	0	0	0	0	0	0	30	1	1	0
4:15 - 4:30pm	2	0	0	0	0	0	0	0	34	1	1	0
4:30 - 4:45pm	1	0	0	0	1	0	0	0	21	2	1	0
4:45 - 5:00pm	1	0	0	0	0	0	0	0	45	2	2	0
Totals	5	0	0	0	1	0	0	0	130	6	5	0
Total Vehicles	* *			0		1		0		136		5
%HV		0%	()%		0%		0%		4%	C)%

Glenfields Blvd Glenfields Blvd Glenfields Blvd

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Thursday, 21 July 2011

Intersecting Roads: Glenfields Blvd / Parklea Esp / Greenway Pl

Weather: Fine

Time: 8:00pm - 9:00am

Recorded By: Anthony Fichera / Andrew Fichera

							t					
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	0	0	0	0	5	0	3	0	21	1	7	0
8:15 - 8:30am	0	0	0	0	5	0	3	0	22	1	7	0
8:30 - 8:45am	0	0	0	0	5	0	2	0	28	2	7	0
8:45 - 9:00am	0	0	0	0	3	0	3	0	25	1	7	0
Totals	0	0	0	0	18	0	11	0	96	5	28	0
Total Vehicles		0		0		18		11		101		28
%HV		0%	()%		0%		0%		5%		0%

								<u> </u>				
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	14	0	0	0	1	0	1	0	58	2	0	0
8:15 - 8:30am	10	0	0	0	2	0	1	0	112	6	0	0
8:30 - 8:45am	15	0	0	0	2	0	1	0	107	1	0	0
8:45 - 9:00am	10	0	0	0	1	0	1	0	100	1	0	0
Totals	49	0	0	0	6	0	4	0	377	10	0	0
Total Vehicles		49		0		6		4	3	387		0
%HV		0%		0%		0%		0%	;	3%	()%

Glenfields Blvd Glenfields Blvd Glenfields Blvd

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Thursday, 21 July 2011

Intersecting Roads: Glenfields Blvd / Parklea Esp / Greenway Pl

Weather: Fine

Time: 4:00pm - 5:00pm

Recorded By: Anthony Fichera / Andrew Fichera

			 	<u> </u>								
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
4:00 - 4:15pm	0	0	0	0	5	0	10	0	80	2	11	0
4:15 - 4:30pm	0	0	0	0	9	0	5	0	84	3	21	0
4:30 - 4:45pm	0	0	0	0	5	0	10	0	67	2	11	0
4:45 - 5:00pm	0	0	0	0	5	0	10	0	123	2	12	0
Totals	0	0	0	0	24	0	35	0	354	9	55	0
Total Vehicles		0		0		24	;	35	3	363		55
%HV	()%	C)%		0%	()%		2%		0%

	_			-						•		
			 									
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
4:00 - 4:15pm	10	0	0	0	0	0	1	0	40	1	1	0
4:15 - 4:30pm	14	0	0	0	0	0	1	0	47	1	1	0
4:30 - 4:45pm	10	0	0	0	0	0	0	0	29	2	0	0
4:45 - 5:00pm	5	0	0	0	0	0	1	0	61	2	1	0
Totals	39	0	0	0	0	0	3	0	177	6	3	0
Total Vehicles		39		0		0		3	,	183		3
%HV		0%	()%	(0%		0%	;	3%	()%

Seriata Way MB Oltl Blvd MB Oltl Blvd MB Oltl Blvd

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Wednesday 27 July 2011

Intersecting Roads: Karawatha Dr / WB Off Ramp / Bundilla Blvd / Seriata Way

Weather: Fine

Time: 8:00am - 9:00am

Recorded By: Anthony Fichera / Andrew Fichera

	7			<u> </u>								
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	0	0	1	0			0	0	15	1	123	4
8:15 - 8:30am	0	0	1	0			0	0	15	1	123	5
8:30 - 8:45am	0	0	1	0			0	0	15	1	123	5
8:45 - 9:00am	0	0	1	0			0	0	15	1	123	4
Totals	0	0	4	0	0	0	0	0	60	4	492	18
Total Vehicles		0		4		0		0		64		10
%HV	0	%	0	1%	C)%	0	1%	(6%	4	.%
	•	%		0	(9%	0	%		7	4	-%
%HV	•	%				\(\sigma\)		\(\tag{\tag{\tag{\tag{\tag{\tag{\tag{				<u></u>
%HV	reh)	% 		0	Pass.	<u></u>		% HV		7		
%HV Maximum Queue Length (v	reh)			0		<u></u>		<u></u>		7		<u></u>
%HV MAXIMUM QUEUE LENGTH (vo	reh)		Pass.	O L	Pass.	 	Pass.	 		7	Pass.	L
%HV MAXIMUM QUEUE LENGTH (volume) Time 8:00 - 8:15am	reh)		Pass.	0 	Pass.	 	Pass.	HV 0		7	Pass.	L HV 0
%HV MAXIMUM QUEUE LENGTH (vi Time 8:00 - 8:15am 8:15 - 8:30am	reh)		Pass.	0	Pass. 74	HV	Pass. 45	HV		7	Pass.	HV
%HV MAXIMUM QUEUE LENGTH (v. Time 8:00 - 8:15am 8:15 - 8:30am 8:30 - 8:45am	reh)		Pass. 0 0	0	Pass. 74 74 74	HV 1 3 4	Pass. 45 45 45	HV 0 0 0		7	Pass. 0 0 0	HV 0 0 0
%HV MAXIMUM QUEUE LENGTH (volume Time 8:00 - 8:15am 8:15 - 8:30am 8:30 - 8:45am 8:45 - 9:00am	Pass.	HV	Pass. 0 0 0 0 0	0 L	Pass. 74 74 74 74 296	HV 1 3 4 3	Pass. 45 45 45 45 180	HV 0 0 0 0 0	Pass.	7 L	Pass. 0 0 0 0 0	HV

Bundilla Blvd Warawatha Dr WB Off Ramb

Totals

Total Vehicles

%HV

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

0

0

0%

0

0

0

0%

0

0

Location: Mountain Creek

Day and Date: Thursday 28 July 2011

Intersecting Roads: Karawatha Dr / WB Off Ramp / Bundilla Blvd / Seriata Way

Weather: Fine

Time: 4:00pm - 5:00pm

Recorded By: Anthony Fichera / Andrew Fichera

Note: 15-min survey factored to an hour using observed data from upstream intersections

				<u> </u>							<u>-</u> t	
ime	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
:00 - 4:15pm	1	0	2	0			1	0	20	1	168	5
:15 - 4:30pm	1	0	2	0			1	0	20	1	168	5
:30 - 4:45pm	1	0	2	0			1	0	20	1	168	5
:45 - 5:00pm	1	0	2	0			1	0	20	1	160	5
otals	4	0	8	0	0	0	4	0	80	4	664	20
Total Vehicles %HV		4		8 %		0		4 0%		84 5%		684 3%
%HV	•			%					Ę			
%HV	•		0	%					Ę	5%		
%HV 1AXIMUM QUEUE LENGTH (ve	•			% 1 					Ę	5%		
%HV IAXIMUM QUEUE LENGTH (ve	eh) [D%		% 1 		DW		L		10		3%
%HV IAXIMUM QUEUE LENGTH (ve ime :00 - 4:15pm	eh) [D%	Pass.	% 1 HV	Pass.	HV	Pass.	HV		10	Pass.	HV
	eh) [D%	Pass.	% 1 L	Pass.	HV 3	Pass.	HV		10	Pass.	HV

230

237

3%

7

96

96

0%

0

0

0

0%

0

0

0

0%

Monutain Or Karawatha Dr Karawatha Dr Karawatha Dr

MAXIMUM QUEUE LENGTH (veh)

CLASSIFIED TRAFFIC COUNT - 4 WAY INTERSECTION

Location: Mountain Creek

Day and Date: Wednesday 27 July 2011

Intersecting Roads: Karawatha Dr / Molokai Dr / Mountain Creek Shops

Weather: Fine

Time: 8:00am - 9:00am

Recorded By: Anthony Fichera / Andrew Fichera

Note: 15-min survey factored to an hour using observed data from upstream intersections

						<u></u>	 					
Time	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV
8:00 - 8:15am	11	0					10	0	83	3	4	0
8:15 - 8:30am	11	0					10	0	83	2	4	0
8:30 - 8:45am	11	0					10	0	83	2	4	0
8:45 - 9:00am	11	0					10	0	83	4	4	0
Totals	44	0	0	0	0	0	40	0	332	11	16	0
Total Vehicles	4	14		0		0		10		343		16
%HV	0	1%	(0%	0)%	0	%	,	3%	(0%
%HV		9%		1	0	9%	0	%		12		0%
		% 			0	\(\sigma\)		<u></u>				D%
	eh)				Pass.	% HV	Pass.	% 			Pass.	0%
MAXIMUM QUEUE LENGTH (ve	eh)			1		<u></u>		<u></u>		12		<u></u>
MAXIMUM QUEUE LENGTH (ve	Pass.	HV		1	Pass.	L HV	Pass.	 	Pass.	12		<u></u>
MAXIMUM QUEUE LENGTH (ve	Pass.	HV 0		1	Pass.	HV 2	Pass.		Pass.	12 HV 5		<u></u>
MAXIMUM QUEUE LENGTH (ve Time 3:00 - 8:15am 8:15 - 8:30am	Pass. 10 10	IHV 0		1	Pass. 23	HV 2 2	Pass. 18 18	HV	Pass. 112	12 HV 5		<u></u>
MAXIMUM QUEUE LENGTH (ve Time 8:00 - 8:15am 8:15 - 8:30am 8:30 - 8:45am	Pass. 10 10	HV 0 0 0		1	Pass. 23 23 23	HV 2 2 2	Pass. 18 18	HV 2 2 2	Pass. 112 112	12 HV 5 6 6		<u></u>
MAXIMUM QUEUE LENGTH (ve	Pass. 10 10 10 40	0 0 0	Pass.	1	Pass. 23 23 23 23 92	HV 2 2 2 2 2 2	Pass. 18 18 18 18 72	HV 2 2 2 2 2 2 2	Pass. 112 112 112 112 448	12 HV 5 6 6 1	Pass.	L HV

Karawatha Dr

MAXIMUM QUEUE LENGTH (veh)

Location: Mountain Creek

Day and Date: Wednesday 27 July 2011

Intersecting Roads: Karawatha Dr / Molokai Dr / Mountain Creek Shops

Weather: Fine

Time: 4:00pm - 5:00pm

Recorded By: Anthony Fichera / Andrew Fichera

Note: 15-min survey factored to an hour using observed data from upstream intersections

10

%HV 0% 0% 0% 4% MAXIMUM QUEUE LENGTH (veh) 1 20 Time Pass. HV Pass.			<u>=</u>	<u> </u>			→						
4:15 - 4:30pm	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	HV	Pass.	Time
14 0 116 5 3 4:30 - 4:45pm 15 0 14 0 116 5 3 4:45 - 5:00pm 15 0 14 0 116 4 3 Total Vehicles 60 0 0 0 0 0 56 0 464 17 12 Total Vehicles 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	3	5	116	0	14					0	15	4:00 - 4:15pm
4:45 - 5:00pm	0	3	3	116	0	14					0	15	4:15 - 4:30pm
Totals 60 0 0 0 0 0 56 0 464 17 12 Total Vehicles 60 0 0 0 0 56 481 %HV 0% 0% 0% 0% 0% 0% 0% 4% MAXIMUM QUEUE LENGTH (veh) Time Pass. HV Pass. H	0	3	5	116	0	14					0	15	4:30 - 4:45pm
Total Vehicles 60 0 0 0 56 481	0	3	4	116	0	14					0	15	4:45 - 5:00pm
%HV 0% 0% 0% 4% MAXIMUM QUEUE LENGTH (veh) 1 20 Time Pass. HV Pass. TY 4 36 3 1	0	12	17	464	0	56	0	0	0	0	0	60	Totals
Time Pass. HV Pass. H	12 0%												
4:00 - 4:15pm 10 0 77 4 36 3 135 4 4:15 - 4:30pm 10 0 77 4 36 3 105 2 4:30 - 4:45pm 10 0 77 4 36 3 140 4 4:45 - 5:00pm 10 0 77 4 36 3 140 3													
4:00 - 4:15pm 10 0 77 4 36 3 135 4 4:15 - 4:30pm 10 0 77 4 36 3 105 2 4:30 - 4:45pm 10 0 77 4 36 3 140 4 4:45 - 5:00pm 10 0 77 4 36 3 140 3			20	2					1				MAXIMUM QUEUE LENGTH (veh)
4:15 - 4:30pm 10 0 77 4 36 3 105 2 4:30 - 4:45pm 10 0 77 4 36 3 140 4 4:45 - 5:00pm 10 0 77 4 36 3 140 3	<u> </u>		20			+			1	-			MAXIMUM QUEUE LENGTH (veh)
4:30 - 4:45pm 10 0 77 4 36 3 140 4 4:45 - 5:00pm 10 0 77 4 36 3 140 3	 	Pass.	→		HV	Pass.	HV	Pass.	<u></u>	Ⅎ↓	HV	[Pass.	
4:45 - 5:00pm 10 0 77 4 36 3 140 3	L 	Pass.	HV	Pass.					<u></u>	Ⅎ↓			Time
	L_ HV	Pass.	HV 4	Pass.	3	36	4	77	<u></u>	Ⅎ↓	0	10	Time 4:00 - 4:15pm
Totals 40 0 0 0 208 16 144 12 520 12 0	L_ HV	Pass.	HV 4	Pass. 135	3	36 36	4	77 77	<u></u>	Ⅎ↓	0	10	Time 4:00 - 4:15pm 4:15 - 4:30pm
10tals 140 0 0 0 300 10 144 12 320 13 0	L_ 	Pass.	HV 4 2 4	Pass. 135 105 140	3 3	36 36 36	4 4	77 77 77	<u></u>	Ⅎ↓	0 0	10 10 10	Time 4:00 - 4:15pm 4:15 - 4:30pm 4:30 - 4:45pm
Total Vehicles 40 0 324 156 533 %HV 0% 0% 5% 8% 2%	☐ HV	Pass.	HV 4 2 4	Pass. 135 105 140	3 3	36 36 36	4 4	77 77 77	<u></u>	Ⅎ↓	0 0	10 10 10	Time 4:00 - 4:15pm 4:15 - 4:30pm 4:30 - 4:45pm

Speed

Zone

60

70

70

80

80

Speed

Sign

<u>Dist</u>

7.71

7.57

7.26

6.21

100 5.50

Sunshine Motorway Road 150A Intersection <u>Structure</u> RP Number **Description** Chainage AADT % CV % Gth Number ID 8.63 Brisbane Rd / Rd 153 On Ramp 218 8.60 Off Ramp to Brisbane Rd On Ramp from Rd 150B Loop WB 8.56 25000 On Ramp from Rd 150B EB 8.26 CCTV # 204 Mountain Ck 8.26 -.32 31000 Sunshine Motorway Rd 150B Bridge 3 940 On Ramp from Rd 150B Minyama Loop EB 8.19 Start Dual Carriageway 8.10 70 8.06On Ramp from Rd 150B Minyama WB 32000 Exit Ramp to Rd 150B 7.91 <0> Exit Ramp to Karawatha Dve 7.88 - 7.72 -.76 Overpass (Karawatha Dr) 943 7.70 <32000> On Ramp from Karawatha Dr Mountain Ck 1079 Exit Ramp to Mtn Creek 6.85 29000 6.21 On Ramp from Bundilla Bvd Help Phone # 202 EB 6.18 CCTV # 203 Greenfields 6.07 VMS Mountain Creek - for EB Traffic 5.87 5.76 VMS Mountain Creek - for WB Traffic 5.64 25376 Culvert 5.27 33000 On Ramp from Rd 152 Exit Ramp to Rd 152 5.18

33424

33423

5.01

4.87

4.70

End Dual Carriageway

Kawana Way Overpass

Kawana Way Overpass

Exit Ramp to Rd 152

Appendix C

Increases in Traffic Volumes caused by Development

SPREADSHEET FOR TIA CALCULATIONS

INPUT VARIABLES

CALCULATION CELLS

OUTPUT CELLS

Explanatory Cell

Job: Proposed Mountain Creek Golf Course

Date: 7/08/2011

Opening Year Design Horizon 2012

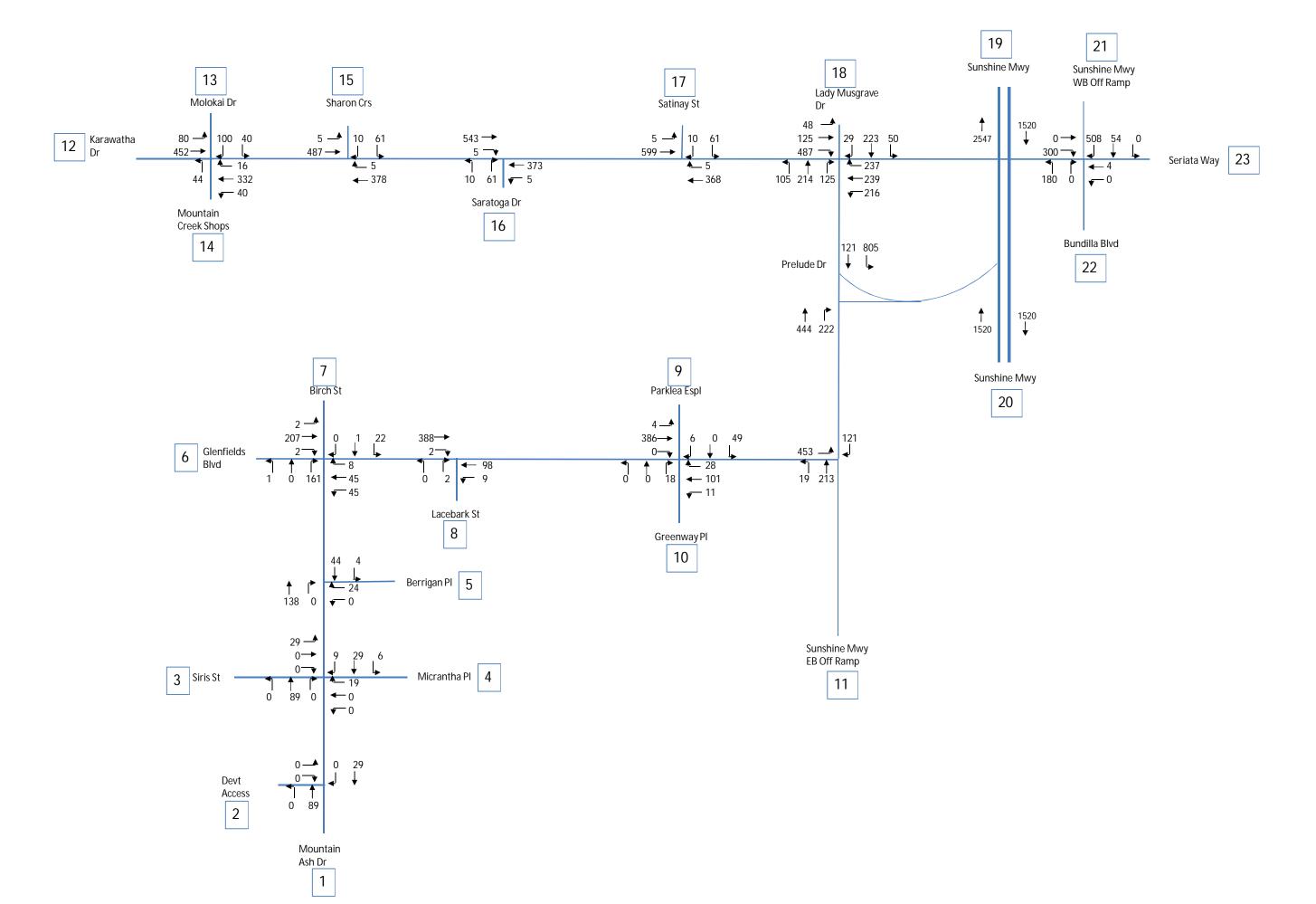
					Fored	ast ADT (2	2012)	
	Base			Total	Devt		Total	% Inc
	Growth	Base	Base	Without	Traffic	Devt	With	due to
Road Link	Rate (%)	ADT	ADT Year	Devt	Split	Traffic	Devt	Devt
Mountain Ash Dr (South of Devt Access)	2.0%	1,050	2011	1,071	2.27%	38	1,109	3.52%
Mountain Ash Dr (Devt Access to Siris St)	2.0%	1,050	2011	1,071	97.73%	1,624	2,695	151.63%
Mountain Ash Dr (Siris St to Berrigan PI)	2.0%	1,615	2011	1,647	96.51%	1,604	3,251	97.35%
Mountain Ash Dr (Berrigan PI to Glenfields Blvd)	2.0%	1,815	2011	1,851	96.07%	1,596	3,448	86.23%
Glenfields Blvd (Mountain Ash Dr to Lacebark St)	2.0%	5,250	2011	5,355	88.61%	1,472	6,827	27.50%
Glenfields Blvd (Lacebark St to Parklea Esp)	2.0%	5,320	2011	5,426	88.29%	1,467	6,893	27.03%
Glenfields Blvd (Parklea Esp to Prelude Dr)	2.0%	6,535	2011	6,666	85.29%	1,417	8,083	21.26%
Prelude Dr (Glenfields Blvd to EB On Ramp)	2.0%	8,155	2011	8,318	79.71%	1,324	9,643	15.92%
Prelude Dr (EB On Ramp to Karawatha Dr)	2.0%	13,270	2011	13,535	66.47%	1,105	14,640	8.16%
Karawatha Dr (Prelude Dr to Bundilla Blvd)	2.0%	10,230	2011	10,435	23.76%	395	10,829	3.78%
Karawatha Dr (Prelude Dr to Satinay St)	2.0%	11,105	2011	11,327	35.13%	584	11,911	5.15%
Karawatha Dr (Satinay St to Saratoga Dr)	2.0%	10,800	2011	11,016	33.87%	563	11,579	5.11%
Karawatha Dr (Saratoga Dr to Sharon Crs)	2.0%	10,490	2011	10,700	32.56%	541	11,241	5.06%
Karawatha Dr (Sharon Crs to Molokai Dr)	2.0%	10,155	2011	10,358	31.37%	521	10,879	5.03%
Karawatha Dr (South of Molokai Dr)	2.0%	13,035	2011	13,296	27.33%	454	13,750	3.42%

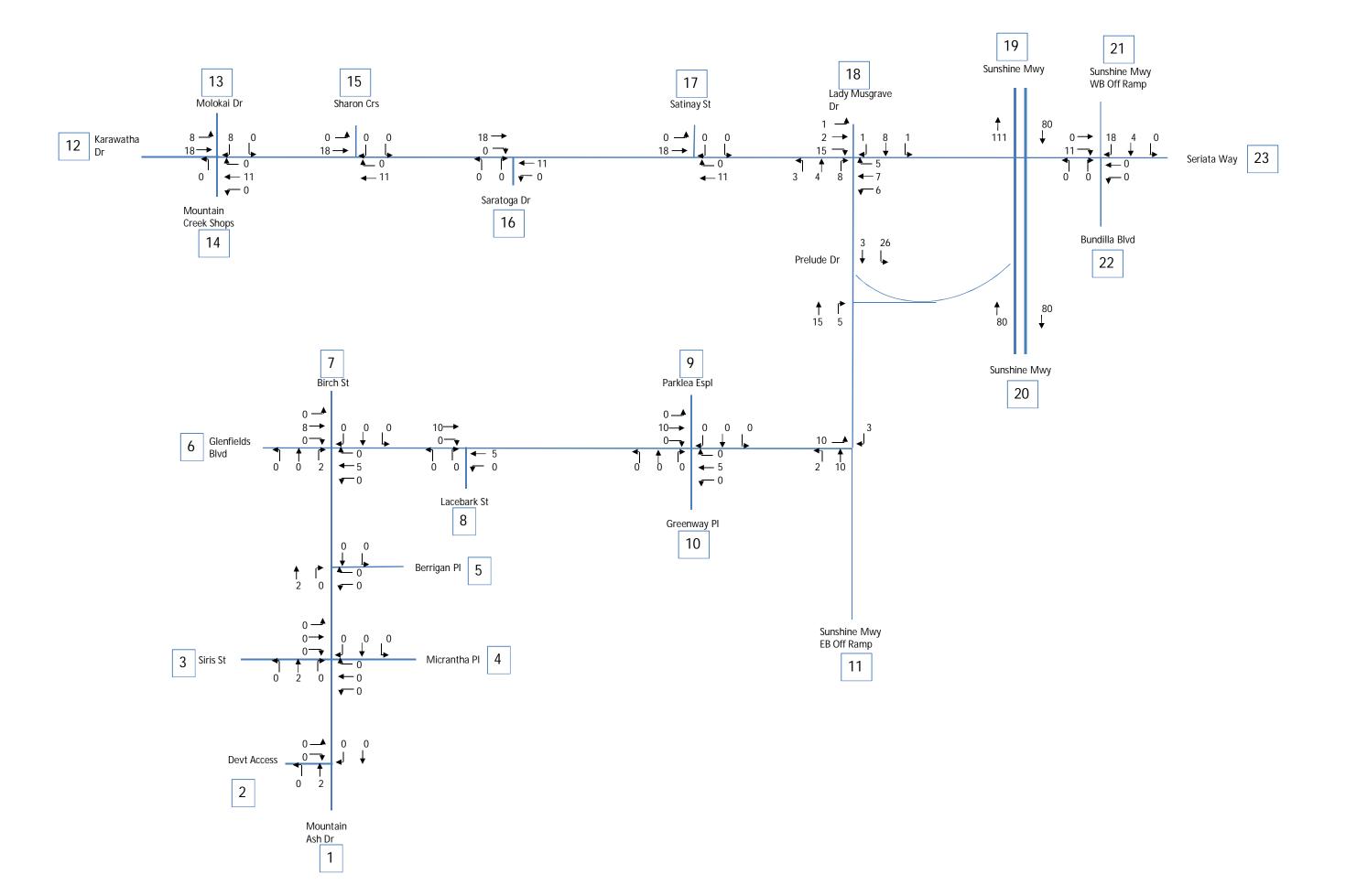
Appendix D

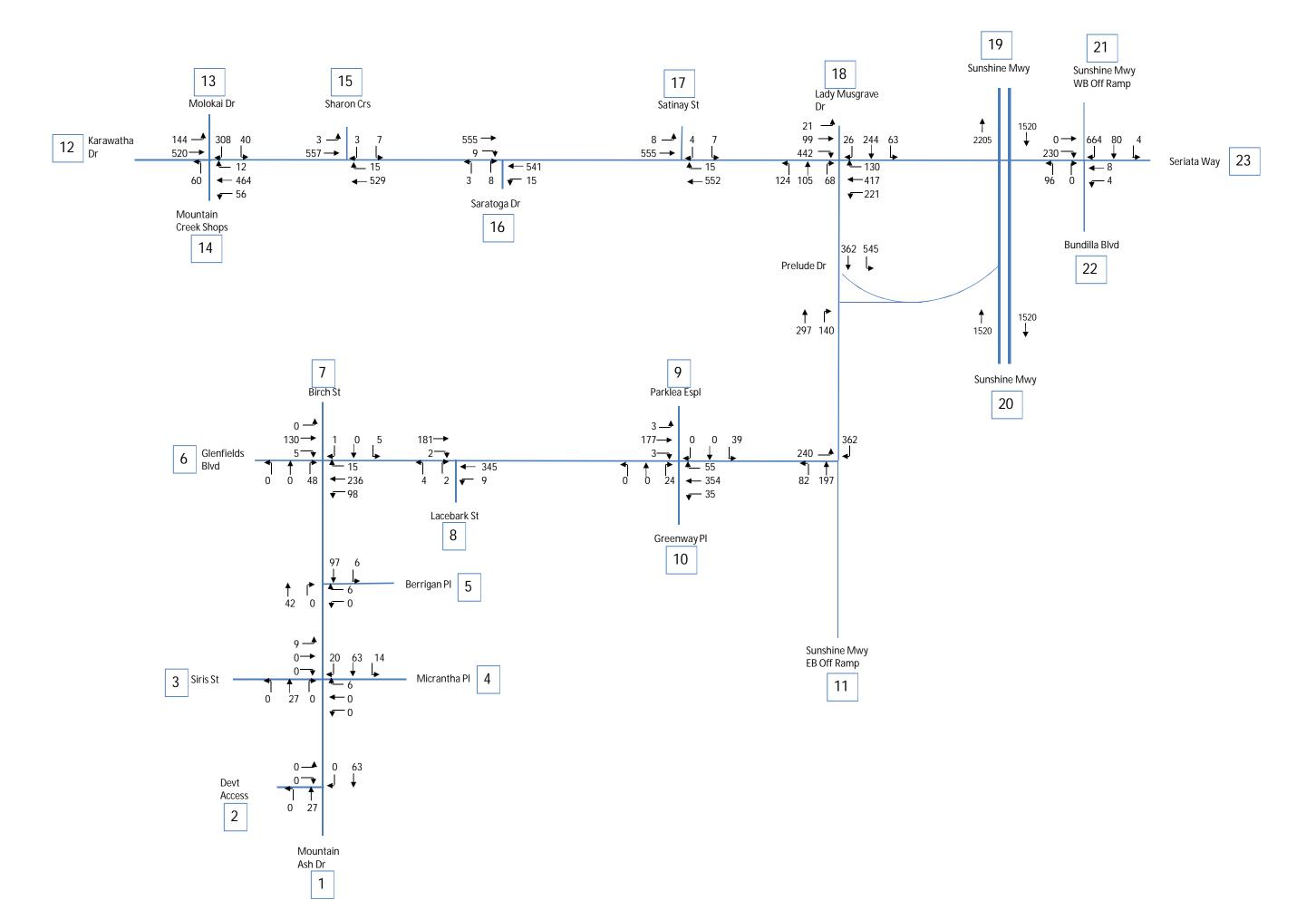
Detailed Assessment of Network Peak Periods

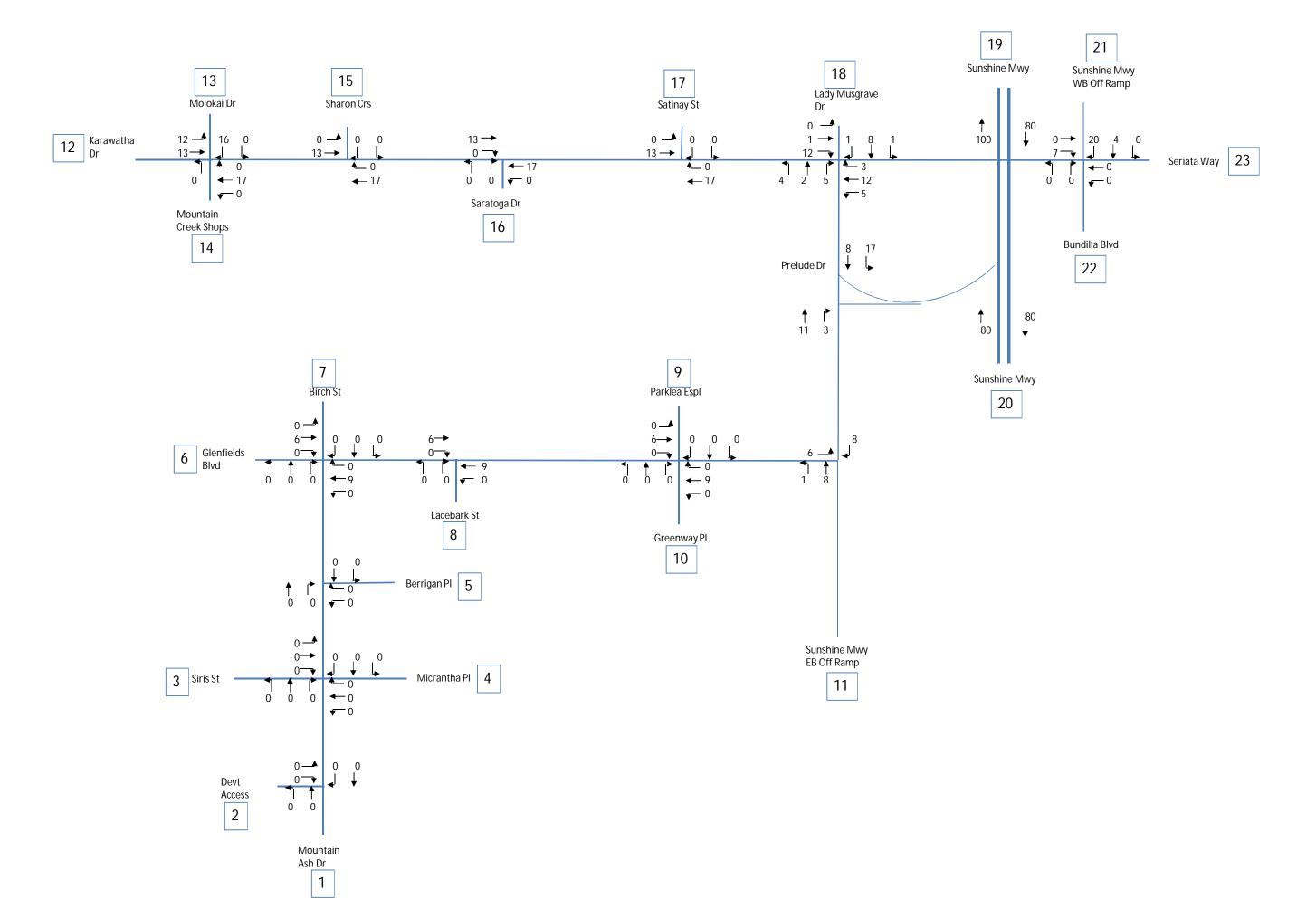
	Author: Glenfields Blvd SB - 145m north of Lacebark St	Author: Karawatha Dr EB - west of Golf Links Rd	Author: Karawatha Dr WB - west of Golf Links Rd	Author: Karawatha Dr EB - east of Golf Links Rd	Author: Karawatha Dr WB - east of Golf Links Rd	Author: Glenfields Blvd / Prelude Dr / Sunshine Mwy Off Ramp	
Site No.	145002	108015	108016	108017	108018	INT1	TOTAL
0000-0100	12		14		15		69
0100-0200	5		8		8		i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de
0200-0300	4	3	5		6		
0300-0400	3	6	5	5	6	0	
0400-0500	7	19	12	19	14	0	70
0500-0600	14	88	42	68	39	0	250
0600-0700	41	169	98	145	118	0	
0700-0800	89	360	250	435	317	561	<u>2</u> 011
0800-0900	119	562	354	614	420	775	2845
0900-1000	132	355	287	364	311	429	1878
1000-1100	154	340	310	376	353	401	1934
1100-1200	161	306	316	339	330	331	1782
1200-1300	173	300	309	359	320	320	1781
1300-1400	184	297	334	338	370	458	1981
1400-1500	195	374	383	480	413	601	2446
1500-1600	271	421	464	462	487	756	2861
1600-1700	320	427	496	491	537	793	3064
1700-1800	342	385	455	447	464	988	3081
1800-1900	215	250	265	292	286	0	1308
1900-2000	114	144	147	158	160	0	723
2000-2100	85	99	102	110	112	0	□ 507
2100-2200	71	63	78	82	83	0	□ 377
2200-2300	43	35	45	50	49	0	222
2300-2400	21	22	28	26	31	0	127
TOTAL	2772	5044	4805	5688	5250	6413	

Appendix E 2011 Base Network Counts

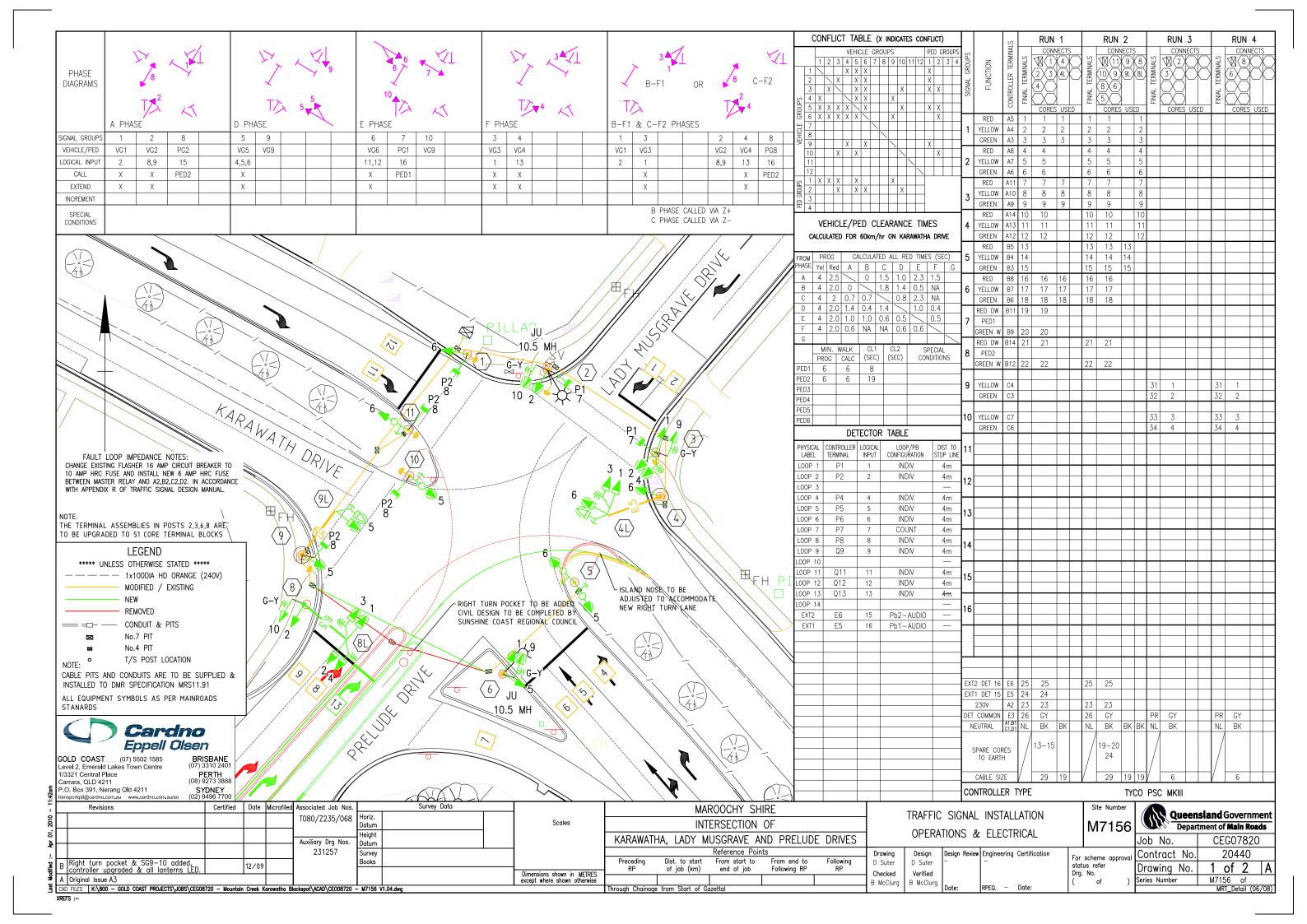


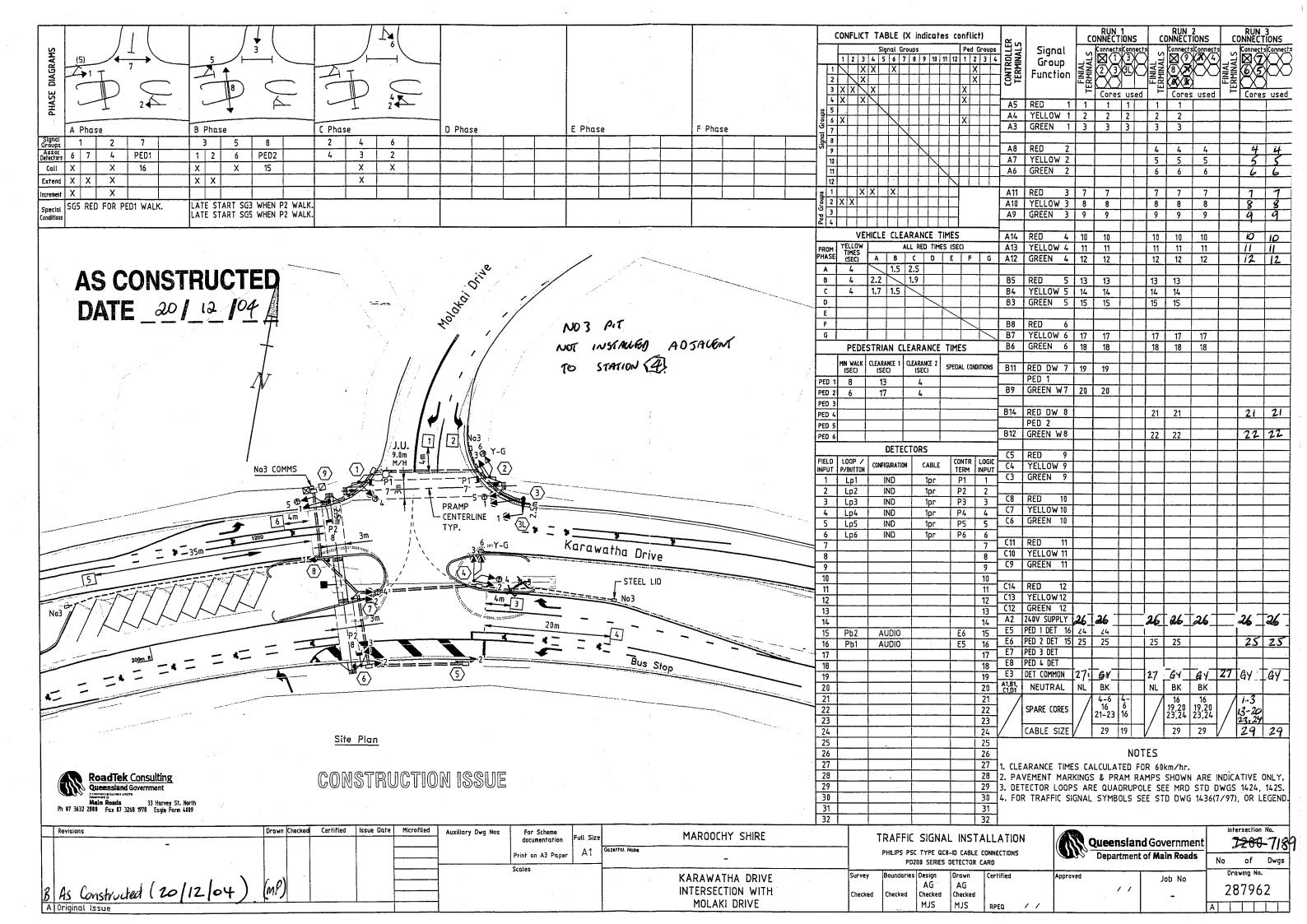


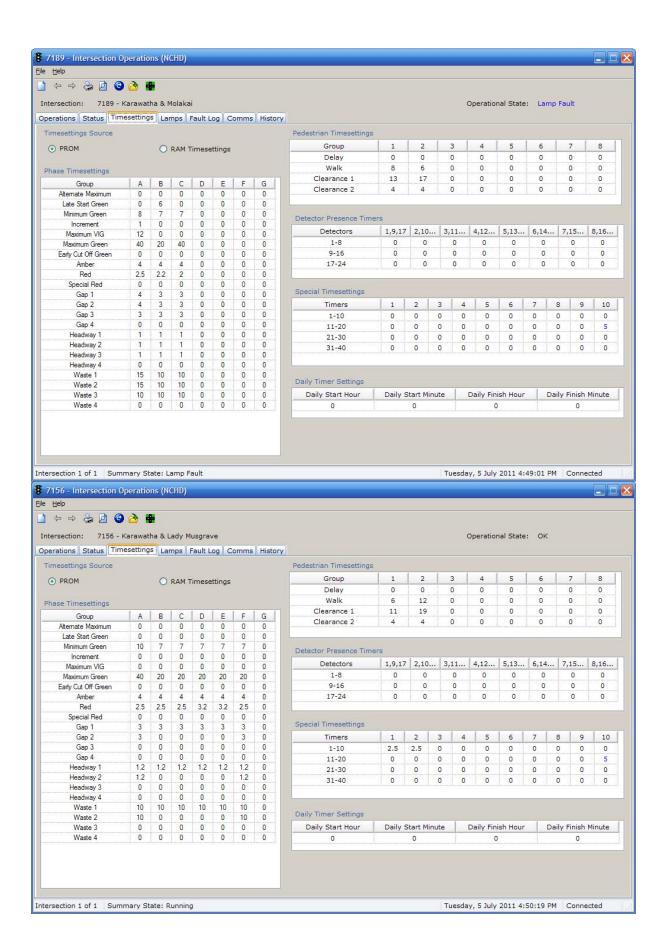




Appendix F Signal Data







Intersection 7156 All Plans

 Start Time:
 May 4, 2011
 7:30:00

 End Time:
 May 4, 2011
 8:30:00

Phase	Α	В	С	D	Е	F	G	Cycle
Count	35	0	0	34	35	35	0	35
Average Time	29.5	0.0	0.0	26.1	29.5	19.5	0.0	103.9
Maximum Time	58	0	0	36	36	34	0	146
Minimum Time	16	0	0	16	14	12	0	56
Standard Deviation	12.24	0.00	0.00	6.47	6.57	6.96	0.00	22.03
Probability	100%	0%	0%	97%	100%	100%	0%	

