



TRAFFIC IMPACT ASSESSMENT
RURAL FUNCTIONS CENTRE
1390 HINTERLAND WAY, BANGALOW


Prepared for
METROPOLIS STUDIOS PTY LTD

10 NOVEMBER 2020

DOCUMENT REGISTER

RTE Reference 20283
 Prepared by Luke Rytenskild, Dare Janzekovic

Document History

Version	Version date	Details	Reviewed and Authorised	
			Name / Position	Signature
1	10 November 2020	DA ISSUE	Luke Rytenskild Director RPEQ 6293	

COPYRIGHT NOTICE

© Copyright CRG Traffic Pty Ltd All Rights Reserved. Copyright in the whole and every part of this document belongs to CRG Traffic Pty Ltd and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person without the prior written consent of CRG Traffic Pty Ltd.

COMPANY INFORMATION

CRG Traffic Pty Ltd as trustee for the Rytenskild CRG Trust trading as Rytenskild Traffic Group
 ABN 24 401 134 418
 ACN 151 846 847
 Director: Luke Rytenskild RPEQ 6293

Suite 8, Level 1
 66 Appel Street
 (PO Box 17)
 Surfers Paradise QLD 4217

Level 19
 10 Eagle Street
 Brisbane QLD 4000

Level 26
 44 Market Street
 Sydney NSW 2000

Phone: 1300 220020
 Facsimile: 1300 087177
 Email: info@rytenskildtraffic.com
 Web: www.rytenskildtraffic.com

TABLE OF CONTENTS

1.0 INTRODUCTION 4

2.0 SUBJECT SITE..... 5

3.0 EXISTING ROAD CONDITIONS..... 6

4.0 DEVELOPMENT PROPOSAL 9

5.0 DEVELOPMENT TRAFFIC IMPACT 12

 5.1 Traffic Estimates..... 12

 5.2 Road Network Impact..... 13

6.0 ROAD SAFETY ASSESSMENT 15

7.0 PROPOSED ON – SITE TRAFFIC ARRANGEMENTS 16

 7.1 Access Road..... 16

 7.2 Car Parking 16

 7.3 Service Vehicle Access..... 16

8.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS 17

APPENDICES..... 18

 APPENDIX A – TRAFFIC COUNT DATA (HINTERLAND WAY / GRANUAILLE CRESCENT)..... 18

 APPENDIX B – CRITERIA FOR EVALUATING SIDRA RESULTS..... 21

 APPENDIX C – DETAILED SIDRA OUTPUT..... 22

1.0 INTRODUCTION

Rytenskild Traffic Engineering (RTE) has been engaged by Metropolis Studio Pty Ltd to prepare a Traffic Impact Assessment of its proposed rural functions centre at Bangalow.

This report forms part of a Development Application (DA) to be lodged with the Byron Shire Council. The report addresses the following issues:

- The potential impact of traffic generated by the proposal upon Granuaille Crescent and its intersection with Hinterland Way;
- The adequacy of the proposed access location with respect to sight distance and general road safety;
- The required geometrical form of the proposed access driveway and its intersection with Granuaille Crescent;
- The adequacy of on – site traffic access and car parking arrangements;
- The provision for occasional service vehicles to access and service the site.

The subject application is being lodged under Clause 6.11 of the Byron LEP, which enables development on land within Zone RU2 Rural Landscape for the purpose of a function centre for a maximum period of 3 years from the date of consent. The maximum guests intended for the site is in accordance with that permitted by the Clause (150 guests).

It is noted that, *Chapter 9D Rural Function Centres* of the Byron Development Control Plan 2014 (DCP) states the following requirements with respect to an assessment of traffic impacts:

a Traffic Impact Assessment, addressing traffic numbers, impact on local roads, access and on-site parking, demonstrating that the use of the site for a function centre will not result in unacceptable adverse impacts on the safety or efficiency of local traffic or the amenity of the neighbourhood;

2.0 SUBJECT SITE

As shown in Figure 2.1, the subject site is located on the eastern side of Hinterland Way and just to the north of the Bangalow village.

The site is identified as Lot 3 DP814299 and Lot 3 DP877662 and is used for agricultural purposes.

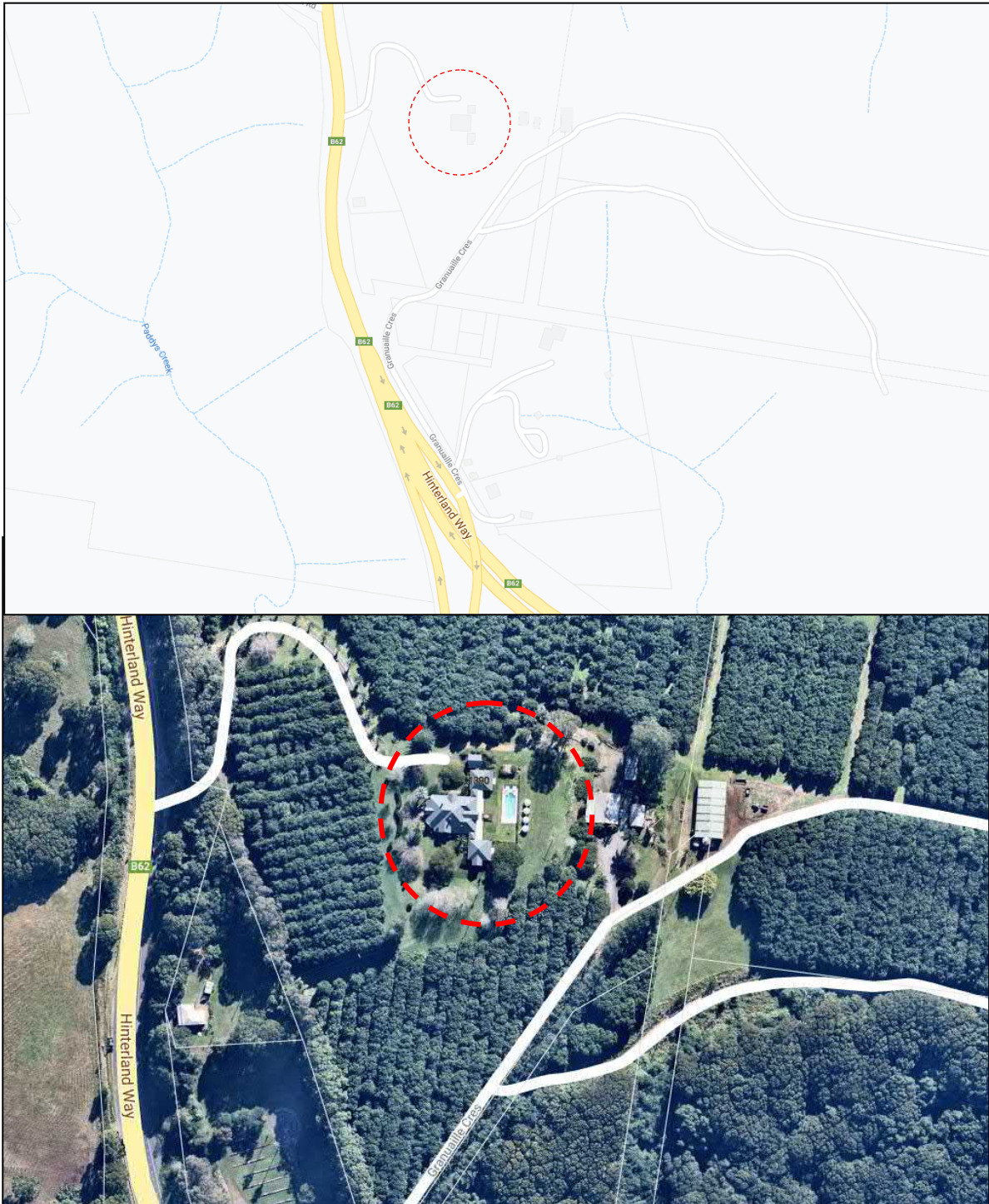


FIGURE 2.1 – LOCATION OF SUBJECT SITE

3.0 EXISTING ROAD CONDITIONS

Granuaille Crescent is a rural local access road which intersects with the southbound off ramp from Hinterland Way. It provides access to some rural properties and a cemetery. Granuaille Crescent generally has a pavement width of approximately 5.5 – 6 metres with grassed shoulders on each side.

Images of Granuaille Crescent in the vicinity of the site are shown in Figure 3.1.

RTE carried out at traffic counts at the Hinterland Way / Granuaille Crescent intersection over a two typical weekdays and a Saturday in mid October 2020. A summary of the surveyed peak hour volumes is provided in Figure 3.2, with the full data set provided as Appendix A.