Pedestrian Demand	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%
Worst LOS								
Average LOS								

Pedestrian Walks	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%

Intersection 7156 All Plans

 Start Time:
 May 4, 2011
 16:30:00

 End Time:
 May 4, 2011
 17:30:00

Phase	Α	В	С	D	Е	F	G	Cycle
Count	35	0	0	35	35	35	0	35
Average Time	27.8	0.0	0.0	26.2	30.5	20.2	0.0	104.7
Maximum Time	40	0	0	34	36	34	0	140
Minimum Time	16	0	0	16	18	14	0	82
Standard Deviation	8.55	0.00	0.00	4.85	4.73	7.18	0.00	15.29
Probability	100%	0%	0%	100%	100%	100%	0%	

Pedestrian Demand	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%
Worst LOS								
Average LOS								

Pedestrian Walks	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%

Intersection 7189 All Plans

 Start Time:
 May 4, 2011
 7:30:00

 End Time:
 May 4, 2011
 8:30:00

Phase	Α	В	С	D	Е	F	G	Cycle
Count	60	56	16	0	0	0	0	60
Average Time	40.8	17.1	13.9	0.0	0.0	0.0	0.0	60.5
Maximum Time	134	32	16	0	0	0	0	148
Minimum Time	16	12	12	0	0	0	0	30
Standard Deviation	27.30	5.64	0.89	0.00	0.00	0.00	0.00	29.55
Probability	100%	93%	27%	0%	0%	0%	0%	

Pedestrian Demand	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%
Worst LOS								
Average LOS								

Pedestrian Walks	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%

Intersection 7189 All Plans

 Start Time:
 May 4, 2011
 16:30:00

 End Time:
 May 4, 2011
 17:30:00

Phase	Α	В	С	D	Е	F	G	Cycle
Count	61	56	10	0	0	0	0	61
Average Time	43.1	15.4	13.4	0.0	0.0	0.0	0.0	59.4
Maximum Time	156	30	14	0	0	0	0	170
Minimum Time	14	12	12	0	0	0	0	28
Standard Deviation	31.03	3.82	0.97	0.00	0.00	0.00	0.00	30.71
Probability	100%	92%	16%	0%	0%	0%	0%	

Pedestrian Demand	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%
Worst LOS								
Average LOS								

Pedestrian Walks	1	2	3	4	5	6	7	8
Count	0	0	0	0	0	0	0	0
Average Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Time	0	0	0	0	0	0	0	0
Minimum Time	0	0	0	0	0	0	0	0
Standard Deviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Probability	0%	0%	0%	0%	0%	0%	0%	0%

Appendix G Base 2011 AM and PM Trip Matrices

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	ZONE-OUT	TOTAL
1	0	0	0	0	0	1	0	0	1	0	0	13	0	1	0	0	0	28	29	0	0	16	0	89	89
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	9	10	0	0	5	0	29	29
4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	6	6	0	0	4	0	19	19
5	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	8	8	0	0	4	0	24	24
6	1	0	1	0	0	0	2	2	3	0	0	27	1	3	0	0	0	65	68	0	0	38	0	211	211
7	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	0	0	4	0	23	23
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	2
9	2	0	1	0	0	3	0	1	0	0	0	/	0	1	0	0	0	16	16	0	0	9	0	55	55 10
10		0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	6	6 72	0	0	3	0	18	18
11	3	0	1	1	1	6	1	1	4	1	0	29	0	4	0	0	0	68	72	0	0	40	0	232	
12	1	0	2	2	1	12	2	2	8	3	0	100	80	0	5	4	4	33	277	0	0	90	0	532	
13 14	1	0	0	0	0	1	0	0	0	0	0	100	0	0	0	0	0	3	27	0	0	7	0	140 44	140 44
15	0 2	0	0	0	0	0 3	0	0	1	0	0	44 9	0	0	0	0	0	4	0 41	0	0	0 9	0	71	71
16		0	0	0	0	3	0	0	1	0	0	9	0	1	0	0	1	4	41	0	0	9	0	71	71
17	2	0	0	0	0	3	0	0	1	0	0	9	0	1	0	0	0	4	41	0	0	10	0	71	71
18	2	0	0	0	0	3	0	0	1	1	0	27	1	1	0	0	0	0	216	0	0	50	0	302	302
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1520	0	0	0	1520	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1520	0	0	0	0	1520	
21	4	0	4	3	2	8	5	5	10	5	0	131	12	20	4	4	4	176	109	0	0	54	0	562	562
22	2	0	0	0	0	3	0	0	1	1	0	50	2	6	1	1	1	60	51	0	0	0	0	180	
23		0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	4	4
	29	0	9	6	4	46	10	11	32	11	0	476	96	40	10	10	10	499	2547	1520	0	354	0		
	29	0	9	6	4	46	10	11	32	11	0	476	96	40	10	10	10	499	2546	1520	0	354	0		

ZONE-IN TOTAL

	Ī	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	ZONE-OUT	TOTAL
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	2
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	2	0	8	8
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	5	0	12	12
	12	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	1	15	0	0	2	0	26	26
	13	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	8	8
	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8	0	0	1	0	10	10
	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	80	80
	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	80	80
	21	0	0	0	0	0	3	0	0	0	0	0	7	0	0	0	0	0	5	3	0	0	4	0	22	22
	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I		0	0	0	0	0	5	0	0	0	0	0	19	8	0	0	0	0	10	111	80	0	15	0		
-		0	0	0	0	0	5	0	0	0	0	0	19	8	0	0	0	0	10		80	0	15	0		

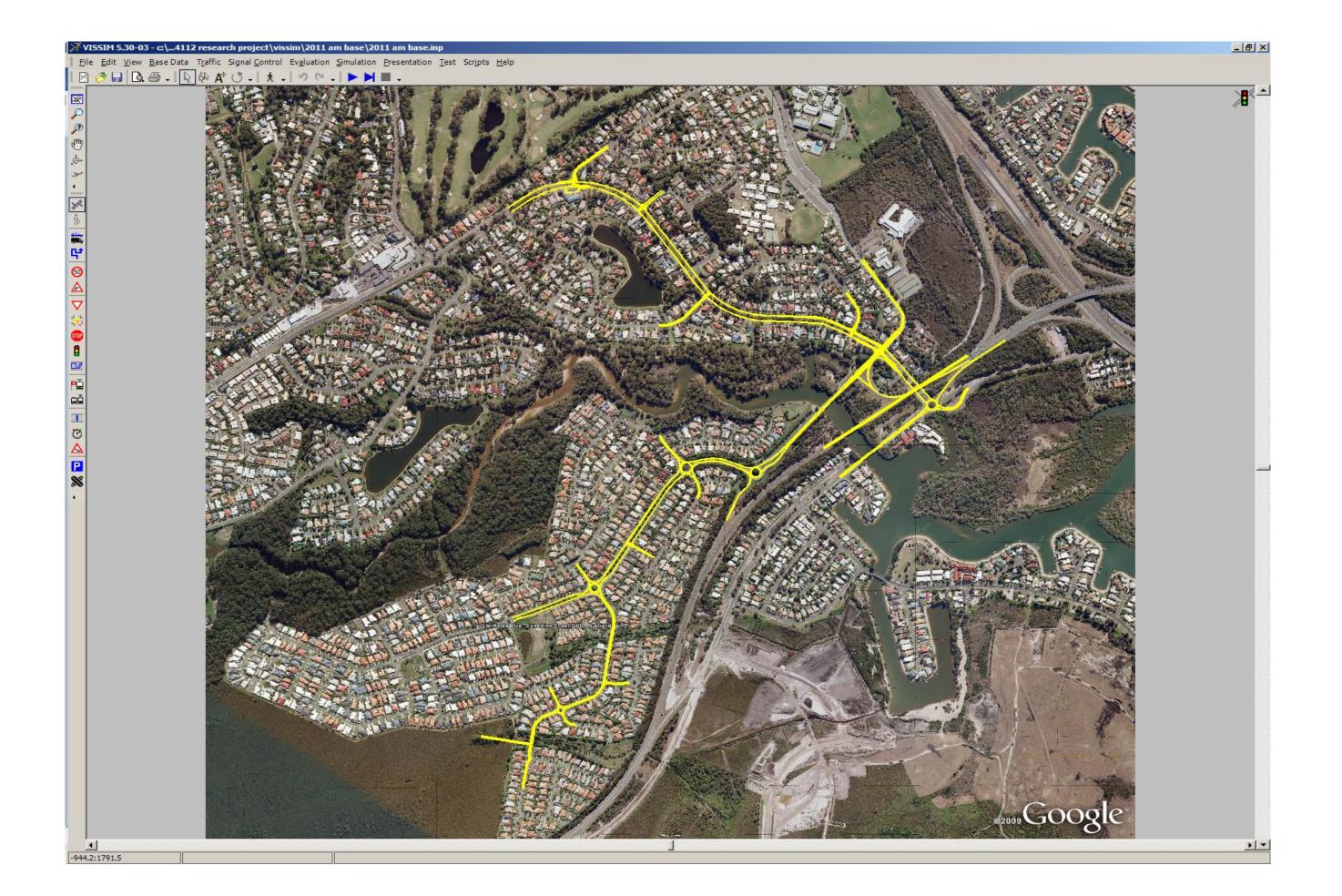
ZONE-IN TOTAL

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	ZONE-OUT
	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	16	0	0	3	0	27
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	5	0	0	1	0	9
	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	0	0	1	0	6
	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	0	0	1	0	6
	6	3	0	1	1	0	0	0	2	3	3	0	17	1	2	1	1	1	18	71	0	0	11	0	135
	7	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	3	0	0	0	0	6
	8	1	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	6
	9	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	23	0	0	4	0	39
	10	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	14	0	0	2	0	24
	11	11	0	4	2	1	44	3	2	9	6	0	65	2	8	2	2	2	70	0	0	0	45	0	279
	12	14	0	4	3	1	51	3	2	12	8	0	0	144	0	3	8	7	19	296	0	0	89	0	664
	13	0	0	2	0	0	3	0	0	1	0	0	308	0	0	0	1	1	2	23	0	0	7	0	348
	14	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	60
	15	0	0	0	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	4	0	0	1	0	10
	16	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	5	0	0	1	0	11
	17	0	0	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0	0	4	0	0	1	0	11
	18	8	0	2	2	1	32	2	1	8	5	0	21	0	2	1	1	1	0	183	0	0	63	0	333
	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1520	0	0	0	1520
	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1520	0	0	0	0	1520
	21	26	0	8	6	2	100	6	4	23	15	0	284	8	36	10	10	10	116	0	0	0	80	4	748
	22	0	0	0	0	0	0	0	0	0	0	0	45	1	6	1	1	1	13	28	0	0	0	0	96
	23	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	1	2	0	0	4	0	12
ZONE-IN		63	0	20	14	6	237	15	11	58	38	Λ	832	156	56	18	24	23	256	2205	1520	Λ	314	4	
TOTAL		63	0	20	14		237	15	11	58	38		832	156	56	18	24	23		2205			314	4	
TOTAL		US	U	20	14	U	231	13	11	50	30	U	032	150	30	10	24	23	200	2203	1320	U	314	4	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	ZONE-OUT	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	0	0	1	0	6	6
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	4	0	9	9
12	0	0	0	0	0	2	0	0	0	0	0	0	12	0	0	0	0	0	10	0	0	1	0	25	25
13	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	16	16
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	7	0	0	1	0	10	10
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	80	80
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	80	80
21	0	0	0	0	0	5	0	0	0	0	0	12	0	0	0	0	0	3	0	0	0	4	0	24	24
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	9	0	0	0	0	0	33	12	0	0	0	0		100	80	0	11	0		
	0	0	0	0	0	9	0	0	0	0	0	33	12	0	0	0	0	5	100	80	0	11	0		

ZONE-IN TOTAL

Appendix H Screenshot of Base VISSIM Model



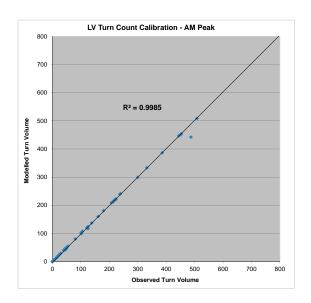
Appendix I

Detailed Turn Count Calibration Statistics - VISSIM

LV Turn Count Calibration

Observations: 66
GEH < 5: 66 100.0%
R²: 0.9985

	R²:	0.9985					
		VISSIM ID	Observed	Modelled	Difference	% Difference	GEH
_	†	19	138	137	-1	-1%	0.10
۵_	▶	20	0	0	0	#DIV/0!	0.00
Ash an F	÷	21	0	0	0	#DIV/0!	0.00
Mountain Ash Dr Berrigan Pl	▲	22	24	24	0	1%	0.04
ē ā	Ļ	24	4	4	0	-5%	0.10
2	↓	23	44	46	2	4%	0.24
ž	•	25	1	1	0	0%	0.00
rg.	†	26	0	0	0	#DIV/0!	0.00
Bi		27	161	160	-1	-1%	80.0
ų. D	₩	34	45	46	1	2%	0.12
٦As	-	35	45	42	-3	-6%	0.39
ntai	4	36	8	8	0	-3%	0.07
Glenfields Blvd / Mountain Ash Dr / Birch St	L,	31	22	22	0	0%	0.00
/px	+	32	1	1	0	0%	0.00
B	-	33	0	0	0	#DIV/0!	0.00
field		28	2	2	0	0%	0.00
Sen	→	29	207	209	2	1%	0.12
<u> </u>	*	30	2	2	0	0%	0.00
<u> </u>	4	45	0	0	0	#DIV/0!	0.00
nwa	<u>†</u>	46 47	0	0	0	#DIV/0!	0.00
3ree	Ľ	48	18 11	18 10	-1	-1% -5%	0.05 0.18
<u>a</u>	↓	49	101	100	-1	-1%	0.18
E	*	50	28	28	0	1%	0.04
훒	<u>-</u>	51	49	50	1	1%	0.09
Glenfields Blvd / Parklea Espl / Greenway Pl	→	52	0	0	0	#DIV/0!	0.00
3kd	4	53	6	6	0	0%	0.00
sp		54	4	4	0	0%	0.00
Ji Ji	→	55	386	386	0	0%	0.02
8	-	56	0	0	0	#DIV/0!	0.00
de	*	57	19	19	0	1%	0.05
Glenfields Blvd / Prelude Dr	†	58	213	212	-1	0%	0.04
d/F	4	60	121	119	-2	-1%	0.16
		59	453	454	1	0%	0.07
Prelude Dr	†	61	444	447	3	1%	0.12
an Ra	_	62	222	223	1	0%	0.04
	+	63	121	120	-1	-1%	0.11
e D	Ţ	66	105	107	2	2%	0.21
Pla	†	67	214	214	0	0%	0.00
ď		68	125	124	-1	-1%	0.13
ē	*	69	216	216	0	0%	0.01
grav	←	70 71	239	241 240	3	1% 1%	0.12
Mus	-	72	50	49	-1	-3%	0.20
ady	↓	73	223	220	-3	-3%	0.20
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	<u>.</u>	74	29	29	0	1%	0.04
ha D	_	75	48	45	-3	-6%	0.44
awat	→	76	125	117	-8	-6%	0.73
Kar	_	77	487	442	-45	-9%	2.07
A VB	•	78	0	0	0	#DIV/0!	0.00
rawatha Dr / Molokai Dr / Karawatha Dr / Bundilla Blvd / WB Mountain Creek Shops Off Ramp / Seriata Way	†	79	4	4	0	-5%	0.10
Wa Wa	₩	80	0	0	0	#DIV/0!	0.00
watha Dr / Bundilla Blvd Off Ramp / Seriata Way	+	81	54	55	1	1%	0.08
Bur / Se	▲	82	508	509	1	0%	0.03
amp	↓	83	0	0	0	#DIV/0!	0.00
atha)#R	4	84	300	299	-1	0%	0.06
araw.		85	180	181	1	0%	0.06
포	→	86	0	0	0	#DIV/0!	0.00
)r/		114	44	44	0	0%	0.03
kai l	*	111	40	39	-1 1	-3%	0.16
Molo S. S.	+	112 113	332 16	333 16	0	0% 2%	0.04
Cre	_	115	40	41	1	2%	0.10
rawatha Dr / Molokai D Mountain Creek Shops	L.	116	100	101	1	1%	0.13
awa	+	117	80	80	0	0%	0.12

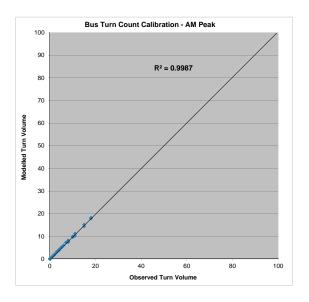


Bus Turn Count Calibration

Observations: GEH < 5: 66 100.0% 0.9987

R²:

		VISSIM ID	Observed	Modelled	Difference	% Difference	GEH
	1	19	2	2	0	0%	0.00
<u>``</u> _	-	20	0	0	0	#DIV/0!	0.00
Ash In P	Ļ	21	0	0	0	#DIV/0!	0.00
Mountain Ash Dr / Berrigan Pl	*_	22	0	0	0	#DIV/0!	0.00
Be	_	24	0	0	0	#DIV/0!	0.00
Š	7	23	0	0	0	#DIV/0!	0.00
	4	25	0	0	0	#DIV/0!	0.00
ų. St	†	26	0	0	0	#DIV/0!	0.00
Biro	-	27	2	2	0	0%	0.00
<u>ا</u> ر /	_	34	0	0	0	#DIV/0!	0.00
Ash	▼	35	5	5	0	0%	0.00
ä	—	36	0	0	0	#DIV/0!	0.00
Ĕ		31	0	0	0	#DIV/0!	0.00
ĕ	<u>↓</u>	32	0	0	0	#DIV/0!	0.00
<u> </u>	—	33	0	0	0	#DIV/0!	0.00
ds E		28	0	0	0	#DIV/0!	0.00
Glenfields Blvd / Mountain Ash Dr / Birch	=	29	8	8	0	-3%	0.07
<u>e</u>		30	0	0	0	#DIV/0!	0.00
	7	45	0	0	0	#DIV/0!	0.00
ξ	+	46	0	0	0	#DIV/0!	0.00
wu		47	0	0	0	#DIV/0!	0.00
Gree	H	48	0	0	0	#DIV/0!	0.00
р Д	*	49	5	5	0	#DIV/0!	0.00
ES	1	50	0	0	0	#DIV/0!	0.00
Glenfields Blvd / Parklea Espl / Greenway Pl	<u> </u>	51	0	0	0	#DIV/0! #DIV/0!	0.00
/Pa	→	52	0	0	0	#DIV/0!	0.00
PA S		53	0	0	0	#DIV/0!	0.00
ds	4	54	0	0	0	#DIV/0!	0.00
ufie	_	55	10	10	0	-2%	0.06
Ge	-	56	0	0	0	#DIV/0!	0.00
	4	57	2	2	0	0%	0.00
Glenfields Blvd / Prelude Dr	+	58	10	10	0	0%	0.00
Glenfields slvd / Preluc Dr	1	60	3	3	0	0%	0.00
B G	1	59	10	10	0	-4%	0.13
占	1	61	15	14	-1	-4%	0.16
Prelude Dr / On Ramp	•	62	5	5	0	0%	0.00
P 6	+	63	3	3	0	0%	0.00
	1	66	3	3	0	7%	0.11
nde	1	67	4	4	0	-5%	0.10
Pre	^	68	8	7	-1	-8%	0.22
۵۲/	-	69	6	6	0	0%	0.00
ave	←	70	7	7	0	3%	0.08
ıgsı	•	71	5	5	0	4%	0.09
ž	_	72	1	1	0	0%	0.00
Гa	+	73	8	8	0	0%	0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	4	74	1	1	0	0%	0.00
atha	1	75	1	1	0	0%	0.00
raw	→	76	2	2	0	-10%	0.15
	-	77	15	15	0	1%	0.05
WB		78	0	0	0	#DIV/0!	0.00
lvd /	1	79	0	0	0	#DIV/0!	0.00
a B ≪	₹	80	0	0	0	#DIV/0!	0.00
ndil	-	81	4	4	0	5%	0.10
watha Dr / Bundilla Blvd Off Ramp / Seriata Way	▲	82	18	18	0	1%	0.05
a Dr ≀amı	+	83	0	0	0	#DIV/0!	0.00
vath. Off F	4	84	11	10	-1	-7%	0.25
arav		85	0	0	0	#DIV/0!	0.00
×	*	86	0	0	0	#DIV/0!	0.00
Dr/	H	114 111	0	0	0	#DIV/0! #DIV/0!	0.00
okai ihop	*	111	11	11	0	#DIV/0! 2%	0.00
Mok ek S	H	112	0	0	0	#DIV/0!	0.06
Or/ Cre	1	115	0	0	0	#DIV/0!	0.00
tha l	<u> </u>	116	8	8	0	#DIV/0!	0.00
Karawatha Dr / Molokai Dr / Karawatha Dr / Bundilla Blvd / WB Mountain Creek Shops Off Ramp / Seriata Way	*	117	8	8	0	2%	0.00
ž Z	=	118	18	18	0	-1%	0.05
	_		.5	Ņ	,	. 70	2.00

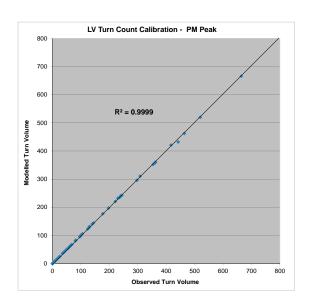


LV Turn Count Calibration

Observations: GEH < 5: 66 100.0% 0.9999 R²:

		VISSIM ID	Observed	Modelled	Difference	% Difference	GEH
). /	1	19	42	42	0	0%	0.03
P D	^	20	0	0	0	#DIV/0!	0.00
Ash	—	21	0	0	0	#DIV/0!	0.00
ıntain As Berrigan	←	22	6	6	0	0%	0.00
Mountain Ash Dr / Berrigan Pl	L.	24	6	6	0	7%	0.16
2	+	23	97	96	-1	-1%	0.12
ž	•	25	0	0	0	#DIV/0!	0.00
/Birch	1	26	0	0	0	#DIV/0!	0.00
/Bi	•	27	48	48	0	0%	0.03
Ash Dr	₩	34	98	97	-1	-1%	0.06
Asl	+	35	236	235	-1	0%	0.07

_	†	19	42	42	0	0%	0.03
č	->	20	0	0	0	#DIV/0!	0.00
로 급							
a As	₩	21	0	0	0	#DIV/0!	0.00
ri gi	▲	22	6	6	0	0%	0.00
untain Ash I Berrigan PI	Ψ.						
Mountain Ash Dr / Berrigan Pl		24	6	6	0	7%	0.16
~	+	23	97	96	-1	-1%	0.12
	₹ 1	25	0	0	0		0.00
భ						#DIV/0!	
5 5	↑	26	0	0	0	#DIV/0!	0.00
薑	-	27	48	48	0	0%	0.03
ž							
4	▼	34	98	97	-1	-1%	0.06
As	←	35	236	235	-1	0%	0.07
.⊑	*	36	15	15	0	0%	0.00
Ę	₹						
2	l L.	31	5	5	0	4%	0.09
2	+	32	0	0	0	#DIV/0!	0.00
3							
m m	4	33	1	1	0	0%	0.00
ğ		28	0	0	0	#DIV/0!	0.00
ij.		29	130	129	-1	0%	0.05
Glenfields Blvd / Mountain Ash Dr / Birch St	→						
	→	30	5	5	0	0%	0.00
-	•	45	0	0	0	#DIV/0!	0.00
₽	<u>†</u>	46	0	0	0		
Wa						#DIV/0!	0.00
eer	^	47	24	24	0	2%	0.08
ō	↓	48	35	36	1	2%	0.10
Ē	+	49	354	352	-2	-1%	0.10
Es							
ea	▲ _	50	55	54	-1	-2%	0.14
Glenfields Blvd / Parklea Espl / Greenway Pl	L	51	39	39	0	1%	0.03
ď	Ť	52	0	0	0	#DIV/0!	0.00
2							
<u></u>	◀	53	0	0	0	#DIV/0!	0.00
ğ		54	3	3	0	-7%	0.12
iĝ.	_	55	177	177	0	0%	0.02
98	_						
	→	56	3	2	-1	-20%	0.37
ωg	٦	57	82	83	1	1%	0.11
흥 등	1	58	197	197	0	0%	0.01
£ - 6	<u> </u>	60	362	359	-3	-1%	0.18
Glenfields Ivd / Prelud Dr							
Glenfields Blvd / Prelude Dr							
		59	240	241	1	0%	0.04
	<u></u> ↑	61	297	296	-1	0%	0.06
		61 62	297 140	296 140	-1 0	0% 0%	0.06 0.03
Prelude Dr / On Ramp		61	297	296	-1	0%	0.06
Prelude Dr / On Ramp		61 62	297 140	296 140	-1 0	0% 0%	0.06 0.03 0.11
Prelude Dr / On Ramp	↑ → →	61 62 63 66	297 140 362 124	296 140 360 123	-1 0 -2 -1	0% 0% -1% -1%	0.06 0.03 0.11 0.11
Prelude Dr / On Ramp	↑ → ↑	61 62 63 66 67	297 140 362 124 105	296 140 360 123 106	-1 0 -2 -1 1	0% 0% -1% -1%	0.06 0.03 0.11 0.11 0.06
Prelude Dr / On Ramp	↑ → →	61 62 63 66	297 140 362 124	296 140 360 123	-1 0 -2 -1	0% 0% -1% -1%	0.06 0.03 0.11 0.11
Prelude Dr / On Ramp	↑ → ↑	61 62 63 66 67 68	297 140 362 124 105	296 140 360 123 106	-1 0 -2 -1 1	0% 0% -1% -1% 1%	0.06 0.03 0.11 0.11 0.06 0.07
Prelude Dr / On Ramp	↑ → ↑ ↓	61 62 63 66 67 68 69	297 140 362 124 105 68 221	296 140 360 123 106 67 221	-1 0 -2 -1 1 -1 0	0% 0% -1% -1% 1% -1% 0%	0.06 0.03 0.11 0.11 0.06 0.07 0.03
Prelude Dr / On Ramp	← 	61 62 63 66 67 68 69 70	297 140 362 124 105 68 221 417	296 140 360 123 106 67 221 421	-1 0 -2 -1 1 -1 0 4	0% 0% -1% -1% 1% -1% 0% 1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21
Prelude Dr / On Ramp	↑ → ↑ ↓	61 62 63 66 67 68 69 70	297 140 362 124 105 68 221	296 140 360 123 106 67 221	-1 0 -2 -1 1 -1 0	0% 0% -1% -1% 1% -1% 0% -1% -1% 0% -1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14
Prelude Dr / On Ramp	← 	61 62 63 66 67 68 69 70	297 140 362 124 105 68 221 417	296 140 360 123 106 67 221 421	-1 0 -2 -1 1 -1 0 4	0% 0% -1% -1% 1% -1% 0% 1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21
Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71	297 140 362 124 105 68 221 417 130	296 140 360 123 106 67 221 421 132 63	-1 0 -2 -1 1 -1 0 4 2	0% 0% -1% -1% 1% -1% 0% 1% 0%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14
Prelude Dr / On Ramp	← ←	61 62 63 66 67 68 69 70 71 72	297 140 362 124 105 68 221 417 130 63 244	296 140 360 123 106 67 221 421 132 63	-1 0 -2 -1 1 -1 0 4 2	0% 0% -1% -1% -1% 0% -1% 0% -1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14
Prelude Dr / On Ramp	← ← ← ← ← ← ← ← ← ←	61 62 63 66 67 68 69 70 71 72 73	297 140 362 124 105 68 221 417 130 63 244 26	296 140 360 123 106 67 221 421 132 63 242 25	-1 0 -2 -1 1 -1 0 4 2 0 -2 -1	0% 0% -1% -1% 1% -1% 0% -1% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13
Prelude Dr / On Ramp	← ←	61 62 63 66 67 68 69 70 71 72	297 140 362 124 105 68 221 417 130 63 244	296 140 360 123 106 67 221 421 132 63	-1 0 -2 -1 1 -1 0 4 2	0% 0% -1% -1% -1% 0% -1% 0% -1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14
Prelude Dr / On Ramp	← ← ← ← ← ← ← ← ← ←	61 62 63 66 67 68 69 70 71 72 73	297 140 362 124 105 68 221 417 130 63 244 26	296 140 360 123 106 67 221 421 132 63 242 25	-1 0 -2 -1 1 -1 0 4 2 0 -2 -1	0% 0% -1% -1% 1% -1% 0% -1% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13
Prelude Dr / On Ramp	← ← ← ← ↓ ↓ ↓ → ¬ ↑ ↑ ↑	61 62 63 66 67 68 69 70 71 72 73 74 75	297 140 362 124 105 68 221 417 130 63 244 26 21 99	296 140 360 123 106 67 221 421 132 63 242 25 20 99	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 1 -1	0% 0% -1% -1% -1% 0% 1% 0% 1% 0% -1% 0% -1% 0% -3% 0%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← ← ← ↓ ↓ ↓ ↓ → ¬ ←	61 62 63 66 67 68 69 70 71 72 73 74 75 76	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0	0% 0% -1% -1% 1% 0% 1% 0% 1% -1% 0% -1% -3% -3% 0% -2%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75	297 140 362 124 105 68 221 417 130 63 244 26 21 99	296 140 360 123 106 67 221 421 132 63 242 25 20 99	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 1 -1	0% 0% -1% -1% -1% 0% 1% 0% 1% 0% -1% 0% -1% 0% -3% 0%	0.06 0.03 0.11 0.11 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.01 0.02
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← ← ← ← ↓ ↓ ↓ → ¬ ↑ ↑ ↑	61 62 63 66 67 68 69 70 71 72 73 74 75 76	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0	0% 0% -1% -1% 1% 0% 1% 0% 1% -1% 0% -1% -3% -3% 0% -2%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -3% -3% -3% -2% -0% -0%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -1% -3% -3% -3% -2% -6% -6% -6% -6% -6% -6% -6% -6% -6% -6	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -3% -3% -3% -2% -0% -0%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -1% -3% -3% -3% -2% -6% -6% -6% -6% -6% -6% -6% -6% -6% -6	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← <u>h</u> → 	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 80 81	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 80 664	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 80 666	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 -1 0 -1 0 0 0 -2 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% 1% 0% 1% 0% -1% 0% -1% 0% -1% 0% -1% -3% -3% 0% -2% 0% 0% 0% 1%	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← <u>h</u> → 	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 4 80 664 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 8 4 80 666 0	-1 0 -1 0 -1 0 -1 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% 1% 0% 1% 1% 0% -1% 0% -1% 0% -1% 0% -1% -3% -3% 0% -2% 0% 0% 0% 0% 0% 0% 0% 0% 0%	0.06 0.03 0.11 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← ← ← ← ← ↓ ↓ ↓ ↓ → → ¬ ← ↑ ↑ ↑ ↑ ← ↓ ↓ ↓ ↓ → ¬	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 81 82 83 84	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 8 4 0 664 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 0 666 0	-1 0 -1 1 0 4 2 0 0 -2 -1 1 0 0 0 0 0 0 0 0 2 0 0 2	0% 0% -1% -1% -1% 0% -1% 0% 1% -1% 0% -1% 0% -1% 0% -1% -3% 0% -2% 0% 0% -2% 0% 0% -2% 0% 0% -1% -2% 0% 0% -1% -2% -2% -2% -2% -2% -2% -2% -2% -2% -2	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← <u>h</u> → 	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 4 80 664 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 8 4 80 666 0	-1 0 -1 0 -1 0 -1 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% 1% 0% 1% 1% 0% -1% 0% -1% 0% -1% 0% -1% -3% -3% 0% -2% 0% 0% 0% 0% 0% 0% 0% 0% 0%	0.06 0.03 0.11 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp	← ← ← ← ← ↓ ↓ ↓ ↓ → → ¬ ← ↑ ↑ ↑ ↑ ← ↓ ↓ ↓ ↓ → ¬	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 81 82 83 84	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 8 4 0 664 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 0 666 0	-1 0 -1 1 0 4 2 0 0 -2 -1 1 0 0 0 0 0 0 0 0 2 0 0 2	0% 0% -1% -1% -1% 0% -1% 0% 1% -1% 0% -1% 0% -1% 0% -1% -3% 0% -2% 0% 0% -2% 0% 0% -2% 0% 0% -1% -2% 0% 0% -1% -2% -2% -2% -2% -2% -2% -2% -2% -2% -2	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.04 0.04
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 80 664 0 230 96 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 66 60 0 232	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 1 0 0 -2 -1 0 0 0 0 0 0 0 0 2 0 2 -1 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -0% -1% -3% -3% -2% -0% -2% -0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.04 0.08 0.00 0.14 0.06 0.00
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 80 81 82 83 84 85 86	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 4 80 664 0 230 96 0 60	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 80 6666 0 232 95 0 60	-1 0 -2 -1 1 -1 0 4 2 0 -2 -1 -1 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% 1% 0% 1% 0% 1% -1% 0% -1% -3% -3% 0% -2% 0% 0% 1% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.04 0.08 0.00 0.00
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 80 664 0 230 96 0	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 66 60 0 232	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 1 0 0 -2 -1 0 0 0 0 0 0 0 0 2 0 2 -1 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -0% -1% -3% -3% -2% -0% -2% -0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.04 0.08 0.00 0.14 0.06 0.00
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 80 81 82 83 84 85 86	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 4 80 664 0 230 96 0 60	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 80 6666 0 232 95 0 60	-1 0 -2 -1 1 -1 0 4 2 0 -2 -1 -1 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% 1% 0% 1% 0% 1% -1% 0% -1% -3% -3% 0% -2% 0% 0% 1% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.04 0.08 0.00 0.00
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 114 111	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 0 664 0 230 96 0 60 56 464	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 8 0 666 0 232 95 0 60 56 462	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0 0 2 0 0 2 -1 -1 0 0 0 0 0 -2 -1 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% -1% 0% -1% 0% -1% -3% -3% 0% -2% 0% 0% -2% 0% -2% 0% -2% 0% -2% 0% -2% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.02 0.47 0.00 0.00 0.04 0.08 0.00 0.14 0.08 0.00 0.14 0.06 0.00 0.00 0.05 0.07
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 81 111 111	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 8 0 664 0 230 96 0 0 60 56 464 12	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 0 666 0 232 95 0 60 56 462	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0 2 0 2 -1 0 0 0 -2 0 0 -2 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% -1% 0% -1% -1% -3% -3% 0% -2% 0% 0% -2% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% -3% 0% -2% -3% -3% -3% -3% -3% -3% -3% -3% -3% -3	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.01 0.04 0.08 0.00 0.14 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.0
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 81 82 83 84 85 86 114 111 112	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 8 0 664 0 230 96 0 60 56 464	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 8 0 666 0 232 95 0 60 56 462	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0 0 2 0 0 2 -1 -1 0 0 0 0 0 -2 -1 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% -1% 0% -1% 0% -1% -3% -3% 0% -2% 0% 0% -2% 0% -2% 0% -2% 0% -2% 0% -2% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.00 0.00
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 81 111 111	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 8 0 664 0 230 96 0 0 60 56 464 12	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 0 666 0 232 95 0 60 56 462	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 -1 0 0 -2 -1 -1 0 0 0 0 2 0 2 -1 0 0 0 -2 0 0 -2 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% -1% 0% -1% -1% -3% -3% 0% -2% 0% 0% -2% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% 0% -2% -3% -3% 0% -2% -3% -3% -3% -3% -3% -3% -3% -3% -3% -3	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.01 0.04 0.08 0.00 0.14 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.0
Karawatha Dr / Bundilla Blvd / WB Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp Off Ramp / Seriata Way	←	61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 114 111 112 113	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 8 0 664 0 230 96 0 60 566 464 12 40 308	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 66 60 0 232 95 0 60 56 64 12 40 311	-1 0 -2 -1 1 1 -1 0 4 2 0 -2 -1 -1 0 0 0 0 0 0 0 0 2 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.02 0.47 0.00 0.00 0.00 0.00 0.01 0.14 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.0
Karawatha Dr / Lady Musgrave Dr / Prelude Dr / On Ramp		61 62 63 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 81 82 83 84 85 86 114 111 112	297 140 362 124 105 68 221 417 130 63 244 26 21 99 442 4 8 4 0 664 0 230 96 0 60 60 65 464 12	296 140 360 123 106 67 221 421 132 63 242 25 20 99 432 4 8 4 8 0666 0 232 95 0 60 60 56 462 12	-1 0 -2 -1 1 1 0 4 2 0 -2 -1 1 0 0 -2 -1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0% 0% -1% -1% -1% 0% -1% -1% 0% -1% -1% 0% -1% -3% 0% -2% 0% 0% -2% 0% -2% 0% -2% 0% -2% 0% -2% 0% -1% -1% -1% -1% -1% -1% -1% -1% -1% -1	0.06 0.03 0.11 0.11 0.06 0.07 0.03 0.21 0.14 0.00 0.13 0.16 0.13 0.02 0.47 0.00 0.00 0.00 0.00 0.00 0.00 0.00

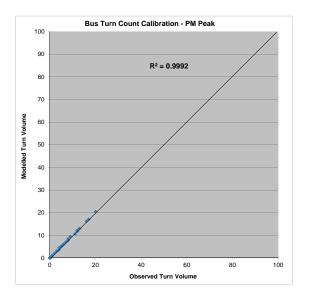


Bus Turn Count Calibration

Observations: 66 **GEH < 5:** 66 100.0%

R ² :	0.9992

		VISSIM ID	Observed	Modelled	Difference	% Difference	GEH
_	1	19	0	0	0	#DIV/0!	0.00
Mountain Ash Dr / Berrigan Pl	→	20	0	0	0	#DIV/0!	0.00
Ash an P	÷	21	0	0	0	#DIV/0!	0.00
untain Ash I Berrigan PI	<u>*</u>	22	0	0	0	#DIV/0!	0.00
oguri Be	L	24	0	0	0	#DIV/0!	0.00
Š	Ť	23	0	0	0	#DIV/0!	0.00
	4	25	0	0	0	#DIV/0!	0.00
Glenfields Blvd / Mountain Ash Dr / Birch St	+	26	0	0	0	#DIV/0!	0.00
ä		27	0	0	0	#DIV/0!	0.00
<u>'</u>	_	34	0	0	0	#DIV/0!	0.00
Ash	+	35	9	9	0	4%	0.13
ä	*	36	0	0	0	#DIV/0!	0.00
ž.		31	0	0	0	#DIV/0!	0.00
ž	→	32	0	0	0	#DIV/0!	0.00
3Kd	+	33	0	0	0	#DIV/0!	0.00
as	-	28	0	0	0	#DIV/0!	0.00
ufiel	=	29	6	6	0	0%	0.00
<u>e</u>		30	0	0	0	#DIV/0!	0.00
	4	45	0	0	0	#DIV/0!	0.00
≥	1	46	0	0	0		
nwa	-	46			0	#DIV/0!	0.00
эrее	H	47	0	0	0	#DIV/0! #DIV/0!	0.00
2	*						
Glenfields Blvd / Parklea Espl / Greenway Pl	←	49 50	9	9	0	4% #DIV/OI	0.13
klea	-					#DIV/0!	0.00
Par	-	51	0	0	0	#DIV/0!	0.00
/p/	+	52	0	0	0	#DIV/0!	0.00
S B	4	53	0	0	0	#DIV/0!	0.00
field	1	54	0	0	0	#DIV/0!	0.00
elen	→	55	6	6	0	0%	0.00
	-▼	56	0	0	0	#DIV/0!	0.00
Glenfields Blvd / Prelude Dr	1	57	1	1	0	0%	0.00
Glenfields ilvd / Preluc Dr	1	58	8	8	0	-3%	0.07
Gler Vd /	4	60	8	8	0	5%	0.14
		59	6	6	0	0%	0.00
Prelude Dr / On Ramp	1	61	11	11	0	-4%	0.12
elud on R	Ľ	62	3	3	0	0%	0.00
	*	63	8	8	0	2%	0.07
ē Ā		66	4	4	0	-10%	0.21
Pin (1	67	2	2	0	0%	0.00
ă.	^	68	5	5	0	0%	0.00
۵	₩	69	5	5	0	4%	0.09
rave	+	70	12	12	0	-2%	0.06
Jase	<u>*</u>	71	3	3	0	0%	0.00
ž S	+	72	1	1	0	0%	0.00
Ĕ	+	73	8	8	0	-3%	0.07
Karawatha Dr / Lady Musgrave Dr / Prelude Dr	4	74	1	1	0	0%	0.00
ath		75	0	0	0	#DIV/0!	0.00
araw	-	76	1	1	0	0%	0.00
	-▼	77	12	12	0	-2%	0.06
W.	\vdash	78	0	0	0	#DIV/0!	0.00
lvd /	1	79	0	0	0	#DIV/0!	0.00
vatha Dr / Bundilla Blvd Off Ramp / Seriata Way	₹	80	0	0	0	#DIV/0!	0.00
ndil eriat	-	81	4	4	0	10%	0.20
/Bu	4_	82	20	20	0	2%	0.09
a Dr	+	83	0	0	0	#DIV/0!	0.00
ath Off F	4	84	7	7	0	0%	0.00
araw		85	0	0	0	#DIV/0!	0.00
꽃	7	86	0	0	0	#DIV/0!	0.00
7	\Box	114	0	0	0	#DIV/0!	0.00
(ai □	₹	111	0	0	0	#DIV/0!	0.00
lolo k Sh	←	112	17	17	0	0%	0.00
Karawatha Dr / Molokai Dr / Karawatha Dr / Bundilla Blvd / WB Mountain Creek Shops Off Ramp / Seriata Way	▲	113	0	0	0	#DIV/0!	0.00
in C	L,	115	0	0	0	#DIV/0!	0.00
wath	4	116	16	16	0	1%	0.05
Mo		117	12	12	0	2%	0.06
¥	+	118	13	13	0	0%	0.00