Granuaille Crescent looking south to Hinterland Way intersection



Hinterland Way / Granuaille Crescent intersection



Granuaille Crescent

FIGURE 3.1 – IMAGES OF GRANUAILLE CRESCENT

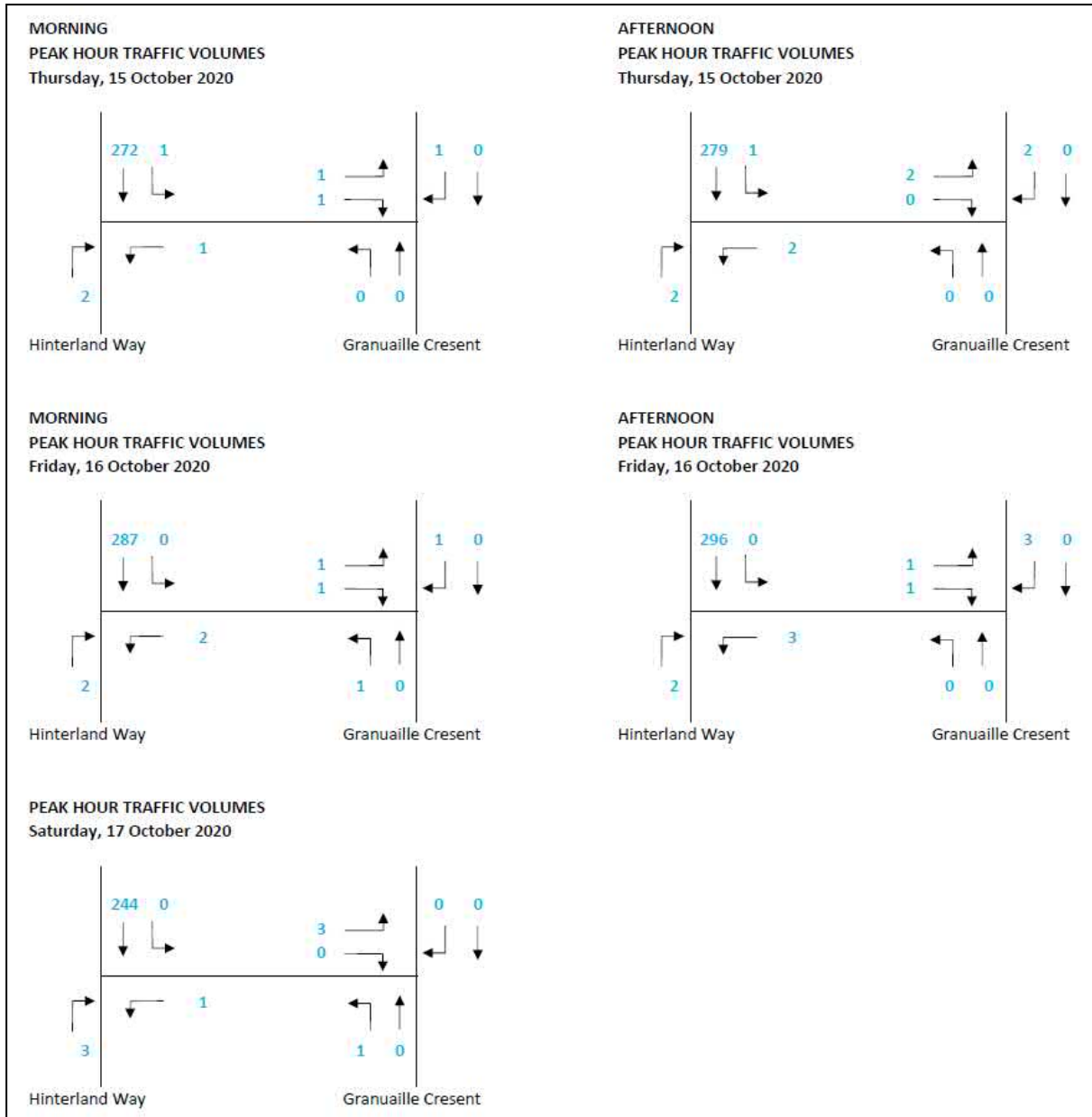


FIGURE 3.2 – SUMMARY OF SURVEYED PEAK HOUR TRAFFIC VOLUMES AT THE HINTERLAND WAY / GRANUAILLE CRESCENT INTERSECTION

4.0 DEVELOPMENT PROPOSAL

It is proposed that the site will host temporary events such as corporate and private parties, and weddings.

The site is expected to host 1 – 2 events per month with an average attendance of 80 – 100 guests. Up to ten marquee events will be held per year, each with a maximum attendance of 150 guests.

Access to the site will be gained via the existing access and driveway off Granuaille Crescent (see below Figure 4.1).

Mini-buses (approx. 26 seater) will be the primary mode of travel to transport guests to and from the property for all events. Private cars will only be used for guests that require private vehicle access (eg a person with a disability, elderly etc).

The proposed site layout plan is shown in Figures 4.2 and 4.3.



FIGURE 4.1 – EXISTING DRIVEWAY OFF GRANUAILLE CRESCENT



FIGURE 4.2 – PROPOSED SITE LAYOUT (OVERALL)



FIGURE 4.3 – PROPOSED SITE PLAN (DETAIL)

5.0 DEVELOPMENT TRAFFIC IMPACT

5.1 Traffic Estimates

It is expected that up to 20 events will be held over a 12 month period, with a maximum of 150 guests permitted at each function. It is proposed that no more than one event will be held over any given weekend. Events will typically be hosted over the full weekend with the set up and pack up of each event carried out 1 – 2 days prior and following the event. Some guests will stay on the premises after the event.

Guests will generally travel to and from the site using a 26 seater mini-bus. Guests would access the service from a pre-arranged location in a central commercial area (eg Bangalow or Byron Bay). It is noted that some guests will also arrive to the site using a car service (taxi, uber etc), or private vehicle if unable to be transported to the site by bus (i.e. a person with a disability, elderly etc).

Each event will also generate some traffic movements associated with the set up / pack down and catering. These will typically occur the day before and after an event and are not expected to generate a significant traffic demand on the adjacent network.

It is estimated that a capacity sized events would typically have the following daily vehicle trip generation:

SET-UP

Marquee Hire	2 trips (1 x inbound / 1 x outbound)
Wedding Hire	4 trips (2 x inbound / 2 x outbound)
Portable WC	4 trips (2 x inbound / 2 x outbound)
Wedding Coordinator	4 trips (2 x inbound / 2 x outbound)
Catering	2 trips (1 x inbound / 1 x outbound)
Cool Room	2 trips (1 x inbound / 1 x outbound)
Other (flowers / catering, etc)	4 trips (2 x inbound / 2 x outbound)

TOTAL TRIPS: 22 daily trips

FUNCTION DAY

Wedding Hire	2 trips (1 x inbound / 1 x outbound)
Wedding Coordinator	4 trips (2 x inbound / 2 x outbound)
Guests – Taxi	10 trips (5 x inbound / 5 x outbound)
Guests – Private Vehicle	12 trips (6 x inbound / 6 x outbound)
Guests – Mini Bus	10 trips (5 x inbound / 5 x outbound)
Staff	6 trips (3 x inbound / 3 x outbound)
Entertainment	2 trips (1 x inbound / 1 x outbound)
Other (flowers / makeup)	4 trips (2 x inbound / 2 x outbound)

TOTAL TRIPS: 50 daily trips

PACK-DOWN

Marquee Hire	2 trips (1 x inbound / 1 x outbound)
Wedding Hire	4 trips (2 x inbound / 2 x outbound)
Portable WC	4 trips (2 x inbound / 2 x outbound)
Wedding Coordinator	4 trips (2 x inbound / 2 x outbound)
Catering	2 trips (1 x inbound / 1 x outbound)
Cool Room	2 trips (1 x inbound / 1 x outbound)
Other (flowers / catering, etc)	4 trips (2 x inbound / 2 x outbound)
Waste Removal	2 trips (1 x inbound / 1 x outbound)

TOTAL TRIPS: 24 daily trips

5.2 Road Network Impact

Hinterland Way / Granuaille Crescent intersection

SIDRA modelling has been carried out assuming that all bus and taxi / car service vehicles would arrive and depart during the same hour, whilst the private vehicles would stay on the premises and only depart after the conclusion of the event.

For the purposes of the analysis traffic generation for a capacity event (150 guests) are estimated as show below:

Guests – Taxi:	10 trips
Guest - Private Vehicle:	6 trips
Guest – Mini Bus:	<u>10 trips</u>
Total Peak Hour Volume:	26 trips

To be conservative, the surveyed peak hour volume for the busiest day has been assumed as the design period, even though traffic movements associated with events are likely to occur outside of this period.

As indicated in Table 5.1, the modelling indicates that the Hinterland Way / Granuaille Crescent intersection would operate satisfactorily with minimal queuing and delays. The full results of the SIDRA analysis are presented in Appendix C, with the criteria for evaluating the SIDRA results is presented in Appendix B.

Table 5.1: SIDRA Results (Hinterland Way / Granuaille Crescent Intersection)

Scenario	Degree of Saturation	Level of Service*	Total Average Delay (seconds)
2020 AM Peak – without development	0.157	A	0.2
2020 PM Peak – without development	0.162	A	0.2
2020 AM Peak – with development (150 guests)	0.157	A	0.9
2020 PM Peak – with development (150 guests)	0.162	A	0.9

Granuaille Crescent

Granuaille Crescent is a two lane rural access road with a sealed carriageway width of 5.5 – 6.0 metres. In accordance with Austroads Part 3, it is considered that this profile has a traffic carrying capacity of approximately 500 - 1,000 vehicles per day.

The average annual daily traffic generation of the proposal will be relatively low, given that it will only generate significant traffic volumes 1-2 days per month. As shown in Section 5, a 150 person event is likely to generate in the order of 50 movements on the function day, with 20 – 25 movement on the days prior and after the event.

Given that Granuaille Crescent currently carries approximately 50-60 vehicles per day, it is considered that it has sufficient spare capacity to accommodate the proposed use.

6.0 ROAD SAFETY ASSESSMENT

Five year road accident data (2015-2019) has been collected from the RMS online database. The data indicates that there has only been one incident recorded at the Hinterland Way / Granuaille Crescent intersection since 2015. A summary of the recorded incident is shown in Figure 6.1.

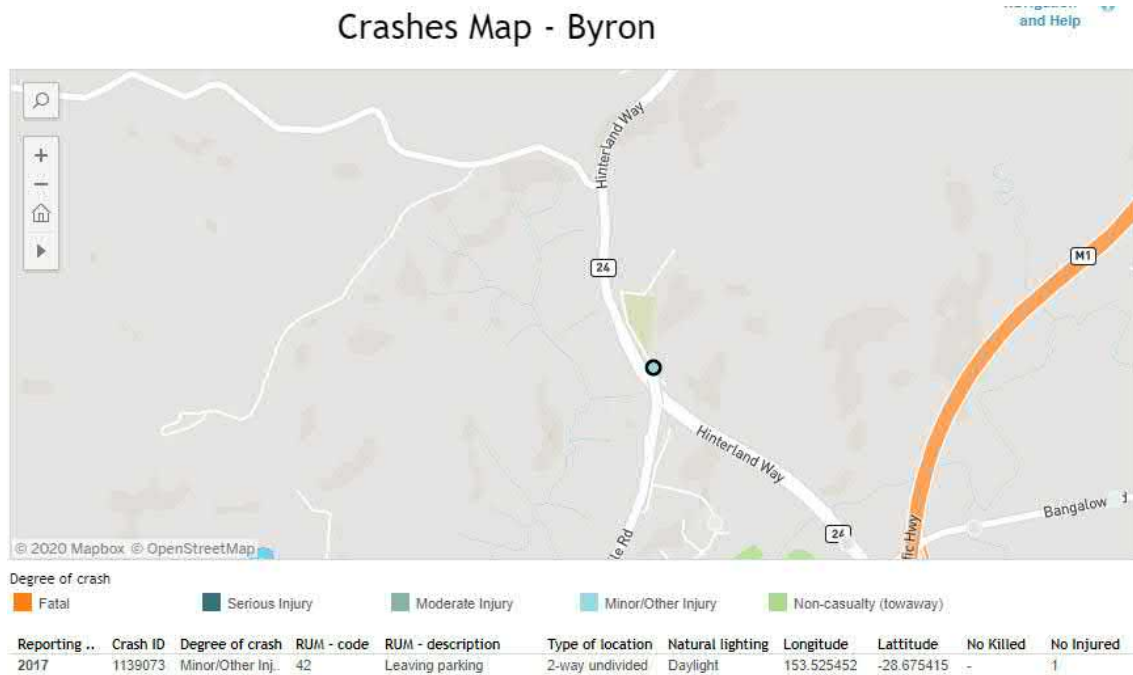


FIGURE 6.1 – ROAD INCIDENT MAP (TWEED VALLEY WAY)

As shown, accidents at the Hinterland Way / Granuaille Crescent intersection are uncommon, with the one recorded incident occurring in 2017. The severity of the incident was considered to be low, with the casualty only sustaining a minor injury. Based on the frequency and seriousness of incidents at the Hinterland Way / Granuaille Crescent intersection, it is considered that the risk level at the intersection will not increase as a result of the proposed development.

7.0 PROPOSED ON – SITE TRAFFIC ARRANGEMENTS

7.1 Access Road

It is considered that the existing road formation will allow suitable access given that traffic will generally be travelling in a single direction to the site before an event and away from the site after the event.

The existing access driveway off Granuaille Crescent will be retained for the site.

7.2 Car Parking

There is sufficient area at the top of the site where events will be held. It is intended that guests will generally be transported to the site using a mini bus, however some parking (6 spaces) will be provided in accordance with AS2890.1:2004. These will be marked appropriately and will be provided for guests who cannot be transported by bus (i.e. a person with a disability, elderly etc).