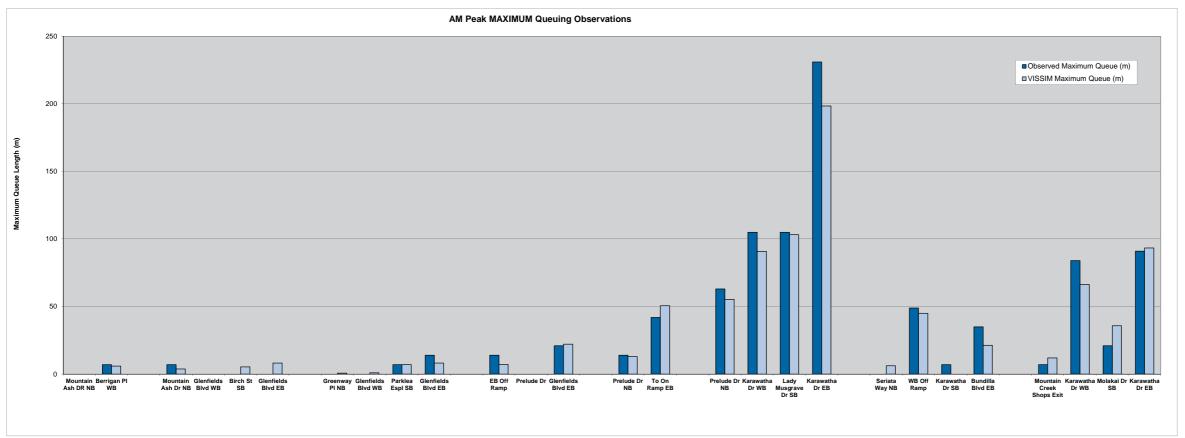


Appendix J

Detailed Queue Length Validation Statistics - VISSIM

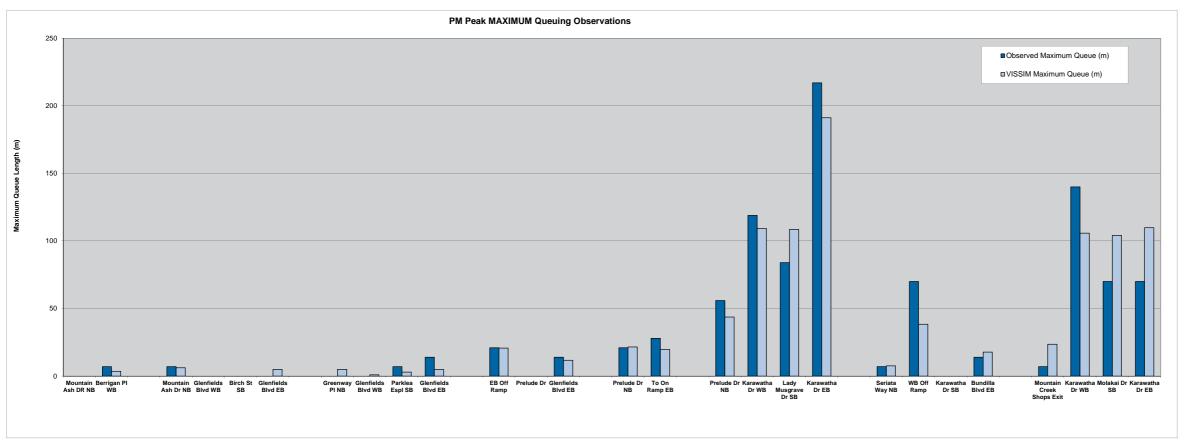
AM Peak Queue Length Calibration

Intersection		Approach	Counter	Observed Maximum Queue (m)	VISSIM Maximum Queue (m)
Mountain Ash Dr / Barrigan Bl	↑	Mountain Ash DR NB	7	0	0
Mountain Ash Dr / Berrigan Pl	₽	Berrigan PI WB	8	7	6
	4	Mountain Ash Dr NB	9	7	4
Glenfields Blvd / Mountain Ash Dr /	4	Glenfields Blvd WB	12	0	0
Birch St	4	Birch St SB	11	0	5
	\Rightarrow	Glenfields Blvd EB	10	0	8
	4	Greenway PI NB	16	0	1
Glenfields Blvd / Parklea Espl /	4	Glenfields Blvd WB	17	0	1
Greenway PI	↔	Parklea Espl SB	18	7	7
	→	Glenfields Blvd EB	19	14	8
	⁴]∱	EB Off Ramp	20	14	7
Glenfields Blvd / Prelude Dr / EB Off Ramp	▲	Prelude Dr	21	0	0
5.7.Tamp	1	Glenfields Blvd EB	22	21	22
	►	Prelude Dr NB	23	14	13
Prelude Dr / On Ramp	→	To On Ramp EB	24	42	51
	4	Prelude Dr NB	25/26	63	55
Karawatha Dr / Lady Musgrave Dr /	4	Karawatha Dr WB	27/28	105	91
Prelude Dr	4	Lady Musgrave Dr SB	29	105	103
	\Rightarrow	Karawatha Dr EB	30	231	198
	4	Seriata Way NB	31	0	6
Karawatha Dr / Bundilla Blvd / WB	4	WB Off Ramp	32	49	45
Off Ramp / Seriata Way	↔	Karawatha Dr SB	33	7	0
	→	Bundilla Blvd EB	34	35	21
	•	Mountain Creek Shops Exit	50	7	12
Karawatha Dr / Molakai Dr /		Karawatha Dr WB	45/46	84	66
Mountain Creek Shops	↓	Molakai Dr SB	47/51	21	36
	\Rightarrow	Karawatha Dr EB	48/49	91	93



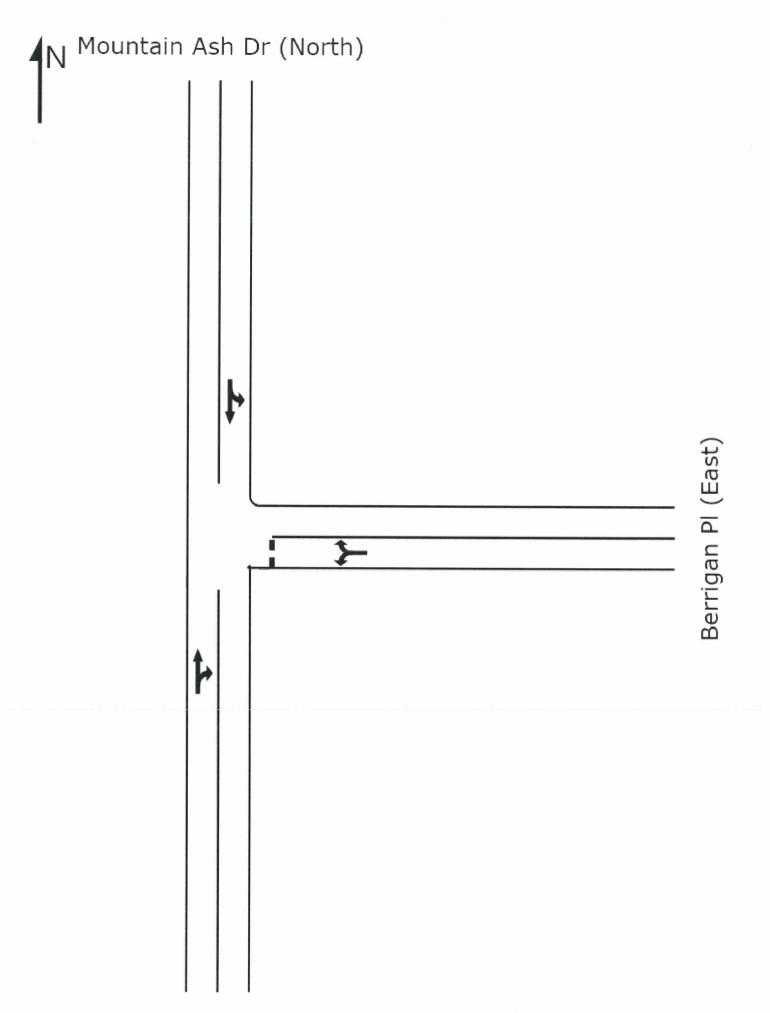
PM Peak Queue Length Calibration

Intersection		Approach	Counter	Observed Maximum Queue (m)	VISSIM Maximum Queue (m)
Manustain Aak Du / Daminan Di	↑	Mountain Ash DR NB	7	0	0
Mountain Ash Dr / Berrigan Pl	⊱	Berrigan PI WB	8	7	4
	4	Mountain Ash Dr NB	9	7	6
Glenfields Blvd / Mountain Ash Dr /	4	Glenfields Blvd WB	12	0	0
Birch St	4	Birch St SB	11	0	0
	→	Glenfields Blvd EB	10	0	5
	4	Greenway PI NB	16	0	5
Glenfields Blvd / Parklea Espl /	4	Glenfields Blvd WB	17	0	1
Greenway PI	↔	Parklea Espl SB	18	7	3
	\Rightarrow	Glenfields Blvd EB	19	14	5
	4]∱	EB Off Ramp	20	21	21
Glenfields Blvd / Prelude Dr / EB Off Ramp	←	Prelude Dr	21	0	0
On Nump		Glenfields Blvd EB	22	14	12
		Prelude Dr NB	23	21	22
Prelude Dr / On Ramp	→	To On Ramp EB	24	28	20
	4₽	Prelude Dr NB	25/26	56	44
Karawatha Dr / Lady Musgrave Dr /	4	Karawatha Dr WB	27/28	119	109
Prelude Dr	4	Lady Musgrave Dr SB	29	84	109
	→	Karawatha Dr EB	30	217	191
	4	Seriata Way NB	31	7	8
Karawatha Dr / Bundilla Blvd / WB	4	WB Off Ramp	32	70	38
Off Ramp / Seriata Way		Karawatha Dr SB	33	0	0
	→	Bundilla Blvd EB	34	14	18
	•	Mountain Creek Shops Exit	50	7	24
Karawatha Dr / Molakai Dr /		Karawatha Dr WB	45/46	140	106
Mountain Creek Shops	↓	Molakai Dr SB	47/51	70	104
	\Rightarrow	Karawatha Dr EB	48/49	70	110

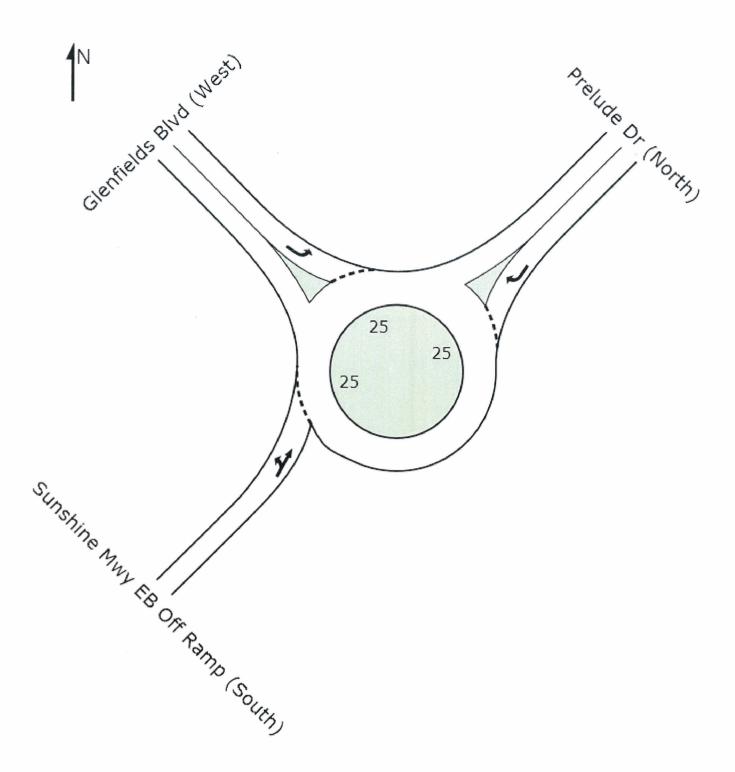


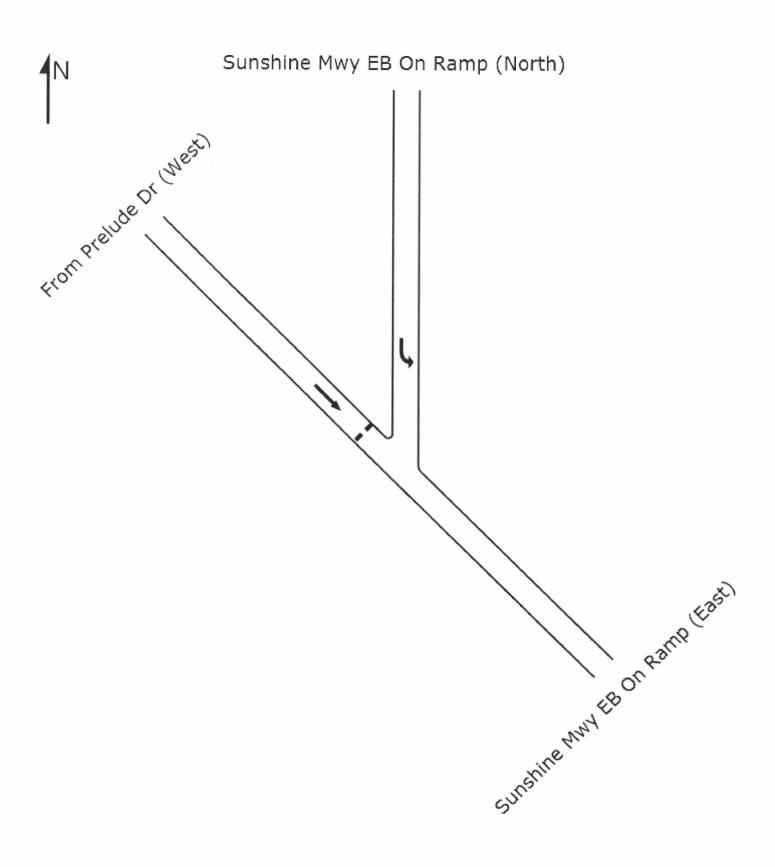
Appendix K

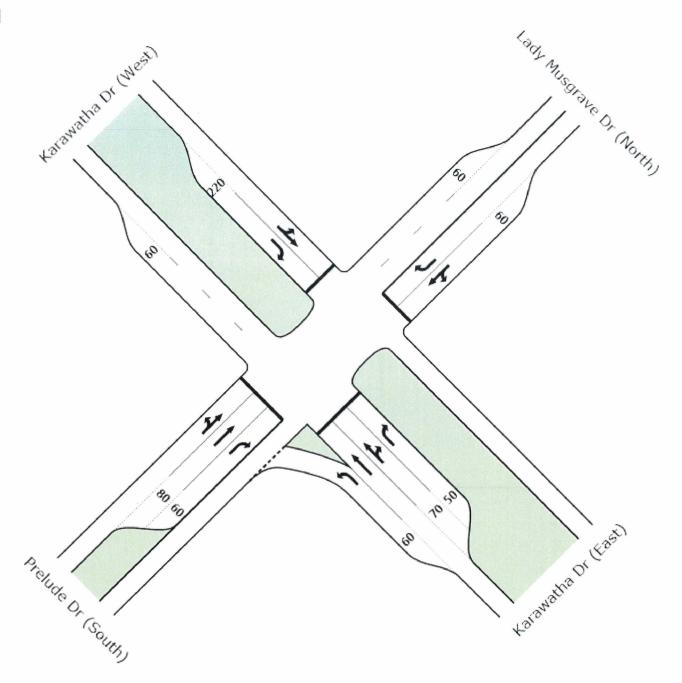
Intersection Layouts for Base SIDRA Models

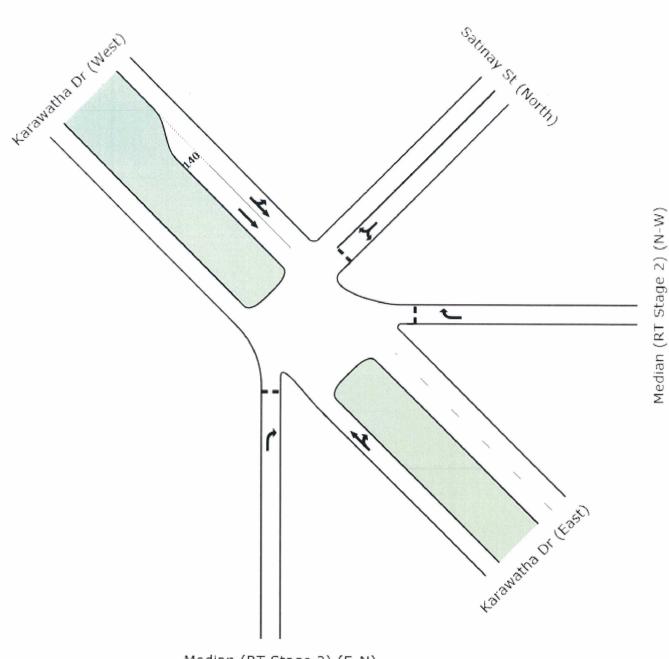


Mountain Ash Dr (South)

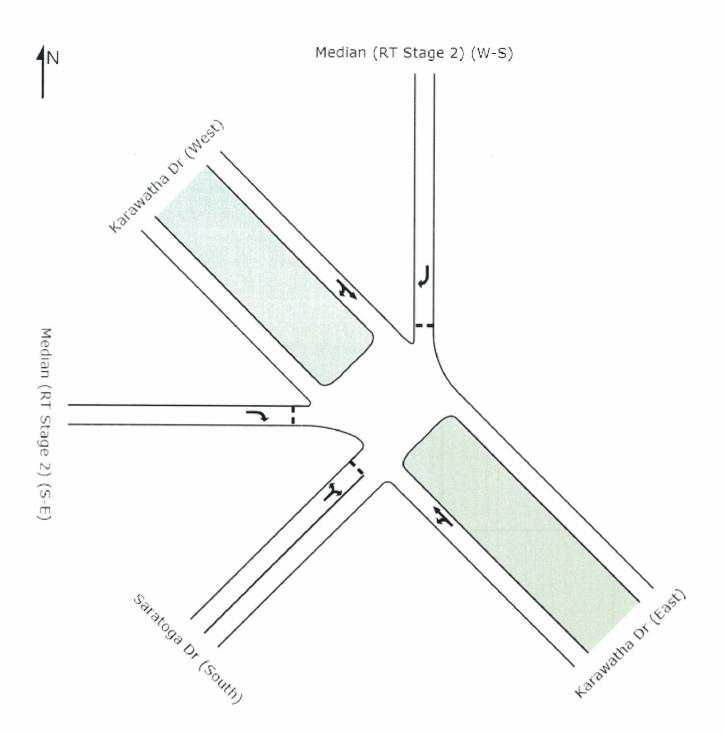




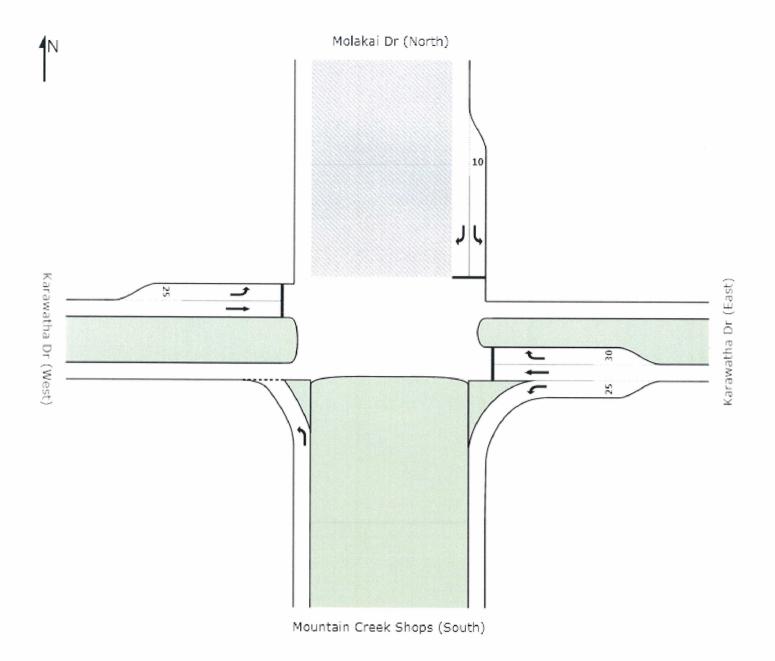




Median (RT Stage 2) (E-N)



Median (RT Stage 2) (E-N)

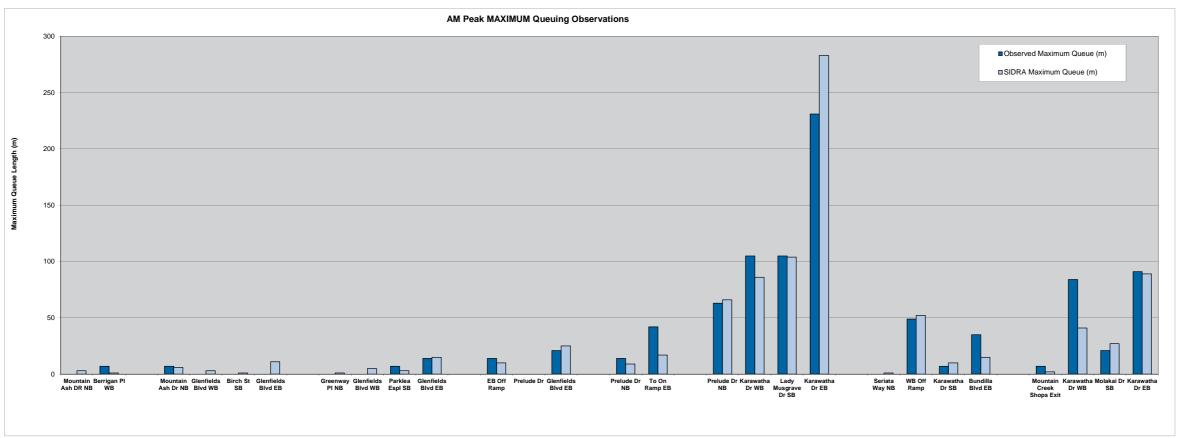


Appendix L

Detailed Queue Length Validation Statistics - SIDRA

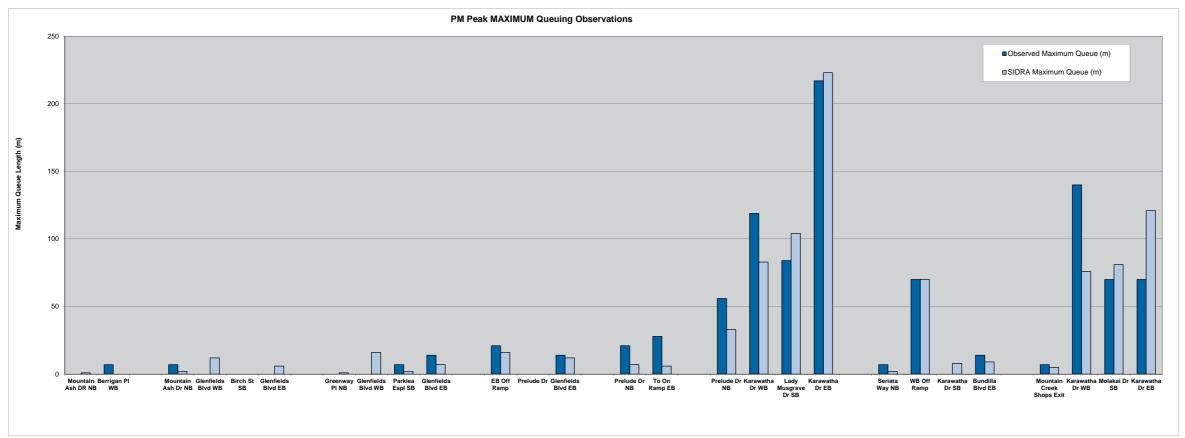
AM Peak Queue Length Calibration

Intersection		Approach	Counter	Observed Maximum Queue (m)	SIDRA Maximum Queue (m)
Mountain Ash Dr / Berrigan Pl	↑	Mountain Ash DR NB	7	0	3
wountain Ash Di / Berngan Fi	₽	Berrigan PI WB	8	7	1
	⁴	Mountain Ash Dr NB	9	7	6
Glenfields Blvd / Mountain Ash Dr /	4	Glenfields Blvd WB	12	0	3
Birch St	4	Birch St SB	11	0	1
	\uparrow	Glenfields Blvd EB	10	0	11
	4₽	Greenway PI NB	16	0	1
Glenfields Blvd / Parklea Espl /	4	Glenfields Blvd WB	17	0	5
Greenway PI	₩	Parklea Espl SB	18	7	3
	→	Glenfields Blvd EB	19	14	15
	⁴ๅ♠	EB Off Ramp	20	14	10
Glenfields Blvd / Prelude Dr / EB Off Ramp	▲	Prelude Dr	21	0	0
On Kamp		Glenfields Blvd EB	22	21	25
	┌►	Prelude Dr NB	23	14	9
Prelude Dr / On Ramp	→	To On Ramp EB	24	42	17
	4	Prelude Dr NB	25/26	63	66
Karawatha Dr / Lady Musgrave Dr /	4	Karawatha Dr WB	27/28	105	86
Prelude Dr	₩	Lady Musgrave Dr SB	29	105	104
	→	Karawatha Dr EB	30	231	283
	4	Seriata Way NB	31	0	1
Karawatha Dr / Bundilla Blvd / WB	4	WB Off Ramp	32	49	52
Off Ramp / Seriata Way	→	Karawatha Dr SB	33	7	10
	→	Bundilla Blvd EB	34	35	15
	•	Mountain Creek Shops Exit	50	7	2
Karawatha Dr / Molakai Dr /		Karawatha Dr WB	45/46	84	41
Mountain Creek Shops	↓	Molakai Dr SB	47/51	21	27
	\Rightarrow	Karawatha Dr EB	48/49	91	89



PM Peak Queue Length Calibration

Intersection		Approach	Counter	Observed Maximum Queue (m)	SIDRA Maximum Queue (m)
Manustain Aak Du / Daminan Di	↑	Mountain Ash DR NB	7	0	1
Mountain Ash Dr / Berrigan Pl	‡	Berrigan PI WB	8	7	0
	4∱>	Mountain Ash Dr NB	9	7	2
Glenfields Blvd / Mountain Ash Dr /	4	Glenfields Blvd WB	12	0	12
Birch St	4	Birch St SB	11	0	0
	\Rightarrow	Glenfields Blvd EB	10	0	6
	4₽	Greenway PI NB	16	0	1
Glenfields Blvd / Parklea Espl /	4	Glenfields Blvd WB	17	0	16
Greenway PI	4	Parklea Espl SB	18	7	2
	→	Glenfields Blvd EB	19	14	7
	4]∱	EB Off Ramp	20	21	16
Glenfields Blvd / Prelude Dr / EB Off Ramp	<u>+</u>	Prelude Dr	21	0	0
On Namp		Glenfields Blvd EB	22	14	12
	 	Prelude Dr NB	23	21	7
Prelude Dr / On Ramp	→	To On Ramp EB	24	28	6
	4	Prelude Dr NB	25/26	56	33
Karawatha Dr / Lady Musgrave Dr /	4	Karawatha Dr WB	27/28	119	83
Prelude Dr	4	Lady Musgrave Dr SB	29	84	104
	→	Karawatha Dr EB	30	217	223
	4₽	Seriata Way NB	31	7	2
Karawatha Dr / Bundilla Blvd / WB	4	WB Off Ramp	32	70	70
Off Ramp / Seriata Way	4	Karawatha Dr SB	33	0	8
	→	Bundilla Blvd EB	34	14	9
	4	Mountain Creek Shops Exit	50	7	5
Karawatha Dr / Molakai Dr /	4	Karawatha Dr WB	45/46	140	76
Mountain Creek Shops	↓	Molakai Dr SB	47/51	70	81
	\Rightarrow	Karawatha Dr EB	48/49	70	121



Appendix M

Future 2022 AM and PM Trip Matrices (Without Development)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	1	0	0	1	0	0	16	0	1	0	0	0	34	36	0	0	20	0	109
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	11	12	0	0	6	0	36
4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	0	0	5	0	23
5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	10	10	0	0	5	0	29
6	1	0	1	0	0	0	2	2	4	0	0	33	1	4	0	0	0	79	82	0	0	47	0	257
7	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	9	9	0	0	5	0	28
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
9	2	0	1	0	0	3	0	1	0	0	0	8	0	1	0	0	0	19	20	0	0	11	0	67
10	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	0	0	4	0	22
11	4	0	1	1	1	7	1	1	5	1	0	36	0	5	0	0	0	83	87	0	0	49	0	283
12	9	0	2	2	1	15	2	2	10	4	0	0	97	0	6	5	5	40	337	0	0	110	0	648
13	1	0	0	0	0	1	0	0	1	0	0	122	0	0	0	0	0	4	33	0	0	8	0	171
14	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	0	0	54
15	2	0	0	0	0	4	0	0	1	0	0	11	0	1	0	1	0	5	50	0	0	11	0	87
16	2	0	0	0	0	4	0	0	1	0	0	11	0	1	0	0	1	5	50	0	0	11	0	87
17	2	0	0	0	0	4	0	0	1	0	0	11	0	1	0	0	0	5	50	0	0	12	0	87
18	2	0	0	0	0	4	0	0	1	1	0	33	1	1	0	0	0	0	264	0	0	61	0	368
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1852	0	0	0	1852
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1852	0	0	0	0	1852
21	5	0	5	4	2	10	6	6	12	6	0	160	15	25	5	5	5	214	133	0	0	66	0	685
22	2	0	0	0	0	4	0	0	1	1	0	61	2	7	1	1	1	74	63	0	0	0	0	219
23	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	5
	35	0	11	7	5	56	12	13	39	13	0	580	117	49	12	12	12	608	3104	1852	0	432	0	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	5	0	0	2	0	10
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	4	0	0	0	6	0	15
12	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	18	0	0	2	0	32
13	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	0	0	1	0	12
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	98
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	98
21	0	0	0	0	0	4	0	0	0	0	0	9	0	0	0	0	0	6	4	0	0	5	0	27
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	6	0	0	0	0	0	23	10	0	0	0	0	12	135	98	0	18	0	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	20	0	0	4	0	33
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	6	0	0	1	0	11
4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	7
5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	7
6	4	0	1	1	0	0	0	2	3	3	0	20	1	2	1	1	1	22	86	0	0	14	0	164
7	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	0	0	7
8	1	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	7
9	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	7	28	0	0	5	0	47
10	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	17	0	0	2	0	29
11	13	0	5	2	1	54	4	2	12	7	0	80	2	10	3	3	2	85	0	0	0	55	0	340
12	17	0	5	4	1	63	4	2	14	10	0	0	176	0	4	10	9	23	361	0	0	108	0	809
13	0	0	2	0	0	4	0	0	1	0	0	375	0	0	0	1	1	2	28	0	0	9	0	424
14	0	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73
15	0	0	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0	0	5	0	0	1	0	12
16	0	0	0	0	0	2	0	0	0	0	0	4	0	0	0	0	0	0	6	0	0	1	0	13
17	0	0	0	0	0	0	0	0	1	1	0	5	0	0	0	0	0	0	5	0	0	1	0	13
18	10	0	2	2	1	39	3	1	9	6	0	25	0	3	1	1	1	0	223	0	0	77	0	406
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1853	0	0	0	1853
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1853	0	0	0	0	1853
21	32	0	9	7	3	122	8	5	28	18	0	346	10	43	12	12	12	142	0	0	0	98	5	912
22	0	0	0	0	0	0	0	0	0	0	0	55	1	7	1	1	1	15	34	0	0	0	0	117
23	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	1	2	0	0	5	0	15
	77	0	24	17	7	289	18	13	70	46	0	1014	190	68	22	29	28	312	2687	1853	0	383	5	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	7
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	5	0	11
12	0	0	0	0	0	2	0	0	0	0	0	0	15	0	0	0	0	0	12	0	0	1	0	30
13	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	20
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	9	0	0	1	0	12
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	98
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	98
21	0	0	0	0	0	6	0	0	0	0	0	15	0	0	0	0	0	4	0	0	0	5	0	29
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	11	0	0	0	0	0	40	15	0	0	0	0	6	122	98	0	13	0	

Appendix N

Future 2022 AM and PM Trip Matrices (With Development)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	2	0	0	0	1	0	0	1	0	0	16	0	1	0	0	0	34	36	0	0	20	0	110
2	2	0	1	0	0	5	0	0	1	1	0	20	3	0	1	1	1	6	20	0	0	12	0	74
3	0	1	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	11	12	0	0	6	0	36
4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	0	0	5	0	24
5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	10	10	0	0	5	0	30
6	1	5	1	0	0	0	2	2	4	0	0	33	1	4	0	0	0	79	82	0	0	47	0	262
7	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	9	9	0	0	5	0	28
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3
9	2	1	1	0	0	3	0	1	0	0	0	8	0	1	0	0	0	19	20	0	0	11	0	69
10	0	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	0	0	4	0	23
11	4	8	1	1	1	7	1	1	5	1	0	36	0	5	0	0	0	83	87	0	0	49	0	291
12	9	20	2	2	1	15	2	2	10	4	0	0	97	0	6	5	5	40	337	0	0	110	0	668
13	1	3	0	0	0	1	0	0	1	0	0	122	0	0	0	0	0	4	33	0	0	8	0	173
14	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	0	0	54
15	2	1	0	0	0	4	0	0	1	0	0	11	0	1	0	1	0	5	50	0	0	11	0	87
16	2	1	0	0	0	4	0	0	1	0	0	11	0	1	0	0	1	5	50	0	0	11	0	87
17	2	1	0	0	0	4	0	0	1	0	0	11	0	1	0	0	0	5	50	0	0	12	0	87
18	2	5	0	0	0	4	0	0	1	1	0	33	1	1	0	0	0	0	264	0	0	61	0	374
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1852	0	0	0	1852
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1852	0	0	0	0	1852
21	5	19	5	4	2	10	6	6	12	6	0	160	15	25	5	5	5	214	133	0	0	66	0	704
22	2	3	0	0	0	4	0	0	1	1	0	61	2	7	1	1	1	74	63	0	0	0	0	223
23	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	5
	37	72	12	8	5	61	13	14	40	14	0	600	120	49	13	13	13	614	3123	1852	0	444	0	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	5	0	0	2	0	10
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	4	0	0	0	6	0	15
12	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	18	0	0	2	0	32
13	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	0	0	1	0	12
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	98
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	98
21	0	0	0	0	0	4	0	0	0	0	0	9	0	0	0	0	0	6	4	0	0	5	0	27
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	6	0	0	0	0	0	23	10	0	0	0	0	12	135	98	0	18	0	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	2	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	20	0	0	4	0	35
2	2	0	1	0	0	6	1	0	2	1	0	26	4	0	1	1	1	7	25	0	0	15	0	94
3	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	6	0	0	1	0	11
4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	8
5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	8
6	4	5	1	1	0	0	0	2	3	3	0	20	1	2	1	1	1	22	86	0	0	14	0	169
7	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	0	0	8
8	1	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	7
9	0	1	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	7	28	0	0	5	0	49
10	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	17	0	0	2	0	30
11	13	8	5	2	1	54	4	2	12	7	0	80	2	10	3	3	2	85	0	0	0	55	0	348
12	17	20	5	4	1	63	4	2	14	10	0	0	176	0	4	10	9	23	361	0	0	108	0	829
13	0	3	2	0	0	4	0	0	1	0	0	375	0	0	0	1	1	2	28	0	0	9	0	427
14	0	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73
15	0	1	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0	0	5	0	0	1	0	13
16	0	1	0	0	0	2	0	0	0	0	0	4	0	0	0	0	0	0	6	0	0	1	0	14
17	0	1	0	0	0	0	0	0	1	1	0	5	0	0	0	0	0	0	5	0	0	1	0	14
18	10	5	2	2	1	39	3	1	9	6	0	25	0	3	1	1	1	0	223	0	0	77	0	411
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1853	0	0	0	1853
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1853	0	0	0	0	1853
21	32	19	9	7	3	122	8	5	28	18	0	346	10	43	12	12	12	142	0	0	0	98	5	931
22	0	3	0	0	0	0	0	0	0	0	0	55	1	7	1	1	1	15	34	0	0	0	0	120
23	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	1	2	0	0	5	0	15
	79	72	25	18	8	295	19	13	72	47	0	1040	194	68	23	30	29	319	2712	1853	0	398	5	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	1	0	7
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	5	0	11
12	0	0	0	0	0	2	0	0	0	0	0	0	15	0	0	0	0	0	12	0	0	1	0	30
13	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	20
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	9	0	0	1	0	12
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	98
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	98
21	0	0	0	0	0	6	0	0	0	0	0	15	0	0	0	0	0	4	0	0	0	5	0	29
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	11	0	0	0	0	0	40	15	0	0	0	0	6	122	98	0	13	0	

Appendix O

2022 AM and PM Peak VISSIM Results (Without Development)

Mountain Ash Dr / Golf Course Access

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intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	4	0	0.0	0.0	Α	0	0.0
	Through	3	111	1.8	0.0	Α	0	0.0
	All		111	1.8	0.0	Α		0.0
Mountain Ash Dr (North)	Through	5	36	0.0	0.0	Α	2	0.0
	Right	6	0	0.0	0.0	Α	2	0.0
	All		36	0.0	0.0	Α		0.0
Golf Course Access (West)	Left	1	0	0.0	0.0	A	1	0.0
` '	Right	2	0	0.0	0.0	Α	1	0.0
	All		0	0.0	0.0	Α		0.0
ALL VEHICLES			147	1.4	0.0	Α		0.0

Mountain Ash Dr / Siris St / Micrantha PI

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Micrantha PI (South)	Left	10	0	0.0	0.0	Α	4	1.2
	Through	11	0	0.0	0.0	Α	4	1.2
	Right	12	23	0.0	0.3	Α	4	1.2
	All		23	0.0	0.3	Α		1.2
Mountain Ash Dr (East)	Left	16	8	0.0	0.3	А	5	0.0
	Through	17	36	0.0	0.4	Α	5	0.0
	Right	18	10	0.0	0.4	Α	5	0.0
	All		55	0.0	0.4	Α		0.0
Siris St (North)	Left	13	36	0.0	0.4	Α	6	3.8
	Through	14	0	0.0	0.0	Α	6	3.8
	Right	15	0	0.0	0.0	Α	6	3.8
	All		36	0.0	0.4	Α		3.8
Mountain Ash Dr (West)	Left	7	0	0.0	0.0	Α	3	4.4
	Through	8	111	1.8	0.3	Α	3	4.4
	Right	9	0	0.0	0.0	Α	3	4.4
	All		111	1.8	0.3	Α		4.4
ALL VEHICLES			225	0.9	0.3	A		4.4

Mountain Ash Dr / Berrigan Pl Intersection Type: Prio

FIIOTILY							
	vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Through	19	171	1.2	0.0	Α	7	0.0
Right	20	0	0.0	0.0	Α	7	0.0
AII		171	1.2	0.0	Α		0.0
Left	21	0	0.0	0.0	Α	8	6.0
Right	22	30	0.0	1.1	Α	8	6.0
AII		30	0.0	1.1	Α		6.0
Left	24	5	0.0	0.0	Α	0	0.0
Through	23	55	0.0	0.0	Α	0	0.0
AII		60	0.0	0.0	Α		0.0
•				•			5
		260	0.8	0.1	Α		6.0
	Through Right AII Left Right AII Left Through	VIZ ID Through 19 Right 20 All	VIZ ID Demand (vph)	Viz ID Demand (vph) WHVs	Viz ID Demand (vph) %HVs Ave. Delay (s)	VIZ ID Demand (vph) %HVs Ave. Delay (s) LoS	Viz ID Demand (vph) WHVs Ave. Delay (s) LoS stz ID

268

622

Glenfields Blvd / Mountain Ash Dr / Birch St

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	1	0.0	0.0	Α	9	4.8
	Through	26	0	0.0	0.0	Α	9	4.8
	Right	27	199	1.0	0.1	Α	9	4.8
	AII		200	1.0	0.1	Α		4.8
Glenfields Blvd (East)	Left	34	56	0.0	0.0	Α	12	0.0
, , , ,	Through	35	60	9.7	0.0	Α	12	0.0
	Right	36	10	0.0	0.0	Α	12	0.0
	AII		126	4.6	0.0	Α		0.0
Birch St (North)	Left	31	27	0.0	1.0	A	11	3.0
,	Through	32	1	0.0	1.5	Α	11	3.0
	Right	33	0	0.0	0.0	Α	11	3.0
	AII		28	0.0	1.0	Α		3.0
Glenfields Blvd (West)	Left	28	3	0.0	0.1	A	10	14.0
(******	Through	29	263	3.7	0.5	A	10	14.0
	Right	30	2	0.0	1.2	Α	10	14.0
						•		

0.5

0.3

14.0

14.0

Glenfields Blvd / Lacebark St

ALL VEHICLES

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Glenfields Blvd (South)	Through	41	487	2.4	0.0	Α	0	0.0
	Right	43	2	0.0	0.2	Α	0	0.0
	All		489	2.4	0.0	А		0.0
Median (RT Stage 2) (S-E)	Right	44	2	0.0	1.2	А	15	2.4
Lacebark St (East)	Left	37	0	0.0	0.0	А	13	0.0
	Right	38	3	0.0	0.7	A	13	
	All		3	0.0	0.7	A		0.0
Median (RT Stage 2) (E-N)	Right	39	3	0.0	1.1	Α	14	7.4
Glenfields Blvd (North)	Left	40	11	0.0	0.2	Α	0	0.0
	Through	42	126	4.6	0.0	Α	0	0.0
	AII		137	4.2	0.0	Α		0.0
ALL VEHICLES			634	2.8	0.0	A		7.4

2.8

Glenfields Blvd / Parklea Espl / Greenway Pl

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Greenway PI (South)	Left	45	0	0.0	0.0	Α	16	1.0
	Through	46	0	0.0	0.0	Α	16	1.0
	Right	47	22	0.0	0.1	Α	16	1.0
	AII		22	0.0	0.1	Α		1.0
Glenfields Blvd (East)	Left	48	13	0.0	0.0	Α	17	2.4
	Through	49	130	4.6	0.0	Α	17	2.4
	Right	50	35	0.0	0.2	Α	17	2.4
	AII		178	3.4	0.0	Α		2.4
Parklea Espl (North)	Left	51	60	0.0	1.3	Α	18	8.4
	Through	52	0	0.0	0.0	Α	18	8.4
	Right	53	7	0.0	2.4	Α	18	8.4
	AII		67	0.0	1.4	Α		8.4
Glenfields Blvd (West)	Left	54	5	0.0	0.2	Α	19	10.4
	Through	55	483	2.4	0.3	Α	19	10.4
	Right	56	0	0.0	0.0	Α	19	10.4
	AII		488	2.4	0.3	Α		10.4
ALL VEHICLES			755	2.4	0.3	Α		10.4

Glenfields Blvd / EB Off Ramp / Prelude Dr

Intersection Type:	Roundabout							
intersection Type.	Roundabout	vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
		VIZ ID	Demand (vpn)	/01143	Ave. Delay (3)	LUJ	SIZ ID	Wax Queue (III)
EB Off Ramp (South)	Left	57	26	9.2	0.3	Α	20	16.8
	Through	58	273	4.6	0.6	Α	20	16.8
	AII		299	5.0	0.6	Α		16.8
Prelude Dr (North)	Right	60	151	2.4	0.1	Α	21	0.0
	AII		151	2.4	0.1	Α		0.0
Glenfields Blvd (West)	Left	59	564	2.1	1.4	Α	22	29.2
	AII		564	2.1	1.4	Α		29.2
ALL VEHICLES			1014	3.0	0.9	Α		29.2

Prelude Dr / EB On Ramp

Intersection Type: Priority

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	560	3.3	0.6	Α	0	0.0
	Right	62	276	2.1	2.3	Α	23	22.4
	AII		836	2.9	1.2	Α		22.4
Prelude Dr (North)	Through	63	151	2.4	0.0	Α	0	0.0
	AII		151	2.4	0.0	Α		0.0
·								
ALL VEHICLES			987	2.8	1.0	A		22.4

EB On Ramp / Prelude Dr Intersection Type:

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB On Ramp (North)	Through	65	1010	3.2	0.1	Α	0	0.0
	AII		1010	3.2	0.1	Α		0.0
Prelude Dr (West)	Through	64	277	2.1	12.9	В	24	62.0
	AII		277	2.1	12.9	В		62.0
•								
ALL VEHICLES			1287	3.0	2.9	Α		62.0

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	132	3.0	19.7	В	25	52.0
	Through	67	264	1.9	35.7	D	25	52.0
	Right	68	163	5.9	45.1	D	26	61.6
	AII		559	3.3	34.7	С		61.6
Karawatha Dr (East)	Left	69	270	2.9	12.5	В	27	48.0
	Through	70	302	3.0	43.0	D	28	98.8
	Right	71	295	2.0	44.8	D	28	98.8
	AII		867	2.7	34.1	С		98.8
Lady Musgrave Dr (North)	Left	72	63	1.9	50.5	D	29	134.6
, ,	Through	73	274	3.6	50.1	D	29	134.6
	Right	74	37	2.7	41.3	D	29	134.6
	AII		374	3.2	49.3	D		134.6
Karawatha Dr (West)	Left	75	55	1.5	21.9	С	30	204.2
•	Through	76	143	1.5	22.7	С	30	204.2
	Right	77	553	3.3	44.2	D	30	204.2
	All		751	2.9	38.5	D		204.2
ALL VEHICLES			2551	2.9	37.8	D		204.2