An informal parking area is proposed to be provided at the rear of the main building for staff (catering, entertainment, celebrant, etc) during the setup and running of the events. However, a formal car parking area is not considered to be necessary given the nature of the proposed use and low vehicle generation.

7.3 Service Vehicle Access

The operators will store some equipment required for events on site, however, equipment such as marquees, portable WC's, cool rooms, etc will be transported to the using small – medium rigid vehicles. There is adequate provision for the required vehicles to turn on the premises and exit in a forward gear. It is not expected that deliveries for the setup or pack down of events will occur on the day of the function.

8.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

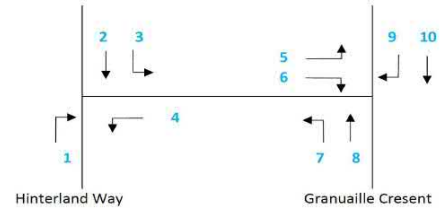
- The subject site is located on the northern side of Granuaille Crescent, approximately one kilometre west of the Bilambil village. The site is identified as Lot 3 DP814299 and Lot 3 DP877662 and is used for agricultural purposes.
- It is proposed that the site will host temporary events such as corporate and private parties, and weddings. The site is expected to host 1-2 events per month with an average attendance of 80-100 guests. Up to ten marquee events will be held per year, each with a maximum attendance of 150 guests.
- Access to the proposed use will be gained via the existing access point off Granuaille Crescent. Granuaille Crescent is a two lane rural access road with a sealed carriageway width of 5.5 – 6.0 metres. In accordance with Austroads Part 3, it is considered that this profile has a traffic carrying capacity of approximately 500 - 1,000 vehicles per day. As discussed in Section 5, Granuaille Crescent currently carries approximately 50-60 vehicles per day and is considered that it has sufficient spare capacity to accommodate the proposed use (50 daily trips on the day of the function).
- Guests will generally travel to and from the site using a 26 seater mini-bus. Guests would access the service from a pre-arranged location in a central commercial area (eg Bangalow or Byron Bay). It is noted that some guests will also arrive to the site using a car service (taxi, uber etc), or private vehicle if unable to be transported to the site by bus (i.e. a person with a disability, elderly etc).
- An assessment of the potential traffic generation of the proposal indicates that such would not adversely impact upon the capacity or performance of Granuaille Crescent. A safety analysis of the indicates that accidents at the Hinterland Way / Granuaille Crescent intersection are uncommon, with the one recorded incident occurring in 2017. Based on the frequency and seriousness of incidents at the Hinterland Way / Granuaille Crescent intersection, it is considered that the risk level at the intersection will not increase as a result of the proposed development.
- It is considered that the existing road formation will allow suitable access given that traffic will generally be travelling in a single direction to the site before an event and away from the site after the event.
- There is sufficient area at the top of the site where events will be held, for cars and mini-buses to park. A formal car parking area is not considered to be necessary given the nature of the proposed use and low vehicle generation.

APPENDICES

APPENDIX A – TRAFFIC COUNT DATA (HINTERLAND WAY / GRANUAILLE CRESCENT)

MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
 RTE ID: 20283
 Location: Hinterland Way / Granuaille Cres, Bangalow
 Date: Thursday, 15 October 2020
 Comments: Fine Weather

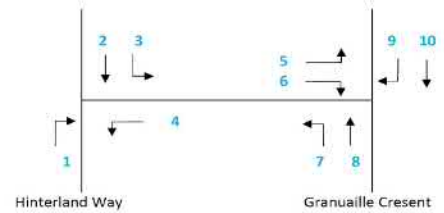


Class All Vehicles

Time	1	2	3	4	5	6	7	8	9	10	Total	Cumul Tot
7:00	0	62	0	0	0	0	0	0	0	0	62	
7:15	1	71	0	1	1	0	0	0	1	0	75	
7:30	0	61	1	1	0	0	1	0	0	0	64	
7:45	1	53	1	0	1	0	0	0	0	0	56	257
8:00	0	64	0	0	0	0	0	0	0	0	64	259
8:15	2	57	0	1	1	1	0	0	1	0	63	247
8:30	0	63	1	1	0	0	0	0	1	0	66	249
8:45	1	64	1	0	1	0	0	0	0	0	67	260
9:00	0	59	0	0	0	0	0	0	0	0	59	255
9:15	0	64	0	1	0	0	0	0	1	0	66	258
9:30	1	42	2	1	1	0	0	0	1	0	48	240
9:45	0	49	1	0	0	0	0	0	0	0	50	223
10:00	0	71	0	0	0	0	0	0	0	0	71	235
10:15	1	66	0	1	1	0	0	0	1	0	70	239
10:30	0	63	1	0	0	0	0	0	0	0	64	255
10:45	1	72	0	0	0	1	0	0	0	0	74	279
11:00	0	51	1	0	0	0	0	0	0	0	52	260
11:15	1	57	1	1	1	0	0	0	1	0	62	252
11:30	0	57	0	2	0	0	1	0	1	0	61	249
11:45	1	57	1	0	1	0	0	0	0	0	60	235
12:00	0	50	2	1	0	0	0	0	1	0	54	237
12:15	1	50	0	0	1	0	0	0	0	0	52	227
12:30	0	60	1	0	0	0	0	0	0	0	61	227
12:45	0	59	0	1	0	0	1	0	0	0	61	228
13:00	1	57	0	0	1	0	0	0	0	0	59	233
13:15	0	55	0	1	0	0	0	0	1	0	57	238
13:30	0	42	1	1	0	0	0	0	1	0	45	222
13:45	1	72	1	0	1	0	0	0	0	0	75	236
14:00	0	63	0	1	0	0	1	0	0	0	65	242
14:15	0	56	1	0	0	0	0	0	0	0	57	242
14:30	1	68	0	0	1	0	0	0	0	0	70	267
14:45	0	70	0	0	0	0	0	0	0	0	70	262
15:00	0	83	1	0	0	0	0	0	0	0	84	281
15:15	1	52	0	1	1	0	0	0	1	0	56	280
15:30	1	74	0	1	1	0	0	0	1	0	78	288
15:45	0	63	0	0	0	0	0	0	0	0	63	281
16:00	1	59	0	2	1	0	1	0	1	0	65	262
16:15	1	72	0	1	1	0	0	0	1	0	76	282
16:30	0	64	1	0	0	0	0	0	0	0	65	269
16:45	0	53	0	1	0	0	0	0	1	0	55	261
AM Peak Hour	2	272	1	1	1	1	0	0	1	0	279	-
PM Peak Hour	2	279	1	2	2	0	0	0	2	0	288	-

MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
 RTE ID: 20283
 Location: Hinterland Way / Granuaille Cres, Bangalow
 Date: Friday, 16 October 2020
 Comments: Fine Weather

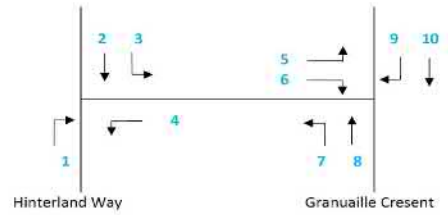


Class All Vehicles

Time	1	2	3	4	5	6	7	8	9	10	Total	Cumul Tot
7:00	0	57	0	1	0	0	0	0	1	0	59	
7:15	1	64	0	0	1	0	0	0	0	0	65	
7:30	0	65	0	1	0	0	0	0	1	0	67	
7:45	1	53	0	1	0	1	1	0	0	0	56	247
8:00	1	75	0	0	1	0	0	0	0	0	76	264
8:15	0	74	0	0	0	0	0	0	0	0	74	273
8:30	0	58	0	1	0	0	0	0	1	0	60	266
8:45	1	80	0	1	0	1	1	0	0	0	83	293
9:00	0	59	0	0	0	0	0	0	0	0	59	276
9:15	0	67	0	1	0	0	0	0	1	0	69	271
9:30	2	52	0	1	2	0	0	0	1	0	56	267
9:45	1	64	0	2	1	0	0	0	2	0	69	253
10:00	1	54	0	0	1	0	0	0	0	0	55	249
10:15	0	74	0	1	0	0	0	0	1	0	76	256
10:30	1	73	0	0	1	0	0	0	0	0	74	274
10:45	0	49	0	0	0	0	0	0	0	0	49	254
11:00	1	59	0	0	1	0	0	0	0	0	60	259
11:15	0	52	0	1	0	0	0	0	1	0	54	237
11:30	0	49	0	0	0	0	0	0	0	0	49	212
11:45	0	69	0	0	0	0	0	0	0	0	69	232
12:00	1	41	0	1	0	1	1	0	0	0	44	216
12:15	1	70	0	0	1	0	0	0	0	0	71	233
12:30	0	64	0	1	0	0	0	0	1	0	66	250
12:45	0	68	0	0	0	0	0	0	0	0	68	249
13:00	1	55	0	1	1	0	0	0	1	0	58	263
13:15	2	54	0	1	2	0	1	0	0	0	58	250
13:30	1	50	0	2	1	0	0	0	2	0	55	239
13:45	0	70	0	0	0	0	0	0	0	0	70	241
14:00	0	78	0	0	0	0	0	0	0	0	78	261
14:15	1	72	0	0	1	0	0	0	0	0	73	276
14:30	0	79	0	1	0	0	0	0	1	0	81	302
14:45	1	78	0	0	0	1	0	0	0	0	79	311
15:00	1	65	0	1	1	0	0	0	1	0	68	301
15:15	0	74	0	1	0	0	0	0	1	0	76	304
15:30	0	70	0	0	0	0	0	0	0	0	70	293
15:45	0	80	0	0	0	0	0	0	0	0	80	294
16:00	1	68	0	0	1	0	0	0	0	0	69	295
16:15	0	68	0	1	0	0	0	0	1	0	70	289
16:30	1	57	0	0	1	0	0	0	0	0	58	277
16:45	0	62	0	0	0	0	0	0	0	0	62	259
AM Peak Hour	2	287	0	2	1	1	1	0	1	0	293	-
PM Peak Hour	2	296	0	3	1	1	0	0	3	0	304	-

MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
 RTE ID: 20283
 Location: Hinterland Way / Granuaille Cres, Bangalow
 Date: Saturday 17th October 2020
 Comments: Fine Weather



Class All Vehicles

Time	1	2	3	4	5	6	7	8	9	10	Total	Cumul Tot
7:00	0	46	0	1	0	0	0	0	1	0	48	
7:15	1	53	0	0	1	0	0	0	0	0	55	
7:30	0	40	0	1	0	0	1	0	0	0	42	
7:45	1	58	0	1	0	1	0	0	1	0	62	207
8:00	1	40	0	0	1	0	0	0	0	0	42	201
8:15	0	60	0	0	0	0	0	0	0	0	60	206
8:30	0	63	0	0	0	0	0	0	0	0	63	227
8:45	1	66	0	1	1	0	0	0	1	0	70	235
9:00	2	50	0	1	1	1	0	0	1	0	56	249
9:15	1	63	0	2	1	0	0	0	2	0	69	258
9:30	1	57	0	1	1	0	0	0	1	0	61	256
9:45	0	72	0	0	0	0	0	0	0	0	72	258
10:00	1	51	0	0	1	0	0	0	0	0	53	255
10:15	0	61	0	0	0	0	0	0	0	0	61	247
10:30	2	60	0	1	2	0	1	0	0	0	66	252
10:45	1	58	0	0	0	1	0	0	0	0	60	240
11:00	0	61	0	1	0	0	0	0	1	0	63	250
11:15	1	79	0	0	1	0	0	0	0	0	81	270
11:30	0	55	0	0	0	0	0	0	0	0	55	259
11:45	1	62	0	1	1	0	0	0	1	0	66	265
12:00	1	54	0	2	1	0	1	0	1	0	60	262
12:15	0	52	0	1	0	0	0	0	1	0	54	235
12:30	0	48	0	1	0	0	0	0	1	0	50	230
12:45	1	53	0	0	1	0	0	0	0	0	55	219
Peak Hour	3	244	0	1	3	0	1	0	0	0	252	-
6 Hour Total	16	1362	0	15	13	3	3	0	12	0	1424	-

APPENDIX B – CRITERIA FOR EVALUATING SIDRA RESULTS

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

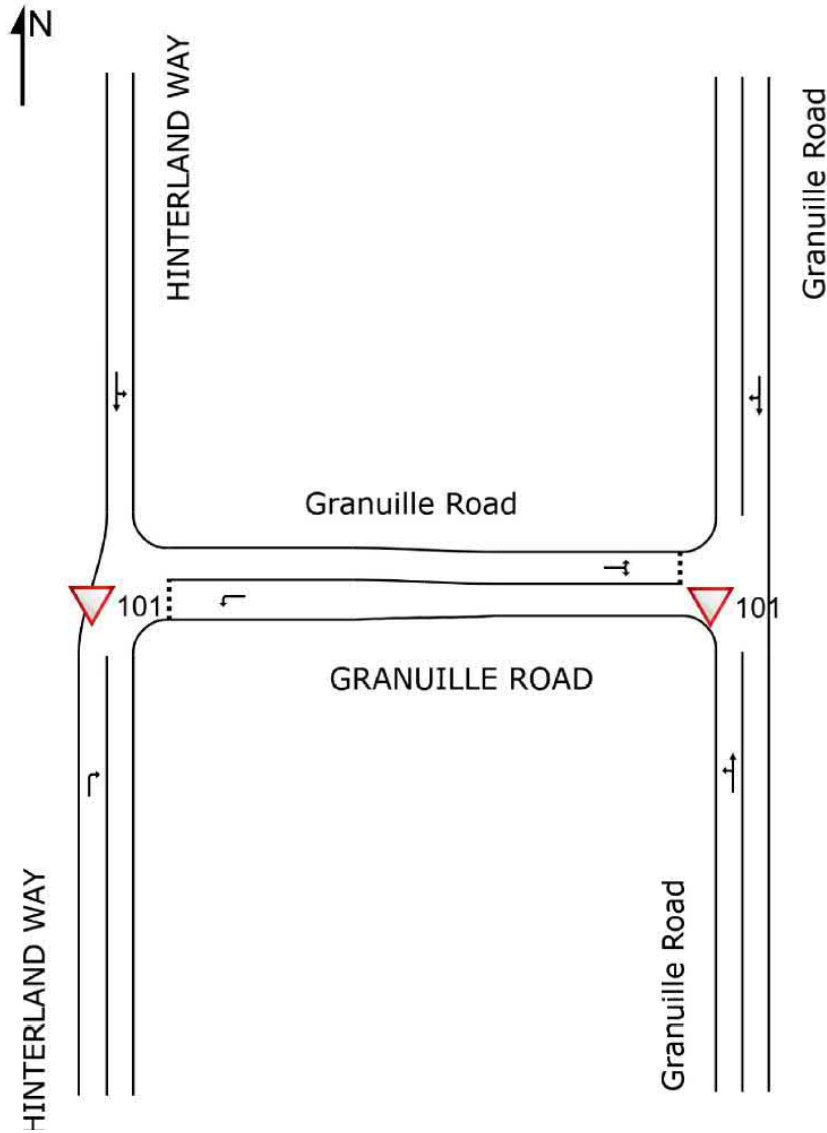
For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹The values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs.

APPENDIX C – DETAILED SIDRA OUTPUT

- 2020 AM Peak – Without Development
- 2020 PM Peak – Without Development
- 2020 AM Peak – With Development
- 2020 PM Peak – With Development



NETWORK SUMMARY

Network: N101 [Hinterland Way / Granuille Rd AM Peak SURVEY (FRIDAY) (Network Folder: General)]

New Network
Network Category: (None)

Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS A		
Speed Efficiency	1.00		
Travel Time Index	9.95		
Congestion Coefficient	1.00		
Travel Speed (Average)	59.8 km/h		59.8 km/h
Travel Distance (Total)	297.2 veh-km/h		356.6 pers-km/h
Travel Time (Total)	5.0 veh-h/h		6.0 pers-h/h
Desired Speed (Program)	60.0 km/h		
Demand Flows (Total for all Sites)	298 veh/h		358 pers/h
Arrival Flows (Total for all Sites)	298 veh/h		358 pers/h
Demand Flows (Entry Total)	294 veh/h		
Midblock Inflows (Total)	0 veh/h		
Midblock Outflows (Total)	-1 veh/h		
Percent Heavy Vehicles (Demand)	9.8 %		
Percent Heavy Vehicles (Arrival)	9.8 %		
Degree of Saturation	0.157		
Control Delay (Total)	0.01 veh-h/h		0.02 pers-h/h
Control Delay (Average)	0.2 sec		0.2 sec
Control Delay (Worst Lane)	6.5 sec		
Control Delay (Worst Movement)	6.5 sec		6.5 sec
Geometric Delay (Average)	0.1 sec		
Stop-Line Delay (Average)	0.1 sec		
Ave. Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	5 veh/h		6 pers/h
Effective Stop Rate	0.02	0.02 per km	0.02
Proportion Queued	0.01		0.01
Performance Index	5.0		5.0
Cost (Total)	218.23 \$/h	0.73 \$/km	218.23 \$/h
Fuel Consumption (Total)	23.8 L/h	80.0 mL/km	
Fuel Economy	8.0 L/100km		
Carbon Dioxide (Total)	57.4 kg/h	193.1 g/km	
Hydrocarbons (Total)	0.004 kg/h	0.014 g/km	
Carbon Monoxide (Total)	0.062 kg/h	0.210 g/km	
NOx (Total)	0.148 kg/h	0.498 g/km	