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way Intersection Type: Roundabout

intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	0	0.0	0.0	Α	31	6.0
	Through	79	5	0.0	9.2	Α	31	6.0
	AII		5	0.0	9.2	Α		6.0
WB Off Ramp (East)	Left	80	0	0.0	0.0	Α	32	61.4
	Through	81	71	7.0	4.5	Α	32	61.4
	Right	82	642	3.6	4.6	Α	32	61.4
	AII		713	3.9	4.6	Α		61.4
Karawatha Dr (North)	Through	83	0	0.0	0.0	A	33	0.0
, ,	Right	84	381	3.4	1.1	Α	33	0.0
	AII		381	3.4	1.1	Α		0.0
Bundilla Blvd (West)	Left	85	219	0.0	7.0	A	34	25.8
, ,	Right	86	0	0.0	0.0	Α	34	25.8
	AII		219	0.0	7.0	Α		25.8
ALL VEHICLES			1317	3.1	4.0	Α		61.4

Karawatha Dr / Satinay St

Intersection Type: Priority

intersection Type.	1 Honey							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	465	3.1	1.0	Α	0	0.0
	Right	92	6	0.0	1.7	Α	0	0.0
	AII		471	3.0	1.0	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	6	0.0	0.1	A	40	11.0
	7g.n.	,,,	<u> </u>	0.0	0.1		10	11.0
Satinay St (North)	Left	87	73	0.0	19.0	В	35	28.2
	Right	88	12	0.0	6.3	Α	35	28.2
	AII		86	0.0	17.2	В		28.2
Median (RT Stage 2) (N-W)	Right	89	12	0.0	1.2	А	36	5.0
Karawatha Dr (West)	Left	90	5	0.0	0.5	Α	0	0.0
` ,	Through	94	753	2.8	10.9	В	0	0.0
	AII		758	2.8	10.8	В		0.0
ALL VEHICLES			1334	2.7	7.6	A		28.2

Karawatha Dr / Saratoga Dr Intersection Type:

intersection Type.	1 Honey							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Saratoga Dr (South)	Left	100	13	0.0	3.7	Α	37	12.8
	Right	101	74	0.0	3.2	Α	37	12.8
	All		86	0.0	3.3	Α		12.8
Ma l'arr (DT 01 arr 0) (0 E)	D'ala	100			0.5		20	00.0
Median (RT Stage 2) (S-E)	Right	102	74	0.0	3.5	Α	38	23.0
Karawatha Dr (East)	Left	95	6	0.0	0.3	Α	0	0.0
· ,	Through	96	471	3.0	0.2	Α	0	0.0
	AII		477	3.0	0.2	Α		0.0
Karawatha Dr (West)	Through	97	684	3.2	0.2	A	0	0.0
, ,	Right	98	6	0.0	0.2	Α	0	0.0
	All		690	3.2	0.2	Α		0.0
Median (RT Stage 2) (W-S)	Right	99	6	0.0	2.5	A	39	6.0
median (KT Stage 2) (W-S)	rigni	99	U	0.0	2.5	Α	39	0.0
ALL VEHICLES			1333	2.7	0.6	А		23.0

Karawatha Dr / Sharon Crs Intersection Type:

intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	103	476	2.9	0.3	Α	0	0.0
	Right	104	6	0.0	0.4	Α	0	0.0
	AII		482	2.9	0.3	A		0.0
Median (RT Stage 2) (E-N)	Right	105	6	0.0	3.4	Α	44	4.8
Sharon Crs (North)	Left	106	75	0.0	5.2	Α	41	18.2
	Right	107	13	0.0	3.7	Α	42	15.4
	AII		87	0.0	5.0	А		18.2
Median (RT Stage 2) (N-W)	Right	108	13	0.0	1.2	А	43	23.0
Karawatha Dr (West)	Left	109	6	0.0	0.3	А	0	0.0
	Through	110	615	3.5	0.3	Α	0	0.0
	AII		621	3.5	0.3	Α		0.0
ALL VEHICLES			1209	2.9	0.6	A		23.0

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	54	0.0	2.9	Α	50	13.0
	AII		54	0.0	2.9	Α		13.0
Karawatha Dr (East)	Left	111	50	0.0	2.2	A	0	0.0
	Through	112	420	3.3	7.0	Α	45	77.0
	Right	113	19	0.0	26.2	С	46	15.2
	AII		489	2.8	7.3	Α		77.0
Molakai Dr (North)	Left	115	48	0.0	13.4	В	51	44.2
	Right	116	132	7.1	22.8	С	47	44.6
	AII		180	5.2	20.3	С		44.6
Karawatha Dr (West)	Left	117	108	9.1	8.8	A	48	18.0
·	Through	118	572	3.8	17.6	В	49	132.8
	AII		680	4.6	16.2	В		132.8
ALL VEHICLES			1403	3.9	13.1	В		132.8

Mountain Ash Dr / Golf Course Access Intersection Type: Priority

		t٧	

intersection Type.	Priority	- ID	D	0/11//-	A D . I (-)	1 - 0	- i- ID	M 0 ()
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	4	0	0.0	0.0	Α	0	0.0
	Through	3	33	0.0	0.0	Α	0	0.0
	AII		33	0.0	0.0	Α		0.0
Mountain Ash Dr (North)	Through	5	74	0.0	0.0	Α	2	0.0
	Right	6	0	0.0	0.0	Α	2	0.0
	AII		74	0.0	0.0	Α		0.0
Golf Course Access (West)	Left	1	0	0.0	0.0	Α	1	0.0
	Right	2	0	0.0	0.0	Α	1	0.0
	AII		0	0.0	0.0	Α		0.0
·	•			·	•	·		· · · · · · · · · · · · · · · · · · ·
ALL VEHICLES			107	0.0	0.0	Α		0.0

Mountain Ash Dr / Siris St / Micrantha Pl Intersection Type:

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Micrantha PI (South)	Left	10	0	0.0	0.0	Α	4	1.2
	Through	11	0	0.0	0.0	Α	4	1.2
	Right	12	7	0.0	0.3	Α	4	1.2
	AII		7	0.0	0.3	Α		1.2
Mountain Ash Dr (East)	Left	16	17	0.0	0.2	Α	5	0.0
	Through	17	74	0.0	0.3	Α	5	0.0
	Right	18	25	0.0	0.5	Α	5	0.0
	AII		116	0.0	0.3	Α		0.0
Siris St (North)	Left	13	11	0.0	0.2	Α	6	1.0
	Through	14	0	0.0	0.0	Α	6	1.0
	Right	15	0	0.0	0.0	Α	6	1.0
	AII		11	0.0	0.2	Α		1.0
Mountain Ash Dr (West)	Left	7	0	0.0	0.0	Α	3	2.2
	Through	8	33	0.0	0.3	Α	3	2.2
	Right	9	0	0.0	0.0	Α	3	2.2
	ĂII		33	0.0	0.3	Α		2.2
ALL VEHICLES			167	0.0	0.3	A		2.2

Mountain Ash Dr / Berrigan Pl Intersection Type: Prio

FIIOHILY							
	vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Through	19	51	0.0	0.0	Α	7	0.0
Right	20	0	0.0	0.0	Α	7	0.0
AII		51	0.0	0.0	Α		0.0
Left	21	0	0.0	0.0	A	8	5.8
Right	22	7	0.0	1.0	Α	8	5.8
AII		7	0.0	1.0	Α		5.8
Left	24	7	0.0	0.0	Α	0	0.0
Through	23	116	0.0	0.0	Α	0	0.0
All		123	0.0	0.0	Α		0.0
		191	0.0	1 00 1	Λ		5.8
	Through Right All Left Right All Left Through	Viz ID Through 19 Right 20 All	VIZ ID Demand (vph) Through 19 51 51	Viz ID Demand (vph) WHVs Through 19 51 0.0 Right 20 0 0.0 All 51 0.0 Left 21 0 0.0 Right 22 7 0.0 All 7 0.0 Left 24 7 0.0 Through 23 116 0.0 All 123 0.0	Viz ID Demand (vph) WHVs Ave. Delay (s)	Viz ID Demand (vph) %HVs Ave. Delay (s) LoS Through 19 51 0.0 0.0 A Right 20 0 0.0 0.0 A All 51 0.0 0.0 A Left 21 0 0.0 0.0 A Right 22 7 0.0 1.0 A All 7 0.0 1.0 A Left 24 7 0.0 0.0 A Through 23 116 0.0 0.0 A All 123 0.0 0.0 A	Viz ID Demand (vph) WHVs Ave. Delay (s) LoS stz ID

673

Glenfields Blvd / Mountain Ash Dr / Birch St

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	0	0.0	0.0	Α	9	7.8
	Through	26	0	0.0	0.0	Α	9	7.8
	Right	27	57	0.0	1.0	Α	9	7.8
	AII		57	0.0	1.0	Α		7.8
Glenfields Blvd (East)	Left	34	119	0.0	0.0	Α	12	3.2
	Through	35	301	3.9	0.0	Α	12	3.2
	Right	36	18	0.0	0.1	Α	12	3.2
	AII		437	2.7	0.0	Α		3.2
Birch St (North)	Left	31	6	0.0	0.3	Α	11	1.0
	Through	32	0	0.0	0.0	Α	11	1.0
	Right	33	1	0.0	1.1	Α	11	1.0
	AII		7	0.0	0.5	Α		1.0
Glenfields Blvd (West)	Left	28	0	0.0	0.0	Α	10	8.0
,	Through	29	165	4.1	0.1	Α	10	8.0
	Right	30	6	0.0	0.1	Α	10	8.0
	AII		171	4.0	0.1	Α		8.0

0.1

8.0

Glenfields Blvd / Lacebark St

ALL VEHICLES

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Glenfields Blvd (South)	Through	41	224	3.0	0.0	Α	0	0.0
	Right	43	2	0.0	0.3	Α	0	0.0
	AII		226	3.0	0.0	Α		0.0
Median (RT Stage 2) (S-E)	Right	44	2	0.0	1.4	A	15	3.4
Landon Ot (Fact)	1 - 6	0.7	_	0.0	4.0	•	40	4.0
Lacebark St (East)	Left Right	37 38	5 2	0.0	4.2 2.5	A	13	4.0 4.0
	AII	30	7	0.0	3.7	A	10	4.0
Median (RT Stage 2) (E-N)	Right	39	2	0.0	0.3	А	14	16.4
Glenfields Blvd (North)	Left	40	11	0.0	0.2	А	0	0.0
	Through	42	434	2.7	0.1	Α	0	0.0
	AII		445	2.6	0.1	А		0.0

2.7

ALL VEHICLES		682	2.7	0.1	Α	16.4

Glenfields Blvd / Parklea Espl / Greenway Pl

Olcillicias Biva / I arkic	a Espi / Cicc	·····ay	• •					
Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m
Greenway PI (South)	Left	45	0	0.0	0.0	Α	16	5.0
-	Through	46	0	0.0	0.0	Α	16	5.0
	Right	47	30	0.0	1.5	Α	16	5.0
	ĂII		30	0.0	1.5	Α		5.0
Glenfields Blvd (East)	Left	48	42	0.0	0.0	Α	17	1.0
	Through	49	445	2.6	0.0	Α	17	1.0
	Right	50	68	0.0	0.2	Α	17	1.0
	AII		555	2.1	0.0	А		1.0
Parklea Espl (North)	Left	51	47	0.0	0.4	A	18	5.0
	Through	52	0	0.0	0.0	Α	18	5.0
	Right	53	0	0.0	0.0	Α	18	5.0
	ĂII		47	0.0	0.4	Α		5.0
Glenfields Blvd (West)	Left	54	4	0.0	0.5	A	19	11.0
, , , , , , , , , , , , , , , , , , , ,	Through	55	220	3.1	0.5	Α	19	
	Right	56	3	0.0	0.1	Α	19	11.0
	ĂII		227	3.0	0.5	Α		11.0
ALL VEHICLES	1	1 1	950	2.1	1 02 1	Λ	1	11.0
ALL VEHICLES			859	2.1	0.2	Α		11.0

Glenfields Blvd / EB Off Ramp / Prelude Dr

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB Off Ramp (South)	Left	57	103	1.4	3.2	Α	20	35.0
	Through	58	251	3.9	3.2 A	Α	20	35.0
	AII		354	3.2	3.2	Α		35.0
relude Dr (North)	Right	60	452	2.3	0.2	A	21	0.0
	AII		452	2.3	0.2	Α		0.0
Glenfields Blvd (West)	Left	59	298	2.3	0.6	A	22	16.4
	AII		298	2.3	0.6	Α		16.4
ALL VEHICLES			1104	2.6	1.3	Α		35.0

Prelude Dr / EB On Ramp

Intersection Type:

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	377	3.5	0.3	Α	0	0.0
	Right	62	171	1.9	3.3	Α	23	22.2
	AII		548	3.0	1.3	Α		22.2
Prelude Dr (North)	Through	63	451	2.3	0.0	Α	0	0.0
	AII		451	2.3	0.0	Α		0.0
ALL VEHICLES			999	2.7	0.7	Α		22.2

EB On Ramp / Prelude Dr

Intersection Type: Priority

	vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Through	65	685	3.1	0.1	Α	0	0.0
AII		685	3.1	0.1	Α		0.0
Through	64	172	1.9	4.0	Α	24	25.6
All		172	1.9	4.0	Α		25.6
		857	2.8	0.9	Ä		25.6
	All Through	Through 65 All Through 64	Through 65 685 All 685 Through 64 172 All 172	Through 65 685 3.1 All 685 3.1 Through 64 172 1.9 All 172 1.9	Through 65 685 3.1 0.1 All 685 3.1 0.1 Through 64 172 1.9 4.0 All 172 1.9 4.0	Through 65 685 3.1 0.1 A All 685 3.1 0.1 A Through 64 172 1.9 4.0 A All 172 1.9 4.0 A	Through 65 685 3.1 0.1 A 0 All 685 3.1 0.1 A Through 64 172 1.9 4.0 A 24 All 172 1.9 4.0 A 24

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	155	3.4	17.4	В	25	55.6
	Through	67	132	1.7	38.8	D	25	55.6
	Right	68	90	6.6	48.2	D	26	48.4
	AII		377	3.6	32.3	С		55.6
Karawatha Dr (East)	Left	69	273	2.3	11.9	В	27	52.6
	Through	70	524	2.8	38.5	D	28	137.6
	Right	71	162	2.5	34.8	С	28	137.6
	AII		959	2.6	30.3	С		137.6
ady Musgrave Dr (North)	Left	72	78	1.5	41.3	D	29	115.8
	Through	73	231	3.7	40.5	D	29	115.8
	Right	74	32	3.7	34.1	С	29	115.8
	AII		341	3.2	40.1	D		115.8
Karawatha Dr (West)	Left	75	26	0.0	27.1	С	30	178.0
	Through	76	122	1.0	27.0	С	30	178.0
	Right	77	549	2.8	40.2	D	30	178.0
	AII		696	2.4	37.4	D		178.0
ALL VEHICLES			2373	2.8	34.1	С		178.0

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way Intersection Type: Roundabout

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	5	0.0	12.1	В	31	9.2
	Through	79	10	0.0	14.3	В	31	9.2
	AII		15	0.0	13.5	В		9.2
WB Off Ramp (East)	Left	80	5	0.0	5.6	A	32	128.0
TTD OII Ruinp (Euot)	Through	81	103	5.0	5.3	A	32	128.0
	Right	82	836	3.0	5.6	Α	32	128.0
	AII		944	3.2	5.6	Α		128.0
Karawatha Dr (North)	Through	83	0	0.0	0.0	Α	33	0.0
	Right	84	291	2.9	1.1	Α	33	0.0
	AII		291	2.9	1.1	Α		0.0
Bundilla Blvd (West)	Left	85	116	0.0	8.9	A	34	21.2
, ,	Right	86	0	0.0	0.0	Α	34	21.2
	AII		116	0.0	8.9	Α		21.2
ALL VEHICLES			1366	2.8	5.0	A		128.0

Karawatha Dr / Satinay St

Intersection Type: Priority

	1iii	vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	693	3.1	2.7	А	0	0.0
, ,	Right	92	18	0.0	4.0	Α	0	0.0
	ĂII		711	3.0	2.7	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	18	0.0	0.2	А	40	72.4
Satinay St (North)	Left	87	9	0.0	7.1	А	35	11.0
	Right	88	5	0.0	6.2	A	35	11.0
	AII		13	0.0	6.8	A		11.0
Median (RT Stage 2) (N-W)	Right	89	5	0.0	2.1	Α	36	5.2
Karawatha Dr (West)	Left	90	11	0.0	0.4	A	0	0.0
	Through	94	696	2.3	7.0	Α	0	0.0
	AII		707	2.3	6.9	А		0.0
ALL VEHICLES			1454	2.6	4.7	A		72.4

Karawatha Dr / Saratoga Dr Intersection Type: Priority

intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Saratoga Dr (South)	Left	100	4	0.0	10.6	В	37	9.8
	Right	101	10	0.0	5.8	Α	37	9.8
	AII		14	0.0	7.1	Α		9.8
Median (RT Stage 2) (S-E)	Right	102	10	0.0	3.1	Α	38	23.0
Karawatha Dr (East)	Left	95	19	0.0	0.3	Α	0	0.0
	Through	96	678	3.1	0.2	Α	0	0.0
	AII		697	3.0	0.2	A	_	0.0
Karawatha Dr (West)	Through	97	694	2.3	0.3	Α	0	0.0
	Right	98	10	0.0	0.3	Α	0	0.0
	AII		705	2.3	0.3	Α		0.0
Median (RT Stage 2) (W-S)	Right	99	10	0.0	3.7	А	39	5.8
ALL VEHICLES			1437	2.6	0.4	Α		23.0

Karawatha Dr / Sharon Crs Intersection Type: Priority

intersection rype.	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	103	665	3.1	0.5	Α	0	0.0
	Right	104	18	0.0	0.7	Α	0	0.0
	AII		682	3.0	0.5	Α		0.0
	5: //	405						
Median (RT Stage 2) (E-N)	Right	105	18	0.0	6.1	A	44	10.2
Sharon Crs (North)	Left	106	8	0.0	6.9	Α	41	6.2
	Right	107	4	0.0	7.3	Α	42	4.6
	AII		12	0.0	7.0	A		6.2
Median (RT Stage 2) (N-W)	Right	108	4	0.0	4.6	A	43	18.4
Karawatha Dr (West)	Left	109	4	0.0	0.2	A	0	0.0
	Through	110	699	2.3	0.3	Α	0	0.0
	AII		703	2.3	0.3	Α		0.0
			1110				_	10.4
ALL VEHICLES			1419	2.6	0.5	A		18.4

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	73	0.0	8.4	Α	50	27.6
	AII		73	0.0	8.4	Α		27.6
Karawatha Dr (East)	Left	111	68	0.0	5.1	Α	0	0.0
	Through	112	585	3.5	9.9	Α	45	115.0
	Right	113	15	0.0	38.6	D	46	14.0
	AII		668	3.1	10.1	В		115.0
Molakai Dr (North)	Left	115	49	0.0	36.4	D	51	144.8
	Right	116	396	4.8	45.0	D	47	145.2
	AII		445	4.3	44.0	D		145.2
Karawatha Dr (West)	Left	117	191	7.7	9.8	Α	48	26.4
	Through	118	654	2.5	21.2	С	49	177.6
	All		845	3.7	18.6	В		177.6
ALL VEHICLES			0004	0.5	1 040		1	477.0
ALL VEHICLES		1	2031	3.5	21.0	С		177.6

Appendix P

2022 AM and PM Peak VISSIM Results (With Development)

Mountain Ash Dr / Golf Course Access Intersection Type: Priority

	0		

intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	4	2	0.0	0.0	Α	0	0.0
	Through	3	109	1.8	0.0	Α	0	0.0
	AII		111	1.8	0.0	Α		0.0
Mountain Ash Dr (North)	Through	5	34	0.0	0.1	Α	2	7.2
	Right	6	68	0.0	0.3	Α	2	7.2
	AII		102	0.0	0.3	Α		7.2
Golf Course Access (West)	Left	1	72	0.0	0.7	A	1	6.4
(,	Right	2	1	0.0	3.3	A	1	6.4
	AII		74	0.0	0.7	Α		6.4
	· -							•
ALL VEHICLES			287	0.7	0.3	Α		7.2

Mountain Ash Dr / Siris St / Micrantha Pl Intersection Type: Roundabout

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Micrantha PI (South)	Left	10	0	0.0	0.0	Α	4	3.4
	Through	11	0	0.0	0.0	Α	4	3.4
	Right	12	23	0.0	0.4	Α	4	3.4
	All		23	0.0	0.4	Α		3.4
Mountain Ash Dr (East)	Left	16	7	0.0	0.3	Α	5	3.8
	Through	17	102	0.0	0.5	Α	5	3.8
	Right	18	12	0.0	0.7	Α	5	3.8
	All		121	0.0	0.5	Α		3.8
Siris St (North)	Left	13	35	0.0	0.7	Α	6	6.0
	Through	14	0	0.0	0.0	Α	6	6.0
	Right	15	0	0.0	1.8	Α	6	6.0
	All		35	0.0	0.7	Α		6.0
Mountain Ash Dr (West)	Left	7	0	0.0	0.1	Α	3	5.8
Ţ	Through	8	181	1.1	0.4	Α	3	5.8
	Right	9	0	0.0	0.6	Α	3	5.8
	AII		181	1.1	0.4	Α		5.8
ALL VEHICLES			360	0.6	0.5	Α		6.0

Mountain Ash Dr / Berrigan Pl Intersection Type: Prio

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Through	19	238	0.8	0.0	Α	7	0.0
	Right	20	0	0.0	0.0	Α	7	0.0
	All		239	0.8	0.0	Α		0.0
Berrigan PI (East)	Left	21	0	0.0	0.0	A	8	9.2
	Right	22	29	0.0	2.7	Α	8	9.2
	AII		29	0.0	2.7	Α		9.2
Mountain Ash Dr (North)	Left	24	5	0.0	0.1	A	0	0.0
	Through	23	121	0.0	0.0	Α	0	0.0
	AII		126	0.0	0.0	Α		0.0
ALL VEHICLES			393	0.5	0.2	A		9.2

Glenfields Blvd / Mountain Ash Dr / Birch St

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	6	0.0	0.2	Α	9	2.0
	Through	26	0	0.0	0.3	Α	9	2.0
	Right	27	261	0.8	0.1	Α	9	2.0
	AII		267	0.7	0.1	Α		2.0
Glenfields Blvd (East)	Left	34	117	0.0	0.0	A	12	3.0
,	Through	35	60	9.7	0.1	Α	12	3.0
	Right	36	10	0.0	0.1	Α	12	3.0
	AII		186	3.1	0.0	Α		3.0
Birch St (North)	Left	31	27	0.0	1.0	A	11	5.0
,	Through	32	1	0.0	2.8	Α	11	5.0
	Right	33	0	0.0	0.0	Α	11	5.0
	All		28	0.0	1.0	Α		5.0
Glenfields Blvd (West)	Left	28	2	0.0	0.5	Α	10	13.0
, ,	Through	29	264	3.7	0.9	Α	10	13.0
	Right	30	8	0.0	1.1	Α	10	13.0
	AII		274	3.6	0.9	Α		13.0

13.0

Glenfields Blvd / Lacebark St

ALL VEHICLES

Gleffileius Divu / Laceba	IK OL							
Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Glenfields Blvd (South)	Through	41	549	2.1	0.0	Α	0	0.0
	Right	43	3	0.0	0.2	Α	0	0.0
	AII		552	2.1	0.0	Α		0.0
Median (RT Stage 2) (S-E)	Right	44	3	0.0	0.6	Α	15	1.2
Lacebark St (East)	Left	37	0	0.0	0.0	А	13	1.0
	Right	38	3	0.0	0.6	Α	13	1.0
	AII		3	0.0	0.6	Α		1.0
Median (RT Stage 2) (E-N)	Right	39	3	0.0	1.9	Α	14	6.6
Glenfields Blvd (North)	Left	40	11	0.0	0.2	Α	0	0.0
	Through	42	187	3.1	0.0	Α	0	0.0
	AII		198	2.9	0.0	Α		0.0
ALL VEHICLES			757	2.3	0.0	A		6.6

Glenfields Blvd / Parklea Espl / Greenway Pl

Intersection Type:	Roundabout	_						
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Greenway PI (South)	Left	45	1	0.0	1.5	Α	16	0.0
	Through	46	0	0.0	0.0	Α	16	0.0
	Right	47	22	0.0	0.2	Α	16	0.0
	AII		23	0.0	0.2	Α		0.0
Glenfields Blvd (East)	Left	48	13	0.0	0.0	А	17	5.0
	Through	49	190	3.2	0.0	Α	17	5.0
	Right	50	34	0.0	0.3	Α	17	5.0
	All		238	2.5	0.0	А		5.0
Parklea Espl (North)	Left	51	60	0.0	1.5	Α	18	8.8
	Through	52	0	0.0	0.0	Α	18	8.8
	Right	53	8	0.0	2.4	Α	18	8.8
	All		68	0.0	1.6	А		8.8
Glenfields Blvd (West)	Left	54	7	0.0	0.0	Α	19	9.4
	Through	55	543	2.2	0.4	Α	19	9.4
	Right	56	1	0.0	0.2	Α	19	9.4
	AII		551	2.1	0.4	Α		9.4
ALL VEHICLES			880	2.0	0.4	Α		9.4

Glenfields Blvd / EB Off Ramp / Prelude Dr

Intersection Type:	Roundabout							
•		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB Off Ramp (South)	Left	57	33	7.2	0.7	Α	20	18.6
	Through	58	274	4.6	0.9	Α	20	18.6
	AII		307	4.9	0.9	Α		18.6
Prelude Dr (North)	Right	60	204	1.8	0.1	A	21	0.0
	All		204	1.8	0.1	Α		0.0
Glenfields Blvd (West)	Left	59	624	1.9	1.7	Α	22	33.8
	AII		624	1.9	1.7	Α		33.8
ALL VEHICLES			1135	2.7	1.2	Α		33.8

Prelude Dr / EB On Ramp

Intersection Type: Priority

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	603	3.0	0.7	Α	0	0.0
	Right	62	295	2.0	2.6	Α	23	21.2
	AII		898	2.7	1.4	Α		21.2
Prelude Dr (North)	Through	63	204	1.8	0.0	Α	0	0.0
	AII		204	1.8	0.0	Α		0.0
ALL VEHICLES			1102	2.5	1.1	Α		21.2

EB On Ramp / Prelude Dr Intersection Type:

Priority

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB On Ramp (North)	Through	65	1009	3.2	0.1	Α	0	0.0
	AII		1009	3.2	0.1	Α		0.0
Prelude Dr (West)	Through	64	295	1.9	11.5	В	24	59.0
	All		295	1.9	11.5	В		59.0
ALL VEHICLES			1304	2.9	2.7	Α		59.0

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	157	2.5	23.4	С	25	65.6
	Through	67	272	1.8	39.0	D	25	65.6
	Right	68	172	5.6	46.0	D	26	82.4
	AII		601	3.1	37.0	D		82.4
Karawatha Dr (East)	Left	69	295	2.5	13.3	В	27	54.2
	Through	70	300	3.1	41.8	D	28	108.8
	Right	71	293	2.0	43.7	D	28	108.8
	AII		888	2.6	32.9	С		108.8
Lady Musgrave Dr (North)	Left	72	61	2.0	52.5	D	29	151.6
	Through	73	271	3.6	52.7	D	29	151.6
	Right	74	37	2.7	37.4	D	29	151.6
	AII		369	3.3	51.1	D		151.6
Karawatha Dr (West)	Left	75	53	1.5	21.5	С	30	214.2
	Through	76	144	1.5	24.6	С	30	214.2
	Right	77	577	3.2	48.8	D	30	214.2
	AII		774	2.8	42.4	D		214.2
ALL VEHICLES			2632	2.8	39.2	D		214.2

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way Intersection Type: Roundabout

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	0	0.0	0.0	Α	31	6.0
	Through	79	5	0.0	6.8	Α	31	6.0
	All		5	0.0	6.8	Α		6.0
MD Off Dawn (Fact)	1 - 6	00		0.0	0.0		20	05.0
WB Off Ramp (East)	Left	80	0	0.0	0.0	A	32	85.2
	Through	81	71	7.0	5.6	A	32	85.2
	Right	82	662	3.4	5.7	Α	32	85.2
	AII		733	3.8	5.7	Α		85.2
Karawatha Dr (North)	Through	83	0	0.0	0.1	Α	33	0.0
	Right	84	390	3.3	1.1	Α	33	0.0
	AII		390	3.3	1.1	Α		0.0
Bundilla Blvd (West)	Left	85	223	0.0	8.9	A	34	33.0
,	Right	86	0	0.0	0.0	Α	34	33.0
	AII		223	0.0	8.9	Α		33.0
ALL VEHICLES			1351	3.0	4.9	A		85.2

Karawatha Dr / Satinay St

Intersection Type: Priority

	1 1101119							r
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	487	3.0	0.9	Α	0	0.0
	Right	92	7	0.0	2.3	Α	0	0.0
	AII		494	2.9	1.0	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	7	0.0	0.1	A	40	26.6
median (KT Stage 2) (E-N)	Rigiit	73	/	0.0	0.1	A	40	20.0
Satinay St (North)	Left	87	76	0.0	28.0	С	35	41.6
	Right	88	12	0.0	19.7	В	35	41.6
	AII		88	0.0	26.9	С		41.6
Median (RT Stage 2) (N-W)	Right	89	12	0.0	1.4	A	36	4.8
Karawatha Dr (West)	Left	90	6	0.0	1.0	A	0	0.0
	Through	94	774	2.8	13.4	В	0	0.0
	AII		780	2.8	13.3	В		0.0
ALL VEHICLES			1380	2.6	9.6	A		41.6

Karawatha Dr / Saratoga Dr Intersection Type:

intersection Type.	1 Honey							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Saratoga Dr (South)	Left	100	12	0.0	5.8	Α	37	18.6
	Right	101	75	0.0	3.9	Α	37	18.6
	All		87	0.0	4.1	Α		18.6
	5: //	400					00	
Median (RT Stage 2) (S-E)	Right	102	75	0.0	3.8	A	38	23.0
Karawatha Dr (East)	Left	95	7	0.0	0.3	Α	0	0.0
	Through	96	492	2.9	0.2	Α	0	0.0
	AII		499	2.9	0.2	Α		0.0
Karawatha Dr (West)	Through	97	709	3.1	0.2	A	0	0.0
·	Right	98	6	0.0	0.3	Α	0	0.0
	All		715	3.0	0.2	Α		0.0
Median (RT Stage 2) (W-S)	Right	99	6	0.0	3.9	A	39	7.2
modian (ICT Grage 2) (W-G)	ragnt	77	<u> </u>	0.0	5.9		37	1.2
ALL VEHICLES			1381	2.6	0.6	Α		23.0

Karawatha Dr / Sharon Crs Intersection Type:

intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	103	498	2.8	0.3	Α	0	0.0
	Right	104	7	0.0	0.4	Α	0	0.0
	AII		505	2.8	0.3	Α		0.0
Median (RT Stage 2) (E-N)	Right	105	7	0.0	4.9	А	44	5.8
Sharon Crs (North)	Left	106	76	0.0	6.4	Α	41	20.8
	Right	107	12	0.0	4.7	Α	42	19.2
	AII		88	0.0	6.1	Α		20.8
Median (RT Stage 2) (N-W)	Right	108	12	0.0	1.7	Α	43	23.0
Karawatha Dr (West)	Left	109	6	0.0	0.4	Α	0	0.0
	Through	110	640	3.4	0.3	Α	0	0.0
	AII		646	3.4	0.3	Α		0.0
ALL VEHICLES			1259	2.9	0.7	А		23.0

Karawatha Dr / Molakai Dr / Mountain Creek Shops

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	53	0.0	4.3	Α	50	13.6
	AII		53	0.0	4.3	Α		13.6
Karawatha Dr (East)	Left	111	48	0.0	2.1	Α	0	0.0
	Through	112	440	3.2	6.7	Α	45	74.4
	Right	113	21	0.0	25.8	С	46	22.6
	All		510	2.7	7.1	Α		74.4
Molakai Dr (North)	Left	115	52	0.0	15.1	В	51	45.4
	Right	116	131	7.2	23.9	С	47	48.8
	All		183	5.1	21.4	С		48.8
Karawatha Dr (West)	Left	117	108	9.1	8.5	Α	48	18.4
	Through	118	591	3.7	18.3	В	49	145.4
	All		699	4.5	16.8	В		145.4
ALL VEHICLES		1 1	1445	3.8	13.5	В	1	145.4

Mountain Ash Dr / Golf Course Access

Intersection Type:

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intersection Type.	FIIOTILY							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	4	2	0.0	0.0	Α	0	0.0
	Through	3	32	0.0	0.0	Α	0	0.0
	AII		34	0.0	0.0	Α		0.0
Mountain Ash Dr (North)	Through	5	77	0.0	0.1	Α	2	3.2
	Right	6	72	0.0	0.0	Α	2	3.2
	All		149	0.0	0.1	Α		3.2
Golf Course Access (West)	Left	1	92	0.0	0.4	Α	1	7.6
	Right	2	2	0.0	1.7	Α	1	7.6
	AII		93	0.0	0.4	Α		7.6
	•			•	•			•
ALL VEHICLES			276	0.0	0.2	Α		7.6

Mountain Ash Dr / Siris St / Micrantha PI

ntersection Type: Roundab

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Micrantha PI (South)	Left	10	0	0.0	0.0	Α	4	0.0
	Through	11	0	0.0	0.0	Α	4	0.0
	Right	12	7	0.0	0.3	Α	4	0.0
	AII		7	0.0	0.3	Α		0.0
Mountain Ash Dr (East)	Left	16	17	0.0	0.3	А	5	2.0
	Through	17	149	0.0	0.5	Α	5	2.0
	Right	18	25	0.0	0.6	Α	5	2.0
	AII		190	0.0	0.5	Α		2.0
Siris St (North)	Left	13	11	0.0	0.7	Α	6	3.4
	Through	14	0	0.0	0.0	Α	6	3.4
	Right	15	0	0.0	0.4	Α	6	3.4
	AII		11	0.0	0.7	Α		3.4
Mountain Ash Dr (West)	Left	7	1	0.0	0.1	Α	3	5.4
	Through	8	123	0.0	0.5	Α	3	5.4
	Right	9	0	0.0	0.0	Α	3	5.4
	AII		124	0.0	0.5	Α		5.4
ALL VEHICLES			333	0.0	0.5	A		5.4

Mountain Ash Dr / Berrigan Pl

ntersection Type:

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Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Through	19	141	0.0	0.0	Α	7	0.0
	Right	20	0	0.0	0.0	Α	7	0.0
	AII		142	0.0	0.0	А		0.0
Berrigan PI (East)	Left	21	0	0.0	1.0	Α	8	4.8
	Right	22	7	0.0	1.5	Α	8	4.8
	All		7	0.0	1.5	Α		4.8
Mountain Ash Dr (North)	Left	24	6	0.0	0.0	A	0	0.0
•	Through	23	189	0.0	0.0	Α	0	0.0
	AII		195	0.0	0.0	Α		0.0
	•		•		·		•	•
ALL VEHICLES			344	0.0	0.0	Α		4.8

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Glenfields Blvd / Mountain Ash Dr / Birch St

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Left

Through Right

ΑII

intersection Type.	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	7	0.0	0.9	Α	9	9.2
	Through	26	1	0.0	0.1	Α	9	9.2
	Right	27	141	0.0	1.2	Α	9	9.2
	AII		148	0.0	1.1	Α		9.2
Glenfields Blvd (East)	Left	34	183	0.0	0.2	Α	12	11.8
	Through	35	294	3.9	0.3	Α	12	11.8
	Right	36	18	0.0	0.1	Α	12	11.8
	AII		495	2.3	0.3	Α		11.8
Birch St (North)	Left	31	6	0.0	0.8	Α	11	2.0
	Through	32	1	0.0	0.7	Α	11	2.0
	Right	33	1	0.0	1.4	Α	11	2.0

0.0

0.0

4.2

0.0

3.9

2.2

0.9

0.0

0.4

0.4

0.5

0.1

Α

Α

A

Α

Α

2.0

7.0

7.0 7.0

7.0

11.8

16.6

Glenfields B	Ivd / Lac	ebark S	St

Glenfields Blvd (West)

ALL VEHICLES

ALL VEHICLES

Glerilleius Bivu / Laceba	IK OL							
Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Glenfields Blvd (South)	Through	41	307	2.2	0.0	Α	0	0.0
	Right	43	3	0.0	0.3	Α	0	0.0
	AII		310	2.2	0.0	Α		0.0
Median (RT Stage 2) (S-E)	Right	44	3	0.0	3.4	Α	15	4.8
Lacebark St (East)	Left	37	5	0.0	4.2	А	13	4.0
	Right	38	2	0.0	1.9	Α	13	4.0
	All		8	0.0	3.5	Α		4.0
Median (RT Stage 2) (E-N)	Right	39	2	0.0	0.4	Α	14	16.6
Glenfields Blvd (North)	Left	40	12	0.0	0.2	Α	0	0.0
	Through	42	491	2.3	0.1	Α	0	0.0
	All		503	2.3	0.1	Α		0.0

Glenfields Blvd / Parklea Espl / Greenway Pl

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Greenway PI (South)	Left	45	1	0.0	3.5	Α	16	8.6
	Through	46	0	0.0	0.0	Α	16	8.6
	Right	47	29	0.0	2.4	Α	16	8.6
	AII		30	0.0	2.5	А		8.6
Glenfields Blvd (East)	Left	48	44	0.0	0.0	A	17	3.8
,	Through	49	502	2.3	0.0	Α	17	3.8
	Right	50	66	0.0	0.3	Α	17	3.8
	ĂII		611	1.9	0.1	Α		3.8
Parklea Espl (North)	Left	51	47	0.0	0.7	A	18	5.0
• > •	Through	52	0	0.0	0.0	Α	18	5.0
	Right	53	2	0.0	0.6	Α	18	5.0
	AII		49	0.0	0.7	А		5.0
Glenfields Blvd (West)	Left	54	5	0.0	0.4	A	19	8.4
	Through	55	300	2.3	0.5	Α	19	
	Right	56	4	0.0	0.6	Α	19	8.4
	ĂII		310	2.2	0.5	Α		8.4
ALL VEHICLES	1		999	1.8	0.3	A		8.6

Glenfields Blvd / EB Off Ramp / Prelude Dr

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB Off Ramp (South)	Left	57	110	1.3	3.9	Α	20	35.8
	Through	58	252	3.9	4.0	Α	20	35.8
	AII		362	3.1	3.9	Α		35.8
Prelude Dr (North)	Right	60	502	2.0	0.3	A	21	1.2
	All		502	2.0	0.3	Α		1.2
Glenfields Blvd (West)	Left	59	377	1.8	0.8	Α	22	17.4
	AII		377	1.8	0.8	Α		17.4
ALL VEHICLES			1241	2.3	1.5	A		35.8

Prelude Dr / EB On Ramp Intersection Type:

intersection Type.	1 Honly							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	432	3.1	0.4	Α	0	0.0
	Right	62	196	1.6	3.9	Α	23	23.0
	AII		628	2.6	1.5	Α		23.0
Prelude Dr (North)	Through	63	503	2.1	0.0	Α	0	0.0
	AII		503	2.1	0.0	Α		0.0
ALL VEHICLES			1131	2.4	0.8	A		23.0

EB On Ramp / Prelude Dr

Intersection Type: Priority

mioresenen rype.								
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
EB On Ramp (North)	Through	65	686	3.0	0.1	Α	0	0.0
	AII		686	3.0	0.1	Α		0.0
Prelude Dr (West)	Through	64	197	1.6	3.8	Α	24	20.4
	AII		197	1.6	3.8	Α		20.4
•								
ALL VEHICLES			883	2.7	0.9	Α		20.4

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	190	2.7	19.1	В	25	58.8
	Through	67	136	1.6	39.2	D	25	58.8
	Right	68	105	5.7	46.2	D	26	46.8
	AII		431	3.1	32.1	С		58.8
Karawatha Dr (East)	Left	69	340	2.2	11.8	В	27	67.2
	Through	70	521	2.8	38.1	D	28	135.0
	Right	71	162	2.5	34.6	С	28	135.0
	AII		1023	2.5	28.8	С		135.0
Lady Musgrave Dr (North)	Left	72	77	1.6	38.6	D	29	121.0
	Through	73	231	3.7	40.5	D	29	121.0
	Right	74	33	3.7	31.9	С	29	121.0
	AII		341	3.2	39.2	D		121.0
Karawatha Dr (West)	Left	75	25	0.0	27.7	С	30	190.4
	Through	76	166	1.4	28.5	С	30	190.4
	Right	77	529	2.7	35.8	D	30	190.4
	AII		720	2.3	33.9	С		190.4
ALL VEHICLES			2515	2.7	32.2	С		190.4

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way

Intersection Type:	Roundabout

intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	5	0.0	15.9	В	31	9.4
	Through	79	10	0.0	14.3	В	31	9.4
	AII		15	0.0	14.9	В		9.4
WB Off Ramp (East)	Left	80	5	0.0	8.7	A	32	149.0
WB On Kamp (Last)	Through	81	102	4.9	11.1	В	32	149.0
	Right	82	848	3.0	11.4	В	32	149.0
	AII		956	3.2	11.4	В		149.0
Karawatha Dr (North)	Through	83	0	0.0	0.1	A	33	0.0
	Right	84	304	2.8	1.3	Α	33	0.0
	AII		304	2.8	1.3	Α		0.0
Bundilla Blvd (West)	Left	85	122	0.0	10.9	В	34	27.8
,	Right	86	0	0.0	0.0	Α	34	27.8
	ĂII		122	0.0	10.9	В		27.8
ALL VEHICLES			1397	2.8	9.2	A		149.0

Karawatha Dr / Satinay St

Intersection Type: Priority

interesection Type:	1 Honly							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	723	2.9	2.5	Α	0	0.0
	Right	92	21	0.0	3.6	Α	0	0.0
	AII		744	2.8	2.5	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	21	0.0	0.2	Α	40	50.6
Satinay St (North)	Left	87	10	0.0	7.7	Α	35	0.0
	Right	88	5	0.0	0.7	Α	35	0.0
	AII		15	0.0	5.5	Α		0.0
Median (RT Stage 2) (N-W)	Right	89	5	0.0	4.2	А	36	5.0
Karawatha Dr (West)	Left	90	10	0.0	4.6	A	0	0.0
	Through	94	722	2.2	7.5	Α	0	0.0
	AII		732	2.2	7.5	Α		0.0
ALL VEHICLES			1516	2.4	4.9	A		50.6

Karawatha Dr / Saratoga Dr Intersection Type: Priority

intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Saratoga Dr (South)	Left	100	4	0.0	4.3	Α	37	7.2
	Right	101	11	0.0	5.3	Α	37	7.2
	AII		14	0.0	5.0	А		7.2
Median (RT Stage 2) (S-E)	Right	102	11	0.0	3.3	Α	38	23.0
Karawatha Dr (East)	Left	95	19	0.0	0.3	Α	0	0.0
	Through	96	710	2.9	0.2	Α	0	0.0
	AII		729	2.9	0.2	A		0.0
Karawatha Dr (West)	Through	97	718	2.2	0.3	Α	0	0.0
	Right	98	11	0.0	0.4	Α	0	0.0
	AII		729	2.2	0.3	А		0.0
Median (RT Stage 2) (W-S)	Right	99	11	0.0	6.9	Α	39	6.0
ALL VEHICLES			1494	2.5	0.4	Α		23.0

Karawatha Dr / Sharon Crs Intersection Type: Priority

intersection Type.	1 Honly							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	103	694	3.0	0.5	Α	0	0.0
	Right	104	21	0.0	0.5	Α	0	0.0
	AII		715	2.9	0.5	Α		0.0
Median (RT Stage 2) (E-N)	Right	105	21	0.0	5.6	А	44	10.4
Sharon Crs (North)	Left	106	10	0.0	5.6	Α	41	7.6
	Right	107	4	0.0	4.9	Α	42	3.4
	AII		13	0.0	5.5	Α		7.6
Median (RT Stage 2) (N-W)	Right	108	4	0.0	4.4	А	43	15.0
Karawatha Dr (West)	Left	109	4	0.0	0.3	Α	0	0.0
	Through	110	721	2.2	0.3	Α	0	0.0
	AII		725	2.2	0.3	Α		0.0
F								
ALL VEHICLES			1478	2.5	0.5	A		15.0

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type: Signalised

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	73	0.0	8.5	Α	50	23.2
	AII		73	0.0	8.5	Α		23.2
Karawatha Dr (East)	Left	111	69	0.0	3.5	Α	0	0.0
	Through	112	609	3.4	8.9	Α	45	142.0
	Right	113	19	0.0	35.9	D	46	14.2
	AII		697	3.0	9.1	Α		142.0
Molakai Dr (North)	Left	115	53	0.0	44.0	D	51	139.6
	Right	116	394	4.9	51.1	D	47	139.4
	AII		447	4.3	50.2	D		139.6
Karawatha Dr (West)	Left	117	192	7.7	10.1	В	48	37.6
·	Through	118	672	2.4	21.2	С	49	190.0
	AII		864	3.6	18.7	В		190.0
ALL VEHICLES			2082	3.4	21.9	С		190.0

Appendix Q

2022 AM and PM Peak SIDRA Results (Without Development)

Site: MountainAshDr / SirisSt / MicranthaPl 2022 AM - PreDevt

Mountain Ash Dr / Siris St / Micrantha Pl 2022 AM Peak Pre Development Roundabout

Movem	nent Per	formance - V	ehicles	_					_		_
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
South F	ast: Micra	veh/h antha PI (South	% 1)	v/c	sec	_	veh	m	_	per veh	km/h
1	L	1	0.0	0.021	5.7	LOS A	0.1	0.9	0.18	0.47	36.8
2	Т	1	0.0	0.021	4.8	LOS A	0.1	0.9	0.18	0.38	37.8
3	R	23	0.0	0.021	9.2	LOS A	0.1	0.9	0.18	0.64	33.3
Approac	ch	25	0.0	0.021	8.9	LOS A	0.1	0.9	0.18	0.62	33.6
North Ea	ast: Mour	ntain Ash Dr (E	ast)								
4	L	8	0.0	0.038	5.4	LOS A	0.2	1.7	0.03	0.55	43.5
5	Т	36	0.0	0.038	4.5	LOS A	0.2	1.7	0.03	0.43	44.4
6	R	10	0.0	0.038	8.9	LOS A	0.2	1.7	0.03	0.83	40.5
Approac	ch	54	0.0	0.038	5.5	LOS A	0.2	1.7	0.03	0.52	43.5
North W	est: Siris	St (North)									
7	L	36	0.0	0.035	6.3	LOS A	0.2	1.6	0.35	0.51	29.9
8	Т	1	0.0	0.035	5.5	LOS A	0.2	1.6	0.35	0.44	30.6
9	R	1	0.0	0.035	9.9	LOS A	0.2	1.6	0.35	0.69	27.5
Approac	ch	38	0.0	0.035	6.4	LOS A	0.2	1.6	0.35	0.52	29.8
South W	Vest: Mou	ıntain Ash Dr (\	West)								
10	L	1	0.0	0.091	5.6	LOS A	0.6	4.2	0.16	0.54	40.9
11	Т	111	1.8	0.091	4.8	LOS A	0.6	4.2	0.16	0.44	41.8
12	R	1	0.0	0.091	9.1	LOS A	0.6	4.2	0.16	0.82	37.9
Approac	ch	113	1.8	0.091	4.8	LOS A	0.6	4.2	0.16	0.44	41.7
All Vehic	cles	230	0.9	0.091	5.7	LOS A	0.6	4.2	0.16	0.49	40.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Micrantha Pl.sip



Site: MountainAshDr / SirisSt / MicranthaPI 2022 PM - PreDevt

Mountain Ash Dr / Siris St / Micrantha Pl 2022 PM Peak Pre Development Roundabout

Movem	ent Perf	formance - V	ehicles								
		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Oth E	N4:	veh/h	%	v/c	sec		veh	m		per veh	km/h
	ast: Micra	antha PI (South	,								
1	L –	1	0.0	0.008	6.0	LOS A	0.0	0.3	0.26	0.47	36.1
2	Т	1	0.0	0.008	5.1	LOS A	0.0	0.3	0.26	0.40	36.9
3	R	7	0.0	0.008	9.5	LOS A	0.0	0.3	0.26	0.64	33.0
Approac	ch	9	0.0	0.008	8.6	LOS A	0.0	0.3	0.26	0.59	33.7
North Ea	ast: Moun	tain Ash Dr (E	ast)								
4	L	17	0.0	0.077	5.4	LOS A	0.5	3.5	0.03	0.54	43.5
5	Т	74	0.0	0.077	4.5	LOS A	0.5	3.5	0.03	0.43	44.4
6	R	25	0.0	0.077	8.9	LOS A	0.5	3.5	0.03	0.82	40.5
Approac	ch	116	0.0	0.077	5.6	LOS A	0.5	3.5	0.03	0.53	43.3
North W	est: Siris	St (North)									
7	L	11	0.0	0.011	5.6	LOS A	0.1	0.5	0.18	0.49	31.3
8	Т	1	0.0	0.011	4.8	LOS A	0.1	0.5	0.18	0.40	32.6
9	R	1	0.0	0.011	9.2	LOS A	0.1	0.5	0.18	0.71	28.0
Approac	ch	13	0.0	0.011	5.8	LOS A	0.1	0.5	0.18	0.50	31.1
South W	Vest: Mou	ntain Ash Dr (\	West)								
10	L	1	0.0	0.030	5.6	LOS A	0.2	1.3	0.15	0.54	40.9
11	Т	33	0.0	0.030	4.7	LOS A	0.2	1.3	0.15	0.43	41.8
12	R	1	0.0	0.030	9.1	LOS A	0.2	1.3	0.15	0.81	37.9
Approac	ch	35	0.0	0.030	4.9	LOS A	0.2	1.3	0.15	0.45	41.7
All Vehic	cles	173	0.0	0.077	5.6	LOS A	0.5	3.5	0.08	0.51	42.3
VII AGIIII	CIGS	173	0.0	0.077	5.0	LO3 A	0.5	3.3	0.00	0.51	

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: MountainAshDr / BerriganPl 2022 AM - PreDevt

Mountain Ash Dr / Berrigan Pl 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

ont Bor	formanaa V	obiolos								
ient Per		enicles	Dan	A.,	Lavalat	1000/ Bask		Duco	Effective.	A
Turn		HV								Average Speed
					Service			Queueu		km/h
Mountain			V/ O	300		VC11			per veri	KIII/II
Т	171	1.2	0.089	0.2	LOS A	0.6	4.1	0.16	0.00	45.2
R	1	0.0	0.089	6.9	LOS A	0.6	4.1	0.16	0.91	35.3
ch	172	1.2	0.089	0.2	NA	0.6	4.1	0.16	0.01	45.1
errigan Pl	(East)									
Ĺ	1	0.0	0.033	7.5	LOS A	0.1	1.0	0.30	0.50	28.7
R	30	0.0	0.033	7.8	LOS A	0.1	1.0	0.30	0.63	28.4
ch	31	0.0	0.033	7.8	LOS A	0.1	1.0	0.30	0.63	28.5
/lountain	Ash Dr (North)									
L	5	0.0	0.031	6.4	LOS A	0.0	0.0	0.00	0.88	40.0
Т	55	0.0	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
ch	60	0.0	0.031	0.5	NA	0.0	0.0	0.00	0.07	49.0
cles	263	0.8	0.089	1.2	NA	0.6	4.1	0.14	0.09	44.5
	Mountain T R ch errigan Pl L R ch Mountain L T	Turn Flow veh/h Mountain Ash Dr (South) T 171 R 1 ch 172 errigan Pl (East) L 1 R 30 ch 31 Mountain Ash Dr (North) L 5 T 55 ch 60	Turn Flow veh/h % Mountain Ash Dr (South) T 171 1.2 R 1 0.0 ch 172 1.2 errigan Pl (East) L 1 0.0 R 30 0.0 ch 31 0.0 Mountain Ash Dr (North) L 5 0.0 T 55 0.0 ch 60 0.0	Turn Flow HV Sath v/c Mountain Ash Dr (South) T 171 1.2 0.089 R 1 0.0 0.089 ch 172 1.2 0.089 ch 172 1.2 0.089 ch 31 0.0 0.033 R 30 0.0 0.033 ch 31 0.0 0.033 Mountain Ash Dr (North) L 5 0.0 0.031 T 55 0.0 0.031 ch 60 0.0 0.031	Turn	Turn	Turn Demand Flow veh/h HV Satn Veh Satn Veh Delay Service Vehicles Service Vehicles Vehicles Vehicles Veh Mountain Ash Dr (South) T 171 1.2 0.089 0.2 LOS A 0.6 R 1 0.0 0.089 6.9 LOS A 0.6 ch 172 1.2 0.089 0.2 NA 0.6 ch 18 0.0 0.033 7.5 LOS A 0.1 ch 31 0.0 0.033 7.8 LOS A 0.1 Mountain Ash Dr (North) L 5 0.0 0.031	Turn Demand Flow veh/h HV Sath V/c Deg. Sath Sath Service Average Delay Service Level of Vehicles Vehicles Distance Vehicles Vehicles Distance Vehicles Service Mountain Ash Dr (South) T 171 1.2 0.089 0.2 LOS A 0.6 4.1 R 1 0.0 0.089 6.9 LOS A 0.6 4.1 ch 172 1.2 0.089 0.2 NA 0.6 4.1 errigan Pl (East) L 1 0.0 0.033 7.5 LOS A 0.1 1.0 R 30 0.0 0.033 7.8 LOS A 0.1 1.0 ch 31 0.0 0.033 7.8 LOS A 0.1 1.0 Mountain Ash Dr (North) L 5 0.0 0.031 6.4 LOS A 0.0 0.0 T 55 0.0 0.031 0.0 LOS A 0.0 0.0 ch 60 0.0 0.031 0.5 NA <t< td=""><td>Turn Demand HV Satn Delay Service Vehicles Distance Queued Prop. Vehicles Distance Queued Prop. Vehicles Distance Queued Prop. Distance Distanc</td><td>Turn Demand Flow veh/h HV Sath V/c Delay Service Sec Level of Vehicles Vehicles Distance Veh Mountain Ash Dr (South) Prop. Sec Sec Sec Sec Veh Mountain Ash Dr (South) Effective Stop Rate Per veh Mountain Ash Dr (South) T 171 1.2 0.089 0.2 LOS A O.6 4.1 0.16 0.00 O.00 R 1 0.0 0.089 6.9 LOS A O.6 4.1 0.16 0.91 O.1 ch 172 1.2 0.089 0.2 NA O.6 4.1 0.16 0.01 errigan PI (East) L 1 0.0 0.033 7.5 LOS A O.1 1.0 0.30 0.50 R 30 0.0 0.033 7.8 LOS A O.1 1.0 0.30 0.63 ch 31 0.0 0.033 7.8 LOS A O.1 1.0 0.30 0.63 Mountain Ash Dr (North) L 5 0.0 0.031 6.4 LOS A O.0 0.0 0.00 0.00 ch 5 0.0 0.031</td></t<>	Turn Demand HV Satn Delay Service Vehicles Distance Queued Prop. Vehicles Distance Queued Prop. Vehicles Distance Queued Prop. Distance Distanc	Turn Demand Flow veh/h HV Sath V/c Delay Service Sec Level of Vehicles Vehicles Distance Veh Mountain Ash Dr (South) Prop. Sec Sec Sec Sec Veh Mountain Ash Dr (South) Effective Stop Rate Per veh Mountain Ash Dr (South) T 171 1.2 0.089 0.2 LOS A O.6 4.1 0.16 0.00 O.00 R 1 0.0 0.089 6.9 LOS A O.6 4.1 0.16 0.91 O.1 ch 172 1.2 0.089 0.2 NA O.6 4.1 0.16 0.01 errigan PI (East) L 1 0.0 0.033 7.5 LOS A O.1 1.0 0.30 0.50 R 30 0.0 0.033 7.8 LOS A O.1 1.0 0.30 0.63 ch 31 0.0 0.033 7.8 LOS A O.1 1.0 0.30 0.63 Mountain Ash Dr (North) L 5 0.0 0.031 6.4 LOS A O.0 0.0 0.00 0.00 ch 5 0.0 0.031

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Mountain Ash Dr Berrigan Pl sin



Site: MountainAshDr / BerriganPl 2022 PM - PreDevt

Mountain Ash Dr / Berrigan Pl 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

ont Porf	ormanco - V	objelos								
ent Fen	Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Turn	Flow		Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
	veh/h	%	v/c	sec		veh	m		per veh	km/h
lountain <i>i</i>	Ash Dr (South)									
Т	51	0.0	0.027	0.3	LOS A	0.2	1.2	0.23	0.00	43.2
R	1	0.0	0.027	7.1	LOS A	0.2	1.2	0.23	0.87	35.3
h	52	0.0	0.027	0.5	NA	0.2	1.2	0.23	0.02	43.1
rrigan Pl	(East)									
L	1	0.0	0.008	7.1	LOS A	0.0	0.2	0.26	0.53	29.0
R	7	0.0	0.008	7.4	LOS A	0.0	0.2	0.26	0.60	28.7
h	8	0.0	0.008	7.4	LOS A	0.0	0.2	0.26	0.59	28.7
ountain A	Ash Dr (North)									
L	7	0.0	0.063	6.4	LOS A	0.0	0.0	0.00	0.89	40.0
Т	116	0.0	0.063	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
h	123	0.0	0.063	0.4	NA	0.0	0.0	0.00	0.05	49.3
eles	183	0.0	0.063	0.7	NA	0.2	1.2	0.08	0.06	47.2
	Turn lountain A T R n rrigan Pl L R n ountain A L T	Turn Flow veh/h lountain Ash Dr (South) T 51 R 1 n 52 rrigan PI (East) L 1 R 7 n 8 ountain Ash Dr (North) L 7 T 116 n 123	Turn Flow veh/h % Iountain Ash Dr (South) T 51 0.0 R 1 0.0 n 52 0.0 Iountain Pl (East) L 1 0.0 R 7 0.0 n 8 0.0 Iountain Ash Dr (North) L 7 0.0 T 116 0.0 In 123 0.0	Turn	Turn Plow HV Satn Delay veh/h % v/c sec lountain Ash Dr (South) T 51 0.0 0.027 0.3 R 1 0.0 0.027 7.1 n 52 0.0 0.027 0.5 rrigan Pl (East) L 1 0.0 0.008 7.1 R 7 0.0 0.008 7.4 n 8 0.0 0.008 7.4 countain Ash Dr (North) L 7 0.0 0.063 6.4 T 116 0.0 0.063 0.0 n 123 0.0 0.063 0.4	Turn Plow veh/h % v/c Satn Delay Service Deg. Average Delay Service Satn Veh/h % v/c Sec Deg. Average Delay Service Sec Deg. Average Delay Service Delay Service Deg. Average Delay Service Deg. Average Delay Service Delay Service Deg. Average Delay Service Delay Service Deg. Average Delay Service D	Turn Plow HV Satn Delay Service Vehicles veh / Nountain Ash Dr (South) T 51 0.0 0.027 0.3 LOS A 0.2 R 1 0.0 0.027 7.1 LOS A 0.2 n 52 0.0 0.027 0.5 NA 0.2 rrigan PI (East) L 1 0.0 0.008 7.1 LOS A 0.0 R 7.0 0.008 7.4 LOS A 0.0 n 8 0.0 0.008 7.4 LOS A 0.0 n 8 0.0 0.008 7.4 LOS A 0.0 n 116 0.0 0.063 6.4 LOS A 0.0 n 123 0.0 0.063 0.4 NA 0.0	Turn Demand HV Satn Deg. Average Level of Service Vehicles Distance Turn Demand Flow veh/h W Satn Delay Service Vehicles Distance veh m Deg. Sec Vehicles Distance veh m Nountain Ash Dr (South) T 51 0.0 0.027 0.3 LOS A 0.2 1.2 0.23 R 1 0.0 0.027 7.1 LOS A 0.2 1.2 0.23 n 52 0.0 0.027 0.5 NA 0.2 1.2 0.23 rrigan Pl (East) L 1 0.0 0.008 7.1 LOS A 0.0 0.2 0.26 R 7 0.0 0.008 7.4 LOS A 0.0 0.2 0.26 n 8 0.0 0.008 7.4 LOS A 0.0 0.2 0.26 ountain Ash Dr (North) L 7 0.0 0.063 6.4 LOS A 0.0 0.0 0.0 T 116 0.0 0.063 0.4 NA 0.0 0.0 0.00 n 123 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 116 0.0 0.063 0.4 NA 0.0 0.0 0.00 n 123 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 116 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 116 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 117 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 118 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 119 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 110 0.0 0.063 0.4 NA 0.0 0.0 0.00 T 110 0.0 0.063 0.4 NA 0.0 0.00 T 116 0.0 0.063 0.4 NA 0.0 0.00 T 117 0.0 0.063 0.00 0.00 T 118 0.0 0.063 0.00 0.00 T 119 0.00 0.063 0.00 0.00 T 110 0.00 0.000 0.000 0.000 T 110 0.00 0.000 0.000 0.000 0.000 T 117 0.00 0.000 0.000 0.000 0.000 T 117 0.00 0.000 0.000 0.000 0.000 0.000 T	Turn Demand Flow veh/h HV yeh/h Sath Sath V/c Average Delay Service Level of Vehicles Vehicles Vehicles Distance Vehicles Vehicles Distance Vehicles Vehicles Vehicles Vehicles Distance Vehicles Vehicles Vehicles Vehicles Vehicles Distance Vehicles Vehicle	

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Mountain Ash Dr Berrigan



Site: GlenfieldsBlvd / MountainAshDr / BirchSt 2022 AM - PreDevt

Glenfields Blvd / Mountain Ash Dr / Birch St 2022 AM Peak Pre Development Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/l
South E	ast: Mour	ntain Ash Dr (S	South)								
1	L	1	0.0	0.150	4.9	LOS A	1.0	7.1	0.24	0.41	43.
2	T	1	0.0	0.150	3.8	LOS A	1.0	7.1	0.24	0.33	43.
3	R	199	1.0	0.150	9.3	LOS A	1.0	7.1	0.24	0.61	39.
Approac	h	201	1.0	0.150	9.3	LOS A	1.0	7.1	0.24	0.61	40.
North Ea	ast: Glenf	ields Blvd (Ea	st)								
4	L	56	0.0	0.078	4.5	LOS A	0.5	3.9	0.04	0.46	44.
5	Т	60	9.7	0.078	3.6	LOS A	0.5	3.9	0.04	0.33	45.
6	R	10	0.0	0.078	8.9	LOS A	0.5	3.9	0.04	0.85	40
Approac	h	126	4.6	0.078	4.4	LOS A	0.5	3.9	0.04	0.43	44
North W	est: Birch	St (North)									
7	L	27	0.0	0.033	7.1	LOS A	0.2	1.5	0.58	0.58	29
8	Т	1	0.0	0.033	6.1	LOS A	0.2	1.5	0.58	0.53	29
9	R	1	0.0	0.033	11.6	LOS B	0.2	1.5	0.58	0.73	27.
Approac	:h	29	0.0	0.033	7.3	LOS A	0.2	1.5	0.58	0.58	29
South W	/est: Glen	fields Blvd (W	/est)								
10	L	3	0.0	0.267	6.1	LOS A	2.0	14.5	0.49	0.58	38
11	Т	263	3.7	0.267	5.2	LOS A	2.0	14.5	0.49	0.51	39
12	R	2	0.0	0.267	10.6	LOS B	2.0	14.5	0.49	0.82	36
Approac	h	268	3.6	0.267	5.2	LOS A	2.0	14.5	0.49	0.52	39
All Vehic	rles	624	2.8	0.267	6.5	LOS A	2.0	14.5	0.32	0.53	40

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Mountain Ash Dr Birch St.sip



Site: GlenfieldsBlvd / MountainAshDr / BirchSt 2022 PM - PreDevt

Glenfields Blvd / Mountain Ash Dr / Birch St 2022 PM Peak Pre Development Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/ł
South E	ast: Mou	ntain Ash Dr (S	South)								
1	L	1	0.0	0.057	6.2	LOS A	0.4	2.5	0.48	0.52	41.6
2	Т	1	0.0	0.057	5.2	LOS A	0.4	2.5	0.48	0.46	41.8
3	R	57	0.0	0.057	10.7	LOS B	0.4	2.5	0.48	0.66	39.2
Approac	:h	59	0.0	0.057	10.5	LOS B	0.4	2.5	0.48	0.65	39.2
North Ea	ast: Glent	fields Blvd (Ea	st)								
4	L	119	0.0	0.261	4.5	LOS A	2.1	15.0	0.07	0.46	44.1
5	Т	301	3.9	0.261	3.5	LOS A	2.1	15.0	0.07	0.34	45.
6	R	18	0.0	0.261	8.9	LOS A	2.1	15.0	0.07	0.86	40.
Approac	:h	438	2.7	0.261	4.0	LOS A	2.1	15.0	0.07	0.39	44.0
North W	est: Birch	St (North)									
7	L	6	0.0	0.007	5.6	LOS A	0.0	0.3	0.40	0.46	30.7
8	Т	1	0.0	0.007	4.6	LOS A	0.0	0.3	0.40	0.39	31.
9	R	1	0.0	0.007	10.1	LOS B	0.0	0.3	0.40	0.68	28.5
Approac	:h	8	0.0	0.007	6.0	LOS A	0.0	0.3	0.40	0.48	30.4
South W	est: Gler	nfields Blvd (W	'est)								
10	L	1	0.0	0.144	4.9	LOS A	1.0	7.5	0.27	0.48	40.
11	Т	165	4.1	0.144	4.0	LOS A	1.0	7.5	0.27	0.38	41.
12	R	6	0.0	0.144	9.4	LOS A	1.0	7.5	0.27	0.82	36.
Approac	h	172	3.9	0.144	4.2	LOS A	1.0	7.5	0.27	0.40	40.
All Vehic	rles	677	2.7	0.261	4.7	LOS A	2.1	15.0	0.16	0.42	43.

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Mountain

Ash Dr Birch St.sip



Site: GlenfieldsBlvd / LacebarkSt 2022 AM - PreDevt

Glenfields Blvd / Lacebark St 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - Vo	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	f Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	/ledian (F	RT Stage 2) (E-I	N)								
3	R	3	0.0	0.003	2.2	LOS A	0.0	0.0	0.25	0.32	28.2
Approac	h	3	0.0	0.003	2.2	LOS A	0.0	0.0	0.25	0.32	28.2
South Ea	ast: Lace	ebark St (East)									
4	L	1	0.0	0.003	6.8	LOS A	0.0	0.1	0.25	0.53	29.2
6	R	3	0.0	0.003	6.8	LOS A	0.0	0.1	0.25	0.57	25.5
Approac	:h	4	0.0	0.003	6.8	LOS A	0.0	0.1	0.25	0.56	26.7
North Ea	ast: Glen	fields Blvd (Nor	th)								
7	L	11	0.0	0.073	6.4	LOS A	0.0	0.0	0.00	0.88	40.0
8	Т	126	4.9	0.073	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	:h	137	4.5	0.073	0.5	NA	0.0	0.0	0.00	0.07	49.0
West: M	edian (R	T Stage 2) (S-E	<u>:</u>)								
12	R	2	0.0	0.001	1.7	LOS A	0.0	0.0	0.24	0.24	28.3
Approac	h	2	0.0	0.001	1.7	LOS A	0.0	0.0	0.24	0.24	28.3
South W	est: Gler	nfields Blvd (So	uth)								
2	Т	487	2.5	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R	2	0.0	0.255	6.4	LOS A	0.0	0.0	0.00	0.76	33.4
Approac	h	489	2.5	0.255	0.0	NA	0.0	0.0	0.00	0.00	49.9
All Vehic	cles	635	2.9	0.255	0.2	NA	0.0	0.1	0.00	0.02	49.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Lacebark



Site: GlenfieldsBlvd / LacebarkSt 2022 PM - PreDevt

Glenfields Blvd / Lacebark St 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	Лedian (F	RT Stage 2) (E-I	N)								
3	R	2	0.0	0.002	1.7	LOS A	0.0	0.0	0.15	0.25	29.4
Approac	ch	2	0.0	0.002	1.7	LOS A	0.0	0.0	0.15	0.25	29.4
South E	ast: Lace	ebark St (East)									
4	L	5	0.0	0.008	8.7	LOS A	0.0	0.3	0.50	0.62	27.3
6	R	2	0.0	0.008	8.7	LOS A	0.0	0.3	0.50	0.63	23.2
Approac	ch	7	0.0	0.008	8.7	LOS A	0.0	0.3	0.50	0.63	26.4
North Ea	ast: Glen	fields Blvd (Nor	th)								
7	L	11	0.0	0.232	6.4	LOS A	0.0	0.0	0.00	0.91	40.0
8	Т	434	2.7	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	ch	445	2.6	0.232	0.2	NA	0.0	0.0	0.00	0.02	49.7
West: M	ledian (R	T Stage 2) (S-E	:)								
12	R	2	0.0	0.002	2.9	LOS A	0.0	0.1	0.47	0.36	25.9
Approac	ch	2	0.0	0.002	2.9	LOS A	0.0	0.1	0.47	0.36	25.9
South W	/est: Gler	nfields Blvd (So	uth)								
2	Т	224	3.0	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R	2	0.0	0.118	6.4	LOS A	0.0	0.0	0.00	0.76	33.4
Approac	ch	226	3.0	0.118	0.1	NA	0.0	0.0	0.00	0.01	49.8
All Vehic	cles	682	2.7	0.232	0.2	NA	0.0	0.3	0.01	0.03	49.5

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: GlenfieldsBlvd / ParkleaEsp / GreenwayPI 2022 AM - PreDevt

Glenfields Blvd / Parklea Esp / Greenway Pl 2022 AM Peak Pre Development Roundabout

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Gree	enway PI (South		V/C	360		Ven	- '''		per veri	KIII/II
1	L	1	0.0	0.021	4.5	LOS A	0.1	0.9	0.34	0.38	37.7
2	Т	1	0.0	0.021	3.4	LOS A	0.1	0.9	0.34	0.31	38.5
3	R	22	0.0	0.021	9.7	LOS A	0.1	0.9	0.34	0.60	34.0
Approac	ch	24	0.0	0.021	9.2	LOS A	0.1	0.9	0.34	0.58	34.3
North E	ast: Glen	fields Blvd (Eas	st)								
4	L	13	0.0	0.117	3.6	LOS A	0.9	6.3	0.07	0.38	40.8
5	Т	130	4.6	0.117	2.6	LOS A	0.9	6.3	0.07	0.25	42.8
6	R	35	0.0	0.117	8.8	LOS A	0.9	6.3	0.07	0.87	35.3
Approac	ch	178	3.4	0.117	3.9	LOS A	0.9	6.3	0.07	0.38	40.7
North W	est: Park	dea Esp (North)								
7	L	60	0.0	0.068	6.1	LOS A	0.5	3.3	0.60	0.57	41.4
8	Т	1	0.0	0.068	5.0	LOS A	0.5	3.3	0.60	0.52	41.5
9	R	7	0.0	0.068	11.3	LOS B	0.5	3.3	0.60	0.75	39.1
Approac	ch	68	0.0	0.068	6.7	LOS A	0.5	3.3	0.60	0.59	41.1
South V	Vest: Glei	nfields Blvd (W	est)								
10	L	5	0.0	0.328	3.9	LOS A	2.7	19.6	0.24	0.42	44.2
11	Т	483	2.4	0.328	2.9	LOS A	2.7	19.6	0.24	0.30	44.9
12	R	1	0.0	0.328	9.1	LOS A	2.7	19.6	0.24	0.88	40.9
Approac	ch	489	2.4	0.328	2.9	LOS A	2.7	19.6	0.24	0.31	44.9
All Vehi	cles	759	2.3	0.328	3.7	LOS A	2.7	19.6	0.24	0.36	43.6

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: GlenfieldsBlvd / ParkleaEsp / GreenwayPI 2022 PM - PreDevt

Glenfields Blvd / Parklea Esp / Greenway Pl 2022 PM Peak Pre Development Roundabout

Move	ment P <u>er</u>	formance - V	ehicle <u>s</u>								
) Turn	Demand Flow	HV	Deg. Satn	Average	Level of Service	100% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average
IVIOV IL	, ruiii	veh/h	%	v/c	Delay sec	Service	venicies veh	Distance m	Queuea	per veh	Speed km/h
South	East: Gree	nway PI (South									
1	L	1	0.0	0.036	6.6	LOS A	0.2	1.6	0.58	0.54	35.2
2	T	1	0.0	0.036	5.4	LOS A	0.2	1.6	0.58	0.49	35.4
3	R	30	0.0	0.036	11.8	LOS B	0.2	1.6	0.58	0.68	32.6
Approa	ach	32	0.0	0.036	11.4	LOS B	0.2	1.6	0.58	0.67	32.7
North E	East: Glenf	ields Blvd (Eas	st)								
4	L	42	0.0	0.335	3.6	LOS A	2.9	20.7	0.06	0.39	41.0
5	Т	445	2.6	0.335	2.5	LOS A	2.9	20.7	0.06	0.26	43.1
6	R	68	0.0	0.335	8.8	LOS A	2.9	20.7	0.06	0.91	35.3
Approa	ach	555	2.1	0.335	3.4	LOS A	2.9	20.7	0.06	0.35	41.6
North \	Nest: Park	lea Esp (North)								
7	L	47	0.0	0.040	4.7	LOS A	0.3	1.8	0.42	0.45	42.5
8	Т	1	0.0	0.040	3.6	LOS A	0.3	1.8	0.42	0.37	42.9
9	R	1	0.0	0.040	9.9	LOS A	0.3	1.8	0.42	0.72	40.0
Approa	ach	49	0.0	0.040	4.8	LOS A	0.3	1.8	0.42	0.46	42.5
South '	West: Gler	nfields Blvd (W	est)								
10	L	4	0.0	0.169	4.1	LOS A	1.2	8.6	0.29	0.44	43.9
11	Т	220	3.1	0.169	3.1	LOS A	1.2	8.6	0.29	0.33	44.6
12	R	3	0.0	0.169	9.3	LOS A	1.2	8.6	0.29	0.86	40.9
Approa	ach	227	3.0	0.169	3.2	LOS A	1.2	8.6	0.29	0.34	44.5
All Veh	nicles	863	2.1	0.335	3.7	LOS A	2.9	20.7	0.16	0.36	42.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: GlenfieldsBlvd / PreludeDr / EBOffRamp 2022 AM - PreDevt

Glenfields Blvd / Prelude Dr / EB Off Ramp 2022 AM Peak Pre Development Roundabout

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
6	R	151	2.4	0.088	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
Approa	ch	151	2.4	0.088	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
North V	Vest: Glen	fields Blvd (We	est)								
7	L	564	2.1	0.516	7.3	LOS A	5.0	35.9	0.67	0.66	36.7
Approa	ch	564	2.1	0.516	7.3	LOS A	5.0	35.9	0.67	0.66	36.7
South V	Vest: Sun	shine Mwy EB	Off Ramp	(South)							
10	L	26	9.2	0.243	6.4	LOS A	1.9	13.8	0.38	0.54	49.3
11	Т	273	4.6	0.243	5.9	LOS A	1.9	13.8	0.38	0.47	50.2
Approa	ch	299	5.0	0.243	5.9	LOS A	1.9	13.8	0.38	0.48	50.1
All Vehi	icles	1014	3.0	0.516	7.3	LOS A	5.0	35.9	0.48	0.61	43.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: GlenfieldsBlvd / PreludeDr / EBOffRamp 2022 PM - PreDevt

Glenfields Blvd / Prelude Dr / EB Off Ramp 2022 PM Peak Pre Development Roundabout

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
6	R	452	2.3	0.262	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
Approa	ch	452	2.3	0.262	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
North V	Vest: Glen	fields Blvd (We	est)								
7	L	298	2.3	0.279	6.6	LOS A	2.3	16.5	0.56	0.59	37.5
Approa	ch	298	2.3	0.279	6.6	LOS A	2.3	16.5	0.56	0.59	37.5
South V	Vest: Sun	shine Mwy EB	Off Ramp	(South)							
10	L	103	1.4	0.361	8.7	LOS A	3.2	23.1	0.68	0.69	47.6
11	Т	251	3.9	0.361	8.4	LOS A	3.2	23.1	0.68	0.66	47.9
Approa	ch	354	3.2	0.361	8.5	LOS A	3.2	23.1	0.68	0.67	47.8
All Vehi	icles	1104	2.6	0.361	8.6	LOS A	3.2	23.1	0.37	0.65	45.2

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **PreludeDr / EBOnRamp 2022 AM - PreDevt

Prelude Dr / EB On Ramp 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
5	Т	151	2.4	0.079	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	151	2.4	0.079	0.0	NA	0.0	0.0	0.00	0.00	60.0
South W	/est: Prel	ude Dr (South)									
11	Т	560	3.3	0.293	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	276	2.1	0.240	9.7	LOS A	1.6	11.8	0.37	0.63	45.0
Approac	ch	836	2.9	0.293	3.2	NA	1.6	11.8	0.12	0.21	54.1
All Vehic	cles	987	2.8	0.293	2.7	NA	1.6	11.8	0.10	0.18	54.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **PreludeDr / EBOnRamp 2022 PM - PreDevt

Prelude Dr / EB On Ramp 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North Ea	ast: Prelu	de Dr (North)									
5	Т	451	2.3	0.235	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	451	2.3	0.235	0.0	NA	0.0	0.0	0.00	0.00	60.0
South W	lest: Prel	ude Dr (South)									
11	Т	377	3.5	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	171	1.9	0.165	11.9	LOS B	1.3	8.9	0.63	0.73	43.1
Approac	ch	548	3.0	0.198	3.7	NA	1.3	8.9	0.20	0.23	53.5
All Vehic	cles	999	2.7	0.235	2.0	NA	1.3	8.9	0.11	0.13	54.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **EBOnRamp / PreludeDr 2022 AM - PreDevt

EB On Ramp / Prelude Dr 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North: S	Sunshine	Mwy EB On Ra	mp (Nort	h)							
7	L	1010	3.2	0.556	9.0	LOS A	0.0	0.0	0.00	0.73	34.6
Approac	ch	1010	3.2	0.556	9.0	NA	0.0	0.0	0.00	0.73	34.6
North W	est: Fror	n Prelude Dr (V	Vest)								
28	Т	277	2.1	0.709	22.3	LOS C	4.7	33.9	0.87	1.19	20.7
Approac	ch	277	2.1	0.709	22.3	LOS C	4.7	33.9	0.87	1.19	20.7
All Vehi	cles	1287	3.0	0.709	11.9	NA	4.7	33.9	0.19	0.83	30.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **EBOnRamp / PreludeDr 2022 PM - PreDevt

EB On Ramp / Prelude Dr 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average	Level of Service	100% Back Vehicles	of Queue Distance	Prop. Queued	Effective	Average
10100 12	rain	veh/h	%	v/c	Delay sec	Service	venicies veh	Distance m	Queueu	Stop Rate per veh	Speed km/h
North: S	Sunshine I	Mwy EB On Ra	amp (Nort	h)							
7	L	685	3.1	0.377	9.0	LOS A	0.0	0.0	0.00	0.73	34.6
Approac	ch	685	3.1	0.377	9.0	NA	0.0	0.0	0.00	0.73	34.6
North W	lest: Fron	n Prelude Dr (V	Vest)								
28	Т	172	1.9	0.272	11.2	LOS B	1.2	8.6	0.54	0.83	30.8
Approac	ch	172	1.9	0.272	11.2	LOS B	1.2	8.6	0.54	0.83	30.8
All Vehi	cles	857	2.9	0.377	9.5	NA	1.2	8.6	0.11	0.75	33.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 **AM - PreDevt**

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 AM Peak Pre Development

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Mover	nent Peri	formance - V	ehicles								
Mov ID		Demand	HV	Deg.	Average	Level of	100% Back		Prop.	Effective	Average
טו ייטועו	Turn	Flow veh/h	пv %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South E	East: Kara	watha Dr (East		V/C	360		VEII	'''		pei veii	KIII/II
21	L	270	2.9	0.516	18.5	LOS B	6.1	43.8	0.66	0.76	30.2
22	Т	302	3.0	0.842	44.2	LOS D	9.4	68.3	1.00	0.98	16.5
23	R	295	2.0	0.842	51.5	LOS D	9.3	66.6	1.00	0.98	14.8
Approa	ch	867	2.6	0.842	38.7	LOS D	9.4	68.3	0.90	0.91	18.6
North E	ast: Lady	Musgrave Dr (North)								
24	L	63	1.9	0.114	8.8	LOS A	0.6	4.1	0.31	0.63	42.6
25	Т	274	3.6	0.847	42.3	LOS D	12.3	89.3	1.00	1.02	24.3
26	R	37	2.7	0.152	38.7	LOS D	1.7	12.1	0.89	0.74	27.1
Approa	ch	374	3.2	0.847	36.3	LOS D	12.3	89.3	0.87	0.92	26.5
North V	Vest: Kara	watha Dr (Wes	st)								
27	L	55	1.5	0.343	31.3	LOS C	6.5	45.9	0.83	0.85	32.6
28	Т	143	1.5	0.343	23.8	LOS C	6.5	45.9	0.83	0.68	34.0
29	R	553	3.3	0.881	45.7	LOS D	23.4	169.3	0.97	0.98	26.7
Approa	ch	751	2.8	0.881	40.4	LOS D	23.4	169.3	0.93	0.91	28.2
South V	Nest: Prel	ude Dr (South)									
30	L	132	3.0	0.797	34.3	LOS C	7.1	51.2	1.00	0.91	31.6
31	Т	264	1.9	0.797	38.3	LOS D	7.9	56.3	1.00	0.92	27.3
32	R	163	5.9	0.805	51.2	LOS D	7.4	55.4	1.00	0.94	25.2
Approa	ch	559	3.3	0.805	41.1	LOS D	7.9	56.3	1.00	0.92	27.5
All Veh	icles	2551	2.9	0.881	39.4	LOS D	23.4	169.3	0.93	0.92	25.1

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Musgrave Dr Prelude Dr.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 **PM - PreDevt**

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 PM Peak Pre Development

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movem	nent P <u>er</u>	formance - V	ehicle <u>s</u>	_							
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
0 11 5		veh/h	%	v/c	sec		veh	m		per veh	km/h
		watha Dr (East	•								
21	L	273	2.3	0.458	14.9	LOS B	5.0	35.8	0.56	0.74	33.5
22	Т	524	2.8	0.774	38.0	LOS D	11.3	81.7	1.00	0.92	18.4
23	R	162	2.5	0.565	40.5	LOS D	6.3	45.1	0.95	0.80	17.4
Approac	ch	959	2.6	0.774	31.8	LOS C	11.3	81.7	0.87	0.85	21.0
North Ea	ast: Lady	Musgrave Dr (North)								
24	L	78	1.5	0.114	7.8	LOS A	0.5	3.6	0.25	0.62	43.4
25	Т	231	3.7	0.734	39.1	LOS D	7.7	55.7	0.99	0.86	25.2
26	R	32	3.7	0.367	43.1	LOS D	3.4	25.0	0.96	0.77	26.0
Approac	ch	341	3.2	0.734	32.4	LOS C	7.7	55.7	0.82	0.80	28.0
North W	est: Kara	awatha Dr (Wes	st)								
27	L	26	0.0	0.265	31.4	LOS C	4.8	33.6	0.81	0.85	32.7
28	Т	122	1.0	0.265	23.9	LOS C	4.8	33.6	0.81	0.66	34.2
29	R	549	2.8	0.792	38.4	LOS D	17.6	126.8	0.94	0.89	29.3
Approac	ch	697	2.4	0.792	35.6	LOS D	17.6	126.8	0.91	0.85	30.2
South W	Vest: Prel	lude Dr (South)									
30	L	155	3.4	0.459	24.1	LOS C	4.1	29.7	0.91	0.80	36.5
31	Т	132	1.7	0.459	33.7	LOS C	4.1	29.7	0.96	0.76	29.1
32	R	90	6.6	0.446	45.6	LOS D	3.7	27.6	0.98	0.77	26.9
Approac	ch	377	3.6	0.459	32.6	LOS C	4.1	29.7	0.94	0.78	31.1
All Vehi	cles	2374	2.8	0.792	33.1	LOS C	17.6	126.8	0.89	0.83	27.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Musgrave Dr Prelude Dr.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 AM - PreDevt

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 AM Peak Pre Development Roundabout

Moven	nent P <u>er</u>	formance - V	ehicle <u>s</u>								
Mov ID		Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Seria	ata Way (South		V/C	Sec		ven	- 111		per veri	KIII/II
1	L	1	0.0	0.019	19.3	LOS B	0.2	1.3	1.00	0.71	35.8
2	Т	5	0.0	0.019	18.2	LOS B	0.2	1.3	1.00	0.71	35.9
Approa	ch	6	0.0	0.019	18.3	LOS B	0.2	1.3	1.00	0.71	35.9
North E	ast: WB (Off Ramp (East))								
4	L	1	0.0	0.656	12.1	LOS B	11.8	86.2	1.00	0.75	42.8
5	Т	71	7.0	0.656	12.0	LOS B	11.8	86.2	1.00	0.77	43.5
6	R	642	3.6	0.656	18.3	LOS B	11.8	86.2	1.00	0.76	41.0
Approa	ch	714	3.9	0.656	17.7	LOS B	11.8	86.2	1.00	0.76	41.2
North W	lest: Kara	watha Dr (Nort	h)								
8	Т	1	0.0	0.229	4.0	LOS A	1.9	13.5	0.02	0.31	46.5
9	R	381	3.4	0.229	11.3	LOS B	1.9	13.5	0.02	0.69	38.9
Approa	ch	382	3.4	0.229	11.2	LOS B	1.9	13.5	0.02	0.69	38.9
South V	Vest: Bun	dilla Blvd (Wes	t)								
10	L	219	0.0	0.378	11.4	LOS B	3.4	23.5	0.90	0.89	45.7
12	R	1	0.0	0.378	15.5	LOS B	3.4	23.5	0.90	0.93	42.3
Approa	ch	220	0.0	0.378	11.4	LOS B	3.4	23.5	0.90	0.89	45.6
All Vehi	cles	1322	3.1	0.656	14.8	LOS B	11.8	86.2	0.70	0.76	41.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 PM - PreDevt

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 PM Peak Pre Development Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Oueue	Prop.	Effective	Averag
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec	00.7.00	veh	m	Quouou	per veh	km/l
South Ea	ast: Seria	ta Way (South	1)								
1	L	5	0.0	0.067	25.3	LOS C	0.7	4.6	1.00	0.82	32.
2	Т	10	0.0	0.067	24.2	LOS C	0.7	4.6	1.00	0.82	32.
Approac	:h	15	0.0	0.067	24.6	LOS C	0.7	4.6	1.00	0.82	32.
North Ea	ast: WB C	Off Ramp (East	t)								
4	L	5	0.0	0.776	13.3	LOS B	19.3	140.1	1.00	0.75	41.
5	Т	103	5.0	0.776	13.2	LOS B	19.3	140.1	1.00	0.77	42
6	R	836	3.0	0.776	19.5	LOS B	19.3	140.1	1.00	0.76	40
Approac	:h	944	3.2	0.776	18.8	LOS B	19.3	140.1	1.00	0.76	40
North W	est: Kara	watha Dr (Nor	th)								
8	Т	1	0.0	0.174	4.0	LOS A	1.4	9.8	0.02	0.31	46
9	R	291	2.9	0.174	11.2	LOS B	1.4	9.8	0.02	0.70	38
Approac	:h	292	2.9	0.174	11.2	LOS B	1.4	9.8	0.02	0.69	38
South W	est: Bun	dilla Blvd (Wes	st)								
10	L	116	0.0	0.275	13.5	LOS B	2.4	16.8	0.95	0.93	43
12	R	1	0.0	0.275	17.5	LOS B	2.4	16.8	0.95	0.94	40
Approac	h	117	0.0	0.275	13.5	LOS B	2.4	16.8	0.95	0.93	43
All Vehic	rles	1368	2.8	0.776	16.8	LOS B	19.3	140.1	0.79	0.76	40

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Karawatha Dr Bundilla Blvd WB Off Ramp Seriata Way.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: **KarawathaDr / SatinaySt 2022 AM - PreDevt

Karawatha Dr / Satinay St 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: M	ledian (F	RT Stage 2) (E-	N)								
12	R	6	0.0	0.024	4.5	LOS A	0.0	0.2	0.54	0.53	24.1
Approacl	h	6	0.0	0.024	4.5	LOS A	0.0	0.2	0.54	0.53	24.1
South Ea	ast: Kara	watha Dr (East	:)								
2	Т	465	3.1	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	6	0.0	0.246	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approacl	h	471	3.1	0.246	0.1	NA	0.0	0.0	0.00	0.01	59.7
East: Me	edian (R1	Stage 2) (N-W	V)								
3	R	12	0.0	0.013	2.6	LOS A	0.0	0.2	0.27	0.36	31.8
Approacl	h	12	0.0	0.013	2.6	LOS A	0.0	0.2	0.27	0.36	31.8
North Ea	ıst: Satin	ay St (North)									
4	L	73	0.0	0.485	16.7	LOS C	0.9	6.4	0.66	0.96	36.8
6	R	12	0.0	0.485	14.7	LOS B	0.9	6.4	0.66	0.91	36.3
Approacl	h	85	0.0	0.485	16.4	LOS C	0.9	6.4	0.66	0.95	36.7
North We	est: Kara	watha Dr (Wes	st)								
7	L	5	0.0	0.104	7.4	LOS A	0.0	0.0	0.00	1.16	48.6
8	Т	753	2.8	0.943	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approacl	h	758	2.8	0.943	0.0	NA	0.0	0.0	0.00	0.01	59.9
All Vehic	eles	1332	2.7	0.943	1.2	NA	0.9	6.4	0.05	0.07	56.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / SatinaySt 2022 PM - PreDevt

Karawatha Dr / Satinay St 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

Movom	ont Por	formance - V	ohiclos								
	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back o	Distance	Prop. Queued	Effective Stop Rate	Average Speed
South: M	Median (F	veh/h RT Stage 2) (E-l	% N)	v/c	sec		veh	m		per veh	km/h
12	R	18	0.0	0.035	4.2	LOS A	0.1	0.6	0.52	0.52	24.6
Approac		18	0.0	0.035	4.2	LOS A	0.1	0.6	0.52	0.52	24.6
South Ea	ast: Kara	watha Dr (East	:)								
2	Т	693	3.1	0.372	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	18	0.0	0.372	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	:h	711	3.0	0.372	0.2	NA	0.0	0.0	0.00	0.02	59.3
East: Me	edian (R	Γ Stage 2) (N-W	V)								
3	R	5	0.0	0.006	3.4	LOS A	0.0	0.1	0.36	0.42	30.7
Approac	:h	5	0.0	0.006	3.4	LOS A	0.0	0.1	0.36	0.42	30.7
North Ea	ast: Satin	ay St (North)									
4	L	9	0.0	0.036	11.4	LOS B	0.1	0.7	0.60	0.78	40.5
6	R	5	0.0	0.036	9.3	LOS A	0.1	0.7	0.60	0.68	40.7
Approac	h	14	0.0	0.036	10.6	LOS B	0.1	0.7	0.60	0.74	40.6
North W	est: Kara	awatha Dr (Wes	st)								
7	L	11	0.0	0.076	7.4	LOS A	0.0	0.0	0.00	1.11	48.6
8	Т	696	2.3	0.504	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	707	2.3	0.504	0.1	NA	0.0	0.0	0.00	0.02	59.8
All Vehic	cles	1455	2.6	0.504	0.3	NA	0.1	0.7	0.01	0.03	59.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SaratogaDr 2022 AM - PreDevt

Karawatha Dr / Saratoga Dr 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Marra	and Dan	(\/	alalada a								
wovem	ent Per	formance - V	enicies				1000/ 5				
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Kara	watha Dr (East									
7	L	6	0.0	0.249	7.4	LOS A	0.0	0.0	0.00	1.17	48.6
8	Т	471	3.0	0.249	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	477	3.0	0.249	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: N	ledian (R	T Stage 2) (W-	·S)								
12	R	6	0.0	0.005	3.0	LOS A	0.0	0.2	0.44	0.37	26.2
Approac	:h	6	0.0	0.005	3.0	LOS A	0.0	0.2	0.44	0.37	26.2
North W	est: Kara	watha Dr (Wes	st)								
2	Т	684	3.2	0.361	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	6	0.0	0.361	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	:h	690	3.2	0.361	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: M	edian (R	T Stage 2) (S-E	≣)								
3	R	74	0.0	0.094	3.4	LOS A	0.2	1.6	0.37	0.52	30.7
Approac	h	74	0.0	0.094	3.4	LOS A	0.2	1.6	0.37	0.52	30.7
South W	est: Sara	atoga Dr (South	n)								
4	L	13	0.0	0.082	9.3	LOS A	0.4	3.1	0.51	0.74	40.2
6	R	74	0.0	0.082	7.3	LOS A	0.4	3.1	0.51	0.64	40.1
Approac	h	87	0.0	0.082	7.6	LOS A	0.4	3.1	0.51	0.66	40.1
All Vehic	cles	1334	2.7	0.361	0.8	NA	0.4	3.1	0.06	0.08	57.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SaratogaDr 2022 PM - PreDevt

Karawatha Dr / Saratoga Dr 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

		·									
Movem	ent Per	formance - V	enicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South Fa	ast: Kara	watha Dr (East		V/C	360		Ven			per veri	KIII/I
7	l	19	0.0	0.365	7.4	LOS A	0.0	0.0	0.00	1.16	48.6
8	T	678	3.1	0.365	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	697	3.0	0.365	0.2	NA	0.0	0.0	0.00	0.03	59.6
North: M	ledian (R	T Stage 2) (W-	·S)								
12	R	10	0.0	0.012	4.5	LOS A	0.1	0.4	0.54	0.50	24.1
Approac	h	10	0.0	0.012	4.5	LOS A	0.1	0.4	0.54	0.50	24.1
North W	est: Kara	watha Dr (Wes	st)								
2	Т	694	2.3	0.367	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	10	0.0	0.367	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	:h	704	2.3	0.367	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: M	edian (R	T Stage 2) (S-E	≣)								
3	R	10	0.0	0.013	3.2	LOS A	0.0	0.2	0.35	0.45	31.0
Approac	h	10	0.0	0.013	3.2	LOS A	0.0	0.2	0.35	0.45	31.0
South W	est: Sara	atoga Dr (South	1)								
4	L	4	0.0	0.019	11.0	LOS B	0.1	0.6	0.60	0.76	38.6
6	R	10	0.0	0.019	9.0	LOS A	0.1	0.6	0.60	0.67	38.4
Approac	h	14	0.0	0.019	9.6	LOS A	0.1	0.6	0.60	0.69	38.5
All Vehic	cles	1435	2.6	0.367	0.3	NA	0.1	0.6	0.01	0.03	59.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SharonCrs 2022 AM - PreDevt

Karawatha Dr / Sharon Crs 2022 AM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	f Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: M	1edian (F	RT Stage 2) (E-	N)								
12	R	6	0.0	0.006	3.9	LOS A	0.0	0.2	0.55	0.45	25.0
Approac	h	6	0.0	0.006	3.9	LOS A	0.0	0.2	0.55	0.45	25.0
South Ea	ast: Kara	watha Dr (East)								
2	Т	476	2.9	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	6	0.0	0.252	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	h	482	2.9	0.252	0.1	NA	0.0	0.0	0.00	0.01	59.9
East: Me	edian (R1	Stage 2) (N-W	/)								
3	R	13	0.0	0.014	2.5	LOS A	0.0	0.2	0.25	0.37	32.1
Approac	h	13	0.0	0.014	2.5	LOS A	0.0	0.2	0.25	0.37	32.1
North Ea	ast: Shar	on Crs (North)									
4	L	75	0.0	0.130	11.7	LOS B	0.7	4.7	0.62	0.82	33.7
6	R	13	0.0	0.130	9.7	LOS A	0.7	4.7	0.62	0.73	31.8
Approac	h	88	0.0	0.130	11.4	LOS B	0.7	4.7	0.62	0.81	33.5
North We	est: Kara	watha Dr (Wes	st)								
7	L	6	0.0	0.326	7.4	LOS A	0.0	0.0	0.00	1.18	40.7
8	Т	615	3.5	0.326	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	621	3.5	0.326	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehic	cles	1210	2.9	0.326	1.0	NA	0.7	4.7	0.05	0.07	57.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SharonCrs 2022 PM - PreDevt

Karawatha Dr / Sharon Crs 2022 PM Peak Pre Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	/ledian (F	RT Stage 2) (E-	N)								
12	R	18	0.0	0.021	4.5	LOS A	0.1	0.7	0.59	0.54	24.0
Approac	ch	18	0.0	0.021	4.5	LOS A	0.1	0.7	0.59	0.54	24.0
South E	ast: Kara	watha Dr (East	t)								
2	Т	665	3.1	0.358	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	18	0.0	0.358	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	ch	683	3.0	0.358	0.2	NA	0.0	0.0	0.00	0.02	59.8
East: Me	edian (R1	Stage 2) (N-W	V)								
3	R	4	0.0	0.005	3.1	LOS A	0.0	0.1	0.34	0.43	31.1
Approac	:h	4	0.0	0.005	3.1	LOS A	0.0	0.1	0.34	0.43	31.1
North Ea	ast: Shar	on Crs (North)									
4	L	8	0.0	0.019	11.8	LOS B	0.1	0.6	0.62	0.75	33.7
6	R	4	0.0	0.019	9.8	LOS A	0.1	0.6	0.62	0.66	31.8
Approac	h	12	0.0	0.019	11.1	LOS B	0.1	0.6	0.62	0.72	33.1
North W	est: Kara	watha Dr (Wes	st)								
7	L	4	0.0	0.366	7.4	LOS A	0.0	0.0	0.00	1.18	40.7
8	Т	699	2.3	0.366	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	703	2.3	0.366	0.0	NA	0.0	0.0	0.00	0.01	59.9
All Vehic	cles	1420	2.6	0.366	0.3	NA	0.1	0.7	0.01	0.03	59.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 AM -**PreDevt**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 AM Peak Pre Development Signals - Actuated Cycle Time = 72 seconds

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N	/lountain	Creek Shops ((South)								
30	L	54	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.8
Approac	ch	54	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.8
East: Ka	arawatha	Dr (East)									
21	L	50	0.0	0.027	8.0	Χ	X	X	Χ	0.63	49.3
22	Т	420	3.3	0.348	7.2	LOS A	7.4	53.9	0.50	0.44	48.1
23	R	19	0.0	0.122	43.0	LOS D	0.7	4.9	0.93	0.69	26.5
Approac	ch	489	2.8	0.348	8.7	LOS A	7.4	53.9	0.47	0.47	46.8
North: N	lolakai D	r (North)									
24	L	48	0.0	0.477	23.2	LOS C	1.1	8.0	0.65	0.70	33.1
26	R	132	7.1	0.355	35.2	LOS D	4.3	32.6	0.87	0.78	28.2
Approac	ch	180	5.2	0.477	32.0	LOS C	4.3	32.6	0.82	0.76	29.4
West: K	arawatha	Dr (West)									
27	L	108	9.1	0.237	10.4	LOS B	1.1	8.1	0.27	0.69	43.6
28	Т	572	3.8	0.649	17.0	LOS B	16.5	120.2	0.81	0.72	36.3
Approac	ch	680	4.6	0.649	15.9	LOS B	16.5	120.2	0.72	0.71	37.2
All Vehi	cles	1403	3.9	0.649	15.0	LOS B	16.5	120.2	0.63	0.62	38.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 PM -**PreDevt**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 PM Peak Pre Development Signals - Actuated Cycle Time = 72 seconds

Movem	nent Peri	formance - V	/ehicles								
Mov ID	Turn	Demand	HV	Deg.	Average	Level of	100% Back		Prop.	Effective	Average
עו ייטואו	Turn	Flow veh/h	пv %	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South: N	Mountain :	Creek Shops (v/c	sec		veh	m		per veh	km/h
30	L	73	0.0	0.101	7.7	LOS A	1.1	7.4	0.41	0.52	24.8
Approac		73	0.0	0.101	7.7	LOS A	1.1	7.4	0.41	0.52	24.8
East: Ka	arawatha	Dr (East)									
21	L	68	0.0	0.036	8.0	Χ	X	Χ	Χ	0.63	49.3
22	Т	585	3.5	0.547	11.5	LOS B	13.9	100.7	0.67	0.60	43.5
23	R	15	0.0	0.096	42.8	LOS D	0.5	3.8	0.93	0.69	26.6
Approac	ch	668	3.1	0.547	11.8	LOS B	13.9	100.7	0.61	0.60	43.4
North: M	/lolakai Dr	· (North)									
24	L	49	0.0	0.433	19.8	LOS B	1.0	7.2	0.58	0.69	35.0
26	R	396	4.8	0.786	36.0	LOS D	14.5	107.0	0.96	0.88	27.9
Approac	ch	445	4.3	0.786	34.2	LOS C	14.5	107.0	0.92	0.86	28.5
West: K	arawatha	Dr (West)									
27	L	191	7.7	0.415	10.9	LOS B	2.0	14.9	0.33	0.70	43.0
28	Т	654	2.5	0.867	23.1	LOS C	22.7	163.4	0.97	0.86	32.0
Approac	ch	845	3.7	0.867	20.4	LOS C	22.7	163.4	0.83	0.83	33.9
All Vehic	cles	2031	3.5	0.867	20.1	LOS C	22.7	163.4	0.76	0.75	35.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Appendix R

2022 AM and PM Peak SIDRA Results (With Development)

Site: MountainAshDr / GolfCourseAccess 2022 AM -**PostDevt**

Mountain Ash Dr / Golf Course Access 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Moven	nent Per	formance - V	ehicles								
Mov ID		Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	Mountain	Ash Dr (South)									
7	L	2	0.0	0.058	5.6	LOS A	0.0	0.0	0.00	0.79	38.7
8	Т	109	1.8	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	ch	111	1.8	0.058	0.1	NA	0.0	0.0	0.00	0.01	49.8
North: N	Mountain A	Ash Dr (North)									
2	Т	34	0.0	0.059	0.3	LOS A	0.3	2.4	0.22	0.00	41.7
3	R	68	0.0	0.059	6.3	LOS A	0.3	2.4	0.22	0.66	31.9
Approa	ch	102	0.0	0.059	4.3	NA	0.3	2.4	0.22	0.44	35.1
West: G	olf Cours	se Access (Eas	t)								
4	L	72	0.0	0.058	4.2	LOS A	0.3	2.2	0.25	0.47	27.9
6	R	1	0.0	0.058	4.6	LOS A	0.3	2.2	0.25	0.57	27.6
Approac	ch	73	0.0	0.058	4.2	LOS A	0.3	2.2	0.25	0.47	27.9
All Vehi	cles	286	0.7	0.059	2.7	NA	0.3	2.4	0.14	0.28	38.6

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Course Access.sip



Site: MountainAshDr / GolfCourseAccess 2022 PM -**PostDevt**

Mountain Ash Dr / Golf Course Access 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Moven	nent Per	formance - Ve	ehicles								
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: I	Mountain	Ash Dr (South)									
7	L	2	0.0	0.017	5.6	LOS A	0.0	0.0	0.00	0.79	38.7
8	Т	32	0.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	ch	34	0.0	0.017	0.3	NA	0.0	0.0	0.00	0.05	49.3
North: N	Mountain .	Ash Dr (North)									
2	Т	77	0.0	0.081	0.1	LOS A	0.5	3.4	0.11	0.00	45.6
3	R	72	0.0	0.081	6.1	LOS A	0.5	3.4	0.11	0.76	32.5
Approac	ch	149	0.0	0.081	3.0	NA	0.5	3.4	0.11	0.37	39.0
West: G	olf Cours	se Access (East	:)								
4	L	92	0.0	0.068	3.8	LOS A	0.4	2.7	0.12	0.45	28.5
6	R	2	0.0	0.068	4.2	LOS A	0.4	2.7	0.12	0.56	28.0
Approac	ch	94	0.0	0.068	3.8	LOS A	0.4	2.7	0.12	0.45	28.5
All Vehi	cles	277	0.0	0.081	3.0	NA	0.5	3.4	0.10	0.36	35.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Course Access.sip



Site: MountainAshDr / SirisSt / MicranthaPI 2022 AM - PostDevt

Mountain Ash Dr / Siris St / Micrantha Pl 2022 AM Peak Post Development Roundabout

erformance - Demand Flow veh/h crantha PI (Sou 1 1 23	HV % oth) 0.0 0.0 0.0	Deg. Satn v/c 0.023 0.023 0.023	Average Delay sec 6.1 5.2	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
Flow veh/h crantha PI (Sou 1 1 23	% (1th) (0.0 (0.0 (0.0 (0.0 (0.0 (0.0 (0.0 (0.	Satn v/c 0.023 0.023	Delay sec 6.1	Service LOS A	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed
veh/h crantha PI (Sou 1 1 23	0.0 0.0 0.0 0.0	0.023 0.023	sec 6.1	LOS A	veh	m		per veh	
1 1 23	0.0 0.0 0.0	0.023	_		0.1	0.0	0.20	0.40	
1 23	0.0	0.023	_		0.1	0.0	0.20	0.40	
23	0.0		5.2			0.9	0.29	0.48	35.9
		0.023		LOS A	0.1	0.9	0.29	0.41	36.6
25		0.020	9.6	LOS A	0.1	0.9	0.29	0.63	32.8
	0.0	0.023	9.3	LOS A	0.1	0.9	0.29	0.61	33.0
untain Ash Dr (East)								
7	0.0	0.080	5.4	LOS A	0.5	3.8	0.04	0.56	43.5
102	0.0	0.080	4.5	LOS A	0.5	3.8	0.04	0.44	44.4
12	0.0	0.080	8.9	LOS A	0.5	3.8	0.04	0.86	40.6
121	0.0	0.080	5.0	LOS A	0.5	3.8	0.04	0.49	43.9
is St (North)									
35	0.0	0.037	6.8	LOS A	0.2	1.7	0.43	0.54	29.3
1	0.0	0.037	6.0	LOS A	0.2	1.7	0.43	0.48	29.8
1	0.0	0.037	10.4	LOS B	0.2	1.7	0.43	0.70	27.1
37	0.0	0.037	6.9	LOS A	0.2	1.7	0.43	0.54	29.2
ountain Ash Dr	(West)								
1	0.0	0.143	5.6	LOS A	1.0	7.0	0.17	0.54	40.8
181	1.1	0.143	4.8	LOS A	1.0	7.0	0.17	0.44	41.7
1	0.0	0.143	9.1	LOS A	1.0	7.0	0.17	0.81	37.9
183	1.1	0.143	4.8	LOS A	1.0	7.0	0.17	0.44	41.6
366	0.5	0.143	5.4	LOS A	1.0	7.0	0.16	0.48	41.4
	untain Ash Dr (7 102 12 121 is St (North) 35 1 1 37 ountain Ash Dr 1 181 1	untain Ash Dr (East) 7	untain Ash Dr (East) 7	untain Ash Dr (East) 7 0.0 0.080 5.4 102 0.0 0.080 4.5 12 0.0 0.080 8.9 121 0.0 0.080 5.0 is St (North) 35 0.0 0.037 6.8 1 0.0 0.037 6.0 1 0.0 0.037 6.9 buntain Ash Dr (West) 1 0.0 0.143 5.6 181 1.1 0.143 4.8 1 0.0 0.143 9.1 183 1.1 0.143 4.8	untain Ash Dr (East) 7 0.0 0.080 5.4 LOS A 102 0.0 0.080 8.9 LOS A 12 0.0 0.080 5.0 LOS A 121 0.0 0.080 5.0 LOS A 121 0.0 0.080 5.0 LOS A is St (North) 35 0.0 0.037 6.8 LOS A 1 0.0 0.037 6.0 LOS A 1 0.0 0.037 10.4 LOS B 37 0.0 0.037 6.9 LOS A Duntain Ash Dr (West) 1 0.0 0.143 5.6 LOS A 181 1.1 0.143 4.8 LOS A 1 0.0 0.143 9.1 LOS A	untain Ash Dr (East) 7 0.0 0.080 5.4 LOS A 0.5 102 0.0 0.080 4.5 LOS A 0.5 12 0.0 0.080 8.9 LOS A 0.5 121 0.0 0.080 5.0 LOS A 0.5 is St (North) 35 0.0 0.037 6.8 LOS A 0.2 1 0.0 0.037 6.0 LOS A 0.2 1 0.0 0.037 10.4 LOS B 0.2 37 0.0 0.037 6.9 LOS A 0.2 buntain Ash Dr (West) 1 0.0 0.143 5.6 LOS A 1.0 181 1.1 0.143 4.8 LOS A 1.0 183 1.1 0.143 4.8 LOS A 1.0	untain Ash Dr (East) 7	untain Ash Dr (East) 7	untain Ash Dr (East) 7 0.0 0.080 5.4 LOS A 0.5 3.8 0.04 0.56 102 0.0 0.080 8.9 LOS A 0.5 3.8 0.04 0.44 12 0.0 0.080 5.0 LOS A 0.5 3.8 0.04 0.49 is St (North) 35 0.0 0.037 6.8 LOS A 0.2 1.7 0.43 0.54 1 0.0 0.037 6.0 LOS A 0.2 1.7 0.43 0.48 1 0.0 0.037 6.9 LOS B 0.2 1.7 0.43 0.70 37 0.0 0.037 6.9 LOS A 0.2 1.7 0.43 0.54 countain Ash Dr (West) 1 0.0 0.143 5.6 LOS A 0.2 1.7 0.43 0.54 1 0.0 0.143 4.8 LOS A 1.0 7.0 0.17 0.44 1 0.0 0.143 9.1 LOS A 1.0 7.0 0.17 0.44 1 0.0 0.143 9.1 LOS A 1.0 7.0 0.17 0.41 1 83 1.1 0.143 4.8 LOS A 1.0 7.0 0.17 0.44

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Micrantha Pl.sip



Site: MountainAshDr / SirisSt / MicranthaPI 2022 PM - PostDevt

Mountain Ash Dr / Siris St / Micrantha Pl 2022 PM Peak Post Development Roundabout

Movem	nent Perf	formance - V	ehicles								
		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/r
South E	ast: Micra	antha PI (South	,								
1	L	1	0.0	0.009	6.4	LOS A	0.1	0.4	0.35	0.49	35.4
2	Т	1	0.0	0.009	5.5	LOS A	0.1	0.4	0.35	0.42	36.0
3	R	7	0.0	0.009	9.9	LOS A	0.1	0.4	0.35	0.63	32.7
Approac	ch	9	0.0	0.009	9.1	LOS A	0.1	0.4	0.35	0.59	33.3
North Ea	ast: Moun	tain Ash Dr (E	ast)								
4	L	17	0.0	0.124	5.4	LOS A	0.9	6.0	0.04	0.55	43.5
5	Т	149	0.0	0.124	4.5	LOS A	0.9	6.0	0.04	0.44	44.4
6	R	25	0.0	0.124	8.9	LOS A	0.9	6.0	0.04	0.84	40.6
Approac	ch	191	0.0	0.124	5.2	LOS A	0.9	6.0	0.04	0.50	43.7
North W	est: Siris	St (North)									
7	L	11	0.0	0.012	6.2	LOS A	0.1	0.6	0.34	0.50	30.0
8	Т	1	0.0	0.012	5.4	LOS A	0.1	0.6	0.34	0.43	30.8
9	R	1	0.0	0.012	9.8	LOS A	0.1	0.6	0.34	0.68	27.6
Approac	ch	13	0.0	0.012	6.4	LOS A	0.1	0.6	0.34	0.50	29.8
South W	Vest: Mou	ntain Ash Dr (\	West)								
10	L	1	0.0	0.098	5.6	LOS A	0.6	4.5	0.15	0.54	40.9
11	Т	123	0.0	0.098	4.7	LOS A	0.6	4.5	0.15	0.44	41.8
12	R	1	0.0	0.098	9.1	LOS A	0.6	4.5	0.15	0.82	37.9
Approac	ch	125	0.0	0.098	4.8	LOS A	0.6	4.5	0.15	0.44	41.8
All Vehic	cles	338	0.0	0.124	5.2	LOS A	0.9	6.0	0.10	0.48	42.6

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: MountainAshDr / BerriganPl 2022 AM - PostDevt

Mountain Ash Dr / Berrigan Pl 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Moven	nent Per	formance - V	ehicles								
Mov ID		Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	Mountain	Ash Dr (South)									
2	Т	238	8.0	0.123	0.4	LOS A	0.9	6.1	0.26	0.00	42.7
3	R	1	0.0	0.123	7.1	LOS A	0.9	6.1	0.26	0.88	35.3
Approac	ch	239	0.8	0.123	0.4	NA	0.9	6.1	0.26	0.00	42.7
East: Be	errigan Pl	(East)									
4	L	1	0.0	0.037	8.3	LOS A	0.2	1.1	0.40	0.53	27.7
6	R	29	0.0	0.037	8.6	LOS A	0.2	1.1	0.40	0.67	27.3
Approac	ch	30	0.0	0.037	8.6	LOS A	0.2	1.1	0.40	0.67	27.3
North: N	Mountain A	Ash Dr (North)									
7	L	5	0.0	0.065	6.4	LOS A	0.0	0.0	0.00	0.90	40.0
8	Т	121	0.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	ch	126	0.0	0.065	0.3	NA	0.0	0.0	0.00	0.04	49.5
All Vehi	icles	395	0.5	0.123	1.0	NA	0.9	6.1	0.19	0.06	44.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: MountainAshDr / BerriganPl 2022 PM - PostDevt

Mountain Ash Dr / Berrigan Pl 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	Mountain .	Ash Dr (South)		V/C	366		Ven	'''		per veri	KIII/II
2	Т	141	0.0	0.073	0.6	LOS A	0.5	3.6	0.32	0.00	41.3
3	R	1	0.0	0.073	7.3	LOS A	0.5	3.6	0.32	0.87	35.4
Approa	ch	142	0.0	0.073	0.7	NA	0.5	3.6	0.32	0.01	41.2
East: Be	errigan Pl	(East)									
4	L	1	0.0	0.009	8.0	LOS A	0.0	0.3	0.37	0.54	28.2
6	R	7	0.0	0.009	8.2	LOS A	0.0	0.3	0.37	0.63	27.8
Approac	ch	8	0.0	0.009	8.2	LOS A	0.0	0.3	0.37	0.62	27.9
North: N	Mountain A	Ash Dr (North)									
7	L	6	0.0	0.100	6.4	LOS A	0.0	0.0	0.00	0.91	40.0
8	Т	189	0.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	ch	195	0.0	0.100	0.2	NA	0.0	0.0	0.00	0.03	49.6
All Vehi	cles	345	0.0	0.100	0.6	NA	0.5	3.6	0.14	0.03	46.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Mountain Ash Dr Berrigan



Site: GlenfieldsBlvd / MountainAshDr / BirchSt 2022 AM - PostDevt

Glenfields Blvd / Mountain Ash Dr / Birch St 2022 AM Peak Post Development Roundabout

Movee	oont Por	formance - V	'ehicles								
Mov ID		Demand	HV	Deg.	Average	Level of	100% Back		Prop.	Effective	Average
טו ייטועו	Turn	Flow veh/h	пv %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South E	ast: Mou	ntain Ash Dr (S		V/ C	300		VCII			per veri	KIII/II
1	L	6	0.0	0.197	4.9	LOS A	1.4	9.9	0.25	0.41	43.0
2	Т	1	0.0	0.197	3.9	LOS A	1.4	9.9	0.25	0.33	43.6
3	R	261	8.0	0.197	9.4	LOS A	1.4	9.9	0.25	0.62	39.9
Approac	ch	268	0.8	0.197	9.2	LOS A	1.4	9.9	0.25	0.61	40.0
North E	ast: Glen	fields Blvd (Eas	st)								
4	L	117	0.0	0.117	4.5	LOS A	0.9	6.2	0.08	0.45	44.0
5	Т	60	9.7	0.117	3.7	LOS A	0.9	6.2	0.08	0.32	45.1
6	R	10	0.0	0.117	8.9	LOS A	0.9	6.2	0.08	0.81	40.4
Approa	ch	187	3.1	0.117	4.5	LOS A	0.9	6.2	0.08	0.43	44.1
North W	est: Bircl	n St (North)									
7	L	27	0.0	0.035	7.6	LOS A	0.2	1.7	0.62	0.60	28.7
8	Т	1	0.0	0.035	6.6	LOS A	0.2	1.7	0.62	0.56	28.9
9	R	1	0.0	0.035	12.1	LOS B	0.2	1.7	0.62	0.74	26.5
Approac	ch	29	0.0	0.035	7.8	LOS A	0.2	1.7	0.62	0.61	28.6
South V	Vest: Gler	nfields Blvd (W	est)								
10	L	2	0.0	0.292	6.7	LOS A	2.2	16.0	0.55	0.63	38.4
11	Т	264	3.7	0.292	5.8	LOS A	2.2	16.0	0.55	0.57	38.6
12	R	8	0.0	0.292	11.2	LOS B	2.2	16.0	0.55	0.83	35.7
Approa	ch	274	3.6	0.292	5.9	LOS A	2.2	16.0	0.55	0.58	38.5
All Vehi	cles	758	2.3	0.292	6.8	LOS A	2.2	16.0	0.33	0.55	40.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Mountain

Ash Dr Birch St.sip



Site: GlenfieldsBlvd / MountainAshDr / BirchSt 2022 PM - PostDevt

Glenfields Blvd / Mountain Ash Dr / Birch St 2022 PM Peak Post Development Roundabout

Moven	nent Per	formance - V	/ahiclas								
Mov ID		Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South F	ast: Mou	ntain Ash Dr (S		V/C	Sec		ven	m		per veri	KIII/II
1	L	7	0.0	0.143	6.3	LOS A	1.0	6.7	0.50	0.55	41.4
2	T	1	0.0	0.143	5.3	LOS A	1.0	6.7	0.50	0.50	41.7
3	R	141	0.0	0.143	10.8	LOS B	1.0	6.7	0.50	0.69	39.1
Approac		149	0.0	0.143	10.6	LOS B	1.0	6.7	0.50	0.68	39.2
North E	ast: Glen	fields Blvd (Ea	st)								
4	L	183	0.0	0.299	4.5	LOS A	2.6	18.6	0.10	0.46	43.9
5	Т	294	3.9	0.299	3.6	LOS A	2.6	18.6	0.10	0.33	44.9
6	R	18	0.0	0.299	9.0	LOS A	2.6	18.6	0.10	0.83	40.4
Approa	ch	495	2.3	0.299	4.1	LOS A	2.6	18.6	0.10	0.40	44.4
North W	Vest: Bircl	n St (North)									
7	L	6	0.0	0.008	6.1	LOS A	0.0	0.3	0.47	0.49	30.0
8	Т	1	0.0	0.008	5.1	LOS A	0.0	0.3	0.47	0.42	30.6
9	R	1	0.0	0.008	10.6	LOS B	0.0	0.3	0.47	0.68	28.0
Approa	ch	8	0.0	0.008	6.5	LOS A	0.0	0.3	0.47	0.50	29.8
South V	Vest: Gle	nfields Blvd (W	est)								
10	L	1	0.0	0.170	5.6	LOS A	1.2	8.9	0.41	0.53	39.2
11	Т	164	4.2	0.170	4.7	LOS A	1.2	8.9	0.41	0.45	39.7
12	R	11	0.0	0.170	10.1	LOS B	1.2	8.9	0.41	0.80	36.5
Approac	ch	176	3.9	0.170	5.0	LOS A	1.2	8.9	0.41	0.47	39.5
All Vehi	cles	828	2.2	0.299	5.5	LOS A	2.6	18.6	0.24	0.47	42.3

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Mountain

Ash Dr Birch St.sip



Site: GlenfieldsBlvd / LacebarkSt 2022 AM - PostDevt

Glenfields Blvd / Lacebark St 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Marram	out Don	(a	abialaa								
wovem	ent Per	formance - V	enicies								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay	Level of Service	100% Back of Vehicles veh	Distance	Prop. Queued	Effective Stop Rate	Average Speed km/h
South: M	ledian (F	RT Stage 2) (E-		V/C	sec		ven	m		per veh	KIII/I
3	R	3	0.0	0.003	2.4	LOS A	0.0	0.0	0.27	0.34	27.9
Approacl	n	3	0.0	0.003	2.4	LOS A	0.0	0.0	0.27	0.34	27.9
South Ea	ast: Lace	bark St (East)									
4	L	1	0.0	0.003	7.0	LOS A	0.0	0.1	0.30	0.54	28.8
6	R	3	0.0	0.003	7.0	LOS A	0.0	0.1	0.30	0.56	25.1
Approacl	h	4	0.0	0.003	7.0	LOS A	0.0	0.1	0.30	0.56	26.3
North Ea	st: Glent	fields Blvd (Nor	th)								
7	L	11	0.0	0.104	6.4	LOS A	0.0	0.0	0.00	0.90	40.0
8	Т	187	3.1	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approacl	h	198	2.9	0.104	0.4	NA	0.0	0.0	0.00	0.05	49.3
West: Me	edian (R	T Stage 2) (S-E	Ξ)								
12	R	3	0.0	0.002	1.9	LOS A	0.0	0.1	0.30	0.26	27.6
Approach	h	3	0.0	0.002	1.9	LOS A	0.0	0.1	0.30	0.26	27.6
South W	est: Gler	nfields Blvd (So	outh)								
2	Т	549	2.1	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R	3	0.0	0.287	6.4	LOS A	0.0	0.0	0.00	0.76	33.4
Approacl	h	552	2.1	0.287	0.0	NA	0.0	0.0	0.00	0.00	49.9
All Vehic	les	760	2.3	0.287	0.2	NA	0.0	0.1	0.00	0.02	49.
All Vehic	les	760	2.3	0.287	0.2	NA	0.0	0.1	0.00	0.02	2

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Lacebark



Site: GlenfieldsBlvd / LacebarkSt 2022 PM - PostDevt

Glenfields Blvd / Lacebark St 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	1edian (R	T Stage 2) (E-	N)								
3	R	2	0.0	0.002	1.9	LOS A	0.0	0.0	0.19	0.28	28.9
Approac	h	2	0.0	0.002	1.9	LOS A	0.0	0.0	0.19	0.28	28.9
South Ea	ast: Lace	bark St (East)									
4	L	5	0.0	0.009	9.2	LOS A	0.0	0.3	0.53	0.65	26.6
6	R	2	0.0	0.009	9.1	LOS A	0.0	0.3	0.53	0.65	22.5
Approac	h	7	0.0	0.009	9.2	LOS A	0.0	0.3	0.53	0.65	25.7
North Ea	ast: Glenf	ields Blvd (Nor	th)								
7	L	12	0.0	0.262	6.4	LOS A	0.0	0.0	0.00	0.91	40.0
8	Т	491	2.3	0.262	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approac	h	503	2.2	0.262	0.2	NA	0.0	0.0	0.00	0.02	49.7
West: Me	edian (R	Γ Stage 2) (S-E	:)								
12	R	3	0.0	0.003	3.2	LOS A	0.0	0.1	0.50	0.39	25.6
Approac	h	3	0.0	0.003	3.2	LOS A	0.0	0.1	0.50	0.39	25.6
South W	est: Gler	nfields Blvd (So	uth)								
2	Т	307	2.2	0.172	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R	23	0.0	0.172	6.4	LOS A	0.0	0.0	0.00	0.76	33.4
Approac	h	330	2.0	0.172	0.4	NA	0.0	0.0	0.00	0.05	48.7
All Vehic	eles	845	2.1	0.262	0.4	NA	0.0	0.3	0.01	0.04	49.2

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Lacebark



Site: GlenfieldsBlvd / ParkleaEsp / GreenwayPI 2022 AM - PostDevt

Glenfields Blvd / Parklea Esp / Greenway Pl 2022 AM Peak Post Development Roundabout

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Gree	enway PI (South		V/C	360		Ven	- '''		per veri	KIII/II
1	L	1	0.0	0.022	4.8	LOS A	0.1	0.9	0.40	0.41	37.1
2	Т	1	0.0	0.022	3.7	LOS A	0.1	0.9	0.40	0.34	37.7
3	R	22	0.0	0.022	10.0	LOS A	0.1	0.9	0.40	0.61	33.7
Approac	ch	24	0.0	0.022	9.5	LOS A	0.1	0.9	0.40	0.59	34.0
North E	ast: Glen	fields Blvd (Eas	st)								
4	L	13	0.0	0.153	3.6	LOS A	1.2	8.6	0.08	0.39	40.8
5	Т	190	3.2	0.153	2.6	LOS A	1.2	8.6	0.08	0.26	42.7
6	R	34	0.0	0.153	8.8	LOS A	1.2	8.6	0.08	0.89	35.3
Approac	ch	237	2.6	0.153	3.5	LOS A	1.2	8.6	0.08	0.35	41.2
North W	est: Park	dea Esp (North)								
7	L	60	0.0	0.072	6.6	LOS A	0.5	3.6	0.63	0.60	41.1
8	Т	1	0.0	0.072	5.4	LOS A	0.5	3.6	0.63	0.55	41.2
9	R	8	0.0	0.072	11.8	LOS B	0.5	3.6	0.63	0.76	38.8
Approac	ch	69	0.0	0.072	7.1	LOS A	0.5	3.6	0.63	0.61	40.8
South V	Vest: Glei	nfields Blvd (W	est)								
10	L	7	0.0	0.367	3.9	LOS A	3.2	23.1	0.25	0.42	44.1
11	Т	543	2.2	0.367	2.9	LOS A	3.2	23.1	0.25	0.31	44.9
12	R	1	0.0	0.367	9.1	LOS A	3.2	23.1	0.25	0.87	40.9
Approac	ch	551	2.2	0.367	2.9	LOS A	3.2	23.1	0.25	0.31	44.9
All Vehi	cles	881	2.0	0.367	3.6	LOS A	3.2	23.1	0.24	0.35	43.6

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Parklea

Esp Greenway Pl.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: GlenfieldsBlvd / ParkleaEsp / GreenwayPI 2022 PM - PostDevt

Glenfields Blvd / Parklea Esp / Greenway Pl 2022 PM Peak Post Development Roundabout

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Gree	nway PI (South		V/C	360		Ven	'''		per veri	KIII/II
1	L	1	0.0	0.037	7.0	LOS A	0.2	1.7	0.61	0.56	34.9
2	Т	1	0.0	0.037	5.9	LOS A	0.2	1.7	0.61	0.51	35.0
3	R	29	0.0	0.037	12.2	LOS B	0.2	1.7	0.61	0.69	32.2
Approac	ch	31	0.0	0.037	11.8	LOS B	0.2	1.7	0.61	0.68	32.3
North Ea	ast: Glenf	fields Blvd (Eas	st)								
4	L	44	0.0	0.371	3.6	LOS A	3.4	24.2	0.07	0.39	40.9
5	Т	502	2.3	0.371	2.5	LOS A	3.4	24.2	0.07	0.26	42.8
6	R	66	0.0	0.371	8.8	LOS A	3.4	24.2	0.07	0.91	35.3
Approac	ch	612	1.9	0.371	3.3	LOS A	3.4	24.2	0.07	0.34	41.6
North W	est: Park	lea Esp (North)								
7	L	47	0.0	0.044	5.1	LOS A	0.3	2.0	0.48	0.49	42.1
8	Т	1	0.0	0.044	4.0	LOS A	0.3	2.0	0.48	0.42	42.4
9	R	2	0.0	0.044	10.3	LOS B	0.3	2.0	0.48	0.73	39.8
Approac	ch	50	0.0	0.044	5.3	LOS A	0.3	2.0	0.48	0.49	42.0
South W	Vest: Gler	nfields Blvd (W	est)								
10	L	5	0.0	0.225	4.1	LOS A	1.7	12.0	0.29	0.44	43.9
11	Т	300	2.3	0.225	3.0	LOS A	1.7	12.0	0.29	0.33	44.5
12	R	4	0.0	0.225	9.3	LOS A	1.7	12.0	0.29	0.86	40.9
Approac	ch	309	2.2	0.225	3.1	LOS A	1.7	12.0	0.29	0.34	44.5
All Vehic	cles	1002	1.8	0.371	3.6	LOS A	3.4	24.2	0.18	0.36	42.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Parklea

Esp Greenway Pl.sip



Site: GlenfieldsBlvd / PreludeDr / EBOffRamp 2022 AM - PostDevt

Glenfields Blvd / Prelude Dr / EB Off Ramp 2022 AM Peak Post Development Roundabout

Mover	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
6	R	204	1.8	0.118	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
Approa	ch	204	1.8	0.118	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
North V	Vest: Gler	nfields Blvd (We	st)								
7	L	624	1.9	0.569	7.4	LOS A	6.0	42.5	0.71	0.67	36.4
Approa	ch	624	1.9	0.569	7.4	LOS A	6.0	42.5	0.71	0.67	36.4
South V	Vest: Sun	shine Mwy EB	Off Ramp	(South)							
10	L	33	7.2	0.263	6.7	LOS A	2.1	15.3	0.44	0.57	49.0
11	Т	274	4.6	0.263	6.3	LOS A	2.1	15.3	0.44	0.50	49.7
Approa	ch	307	4.9	0.263	6.3	LOS A	2.1	15.3	0.44	0.51	49.6
All Veh	icles	1135	2.7	0.569	7.6	LOS A	6.0	42.5	0.51	0.63	43.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Prelude Dr EB Off Ramp.sip



Site: GlenfieldsBlvd / PreludeDr / EBOffRamp 2022 PM - PostDevt

Glenfields Blvd / Prelude Dr / EB Off Ramp 2022 PM Peak Post Development Roundabout

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
6	R	502	2.0	0.290	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
Approa	ch	502	2.0	0.290	10.0	LOS A	0.0	0.0	0.00	0.68	46.2
North V	Vest: Gler	nfields Blvd (We	st)								
7	L	377	1.8	0.349	6.7	LOS A	3.1	22.0	0.59	0.61	37.3
Approa	ch	377	1.8	0.349	6.7	LOS A	3.1	22.0	0.59	0.61	37.3
South V	Vest: Sun	shine Mwy EB	Off Ramp	(South)							
10	L	110	1.3	0.381	9.3	LOS A	3.5	25.0	0.72	0.71	47.3
11	Т	252	3.9	0.381	8.9	LOS A	3.5	25.0	0.72	0.69	47.6
Approa	ch	362	3.1	0.381	9.0	LOS A	3.5	25.0	0.72	0.70	47.5
All Vehi	icles	1241	2.3	0.381	8.7	LOS A	3.5	25.0	0.39	0.66	44.8

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Glenfields Blvd Prelude Dr EB Off Ramp.sip



Site: **PreludeDr / EBOnRamp 2022 AM - PostDevt

Prelude Dr / EB On Ramp 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ide Dr (North)									
5	Т	204	1.8	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approa	ch	204	1.8	0.106	0.0	NA	0.0	0.0	0.00	0.00	60.0
South V	Vest: Prel	ude Dr (South)									
11	Т	603	3.0	0.315	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	295	2.0	0.260	10.1	LOS B	1.9	13.2	0.44	0.64	44.7
Approa	ch	898	2.7	0.315	3.3	NA	1.9	13.2	0.15	0.21	54.0
All Vehi	icles	1102	2.5	0.315	2.7	NA	1.9	13.2	0.12	0.17	54.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Prelude Dr EB On Ramp sin



Site: **PreludeDr / EBOnRamp 2022 PM - PostDevt

Prelude Dr / EB On Ramp 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles									
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
North E	North East: Prelude Dr (North)											
5	Т	503	2.1	0.261	0.0	LOS A	0.0	0.0	0.00	0.00	60.0	
Approac	Approach		2.1	0.261	0.0	NA	0.0	0.0	0.00	0.00	60.0	
South V	Vest: Prel	ude Dr (South)										
11	Т	432	3.1	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	60.0	
12	R	196	1.6	0.202	12.4	LOS B	1.5	10.9	0.67	0.77	42.5	
Approac	ch	628	2.6	0.226	3.9	NA	1.5	10.9	0.21	0.24	53.2	
All Vehi	cles	1131	2.4	0.261	2.2	NA	1.5	10.9	0.12	0.13	54.7	

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **EBOnRamp / PreludeDr 2022 AM - PostDevt

EB On Ramp / Prelude Dr 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North: Sunshine Mwy EB On Ramp (North)											
7	L	1009	3.2	0.556	9.0	LOS A	0.0	0.0	0.00	0.73	34.6
Approac	h	1009	3.2	0.556	9.0	NA	0.0	0.0	0.00	0.73	34.6
North W	est: Fron	n Prelude Dr (V	Vest)								
28	Т	295	1.9	0.750	23.6	LOS C	5.4	38.8	0.89	1.25	20.0
Approac	ch	295	1.9	0.750	23.6	LOS C	5.4	38.8	0.89	1.25	20.0
All Vehi	cles	1304	2.9	0.750	12.3	NA	5.4	38.8	0.20	0.85	29.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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SIDRA INTERSECTION

Site: **EBOnRamp / PreludeDr 2022 PM - PostDevt

EB On Ramp / Prelude Dr 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North: Sunshine Mwy EB On Ramp (North)											
7	L	686	3.0	0.377	9.0	LOS A	0.0	0.0	0.00	0.73	34.6
Approac	h	686	3.0	0.377	9.0	NA	0.0	0.0	0.00	0.73	34.6
North W	est: Fror	m Prelude Dr (W	/est)								
28	Т	197	1.6	0.310	11.5	LOS B	1.5	10.4	0.55	0.85	30.4
Approac	ch	197	1.6	0.310	11.5	LOS B	1.5	10.4	0.55	0.85	30.4
All Vehi	cles	883	2.7	0.377	9.6	NA	1.5	10.4	0.12	0.76	33.6

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 AM - PostDevt

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 AM Peak Post Development

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Moyen	nont Pari	ormance - V	objeles								
woven	nent Pen	Demand	enicles	Dog	Average	Level of	100% Back	of Ougus	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Deg. Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec	COLVIOC	veh	m	Queucu	per veh	km/h
South E	ast: Kara	watha Dr (East									
21	L	295	2.5	0.561	18.7	LOS B	6.7	48.4	0.67	0.76	30.1
22	Т	300	3.1	0.837	43.9	LOS D	9.3	67.6	1.00	0.98	16.6
23	R	293	2.0	0.837	51.2	LOS D	9.2	65.8	1.00	0.98	14.9
Approac	ch	888	2.5	0.837	37.9	LOS D	9.3	67.6	0.89	0.91	18.9
North E	ast: Lady	Musgrave Dr (North)								
24	L	61	2.0	0.111	8.8	LOS A	0.6	3.9	0.31	0.63	42.6
25	Т	271	3.6	0.825	40.7	LOS D	11.7	85.1	1.00	0.98	24.8
26	R	37	2.7	0.165	38.8	LOS D	1.8	13.2	0.90	0.74	27.1
Approa	ch	369	3.2	0.825	35.3	LOS D	11.7	85.1	0.87	0.90	26.9
North W	Vest: Kara	watha Dr (Wes	st)								
27	L	53	1.5	0.341	31.3	LOS C	6.4	45.6	0.82	0.85	32.6
28	Т	144	1.5	0.341	23.8	LOS C	6.4	45.6	0.82	0.68	34.0
29	R	577	3.2	0.881	45.0	LOS D	23.4	169.1	0.96	0.97	26.9
Approa	ch	774	2.8	0.881	40.1	LOS D	23.4	169.1	0.93	0.91	28.4
South V	Vest: Preli	ude Dr (South)									
30	L	157	2.5	0.840	35.4	LOS D	8.1	57.8	1.00	0.95	31.1
31	Т	272	1.8	0.840	40.2	LOS D	8.6	61.1	1.00	0.96	26.6
32	R	172	5.6	0.847	53.3	LOS D	8.1	60.1	1.00	0.99	24.6
Approa	ch	601	3.1	0.847	42.7	LOS D	8.6	61.1	1.00	0.97	27.0
All Vehi	cles	2632	2.8	0.881	39.3	LOS D	23.4	169.1	0.92	0.92	25.2

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 PM - PostDevt

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 PM Peak Post Development

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay	Level of Service	100% Back Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed km/h
South E	ast: Kara	ven/n watha Dr (East		V/C	sec		veh	m		per veh	KIII/II
21	L	340	2.2	0.548	14.3	LOS B	6.1	43.9	0.56	0.74	34.1
22	Т	521	2.8	0.718	35.4	LOS D	10.8	77.8	0.99	0.88	19.2
23	R	162	2.5	0.556	39.3	LOS D	6.2	44.3	0.94	0.79	17.8
Approac	ch	1023	2.6	0.718	29.0	LOS C	10.8	77.8	0.84	0.82	22.3
North Ea	ast: Lady	Musgrave Dr (North)								
24	L	77	1.6	0.128	8.4	LOS A	0.6	4.4	0.29	0.63	42.9
25	Т	231	3.7	0.713	38.7	LOS D	7.4	53.7	0.99	0.85	25.3
26	R	33	3.7	0.392	43.3	LOS D	3.7	26.8	0.96	0.77	26.0
Approac	ch	341	3.2	0.713	32.3	LOS C	7.4	53.7	0.83	0.79	28.0
North W	/est: Kara	awatha Dr (Wes	st)								
27	L	25	0.0	0.358	32.9	LOS C	6.4	45.6	0.85	0.86	32.1
28	Т	166	1.4	0.358	25.5	LOS C	6.4	45.6	0.85	0.70	33.4
29	R	529	2.7	0.750	37.4	LOS D	15.3	110.4	0.93	0.86	29.7
Approac	ch	720	2.3	0.750	34.5	LOS C	15.3	110.4	0.91	0.82	30.6
South W	Vest: Prel	lude Dr (South)									
30	L	190	2.7	0.489	23.1	LOS C	4.5	32.4	0.90	0.81	37.0
31	Т	136	1.6	0.489	34.2	LOS C	4.5	32.4	0.96	0.76	29.0
32	R	105	5.7	0.518	46.0	LOS D	4.3	32.2	0.99	0.78	26.8
Approac	ch	431	3.1	0.518	32.2	LOS C	4.5	32.4	0.94	0.79	31.4
All Vehic	cles	2515	2.7	0.750	31.6	LOS C	15.3	110.4	0.88	0.81	27.6

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 AM - PostDevt

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 AM Peak Post Development Roundabout

		Demand		Dog	Averege	Level of	100% Back	of Ougue	Dron	Effective	Avorage
Mov ID	Turn	Flow	HV	Deg. Satn	Average Delay	Service	Vehicles	Distance	Prop. Queued	Stop Rate	Average Speed
		veh/h	%	v/c	sec	OCIVICC	veh	m	Queucu	per veh	km/ł
South E	ast: Seria	ata Way (South									
1	L	1	0.0	0.020	20.5	LOS C	0.2	1.4	1.00	0.71	35.
2	Т	5	0.0	0.020	19.3	LOS B	0.2	1.4	1.00	0.71	35.2
Approac	ch	6	0.0	0.020	19.5	LOS B	0.2	1.4	1.00	0.71	35.2
North Ea	ast: WB (Off Ramp (East	t)								
4	L	1	0.0	0.679	13.3	LOS B	13.4	97.7	1.00	0.78	41.
5	Т	71	7.0	0.679	13.3	LOS B	13.4	97.7	1.00	0.80	42.
6	R	662	3.4	0.679	19.5	LOS B	13.4	97.7	1.00	0.79	40.
Approac	ch	734	3.7	0.679	18.9	LOS B	13.4	97.7	1.00	0.79	40.
North W	est: Kara	watha Dr (Nor	th)								
8	Т	1	0.0	0.234	4.0	LOS A	1.9	13.9	0.02	0.31	46.
9	R	390	3.3	0.234	11.3	LOS B	1.9	13.9	0.02	0.69	38.
Approac	ch	391	3.3	0.234	11.2	LOS B	1.9	13.9	0.02	0.69	38.
South W	/est: Bun	dilla Blvd (Wes	st)								
10	L	223	0.0	0.396	11.8	LOS B	3.6	25.0	0.91	0.91	45.
12	R	1	0.0	0.396	15.9	LOS B	3.6	25.0	0.91	0.94	42.
Approac	h	224	0.0	0.396	11.8	LOS B	3.6	25.0	0.91	0.91	45.
All Vehic	cles	1355	3.0	0.679	15.5	LOS B	13.4	97.7	0.70	0.78	40

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

Processed: Monday, 3 October 2011 9:14:26 PM SIDRA INTERSECTION 5.1.2.1953

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 PM - PostDevt

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 PM Peak Post Development Roundabout

		Damand	'ehicles	Dan	A.,	l avial af	4000/ Daale	-4 0	Duan	Effective.	A
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
11101 12		veh/h	%	V/C	Sec	Service	verlicies veh	Distance	Queueu	per veh	speed km/h
South E	ast: Seria	ta Way (South		V/ C	300		VCII			per veri	KITI/T
1	L	5	0.0	0.070	27.0	LOS C	0.7	4.9	1.00	0.82	31.6
2	Т	10	0.0	0.070	25.9	LOS C	0.7	4.9	1.00	0.82	31.8
Approac	ch	15	0.0	0.070	26.3	LOS C	0.7	4.9	1.00	0.82	31.7
North E	ast: WB C	Off Ramp (East	t)								
4	L	5	0.0	0.796	15.1	LOS B	22.1	159.9	1.00	0.80	40.3
5	Т	102	4.9	0.796	15.0	LOS B	22.1	159.9	1.00	0.81	41.1
6	R	848	3.0	0.796	21.3	LOS C	22.1	159.9	1.00	0.81	38.9
Approac	ch	955	3.2	0.796	20.6	LOS C	22.1	159.9	1.00	0.81	39.1
North W	/est: Kara	watha Dr (Nor	th)								
8	Т	1	0.0	0.182	4.0	LOS A	1.4	10.3	0.02	0.31	46.5
9	R	304	2.8	0.182	11.2	LOS B	1.4	10.3	0.02	0.70	38.9
Approac	ch	305	2.8	0.182	11.2	LOS B	1.4	10.3	0.02	0.69	38.9
South W	Vest: Bun	dilla Blvd (Wes	st)								
10	L	122	0.0	0.296	13.7	LOS B	2.6	18.2	0.96	0.94	43.5
12	R	1	0.0	0.296	17.8	LOS B	2.6	18.2	0.96	0.95	40.6
Approac	ch	123	0.0	0.296	13.8	LOS B	2.6	18.2	0.96	0.94	43.5
All Vehi	cles	1398	2.8	0.796	18.0	LOS B	22.1	159.9	0.78	0.80	39.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

Processed: Monday, 3 October 2011 9:15:25 PM SIDRA INTERSECTION 5.1.2.1953

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Site: **KarawathaDr / SatinaySt 2022 AM - PostDevt

Karawatha Dr / Satinay St 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	/ledian (F	RT Stage 2) (E-	N)								
12	R	7	0.0	0.028	4.6	LOS A	0.0	0.2	0.56	0.55	23.8
Approac	ch	7	0.0	0.028	4.6	LOS A	0.0	0.2	0.56	0.55	23.8
South E	ast: Kara	watha Dr (East	t)								
2	Т	487	3.0	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	7	0.0	0.258	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	ch	494	3.0	0.258	0.1	NA	0.0	0.0	0.00	0.01	59.6
East: Median (RT Stage 2) (N-W)											
3	R	12	0.0	0.013	2.7	LOS A	0.0	0.2	0.28	0.37	31.7
Approac	ch	12	0.0	0.013	2.7	LOS A	0.0	0.2	0.28	0.37	31.7
North Ea	ast: Satin	ay St (North)									
4	L	76	0.0	0.520	17.9	LOS C	1.0	7.0	0.67	0.98	36.1
6	R	12	0.0	0.520	15.9	LOS C	1.0	7.0	0.67	0.93	35.5
Approac	h	88	0.0	0.520	17.6	LOS C	1.0	7.0	0.67	0.97	36.0
North W	est: Kara	watha Dr (Wes	st)								
7	L	6	0.0	0.103	7.4	LOS A	0.0	0.0	0.00	1.16	48.6
8	Т	774	2.8	0.982	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	780	2.8	0.982	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehic	cles	1381	2.6	0.982	1.2	NA	1.0	7.0	0.05	0.08	56.5

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / SatinaySt 2022 PM - PostDevt

Karawatha Dr / Satinay St 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	ledian (F	RT Stage 2) (E-	N)								
12	R	21	0.0	0.035	4.4	LOS A	0.1	0.7	0.53	0.53	24.3
Approac	h	21	0.0	0.035	4.4	LOS A	0.1	0.7	0.53	0.53	24.3
South Ea	ast: Kara	ıwatha Dr (East	t)								
2	T	723	2.9	0.389	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	21	0.0	0.389	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approach 744 2.8		2.8	0.389	0.2	NA	0.0	0.0	0.00	0.02	59.3	
East: Median (RT Stage 2) (N-W)											
3	R	5	0.0	0.007	3.5	LOS A	0.0	0.1	0.37	0.43	30.4
Approac	h	5	0.0	0.007	3.5	LOS A	0.0	0.1	0.37	0.43	30.4
North Ea	st: Satin	ay St (North)									
4	L	10	0.0	0.033	11.7	LOS B	0.1	0.8	0.61	0.78	40.3
6	R	5	0.0	0.033	9.6	LOS A	0.1	0.8	0.61	0.69	40.4
Approac	h	15	0.0	0.033	11.0	LOS B	0.1	0.8	0.61	0.75	40.3
North W	est: Kara	awatha Dr (Wes	st)								
7	L	10	0.0	0.108	7.4	LOS A	0.0	0.0	0.00	1.14	48.6
8	Т	722	2.2	0.385	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	732	2.2	0.385	0.1	NA	0.0	0.0	0.00	0.02	59.8
All Vehic	eles	1517	2.4	0.389	0.3	NA	0.1	0.8	0.01	0.03	58.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SaratogaDr 2022 AM - PostDevt

Karawatha Dr / Saratoga Dr 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - Vo	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Kara	watha Dr (East)								
7	L	7	0.0	0.261	7.4	LOS A	0.0	0.0	0.00	1.17	48.6
8	Т	492	2.9	0.261	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	499	2.9	0.261	0.1	NA	0.0	0.0	0.00	0.02	59.8
North: N	1edian (R	T Stage 2) (W-	S)								
12	R	6	0.0	0.005	3.2	LOS A	0.0	0.2	0.45	0.38	26.1
Approac	:h	6	0.0	0.005	3.2	LOS A	0.0	0.2	0.45	0.38	26.1
North West: Karawatha Dr (We		watha Dr (Wes	t)								
2	Т	709	3.1	0.374	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	6	0.0	0.374	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	:h	715	3.1	0.374	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: M	edian (R	T Stage 2) (S-E	<u>:</u>)								
3	R	75	0.0	0.097	3.5	LOS A	0.2	1.6	0.38	0.53	30.5
Approac	:h	75	0.0	0.097	3.5	LOS A	0.2	1.6	0.38	0.53	30.5
South W	est: Sar	atoga Dr (South)								
4	L	12	0.0	0.084	9.4	LOS A	0.4	3.1	0.52	0.75	40.1
6	R	75	0.0	0.084	7.4	LOS A	0.4	3.1	0.52	0.65	40.1
Approac	:h	87	0.0	0.084	7.7	LOS A	0.4	3.1	0.52	0.67	40.1
All Vehic	cles	1382	2.6	0.374	0.8	NA	0.4	3.1	0.06	0.08	58.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SaratogaDr 2022 PM - PostDevt

Karawatha Dr / Saratoga Dr 2022 PM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back of Vehicles veh	Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Kara	watha Dr (East		V/C	Sec		ven	m		per veri	KIII/II
7	ı I	19	0.0	0.381	7.4	LOS A	0.0	0.0	0.00	1.16	48.6
8	T	710	2.9	0.381	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	· ·	710	2.8	0.381	0.0	NA	0.0	0.0	0.00	0.00	59.7
• •		T Stage 2) (W-	.8)								
12	R	11	0.0	0.014	4.8	LOS A	0.1	0.4	0.56	0.52	23.6
Approac	:h	11	0.0	0.014	4.8	LOS A	0.1	0.4	0.56	0.52	23.6
North West: Karawatha Dr (West)		st)									
2	Т	718	2.2	0.379	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	11	0.0	0.379	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approac	h	729	2.2	0.379	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: M	edian (R	T Stage 2) (S-E	Ξ)								
3	R	11	0.0	0.014	3.3	LOS A	0.0	0.2	0.36	0.47	30.8
Approac	h	11	0.0	0.014	3.3	LOS A	0.0	0.2	0.36	0.47	30.8
South W	est: Sara	atoga Dr (South	า)								
4	L	4	0.0	0.021	11.2	LOS B	0.1	0.7	0.61	0.77	38.3
6	R	11	0.0	0.021	9.3	LOS A	0.1	0.7	0.61	0.68	38.1
Approac	:h	15	0.0	0.021	9.8	LOS A	0.1	0.7	0.61	0.71	38.2
All Vehic	cles	1495	2.4	0.381	0.3	NA	0.1	0.7	0.01	0.03	59.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SharonCrs 2022 AM - PostDevt

Karawatha Dr / Sharon Crs 2022 AM Peak Post Development Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: M	ledian (R	RT Stage 2) (E-	N)								
12	R	7	0.0	0.008	4.1	LOS A	0.0	0.3	0.57	0.47	24.9
Approach	h	7	0.0	0.008	4.1	LOS A	0.0	0.3	0.57	0.47	24.9
South Ea	ast: Kara	watha Dr (East	:)								
2	Т	498	2.8	0.264	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	7	0.0	0.264	8.0	LOS A	0.0	0.0	0.00	0.66	51.5
Approach	h	505	2.8	0.264	0.1	NA	0.0	0.0	0.00	0.01	59.9
East: Median (RT Stage 2) (N-W)		V)									
3	R	12	0.0	0.013	2.5	LOS A	0.0	0.2	0.26	0.38	32.0
Approach	h	12	0.0	0.013	2.5	LOS A	0.0	0.2	0.26	0.38	32.0
North Ea	st: Shar	on Crs (North)									
4	L	76	0.0	0.136	12.0	LOS B	0.7	4.9	0.64	0.84	33.3
6	R	12	0.0	0.136	10.1	LOS B	0.7	4.9	0.64	0.74	31.3
Approach	h	88	0.0	0.136	11.8	LOS B	0.7	4.9	0.64	0.83	33.1
North We	est: Kara	watha Dr (Wes	st)								
7	L	6	0.0	0.339	7.4	LOS A	0.0	0.0	0.00	1.18	40.7
8	Т	640	3.4	0.339	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach	h	646	3.4	0.339	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehic	les	1258	2.8	0.339	1.0	NA	0.7	4.9	0.05	0.07	57.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: KarawathaDr / SharonCrs 2022 PM - PostDevt

Karawatha Dr / Sharon Crs 2022 PM Peak Post Development Giveway / Yield (Two-Way)

			_												
Movem	Movement Performance - Vehicles														
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h				
South: N	1edian (F	RT Stage 2) (E-	N)												
12	R	21	0.0	0.025	4.7	LOS A	0.1	0.9	0.60	0.56	23.7				
Approac	h	21	0.0	0.025	4.7	LOS A	0.1	0.9	0.60	0.56	23.7				
South Ea	ast: Kara	watha Dr (East	t)												
2	Т	694	3.0	0.374	0.0	LOS A	0.0	0.0	0.00	0.00	60.0				
3	R	21	0.0	0.374	8.0	LOS A	0.0	0.0	0.00	0.66	51.5				
Approac	h	715	2.9	0.374	0.2	NA	0.0	0.0	0.00	0.02	59.7				
East: Me	edian (R1	Stage 2) (N-W	V)												
3	R	4	0.0	0.005	3.2	LOS A	0.0	0.1	0.36	0.44	30.9				
Approac	h	4	0.0	0.005	3.2	LOS A	0.0	0.1	0.36	0.44	30.9				
North Ea	ast: Shar	on Crs (North)													
4	L	10	0.0	0.023	12.2	LOS B	0.1	0.8	0.63	0.77	33.2				
6	R	4	0.0	0.023	10.2	LOS B	0.1	0.8	0.63	0.68	31.2				
Approac	h	14	0.0	0.023	11.6	LOS B	0.1	0.8	0.63	0.74	32.8				
North W	est: Kara	watha Dr (Wes	st)												
7	L	4	0.0	0.377	7.4	LOS A	0.0	0.0	0.00	1.18	40.7				
8	Т	721	2.2	0.377	0.0	LOS A	0.0	0.0	0.00	0.00	60.0				
Approac	h	725	2.2	0.377	0.0	NA	0.0	0.0	0.00	0.01	59.9				
All Vehic	eles	1479	2.5	0.377	0.3	NA	0.1	0.9	0.02	0.03	59.2				

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 AM -**PostDevt**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 AM Peak Post Development Signals - Actuated Cycle Time = 72 seconds

Movem	nent Peri	formance - V	/ehicles								
Mov ID	Turn	Demand	HV	Deg.	Average	Level of	100% Back		Prop.	Effective	Average
טו ייטוייו	Tulli	Flow veh/h	%	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South: N	Mountain	Creek Shops (V/C	366		Ven	111		per veri	KIII/I
30	L	53	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.8
Approac	ch	53	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.8
East: Ka	arawatha	Dr (East)									
21	L	48	0.0	0.026	8.0	X	X	Χ	Χ	0.63	49.3
22	T	440	3.2	0.357	6.8	LOS A	7.6	55.0	0.49	0.43	48.6
23	R	21	0.0	0.134	43.1	LOS D	0.8	5.4	0.93	0.70	26.5
Approac	ch	509	2.8	0.357	8.4	LOS A	7.6	55.0	0.46	0.46	47.1
North: N	/lolakai Dr	· (North)									
24	L	52	0.0	0.528	24.0	LOS C	1.3	8.9	0.67	0.70	32.7
26	R	131	7.2	0.378	36.3	LOS D	4.4	33.1	0.89	0.78	27.8
Approac	ch	183	5.2	0.528	32.8	LOS C	4.4	33.1	0.83	0.76	29.1
West: K	arawatha	Dr (West)									
27	L	108	9.1	0.237	10.4	LOS B	1.1	8.1	0.27	0.69	43.6
28	Т	591	3.7	0.651	16.3	LOS B	16.8	122.5	0.80	0.71	36.8
Approac	ch	699	4.5	0.651	15.4	LOS B	16.8	122.5	0.72	0.71	37.6
All Vehi	cles	1444	3.8	0.651	14.7	LOS B	16.8	122.5	0.62	0.62	39.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Mountain Creek Shops.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 PM -**PostDevt**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 PM Peak Post Development Signals - Actuated Cycle Time = 72 seconds

Movem	nent Peri	formance - V	/ehicles								
Mov ID	Turn	Demand	HV	Deg.	Average	Level of	100% Back		Prop.	Effective	Average
עו ייטואו	Turn	Flow veh/h	пv %	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South: N	Mountain :	Creek Shops (v/c	sec		veh	m		per veh	km/h
30	L	73	0.0	0.103	8.1	LOS A	1.1	7.6	0.42	0.52	24.3
Approac		73	0.0	0.103	8.1	LOS A	1.1	7.6	0.42	0.52	24.3
East: Ka	arawatha	Dr (East)									
21	L	69	0.0	0.037	8.0	Χ	X	Χ	Χ	0.63	49.3
22	Т	609	3.4	0.569	11.7	LOS B	14.7	106.7	0.68	0.61	43.2
23	R	19	0.0	0.122	43.0	LOS D	0.7	4.9	0.93	0.69	26.5
Approac	ch	697	3.0	0.569	12.2	LOS B	14.7	106.7	0.62	0.61	43.1
North: M	/lolakai Dr	· (North)									
24	L	53	0.0	0.469	19.8	LOS B	1.1	7.8	0.58	0.70	34.9
26	R	394	4.9	0.782	35.9	LOS D	14.4	106.2	0.96	0.88	27.9
Approac	ch	447	4.3	0.782	34.0	LOS C	14.4	106.2	0.92	0.86	28.6
West: K	arawatha	Dr (West)									
27	L	192	7.7	0.417	10.9	LOS B	2.0	14.9	0.34	0.70	42.9
28	Т	672	2.4	0.891	23.4	LOS C	23.7	170.1	0.99	0.88	31.8
Approac	ch	864	3.6	0.891	20.7	LOS C	23.7	170.1	0.84	0.84	33.7
All Vehic	cles	2081	3.4	0.891	20.2	LOS C	23.7	170.1	0.77	0.76	34.9

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Appendix S

2011 and 2022 AM and PM Peak VISSIM Results (Existing Layouts for Model Comparison)

Glenfields Blvd / Mountain Ash Dr / Birch St

intersection Type.	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	1	0.0	0.0	Α	9	3.8
	Through	26	0	0.0	0.0	Α	9	3.8
	Right	27	162	1.2	0.1	Α	9	3.8
	All		163	1.2	0.1	А		3.8
Glenfields Blvd (East)	Left	34	46	0.0	0.0	A	12	0.0
` '	Through	35	47	10.5	0.0	Α	12	0.0
	Right	36	8	0.0	0.0	Α	12	0.0
	All		101	5.0	0.0	А		0.0
Birch St (North)	Left	31	22	0.0	1.0	A	11	5.4
	Through	32	1	0.0	1.6	Α	11	5.4
	Right	33	0	0.0	0.0	Α	11	5.4
	All		23	0.0	1.1	Α		5.4
Glenfields Blvd (West)	Left	28	2	0.0	0.7	A	10	8.2
	Through	29	217	3.6	0.3	Α	10	8.2
	Right	30	2	0.0	0.0	Α	10	8.2
	AII		221	3.5	0.3	Α		8.2
ALL VEHICLES			508	2.9	0.2	A	1	8.2

Prelude Dr / EB On Ramp

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	461	3.1	0.4	Α	0	0.0
	Right	62	228	2.2	1.6	Α	23	13.0
	AII		689	2.8	0.8	Α		13.0
Prelude Dr (North)	Through	63	123	2.4	0.0	Α	0	0.0
	AII		123	2.4	0.0	Α		0.0
						•		
ALL VEHICLES			811	2.8	0.7	Α		13.0

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

Intersection Type:	Signalised	vlz ID	Demand (vph)	%HVs	Ava Dalay (a)	LoS	stz ID	Max Queue (m)
/					Ave. Delay (s)			
Prelude Dr (South)	Left	66	110	2.9	16.9	В	25	52.2
	Through	67	218	1.7	37.2	D	25	52.2
	Right	68	131	5.6	44.8	D	26	55.4
	AII		459	3.1	34.5	С		55.4
Karawatha Dr (East)	Left	69	222	2.7	10.2	В	27	40.2
	Through	70	248	2.9	45.4	D	28	90.8
	Right	71	245	2.1	42.1	D	28	90.8
	AII		715	2.6	33.3	С		90.8
Lady Musgrave Dr (North)	Left	72	50	2.0	44.4	D	29	103.2
	Through	73	228	3.5	43.8	D	29	103.2
	Right	74	30	3.3	38.7	D	29	103.2
	AII		308	3.2	43.4	D		103.2
Karawatha Dr (West)	Left	75	46	2.2	30.0	С	30	198.4
	Through	76	119	1.5	30.8	С	30	198.4
	Right	77	458	3.3	54.4	D	30	198.4
	ĂII		622	2.9	48.1	D		198.4
ALL VEHICLES			2105	2.9	39.4	D		198.4

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	0	0.0	0.0	Α	31	6.2
	Through	79	4	0.0	4.4	Α	31	6.2
	AII		4	0.0	4.4	Α		6.2
WB Off Ramp (East)	Left	80	0	0.0	0.0	Α	32	45.0
	Through	81	59	7.1	3.0	Α	32	45.0
	Right	82	527	3.5	2.8	Α	32	45.0
	AII		586	3.8	2.8	Α		45.0
Karawatha Dr (North)	Through	83	0	0.0	0.0	Α	33	0.0
	Right	84	309	3.3	1.0	Α	33	0.0
	AII		309	3.3	1.0	Α		0.0
Bundilla Blvd (West)	Left	85	181	0.0	5.2	A	34	21.4
Ţ	Right	86	0	0.0	0.0	Α	34	21.4
	AII		181	0.0	5.2	Α		21.4
ALL VEHICLES	1		1079	3.0	2.7	Α		45.0

Karawatha Dr / Satinay St Intersection Type:

Priority

intersection rype.	1 Honly							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	384	3.0	0.9	Α	0	0.0
	Right	92	5	0.0	1.3	Α	0	0.0
	AII		389	2.9	0.9	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	5	0.0	0.1	Α	40	8.8
Satinay St (North)	Left	87	61	0.0	19.8	В	35	24.2
	Right	88	10	0.0	12.7	В	35	24.2
	AII		71	0.0	18.8	В		24.2
Median (RT Stage 2) (N-W)	Right	89	10	0.0	0.6	Α	36	3.6
Karawatha Dr (West)	Left	90	5	0.0	0.5	Α	0	0.0
	Through	94	622	2.9	12.8	В	0	0.0
	AII		627	2.9	12.7	В		0.0
ALL VEHICLES			1102	2.7	8.8	A		24.2

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:	Signalised							
<u>.</u>		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	44	0.0	2.6	Α	50	12.0
	AII		44	0.0	2.6	Α		12.0
Karawatha Dr (East)	Left	111	39	0.0	1.7	A	0	0.0
,	Through	112	344	3.3	7.1	Α	45	66.4
	Right	113	16	0.0	21.5	С	46	13.4
	AII		399	2.8	7.1	А		66.4
Molakai Dr (North)	Left	115	41	0.0	11.7	В	51	35.6
•	Right	116	109	7.3	20.3	С	47	35.8
	AII		150	5.3	18.0	В		35.8
Karawatha Dr (West)	Left	117	88	9.3	6.0	Α	48	27.8
•	Through	118	469	3.8	15.4	В	49	93.4
	AII		557	4.7	13.9	В		93.4
ALL VEHICLES	1	1 1	1150	3.9	116	B		93.4

Glenfields Blvd / Mountain Ash Dr / Birch St

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	0	0.0	0.0	Α	9	6.2
	Through	26	0	0.0	0.0	Α	9	6.2
	Right	27	48	0.0	0.9	Α	9	6.2
	All		48	0.0	0.9	A		6.2
Glenfields Blvd (East)	Left	34	97	0.0	0.0	A	12	0.0
· ·	Through	35	244	3.8	0.0	Α	12	0.0
	Right	36	15	0.0	0.0	Α	12	0.0
	All		357	2.6	0.0	A		0.0
Birch St (North)	Left	31	5	0.0	0.0	A	11	0.0
,	Through	32	0	0.0	0.0	Α	11	0.0
	Right	33	1	0.0	0.3	Α	11	0.0
	All		6	0.0	0.1	Α		0.0
Glenfields Blvd (West)	Left	28	0	0.0	0.0	A	10	5.0
	Through	29	135	4.4	0.0	Α	10	5.0
	Right	30	5	0.0	0.0	Α	10	5.0
	All		140	4.3	0.0	Α		5.0
ALL VEHICLES			552	2.8	0.1	A		6.2

Prelude Dr / EB On Ramp

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	307	3.5	0.2	Α	0	0.0
	Right	62	143	2.1	2.4	Α	23	21.6
	AII		450	3.0	0.9	Α		21.6
Prelude Dr (North)	Through	63	368	2.2	0.0	Α	0	0.0
	AII		368	2.2	0.0	Α		0.0
	•							
ALL VEHICLES			818	2.7	0.5	Α		21.6

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	126	2.8	11.9	В	25	39.4
	Through	67	108	1.9	34.9	C	25	39.4
	Right	68	72	6.9	42.2	D	26	43.8
	AII		306	3.5	27.1	С		43.8
Karawatha Dr (East)	Left	69	226	2.3	9.4	Α	27	39.8
	Through	70	433	2.7	43.0	D	28	109.2
	Right	71	135	2.2	39.9	D	28	109.2
	AII		793	2.5	32.9	С		109.2
Lady Musgrave Dr (North)	Left	72	64	1.6	41.8	D	29	108.6
	Through	73	250	3.1	42.0	D	29	108.6
	Right	74	26	3.8	39.1	D	29	108.6
	AII		340	2.9	41.8	D		108.6
Karawatha Dr (West)	Left	75	20	0.0	32.5	С	30	191.2
	Through	76	100	1.0	31.9	С	30	191.2
	Right	77	444	2.7	50.2	D	30	191.2
	AII		565	2.3	46.3	D		191.2
ALL VEHICLES			2004	2.7	37.3	D		191.2

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way

• •		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	4	0.0	8.8	Α	31	7.6
, ,	Through	79	8	0.0	5.4	Α	31	7.6
	AII		12	0.0	6.5	Α		7.6
WB Off Ramp (East)	Left	80	4	0.0	1.4	Α	32	38.4
	Through	81	85	5.2	2.8	Α	32	38.4
	Right	82	686	3.0	2.8	Α	32	38.4
	AII		775	3.2	2.8	Α		38.4
Karawatha Dr (North)	Through	83	0	0.0	0.0	Α	33	0.0
	Right	84	239	2.9	0.9	Α	33	0.0
	AII		239	2.9	0.9	А		0.0
Bundilla Blvd (West)	Left	85	95	0.0	5.8	Α	34	17.8
•	Right	86	0	0.0	0.0	Α	34	17.8
	AII		95	0.0	5.8	Α		17.8
ALL VEHICLES			1122	2.8	2.7	Α		38.4

Karawatha Dr / Satinay St Intersection Type:

Priority

intersection Type.	1 HOHLY							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	568	2.9	2.4	Α	0	0.0
	Right	92	15	0.0	2.8	Α	0	0.0
	AII		583	2.8	2.4	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	15	0.0	0.1	Α	40	42.0
Satinay St (North)	Left	87	7	0.0	15.4	В	35	6.0
	Right	88	4	0.0	1.0	Α	35	6.0
	AII		11	0.0	10.1	В	_	6.0
Median (RT Stage 2) (N-W)	Right	89	4	0.0	2.6	Α	36	2.4
Karawatha Dr (West)	Left	90	8	0.0	0.9	Α	0	0.0
	Through	94	566	2.3	11.0	В	0	0.0
	AII		575	2.3	10.9	В		0.0
ALL VEHICLES			1189	2.5	6.5	Α		42.0

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	60	0.0	6.5	Α	50	23.6
	AII		60	0.0	6.5	А		23.6
Karawatha Dr (East)	Left	111	56	0.0	4.0	А	0	0.0
	Through	112	479	3.5	9.5	Α	45	105.8
	Right	113	12	0.0	33.7	С	46	10.2
	AII		547	3.1	9.5	А		105.8
Molakai Dr (North)	Left	115	40	0.0	22.1	С	51	102.6
	Right	116	327	5.0	28.4	С	47	104.2
	AII		367	4.4	27.7	С		104.2
Karawatha Dr (West)	Left	117	156	7.8	6.1	A	48	25.6
•	Through	118	533	2.4	16.5	В	49	109.8
	AII		689	3.7	14.2	В		109.8
								•
ALL VEHICLES			1663	3.5	15.3	В		109.8

Glenfields Blvd / Mountain Ash Dr / Birch St

intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	1	0.0	0.3	Α	9	5.0
	Through	26	0	0.0	0.0	Α	9	5.0
	Right	27	199	1.0	0.1	Α	9	5.0
	All		200	1.0	0.1	Α		5.0
Glenfields Blvd (East)	Left	34	55	0.0	0.0	Α	12	0.0
	Through	35	54	10.8	0.1	Α	12	0.0
	Right	36	9	0.0	0.0	Α	12	0.0
	All		118	4.9	0.0	Α		0.0
Birch St (North)	Left	31	27	0.0	0.9	Α	11	3.0
	Through	32	1	0.0	1.6	Α	11	3.0
	Right	33	0	0.0	0.0	Α	11	3.0
	All		28	0.0	0.9	Α		3.0
Glenfields Blvd (West)	Left	28	3	0.0	0.1	Α	10	13.8
	Through	29	263	3.7	0.5	Α	10	13.8
	Right	30	2	0.0	1.4	Α	10	13.8
	AII		268	3.7	0.6	Α		13.8
ALL VEHICLES			614	2.9	0.3	Α		13.8

Prelude Dr / EB On Ramp

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	560	3.3	0.5	Α	0	0.0
	Right	62	276	2.1	2.3	Α	23	19.8
	AII		836	2.9	1.1	Α		19.8
Prelude Dr (North)	Through	63	141	2.6	0.0	Α	0	0.0
	AII		141	2.6	0.0	Α		0.0
ALL VEHICLES			977	2.8	1.0	Α		19.8

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	133	3.0	23.0	C	25	62.6
	Through	67	266	1.9	41.4	D	25	62.6
	Right	68	162	5.8	52.1	D	26	88.8
	ĂII		561	3.3	40.1	D		88.8
Karawatha Dr (East)	Left	69	269	2.9	14.4	В	27	53.8
	Through	70	301	3.1	53.7	D	28	189.4
	Right	71	297	2.0	52.8	D	28	189.4
	AII		867	2.7	41.2	D		189.4
Lady Musgrave Dr (North)	Left	72	64	1.9	50.1	D	29	147.4
	Through	73	285	3.4	51.0	D	29	147.4
	Right	74	37	2.7	55.8	E	29	147.4
	AII		386	3.1	51.3	D		147.4
Karawatha Dr (West)	Left	75	45	1.8	69.1	Е	30	511.6
	Through	76	125	1.6	71.6	E	30	511.6
	Right	77	466	3.4	198.8	F	30	511.6
	AII		635	2.9	164.6	F		511.6
ALL VEHICLES			2449	2.9	74.5	Е		511.6

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	0	0.0	0.0	Α	31	6.2
	Through	79	5	0.0	9.3	Α	31	6.2
	AII		5	0.0	9.3	Α		6.2
WB Off Ramp (East)	Left	80	0	0.0	0.0	Α	32	76.4
	Through	81	71	7.0	5.2	Α	32	76.4
	Right	82	643	3.5	5.5	Α	32	76.4
	AII		714	3.9	5.5	Α		76.4
Karawatha Dr (North)	Through	83	0	0.0	0.0	Α	33	0.0
	Right	84	362	3.5	1.2	Α	33	0.0
	AII		362	3.5	1.2	Α		0.0
Bundilla Blvd (West)	Left	85	218	0.0	8.2	A	34	35.2
	Right	86	0	0.0	0.0	Α	34	35.2
	AII		218	0.0	8.2	Α		35.2
ALL VEHICLES		1	1300	3.1	4.8	A	_	76.4

Karawatha Dr / Satinay St Intersection Type:

Priority

intersection Type.	1 Honly							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	465	3.1	1.2	Α	0	0.0
	Right	92	6	0.0	4.6	Α	0	0.0
	AII		471	3.0	1.2	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	6	0.0	0.1	А	40	18.4
Satinay St (North)	Left	87	73	0.0	98.8	F	35	63.8
	Right	88	11	0.0	59.4	E	35	63.8
	AII		84	0.0	93.4	F		63.8
Median (RT Stage 2) (N-W)	Right	89	11	0.0	0.3	Α	36	3.4
Karawatha Dr (West)	Left	90	5	0.0	50.4	D	0	0.0
	Through	94	634	3.0	121.7	F	0	0.0
	AII		639	3.0	121.2	F		0.0
ALL VEHICLES			1212	2.8	70.9	E		63.8

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	54	0.0	2.6	Α	50	13.0
	AII		54	0.0	2.6	А		13.0
Karawatha Dr (East)	Left	111	49	0.0	2.3	А	0	0.0
	Through	112	408	3.2	8.1	Α	45	91.0
	Right	113	19	0.0	31.3	С	46	13.0
	AII		475	2.7	8.4	А		91.0
Molakai Dr (North)	Left	115	48	0.0	15.2	В	51	50.4
, ,	Right	116	131	7.0	24.3	С	47	52.6
	AII		179	5.1	21.9	С		52.6
Karawatha Dr (West)	Left	117	108	9.1	8.9	A	48	19.2
,	Through	118	571	3.8	19.1	В	49	148.0
	AII		679	4.7	17.5	В		148.0
ALL VEHICLES			1388	3.9	14.4	В		148.0

Glenfields Blvd / Mountain Ash Dr / Birch St

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Ash Dr (South)	Left	25	0	0.0	0.0	Α	9	4.0
	Through	26	0	0.0	0.0	Α	9	4.0
	Right	27	57	0.0	0.8	Α	9	4.0
	AII		57	0.0	0.8	А		4.0
Glenfields Blvd (East)	Left	34	115	0.0	0.0	A	12	4.6
(Through	35	292	3.8	0.0	A	12	4.6
	Right	36	18	0.0	0.0	Α	12	4.6
	ĂII		425	2.6	0.0	Α		4.6
Birch St (North)	Left	31	6	0.0	0.2	A	11	1.0
	Through	32	0	0.0	0.0	Α	11	1.0
	Right	33	1	0.0	1.0	Α	11	1.0
	AII		7	0.0	0.4	Α		1.0
Glenfields Blvd (West)	Left	28	0	0.0	0.0	A	10	5.4
` '	Through	29	165	4.1	0.1	Α	10	5.4
	Right	30	6	0.0	0.1	Α	10	5.4
	AII		171	4.0	0.1	Α		5.4
	•					•		
ALL VEHICLES			660	2.7	0.1	Α		5.4

Prelude Dr / EB On Ramp

Intersection Type:	Priority							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Through	61	377	3.5	0.2	Α	0	0.0
	Right	62	171	1.9	3.2	Α	23	25.6
	AII		548	3.0	1.2	Α		25.6
Prelude Dr (North)	Through	63	435	2.3	0.0	Α	0	0.0
	AII		435	2.3	0.0	Α		0.0
				•	•	•	•	•
ALL VEHICLES			983	2.7	0.7	A		25.6

Karawatha Dr / Lady Musgrave Dr / Prelude Dr

		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Prelude Dr (South)	Left	66	156	3.3	16.7	B	25	52.8
Tretade Dr (Ooddi)	Through	67	131	1.7	40.1	D	25	52.8
	Right	68	89	6.8	51.2	D	26	55.0
	AII	00	375	3.6	33.0	C	20	55.0
14 1 5 (5 1)		10	074		40.7		07	
Karawatha Dr (East)	Left	69	274	2.3	19.7	<u>B</u>	27	63.6
	Through	70	527	2.8	60.8	E	28	267.8
	Right	71	164	2.4	59.3	E	28	267.8
	AII		965	2.6	48.9	D		267.8
Lady Musgrave Dr (North)	Left	72	79	1.5	51.6	D	29	180.6
	Through	73	307	3.2	55.2	E	29	180.6
	Right	74	32	3.8	67.4	Е	29	180.6
	AII		417	2.9	55.5	E		180.6
Karawatha Dr (West)	Left	75	23	0.0	71.2	E	30	512.0
, ,	Through	76	108	0.9	71.8	Е	30	512.0
	Right	77	480	2.7	189.9	F	30	512.0
	ĂII		611	2.3	164.5	F		512.0
ALL VEHICLES			2369	2.7	77.3	E	1	512.0

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way

Intersection Type:	Roundabout							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Seriata Way (South)	Left	78	5	0.0	9.9	Α	31	6.6
	Through	79	10	0.0	20.3	С	31	6.6
	AII		15	0.0	16.8	В		6.6
WB Off Ramp (East)	Left	80	5	0.0	9.2	Α	32	171.6
	Through	81	104	5.0	8.1	Α	32	171.6
	Right	82	835	3.0	9.5	Α	32	171.6
	AII		944	3.2	9.4	Α		171.6
Karawatha Dr (North)	Through	83	0	0.0	0.0	Α	33	0.0
	Right	84	278	3.0	1.7	Α	33	0.0
	AII		278	3.0	1.7	Α		0.0
Bundilla Blvd (West)	Left	85	116	0.0	16.6	В	34	36.6
Ţ	Right	86	0	0.0	0.0	Α	34	36.6
	ÄII		116	0.0	16.6	В		36.6
ALL VEHICLES	1		1352	2.9	8.5	A		171.6

Karawatha Dr / Satinay St Intersection Type:

Priority

intersection Type.	1 HOHLY							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Karawatha Dr (East)	Through	91	697	3.0	3.1	Α	0	0.0
	Right	92	19	0.0	3.3	Α	0	0.0
	AII		716	3.0	3.1	Α		0.0
Median (RT Stage 2) (E-N)	Right	93	19	0.0	0.1	Α	40	23.0
Satinay St (North)	Left	87	8	0.0	46.1	D	35	12.8
	Right	88	5	0.0	14.2	В	35	12.8
	AII		13	0.0	34.5	С		12.8
Median (RT Stage 2) (N-W)	Right	89	5	0.0	5.5	Α	36	5.0
Karawatha Dr (West)	Left	90	9	0.0	33.0	С	0	0.0
	Through	94	611	2.3	115.9	F	0	0.0
	AII		620	2.3	114.7	F		0.0
ALL VEHICLES			1372	2.6	53.8	D		23.0

Karawatha Dr / Molakai Dr / Mountain Creek Shops

Intersection Type:	Signalised							
		vlz ID	Demand (vph)	%HVs	Ave. Delay (s)	LoS	stz ID	Max Queue (m)
Mountain Creek Shops (South)	Left	114	73	0.0	9.1	Α	50	27.6
	AII		73	0.0	9.1	А		27.6
Karawatha Dr (East)	Left	111	67	0.0	5.7	А	0	0.0
•	Through	112	575	3.5	10.8	В	45	155.2
	Right	113	15	0.0	35.9	D	46	12.6
	AII		657	3.1	10.8	В		155.2
Molakai Dr (North)	Left	115	48	0.0	48.7	D	51	145.6
, ,	Right	116	388	4.6	55.3	Е	47	145.4
	AII		436	4.1	54.6	D		145.6
Karawatha Dr (West)	Left	117	191	7.7	8.3	A	48	22.8
,	Through	118	651	2.5	18.8	В	49	167.0
	AII		842	3.7	16.4	В		167.0
ALL VEHICLES			2009	3.4	22.6	С		167.0

Appendix T

2011 and 2022 AM and PM Peak SIDRA Results (Existing Layouts for Model Comparison)

Glenfields Blvd / Mountain Ash Dr / Birch St 2011 AM Peak **CALIBRATED** Roundabout

Move	mont Port	formance - \	Vahiclas								
Move	illellt Fell	Demand	veriicies	Deg.	Average	Level of	100% Back	of Ougus	Prop.	Effective	Average
Mov IC) Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South	East: Mour	ntain Ash Dr (South)								
1	L	1	0.0	0.121	4.8	LOS A	0.8	5.6	0.21	0.40	43.3
2	Т	1	0.0	0.121	3.7	LOS A	0.8	5.6	0.21	0.31	44.0
3	R	162	1.2	0.121	9.3	LOS A	0.8	5.6	0.21	0.61	40.1
Approa	ach	164	1.2	0.121	9.2	LOS A	0.8	5.6	0.21	0.61	40.1
North E	East: Glenf	ields Blvd (Ea	ast)								
4	L	46	0.0	0.063	4.5	LOS A	0.4	3.1	0.04	0.46	44.2
5	T	47	10.5	0.063	3.6	LOS A	0.4	3.1	0.04	0.33	45.3
6	R	8	0.0	0.063	8.9	LOS A	0.4	3.1	0.04	0.85	40.5
Approa	ach	101	4.9	0.063	4.4	LOS A	0.4	3.1	0.04	0.43	44.4
North \	Nest: Birch	St (North)									
7	L	22	0.0	0.025	6.6	LOS A	0.2	1.1	0.53	0.54	29.6
8	Т	1	0.0	0.025	5.5	LOS A	0.2	1.1	0.53	0.48	30.0
9	R	1	0.0	0.025	11.0	LOS B	0.2	1.1	0.53	0.72	27.6
Approa	ach	24	0.0	0.025	6.7	LOS A	0.2	1.1	0.53	0.55	29.5
South '	West: Gler	nfields Blvd (V	Vest)								
10	L	2	0.0	0.211	5.7	LOS A	1.5	10.9	0.42	0.55	39.2
11	Т	217	3.6	0.211	4.8	LOS A	1.5	10.9	0.42	0.47	39.7
12	R	2	0.0	0.211	10.2	LOS B	1.5	10.9	0.42	0.82	36.4
Approa	ach	221	3.5	0.211	4.9	LOS A	1.5	10.9	0.42	0.47	39.6
All Veh	nicles	510	2.9	0.211	6.3	LOS A	1.5	10.9	0.28	0.51	40.6

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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SIDRA INTERSECTION Glenfields Blvd / Mountain Ash Dr / Birch St 2011 PM Peak **CALIBRATED** Roundabout

Movem	ent Per	formance - V	ehicle's								
	_	Demand		Deg.	Average	Level of	100% Back		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Caudh E	+- N4	veh/h	%	v/c	sec		veh	m		per veh	km/h
		ntain Ash Dr (S	,	0.040	5 0	1.00.4	0.0	2.0	0.40	0.40	44.0
1	L -	1	0.0	0.046	5.8	LOS A	0.3	2.0	0.43	0.48	41.9
2	T	1	0.0	0.046	4.8	LOS A	0.3	2.0	0.43	0.42	42.2
3	R	48	0.0	0.046	10.3	LOS B	0.3	2.0	0.43	0.64	39.3
Approac	ch	50	0.0	0.046	10.1	LOS B	0.3	2.0	0.43	0.63	39.4
North Ea	ast: Glenf	ields Blvd (Eas	st)								
4	L	97	0.0	0.213	4.5	LOS A	1.6	11.5	0.06	0.47	44.2
5	Т	244	3.8	0.213	3.5	LOS A	1.6	11.5	0.06	0.34	45.2
6	R	15	0.0	0.213	8.9	LOS A	1.6	11.5	0.06	0.87	40.5
Approac	ch	356	2.6	0.213	4.0	LOS A	1.6	11.5	0.06	0.40	44.7
North W	est: Birch	St (North)									
7	L	5	0.0	0.006	5.4	LOS A	0.0	0.3	0.37	0.45	31.0
8	Т	1	0.0	0.006	4.4	LOS A	0.0	0.3	0.37	0.37	32.0
9	R	1	0.0	0.006	9.9	LOS A	0.0	0.3	0.37	0.68	28.5
Approac	ch	7	0.0	0.006	5.9	LOS A	0.0	0.3	0.37	0.47	30.7
South W	/est: Gler	nfields Blvd (W	est)								
10	L	1	0.0	0.117	4.9	LOS A	0.8	5.9	0.24	0.48	40.3
11	Т	135	4.4	0.117	3.9	LOS A	0.8	5.9	0.24	0.37	41.2
12	R	5	0.0	0.117	9.3	LOS A	0.8	5.9	0.24	0.83	36.8
Approac	ch	141	4.2	0.117	4.1	LOS A	0.8	5.9	0.24	0.39	41.0
All Vehic	cles	554	2.7	0.213	4.6	LOS A	1.6	11.5	0.14	0.42	43.3

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Ash Dr Birch St.sip



Glenfields Blvd / Mountain Ash Dr / Birch St 2022 AM Peak Base Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/l
South E	ast: Mour	ntain Ash Dr (South)								
1	L	1	0.0	0.149	4.8	LOS A	1.0	7.1	0.23	0.41	43.
2	T	1	0.0	0.149	3.8	LOS A	1.0	7.1	0.23	0.32	43.
3	R	199	1.0	0.149	9.3	LOS A	1.0	7.1	0.23	0.61	40.
Approac	ch	201	1.0	0.149	9.3	LOS A	1.0	7.1	0.23	0.61	40.
North Ea	ast: Glenf	ields Blvd (Ea	ıst)								
4	L	55	0.0	0.073	4.5	LOS A	0.5	3.6	0.04	0.46	44.
5	Т	54	10.8	0.073	3.7	LOS A	0.5	3.6	0.04	0.33	45
6	R	9	0.0	0.073	8.9	LOS A	0.5	3.6	0.04	0.85	40
Approac	ch	118	4.9	0.073	4.4	LOS A	0.5	3.6	0.04	0.43	44
North W	est: Birch	St (North)									
7	L	27	0.0	0.033	7.1	LOS A	0.2	1.5	0.58	0.58	29
8	Т	1	0.0	0.033	6.1	LOS A	0.2	1.5	0.58	0.53	29
9	R	1	0.0	0.033	11.6	LOS B	0.2	1.5	0.58	0.73	27
Approac	ch	29	0.0	0.033	7.3	LOS A	0.2	1.5	0.58	0.58	29.
South W	/est: Glen	fields Blvd (W	/est)								
10	L	3	0.0	0.267	6.1	LOS A	2.0	14.5	0.48	0.58	38
11	Т	263	3.7	0.267	5.2	LOS A	2.0	14.5	0.48	0.51	39
12	R	2	0.0	0.267	10.6	LOS B	2.0	14.5	0.48	0.82	36
Approac	ch	268	3.6	0.267	5.2	LOS A	2.0	14.5	0.48	0.52	39
All Vehic	rles	616	2.8	0.267	6.5	LOS A	2.0	14.5	0.32	0.53	40

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Glenfields Blvd / Mountain Ash Dr / Birch St 2022 PM Peak Base Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/l
South E	ast: Mour	ntain Ash Dr (S	,								
1	L	1	0.0	0.056	6.2	LOS A	0.4	2.5	0.47	0.51	41.0
2	Т	1	0.0	0.056	5.1	LOS A	0.4	2.5	0.47	0.45	41.
3	R	57	0.0	0.056	10.6	LOS B	0.4	2.5	0.47	0.66	39.
Approac	h	59	0.0	0.056	10.4	LOS B	0.4	2.5	0.47	0.65	39.
North Ea	ast: Glenf	ields Blvd (Ea	st)								
4	L	115	0.0	0.254	4.5	LOS A	2.0	14.4	0.07	0.46	44.
5	T	292	3.8	0.254	3.5	LOS A	2.0	14.4	0.07	0.34	45.
6	R	18	0.0	0.254	8.9	LOS A	2.0	14.4	0.07	0.86	40
Approac	h	425	2.6	0.254	4.0	LOS A	2.0	14.4	0.07	0.39	44
North W	est: Birch	St (North)									
7	L	6	0.0	0.007	5.6	LOS A	0.0	0.3	0.40	0.46	30.
8	Т	1	0.0	0.007	4.6	LOS A	0.0	0.3	0.40	0.39	31.
9	R	1	0.0	0.007	10.1	LOS B	0.0	0.3	0.40	0.68	28.
Approac	:h	8	0.0	0.007	6.0	LOS A	0.0	0.3	0.40	0.48	30.
South W	/est: Glen	ifields Blvd (W	est)								
10	L	1	0.0	0.144	4.9	LOS A	1.0	7.5	0.27	0.48	40
11	Т	165	4.1	0.144	4.0	LOS A	1.0	7.5	0.27	0.38	41.
12	R	6	0.0	0.144	9.4	LOS A	1.0	7.5	0.27	0.82	36
Approac	h	172	3.9	0.144	4.2	LOS A	1.0	7.5	0.27	0.40	40
All Vehic	rles	664	2.7	0.254	4.7	LOS A	2.0	14.4	0.16	0.42	43

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **PreludeDr / EBOnRamp 2011 AM - CAL

Prelude Dr / EB On Ramp 2011 AM Peak CALIBRATED Giveway / Yield (Two-Way)

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North Ea	ast: Prelu	ide Dr (North)									
5	Т	123	2.4	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	123	2.4	0.064	0.0	NA	0.0	0.0	0.00	0.00	60.0
South W	lest: Prel	ude Dr (South)									
11	Т	461	3.1	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	228	2.2	0.198	9.5	LOS A	1.3	9.3	0.32	0.63	45.2
Approac	ch	689	2.8	0.241	3.2	NA	1.3	9.3	0.11	0.21	54.2
All Vehic	cles	812	2.7	0.241	2.7	NA	1.3	9.3	0.09	0.18	54.5

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **PreludeDr / EBOnRamp 2011 PM - CAL

Prelude Dr / EB On Ramp 2011 PM Peak CALIBRATED Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	de Dr (North)									
5	T	368	2.2	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	368	2.2	0.191	0.0	NA	0.0	0.0	0.00	0.00	60.0
South V	Vest: Prel	ude Dr (South)									
11	Т	307	3.5	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	143	2.1	0.134	11.1	LOS B	1.0	6.8	0.56	0.69	43.9
Approac	ch	450	3.1	0.161	3.5	NA	1.0	6.8	0.18	0.22	53.8
All Vehi	cles	818	2.7	0.191	1.9	NA	1.0	6.8	0.10	0.12	55.2

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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SIDRA INTERSECTION

Site: **PreludeDr / EBOnRamp 2022 AM - Base

Prelude Dr / EB On Ramp 2022 AM Peak Base Giveway / Yield (Two-Way)

Moven	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	ude Dr (North)									
5	Т	141	2.6	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approa	ch	141	2.6	0.074	0.0	NA	0.0	0.0	0.00	0.00	60.0
South V	Vest: Pre	lude Dr (South)									
11	Т	560	3.3	0.293	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	276	2.1	0.240	9.7	LOS A	1.6	11.7	0.36	0.63	45.1
Approa	ch	836	2.9	0.293	3.2	NA	1.6	11.7	0.12	0.21	54.1
All Vehi	cles	977	2.9	0.293	2.7	NA	1.6	11.7	0.10	0.18	54.4

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **PreludeDr / EBOnRamp 2022 PM - Base

Prelude Dr / EB On Ramp 2022 PM Peak Base Giveway / Yield (Two-Way)

Movem	nent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North E	ast: Prelu	de Dr (North)									
5	Т	435	2.3	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	ch	435	2.3	0.226	0.0	NA	0.0	0.0	0.00	0.00	60.0
South V	Vest: Prel	ude Dr (South)									
11	Т	377	3.5	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	171	1.9	0.161	11.7	LOS B	1.2	8.8	0.62	0.72	43.3
Approac	ch	548	3.0	0.198	3.7	NA	1.2	8.8	0.19	0.23	53.6
All Vehi	cles	983	2.7	0.226	2.0	NA	1.2	8.8	0.11	0.13	55.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2011 AM - CAL

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2011 AM Peak CALIBRATED Signals - Actuated Cycle Time = 104 seconds

Movem	nent Per	formance - V	ehicles								
	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South E	ast: Kara	watha Dr (Eas	t)								
21	L	222	2.7	0.464	18.4	LOS B	5.5	39.8	0.56	0.73	30.4
22	Т	248	2.9	0.390	42.3	LOS D	6.6	47.3	0.90	0.72	17.2
<mark>23</mark>	R	<mark>245</mark>	2.1	1.000 ³	52.7	LOS D	12.1	86.3	0.96	0.82	14.4
Approac	ch	715	2.6	1.000	38.4	LOS D	12.1	86.3	0.81	0.76	18.7
North Ea	ast: Lady	Musgrave Dr (North)								
24	L	50	2.0	0.965	51.3	LOS D	14.3	103.5	0.94	0.88	23.8
25	Т	228	3.5	0.965	44.0	LOS D	14.3	103.5	0.94	0.82	23.8
26	R	30	3.3	0.131	53.0	LOS D	1.5	10.6	0.90	0.72	23.0
Approac	ch	308	3.2	0.965	46.0	LOS D	14.3	103.5	0.93	0.82	23.7
North W	est: Kara	watha Dr (Wes	st)								
27	L	46	2.2	0.357	44.5	LOS D	7.4	52.9	0.85	0.84	27.0
28	Т	119	1.5	0.357	37.0	LOS D	7.4	52.9	0.85	0.70	28.2
29	R	458	3.3	1.039	108.4	LOS F	39.0	282.6	1.00	1.18	15.2
Approac	ch	623	2.9	1.039	90.0	LOS F	39.0	282.6	0.96	1.07	17.2
South W	lest: Prel	ude Dr (South)									
30	L	110	2.9	0.228	23.6	LOS C	2.9	21.1	0.75	0.78	36.7
31	Т	218	1.7	0.533	38.6	LOS D	9.3	66.3	0.88	0.73	27.5
32	R	131	5.6	0.581	57.6	LOS E	6.9	51.2	0.96	0.79	23.5
Approac	ch	459	3.1	0.581	40.4	LOS D	9.3	66.3	0.87	0.76	27.8
All Vehic	cles	2105	2.9	1.039	55.3	LOS E	39.0	282.6	0.89	0.86	20.6

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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Site: **KarawathaDr /
LadyMusgraveDr / PreludeDr 2011
PM - CAL

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2011 PM Peak CALIBRATED Signals - Actuated Cycle Time = 105 seconds

Move	ment Perf	formance - V	ehicles								
Movement Performance - Vehicles Demand			Deg.	Average	Level of	100% Back of Queue		Prop.	Effective	Average	
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South	East: Kara	watha Dr (Eas	t)								
21	L	226	2.3	0.483	18.4	LOS B	5.7	41.1	0.56	0.73	30.3
22	Т	433	2.7	0.671	45.3	LOS D	11.5	83.0	0.95	0.78	16.4
23	R	135	2.2	0.581	50.5	LOS D	6.6	47.2	0.90	0.78	14.8
Approa	ach	794	2.5	0.671	38.5	LOS D	11.5	83.0	0.83	0.77	18.6
North E	East: Lady	Musgrave Dr ((North)								
<mark>24</mark>	L	<mark>64</mark>	1.6	1.000 ³	46.8	LOS D	14.4	103.5	0.96	0.84	25.0
<mark>25</mark>	T	<mark>240</mark>	3.1	1.000 ³	39.5	LOS D	14.4	103.5	0.96	0.81	25.0
26	R	36	3.8	0.252	60.1	LOS E	1.9	13.9	0.95	0.73	21.5
Approa	ach	340	2.9	1.000	43.0	LOS D	14.4	103.5	0.95	0.80	24.6
North \	Nest: Kara	watha Dr (Wes	st)								
27	L	20	0.0	0.249	42.9	LOS D	5.2	37.0	0.82	0.84	27.7
28	Т	100	1.0	0.249	35.5	LOS D	5.2	37.0	0.82	0.66	28.9
29	R	444	2.7	0.974	73.2	LOS E	31.0	223.2	1.00	1.04	20.1
Approa	ach	564	2.3	0.974	65.4	LOS E	31.0	223.2	0.96	0.96	21.4
South	West: Preli	ude Dr (South))								
30	L	126	2.8	0.133	16.1	LOS B	2.2	15.7	0.53	0.74	41.6
31	T	108	1.9	0.278	34.5	LOS C	4.5	32.5	0.79	0.65	29.2
32	R	72	6.9	0.528	62.9	LOS E	4.0	30.0	0.98	0.76	22.2
Approa	ach	306	3.4	0.528	33.6	LOS C	4.5	32.5	0.73	0.72	30.7
All Vehicles		2004	2.7	1.000	46.1	LOS D	31.0	223.2	0.87	0.82	22.5

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 AM - Base

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 AM Peak

Base

Signals - Actuated Cycle Time = 104 seconds

Move	ment Per	formance - V	ehicles								
		Demand		Deg.	Average	Level of	100% Back		Prop.	Effective	Average
Mov IL) Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	Fact: Kara	veh/h watha Dr (East	% N	v/c	sec		veh	m		per veh	km/h
21	Last. Itala L	269	2.9	0.553	18.2	LOS B	6.8	48.7	0.57	0.74	30.5
22	T	301	3.1	0.684	44.8	LOS D	12.4	89.6	0.95	0.74	16.5
23	R	297	2.0	1.000 ³	52.1	LOS D	12.1	86.3	0.95	0.73	14.6
Approa		867	2.7	1.000	39.0	LOS D	12.4	89.6	0.83	0.78	18.5
Дрргое	aGI I	007	2.1	1.000	33.0	LOGD	12.4	03.0	0.03	0.70	10.5
	East: Lady	Musgrave Dr (North)								
<mark>24</mark>	L	<mark>64</mark>	1.9	1.000 ³	48.8	LOS D	14.3	103.5	0.95	0.84	24.4
<mark>25</mark>	T	<mark>225</mark>	3.4	1.000 ³	41.6	LOS D	14.3	103.5	0.95	0.79	24.4
26	R	97	2.7	0.381	54.0	LOS D	4.9	35.5	0.93	0.78	23.0
Approa	ach	386	3.1	1.000	45.9	LOS D	14.3	103.5	0.94	0.80	24.1
North \	Nest: Kara	watha Dr (Wes	st)								
27	L	45	1.8	0.383	45.6	LOS D	7.8	55.4	0.87	0.84	26.7
28	Т	125	1.6	0.383	38.1	LOS D	7.8	55.4	0.87	0.71	27.8
29	R	466	3.4	1.102	159.2	LOS F	48.7	353.6	1.00	1.37	11.2
Approa	ach	636	2.9	1.102	127.4	LOS F	48.7	353.6	0.96	1.20	13.3
South '	West: Prel	ude Dr (South)									
30	L	133	3.0	0.279	24.3	LOS C	3.7	26.8	0.78	0.79	36.3
31	Т	266	1.9	0.651	39.6	LOS D	11.6	83.1	0.90	0.76	27.1
32	R	162	5.8	0.668	57.4	LOS E	8.6	63.9	0.98	0.80	23.5
Approa	ach	561	3.3	0.668	41.1	LOS D	11.6	83.1	0.89	0.78	27.5
All Veh	nicles	2450	2.9	1.102	63.5	LOS E	48.7	353.6	0.90	0.89	18.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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Site: **KarawathaDr / LadyMusgraveDr / PreludeDr 2022 PM - Base

Karawatha Dr / Lady Musgrave Dr / Prelude Dr 2022 PM Peak

Base

Signals - Actuated Cycle Time = 105 seconds

Move	ment Perf	formance - V	ehicles								
Move	ilone i on	Demand	Ciliolos	Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South	East: Kara	watha Dr (Eas	t)								
21	L	274	2.3	0.566	18.2	LOS B	6.9	49.8	0.57	0.74	30.5
22	Т	527	2.8	0.818	47.7	LOS D	14.7	105.8	0.98	0.84	15.9
23	R	164	2.4	0.708	51.4	LOS D	8.2	58.6	0.92	0.79	14.6
Approa	ach	965	2.6	0.818	39.9	LOS D	14.7	105.8	0.85	0.80	18.2
North E	East: Lady	Musgrave Dr ((North)								
<mark>24</mark>	L	<mark>79</mark>	1.5	1.000 ³	48.3	LOS D	14.4	103.5	0.95	0.84	24.5
<mark>25</mark>	T	<mark>215</mark>	3.2	1.000 ³	41.1	LOS D	14.4	103.5	0.95	0.80	24.5
26	R	124	3.8	0.571	58.0	LOS E	6.6	48.1	0.97	0.79	22.2
Approa	ach	418	2.9	1.000	47.5	LOS D	14.4	103.5	0.96	0.80	23.8
North \	Nest: Kara	watha Dr (Wes	st)								
27	L	23	0.0	0.283	44.1	LOS D	5.8	41.2	0.84	0.84	27.3
28	Т	108	0.9	0.283	36.7	LOS D	5.8	41.2	0.84	0.67	28.4
29	R	480	2.7	1.095	154.6	LOS F	49.8	359.0	1.00	1.35	11.5
Approa	ach	611	2.3	1.095	129.6	LOS F	49.8	359.0	0.96	1.21	13.2
South	West: Preli	ude Dr (South))								
30	L	156	3.3	0.179	17.4	LOS B	2.8	20.0	0.59	0.76	40.7
31	Т	131	1.7	0.348	37.9	LOS D	5.8	41.6	0.84	0.69	27.9
32	R	89	6.8	0.435	58.1	LOS E	4.7	35.2	0.95	0.77	23.4
Approa	ach	376	3.6	0.435	34.1	LOS C	5.8	41.6	0.76	0.74	30.5
All Veh	icles	2370	2.7	1.095	63.5	LOS E	49.8	359.0	0.89	0.90	18.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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Musgrave Dr Prelude Dr.sip 8000065, GHD SERVICES PTY LTD, ENTERPRISE



Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2011 AM - CAL

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2011 AM Peak **CALIBRATED** Roundabout

Moven	nent P <u>er</u>	formance - V	ehicle <u>s</u>								
Mov ID		Demand Flow veh/h	HV	Deg. Satn	Average Delay	Level of Service	100% Back of Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
South F	ast: Seria	ven/n ata Way (South	%	v/c	sec		veh	m		per veh	km/h
1	L	1	0.0	0.011	13.5	LOS B	0.1	0.7	0.87	0.65	39.4
2	Т	4	0.0	0.011	12.3	LOS B	0.1	0.7	0.87	0.63	39.7
Approa	ch	5	0.0	0.011	12.6	LOS B	0.1	0.7	0.87	0.64	39.6
North E	ast: WB 0	Off Ramp (East)								
4	L	1	0.0	0.497	9.0	LOS A	7.1	51.6	0.83	0.62	45.2
5	Т	59	7.1	0.497	8.9	LOS A	7.1	51.6	0.83	0.62	45.4
6	R	527	3.5	0.497	15.2	LOS B	7.1	51.6	0.83	0.68	43.3
Approa	ch	587	3.9	0.497	14.5	LOS B	7.1	51.6	0.83	0.67	43.5
North W	Vest: Kara	watha Dr (Nort	:h)								
8	Т	1	0.0	0.186	4.0	LOS A	1.4	10.1	0.02	0.31	46.5
9	R	309	3.3	0.186	11.3	LOS B	1.4	10.1	0.02	0.70	38.9
Approa	ch	310	3.3	0.186	11.2	LOS B	1.4	10.1	0.02	0.69	38.9
South V	Vest: Bun	dilla Blvd (Wes	t)								
10	L	181	0.0	0.258	10.0	LOS A	2.1	14.6	0.77	0.78	46.9
12	R	1	0.0	0.258	14.0	LOS B	2.1	14.6	0.77	0.86	43.4
Approa	ch	182	0.0	0.258	10.0	LOS A	2.1	14.6	0.77	0.78	46.9
All Vehi	icles	1084	3.0	0.497	12.8	LOS B	7.1	51.6	0.59	0.70	43.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2011 PM - CAL

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2011 PM Peak **CALIBRATED** Roundabout

Moven	nent Per	formance - V	ehicles								
Mov ID		Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back of Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
South F	ast: Seria	veh/h ata Way (South	%	v/c	sec		veh	m		per veh	km/h
1	1	4	0.0	0.034	16.0	LOS B	0.3	2.0	0.93	0.75	37.6
2	T	8	0.0	0.034	14.9	LOS B	0.3	2.0	0.93	0.75	37.8
Approa	•	12	0.0	0.034	15.3	LOS B	0.3	2.0	0.93	0.75	37.7
North E	ast: WB (Off Ramp (East	:)								
4	L	4	0.0	0.600	8.5	LOS A	9.7	70.3	0.83	0.59	45.2
5	Т	85	5.2	0.600	8.4	LOS A	9.7	70.3	0.83	0.59	45.4
6	R	686	3.0	0.600	14.7	LOS B	9.7	70.3	0.83	0.65	43.7
Approa	ch	775	3.2	0.600	13.9	LOS B	9.7	70.3	0.83	0.64	43.9
North W	Vest: Kara	awatha Dr (Nort	th)								
8	Т	1	0.0	0.144	4.0	LOS A	1.1	7.6	0.02	0.31	46.5
9	R	239	2.9	0.144	11.2	LOS B	1.1	7.6	0.02	0.70	38.9
Approa	ch	240	2.9	0.144	11.2	LOS B	1.1	7.6	0.02	0.69	38.9
South V	Vest: Bun	dilla Blvd (Wes	t)								
10	L	95	0.0	0.168	11.3	LOS B	1.3	9.4	0.83	0.81	45.8
12	R	1	0.0	0.168	15.3	LOS B	1.3	9.4	0.83	0.87	42.4
Approa	ch	96	0.0	0.168	11.3	LOS B	1.3	9.4	0.83	0.81	45.8
All Vehi	icles	1123	2.8	0.600	13.1	LOS B	9.7	70.3	0.66	0.67	43.2

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Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

Processed: Friday, 2 September 2011 11:04:31 PM SIDRA INTERSECTION 5.1.2.1953

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 AM - Base

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 AM Peak Base Roundabout

			'ehicles	Dea	A	l avalat	4000/ David	-4 O	D	Effective.	A
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	100% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	Sec	Service	veriicies	m	Queueu	per veh	km/r
South E	ast: Seria	ata Way (South		• • • • • • • • • • • • • • • • • • • •			7011			por vori	1011/1
1	L	1	0.0	0.019	18.5	LOS B	0.2	1.2	0.99	0.71	36.2
2	Т	5	0.0	0.019	17.4	LOS B	0.2	1.2	0.99	0.71	36.4
Approac	ch	6	0.0	0.019	17.6	LOS B	0.2	1.2	0.99	0.71	36.3
North Ea	ast: WB (Off Ramp (East	t)								
4	L	1	0.0	0.643	11.0	LOS B	10.7	78.3	0.98	0.71	43.
5	Т	71	7.0	0.643	10.9	LOS B	10.7	78.3	0.98	0.73	44.
6	R	643	3.5	0.643	17.2	LOS B	10.7	78.3	0.98	0.73	41.
Approac	ch	715	3.8	0.643	16.5	LOS B	10.7	78.3	0.98	0.73	42.
North W	est: Kara	watha Dr (Nor	th)								
8	Т	1	0.0	0.218	4.0	LOS A	1.8	12.7	0.02	0.31	46.
9	R	362	3.5	0.218	11.3	LOS B	1.8	12.7	0.02	0.69	38.
Approac	ch	363	3.5	0.218	11.2	LOS B	1.8	12.7	0.02	0.69	38.
South W	lest: Bun	dilla Blvd (Wes	st)								
10	L	218	0.0	0.375	11.4	LOS B	3.3	23.2	0.89	0.89	45.
12	R	1	0.0	0.375	15.5	LOS B	3.3	23.2	0.89	0.92	42.
Approac	ch	219	0.0	0.375	11.4	LOS B	3.3	23.2	0.89	0.89	45.
All Vehic	cles	1303	3.1	0.643	14.2	LOS B	10.7	78.3	0.70	0.75	42

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **KarawathaDr / BundillaBlvd / WBOffRamp / SeriataWay 2022 PM - Base

Karawatha Dr / Bundilla Blvd / WB Off Ramp / Seriata Way 2022 PM Peak Base Roundabout

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	· km/h
South E	ast: Seria	ata Way (South	າ)								
1	L	5	0.0	0.066	24.5	LOS C	0.6	4.4	1.00	0.83	32.9
2	Т	10	0.0	0.066	23.3	LOS C	0.6	4.4	1.00	0.83	33.0
Approac	ch	15	0.0	0.066	23.7	LOS C	0.6	4.4	1.00	0.83	33.0
North E	ast: WB (Off Ramp (East	t)								
4	L	5	0.0	0.765	12.1	LOS B	17.8	128.5	1.00	0.72	42.8
5	Т	104	5.0	0.765	12.0	LOS B	17.8	128.5	1.00	0.73	43.5
6	R	835	3.0	0.765	18.3	LOS B	17.8	128.5	1.00	0.73	41.0
Approac	ch	944	3.2	0.765	17.6	LOS B	17.8	128.5	1.00	0.73	41.2
North W	/est: Kara	awatha Dr (Nor	th)								
8	Т	1	0.0	0.167	4.0	LOS A	1.3	9.3	0.02	0.31	46.5
9	R	278	3.0	0.167	11.2	LOS B	1.3	9.3	0.02	0.70	38.9
Approac	ch	279	3.0	0.167	11.2	LOS B	1.3	9.3	0.02	0.69	38.9
South W	Vest: Bun	dilla Blvd (Wes	st)								
10	L	116	0.0	0.275	13.5	LOS B	2.4	16.8	0.95	0.93	43.8
12	R	1	0.0	0.275	17.5	LOS B	2.4	16.8	0.95	0.94	40.8
Approac	ch	117	0.0	0.275	13.5	LOS B	2.4	16.8	0.95	0.93	43.7
All Vehi	cles	1355	2.8	0.765	16.0	LOS B	17.8	128.5	0.79	0.74	41.0

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 used.

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Site: **KarawathaDr / SatinaySt 2011 AM - CAL

Karawatha Dr / Satinay St 2011 AM Peak **CALIBRATED** Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	1edian (F	RT Stage 2) (E-	N)								
12	R	5	0.0	0.052	3.7	LOS A	0.0	0.1	0.47	0.49	25.6
Approac	h	5	0.0	0.052	3.7	LOS A	0.0	0.1	0.47	0.49	25.6
South Ea	ast: Kara	ıwatha Dr (East	t)								
2	Т	384	3.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	5	0.0	0.203	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	h	389	3.0	0.203	0.1	NA	0.0	0.0	0.00	0.01	59.7
East: Me	edian (R1	Γ Stage 2) (N-W	V)								
3	R	10	0.0	0.010	2.4	LOS A	0.0	0.2	0.24	0.33	32.2
Approac	h	10	0.0	0.010	2.4	LOS A	0.0	0.2	0.24	0.33	32.2
North Ea	ast: Satin	ay St (North)									
4	L	61	0.0	0.689	21.4	LOS C	0.8	5.5	0.60	1.00	34.1
6	R	10	0.0	0.689	19.4	LOS C	0.8	5.5	0.60	0.95	33.3
Approac	h	71	0.0	0.689	21.1	LOS C	0.8	5.5	0.60	0.99	34.0
North W	est: Kara	awatha Dr (Wes	st)								
7	L	5	0.0	0.087	7.4	LOS A	0.0	0.0	0.00	1.16	48.6
8	Т	622	2.9	0.964	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	627	2.9	0.964	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehic	cles	1102	2.7	0.964	1.5	NA	0.8	5.5	0.04	0.08	56.1

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / SatinaySt 2011 PM - CAL

Karawatha Dr / Satinay St 2011 PM Peak **CALIBRATED** Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: M	ledian (F	RT Stage 2) (E-	N)								
12	R	15	0.0	0.146	3.4	LOS A	0.1	0.4	0.43	0.49	26.1
Approac	h	15	0.0	0.146	3.4	LOS A	0.1	0.4	0.43	0.49	26.1
South Ea	ast: Kara	ıwatha Dr (East	:)								
2	T	568	2.9	0.305	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	15	0.0	0.305	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	h	583	2.8	0.305	0.2	NA	0.0	0.0	0.00	0.02	59.3
East: Me	dian (R1	Γ Stage 2) (N-W	V)								
3	R	4	0.0	0.005	2.9	LOS A	0.0	0.1	0.31	0.37	31.4
Approac	h	4	0.0	0.005	2.9	LOS A	0.0	0.1	0.31	0.37	31.4
North Ea	st: Satin	ay St (North)									
4	L	7	0.0	0.091	10.2	LOS B	0.1	0.5	0.55	0.77	41.4
6	R	4	0.0	0.091	8.2	LOS A	0.1	0.5	0.55	0.67	41.8
Approac	h	11	0.0	0.091	9.4	LOS A	0.1	0.5	0.55	0.74	41.5
North We	est: Kara	awatha Dr (Wes	st)								
7	L	8	0.0	0.062	7.4	LOS A	0.0	0.0	0.00	1.12	48.6
8	Т	566	2.3	0.949	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	574	2.3	0.949	0.1	NA	0.0	0.0	0.00	0.02	59.8
All Vehic	les	1187	2.5	0.949	0.3	NA	0.1	0.5	0.01	0.03	59.1

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / SatinaySt 2022 AM - Base

Karawatha Dr / Satinay St 2022 AM Peak Base Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back (Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	1edian (F	RT Stage 2) (E-	N)								
12	R	6	0.0	0.633	15.9	LOS C	0.0	0.2	0.47	0.63	13.1
Approac	h	6	0.0	0.633	15.9	LOS C	0.0	0.2	0.47	0.63	13.1
South Ea	ast: Kara	watha Dr (East	t)								
2	Т	465	3.1	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	6	0.0	0.246	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	h	471	3.1	0.246	0.1	NA	0.0	0.0	0.00	0.01	59.7
East: Me	edian (R1	Stage 2) (N-V	V)								
3	R	11	0.0	0.012	2.6	LOS A	0.0	0.2	0.27	0.36	31.8
Approac	h	11	0.0	0.012	2.6	LOS A	0.0	0.2	0.27	0.36	31.8
North Ea	ast: Satin	ay St (North)									
4	L	73	0.0	12.502	11086.5	LOS F	58.4	408.8	1.00	25.28	0.2
6	R	11	0.0	12.502	11084.5	LOS F	58.4	408.8	1.00	27.25	0.2
Approac	h	84	0.0	12.502	11086.3	LOS F	58.4	408.8	1.00	25.54	0.2
North W	est: Kara	watha Dr (Wes	st)								
7	L	5	0.0	0.301	7.4	LOS A	0.0	0.0	0.00	1.18	48.6
8	Т	634	3.0	3.342	212.5	LOS F	33.3	240.3	0.10	0.00	8.8
Approac	h	639	3.0	3.342	210.9	NA	33.3	240.3	0.10	0.01	8.8
All Vehic	eles	1211	2.8	12.502	880.4	NA	58.4	408.8	0.13	1.79	1.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / SatinaySt 2022 PM - Base

Karawatha Dr / Satinay St 2022 PM Peak Base Giveway / Yield (Two-Way)

Movem	ent Per	formance - V	ehicles								
	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	1edian (F	RT Stage 2) (E-	N)								
12	R	19	0.0	1.951	1375.1	LOS F	7.0	49.3	1.00	30.78	0.2
Approac	h	19	0.0	1.951	1375.1	LOS F	7.0	49.3	1.00	30.78	0.2
South Ea	ast: Kara	ıwatha Dr (East	:)								
2	T	697	3.0	0.375	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	19	0.0	0.375	8.0	LOS A	0.0	0.0	0.00	0.65	33.9
Approac	:h	716	2.9	0.375	0.2	NA	0.0	0.0	0.00	0.02	59.3
East: Me	edian (R1	Γ Stage 2) (N-W	V)								
3	R	5	0.0	0.006	3.4	LOS A	0.0	0.1	0.36	0.42	30.7
Approac	:h	5	0.0	0.006	3.4	LOS A	0.0	0.1	0.36	0.42	30.7
North Ea	ast: Satin	ay St (North)									
4	L	8	0.0	1.709	1318.9	LOS F	4.2	29.2	1.00	12.69	1.6
6	R	5	0.0	1.709	1316.9	LOS F	4.2	29.2	1.00	13.65	1.4
Approac	h	13	0.0	1.709	1318.1	LOS F	4.2	29.2	1.00	13.06	1.5
North W	est: Kara	awatha Dr (Wes	st)								
7	L	9	0.0	0.280	7.4	LOS A	0.0	0.0	0.00	1.17	48.6
8	Т	611	2.3	4.305	402.6	LOS F	47.2	338.2	0.14	0.00	5.0
Approac	h	620	2.3	4.305	396.9	NA	47.2	338.2	0.13	0.02	5.0
All Vehic	cles	1373	2.5	4.305	210.9	NA	47.2	338.2	0.08	0.57	5.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2011 AM -CAL

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2011 AM Peak **CALIBRATED** Signals - Actuated Cycle Time = 72 seconds

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/ł
South: N	/lountain (Creek Shops ((South)								
30	L	44	0.0	0.042	3.4	LOS A	0.3	1.9	0.18	0.40	31.2
Approac	ch	44	0.0	0.042	3.4	LOS A	0.3	1.9	0.18	0.40	31.2
East: Ka	arawatha l	Dr (East)									
21	L	39	0.0	0.021	8.0	Χ	X	X	Χ	0.63	49.3
22	Т	344	3.3	0.279	6.3	LOS A	5.6	40.4	0.46	0.40	49.2
23	R	16	0.0	0.102	42.9	LOS D	0.6	4.1	0.93	0.69	26.6
Approac	ch	399	2.8	0.279	8.0	LOS A	5.6	40.4	0.43	0.43	47.7
North: N	lolakai Dr	(North)									
24	L	41	0.0	0.416	23.9	LOS C	1.0	6.9	0.66	0.70	32.8
26	R	109	7.3	0.314	35.8	LOS D	3.6	27.2	0.88	0.77	28.0
Approac	ch	150	5.3	0.416	32.5	LOS C	3.6	27.2	0.82	0.75	29.2
West: K	arawatha	Dr (West)									
27	L	88	9.3	0.193	10.4	LOS B	0.8	6.5	0.27	0.68	43.6
28	Т	469	3.8	0.517	14.9	LOS B	12.2	89.0	0.73	0.64	38.1
Approac	ch	557	4.7	0.517	14.2	LOS B	12.2	89.0	0.66	0.65	38.8
All Vehic	cles	1150	3.9	0.517	14.0	LOS B	12.2	89.0	0.58	0.58	39.

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2011 PM -CAL

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2011 PM Peak **CALIBRATED** Signals - Actuated Cycle Time = 72 seconds

		Demand		Deg.	Average	Level of	100% Back	of Queue	Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N	Mountain	Creek Shops ((South)								
30	L	60	0.0	0.071	5.4	LOS A	0.6	4.5	0.31	0.47	27.8
Approac	ch	60	0.0	0.071	5.4	LOS A	0.6	4.5	0.31	0.47	27.8
East: Ka	arawatha	Dr (East)									
21	L	56	0.0	0.030	8.0	Х	X	X	X	0.63	49.3
22	Т	479	3.5	0.448	10.6	LOS B	10.5	76.3	0.62	0.55	44.4
23	R	12	0.0	0.077	42.7	LOS D	0.4	3.0	0.93	0.68	26.7
Approac	ch	547	3.1	0.448	11.0	LOS B	10.5	76.3	0.56	0.56	44.2
North: N	/lolakai Dr	· (North)									
24	L	40	0.0	0.353	19.7	LOS B	0.8	5.8	0.58	0.69	35.0
26	R	327	5.0	0.650	33.4	LOS C	11.0	81.1	0.91	0.83	28.9
Approac	ch	367	4.5	0.650	31.9	LOS C	11.0	81.1	0.88	0.81	29.4
West: K	arawatha	Dr (West)									
27	L	156	7.8	0.339	10.4	LOS B	1.6	11.9	0.28	0.69	43.5
28	Т	533	2.4	0.707	21.1	LOS C	16.9	121.3	0.88	0.78	33.4
Approac	ch	689	3.6	0.707	18.7	LOS B	16.9	121.3	0.75	0.76	35.2
All Vehi	cles	1663	3.5	0.707	18.6	LOS B	16.9	121.3	0.70	0.69	36.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 AM -**Base**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 AM Peak

Base

Signals - Actuated Cycle Time = 72 seconds

Moven	nent Per	formance - \	/ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	Mountain	Creek Shops (V/C	Sec		ven	- '''		per veri	KIII/II
30	L	54	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.9
Approac		54	0.0	0.054	3.6	LOS A	0.4	2.6	0.20	0.41	30.9
East: Ka	arawatha	Dr (East)									
21	L	49	0.0	0.026	8.0	Х	Х	Х	Х	0.63	49.3
22	Т	408	3.2	0.338	7.1	LOS A	7.2	51.8	0.50	0.43	48.2
23	R	19	0.0	0.122	43.0	LOS D	0.7	4.9	0.93	0.69	26.5
Approac	ch	476	2.7	0.338	8.7	LOS A	7.2	51.8	0.46	0.46	46.9
North: N	Molakai D	r (North)									
24	L	48	0.0	0.477	23.2	LOS C	1.1	8.0	0.65	0.70	33.1
26	R	131	7.0	0.352	35.2	LOS D	4.3	32.3	0.87	0.78	28.2
Approac	ch	179	5.1	0.477	32.0	LOS C	4.3	32.3	0.81	0.76	29.4
West: K	Karawatha	Dr (West)									
27	L	108	9.1	0.237	10.4	LOS B	1.1	8.1	0.27	0.69	43.6
28	Т	571	3.8	0.648	17.0	LOS B	16.5	119.9	0.81	0.72	36.3
Approac	ch	679	4.6	0.648	15.9	LOS B	16.5	119.9	0.72	0.71	37.2
All Vehi	icles	1388	3.9	0.648	15.0	LOS B	16.5	119.9	0.63	0.62	38.7

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Site: **KarawathaDr / MolakaiDr / MountainCreekShops 2022 PM -**Base**

Karawatha Dr / Molakai Dr / Mountain Creek Shops 2022 PM Peak

Base

Signals - Actuated Cycle Time = 72 seconds

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	100% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mountain Creek Shops (So				V/C	360		Ven	- '''		per veri	KIII/II
30	L	73	0.0	0.099	7.3	LOS A	1.0	7.1	0.39	0.51	25.3
Approa	ch	73	0.0	0.099	7.3	LOS A	1.0	7.1	0.39	0.51	25.3
East: Ka	arawatha	Dr (East)									
21	L	67	0.0	0.036	8.0	Х	Х	Χ	Х	0.63	49.3
22	Т	575	3.5	0.537	11.4	LOS B	13.5	98.3	0.67	0.59	43.6
23	R	15	0.0	0.096	42.8	LOS D	0.5	3.8	0.93	0.69	26.6
Approach		657	3.1	0.537	11.7	LOS B	13.5	98.3	0.60	0.60	43.5
North: N	Molakai D	r (North)									
24	L	48	0.0	0.424	19.8	LOS B	1.0	7.1	0.58	0.69	35.0
26	R	388	4.6	0.769	35.5	LOS D	14.0	103.0	0.96	0.87	28.1
Approach		436	4.1	0.769	33.8	LOS C	14.0	103.0	0.91	0.85	28.7
West: K	Karawatha	Dr (West)									
27	L	191	7.7	0.415	10.9	LOS B	2.0	14.9	0.33	0.70	43.0
28	Т	651	2.5	0.864	23.1	LOS C	22.6	162.3	0.97	0.86	32.1
Approa	ch	842	3.7	0.864	20.3	LOS C	22.6	162.3	0.83	0.83	33.9
All Vehicles		2008	3.4	0.864	19.9	LOS B	22.6	162.3	0.76	0.75	35.1

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (HCM 2000).

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 used.

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Project: C:\Anthony\University 2011\ENG4111 and ENG4112 Research Project\SIDRA\Karawatha Dr Molakai Dr

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Appendix U VISSIM Visualisation File