Network Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

Network Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total for all Sites)	143,040 veh/y	171,648 pers/y
Delay	7 veh-h/y	8 pers-h/y
Effective Stops	2,281 veh/y	2,738 pers/y
Travel Distance	142,660 veh-km/y	171,191 pers-km/y
Travel Time	2,387 veh-h/y	2,865 pers-h/y

MOVEMENT SUMMARY

▼ Site: 101 [Hinterland Way / Granuille Rd AM Peak hour (1) - SURVEY (FRIDAY) (Site Folder: General)]

■ Network: N101 [Hinterland Way / Granuille Rd AM Peak SURVEY (FRIDAY) (Network Folder: General)]

AM Peak hour AM base
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: HINTERLAND WAY														
3	R2	2	5.0	2	5.0	0.002	6.5	LOS A	0.0	0.0	0.38	0.53	0.38	49.0
Approach		2	5.0	2	5.0	0.002	6.5	NA	0.0	0.0	0.38	0.53	0.38	49.0
East: GRANUILLE ROAD														
4	L2	2	5.0	2	5.0	0.002	3.1	LOS A	0.0	0.0	0.35	0.47	0.35	51.7
Approach		2	5.0	2	5.0	0.002	3.1	LOS A	0.0	0.0	0.35	0.47	0.35	51.7
North: HINTERLAND WAY														
7	L2	1	5.0	1	5.0	0.157	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
8	T1	287	10.0	287	10.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		288	10.0	288	10.0	0.157	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		292	9.9	292	9.9	0.157	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Hinterland Way / Granuille Rd AM Peak hour (2) - SURVEY (FRIDAY) (Site Folder: General)]

Network: N101 [Hinterland Way / Granuille Rd AM Peak SURVEY (FRIDAY) (Network Folder: General)]

Hinterland Way / Granuille Road
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh.]	[Dist]				
South: Granuille Road														
1	L2	1	5.0	1	5.0	0.001	5.6	LOSA	0.0	0.0	0.00	0.29	0.00	55.0
2	T1	1	5.0	1	5.0	0.001	0.0	LOSA	0.0	0.0	0.00	0.29	0.00	57.4
Approach		2	5.0	2	5.0	0.001	2.8	NA	0.0	0.0	0.00	0.29	0.00	56.6
North: Granuille Road														
8	T1	1	5.0	1	5.0	0.001	0.0	LOSA	0.0	0.0	0.02	0.30	0.02	57.4
9	R2	1	5.0	1	5.0	0.001	5.5	LOSA	0.0	0.0	0.02	0.30	0.02	55.0
Approach		2	5.0	2	5.0	0.001	2.8	NA	0.0	0.0	0.02	0.30	0.02	56.5
West: Granuille Road														
10	L2	1	5.0	1	5.0	0.001	2.2	LOSA	0.0	0.0	0.01	0.48	0.01	53.1
12	R2	1	5.0	1	5.0	0.001	1.9	LOSA	0.0	0.0	0.01	0.48	0.01	52.3
Approach		2	5.0	2	5.0	0.001	2.0	LOSA	0.0	0.0	0.01	0.48	0.01	52.7
All Vehicles		6	5.0	6	5.0	0.001	2.5	NA	0.0	0.0	0.01	0.36	0.01	55.5

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

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

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

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

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

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

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

NETWORK SUMMARY

■ Network: N101 [Hinterland Way / Granuille Rd PM Peak SURVEY (FRIDAY) (Network Folder: General)]

New Network
Network Category: (None)

Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS A		
Speed Efficiency	1.00		
Travel Time Index	9.95		
Congestion Coefficient	1.00		
Travel Speed (Average)	59.7 km/h		59.7 km/h
Travel Distance (Total)	307.9 veh-km/h		369.4 pers-km/h
Travel Time (Total)	5.2 veh-h/h		6.2 pers-h/h
Desired Speed (Program)	60.0 km/h		
Demand Flows (Total for all Sites)	310 veh/h		372 pers/h
Arrival Flows (Total for all Sites)	310 veh/h		372 pers/h
Demand Flows (Entry Total)	305 veh/h		
Midblock Inflows (Total)	0 veh/h		
Midblock Outflows (Total)	-2 veh/h		
Percent Heavy Vehicles (Demand)	9.8 %		
Percent Heavy Vehicles (Arrival)	9.8 %		
Degree of Saturation	0.162		
Control Delay (Total)	0.02 veh-h/h		0.02 pers-h/h
Control Delay (Average)	0.2 sec		0.2 sec
Control Delay (Worst Lane)	6.5 sec		
Control Delay (Worst Movement)	6.5 sec		6.5 sec
Geometric Delay (Average)	0.2 sec		
Stop-Line Delay (Average)	0.1 sec		
Ave. Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	6 veh/h		8 pers/h
Effective Stop Rate	0.02	0.02 per km	0.02
Proportion Queued	0.01		0.01
Performance Index	5.2		5.2
Cost (Total)	226.24 \$/h	0.73 \$/km	226.24 \$/h
Fuel Consumption (Total)	24.6 L/h	80.1 mL/km	
Fuel Economy	8.0 L/100km		
Carbon Dioxide (Total)	59.5 kg/h	193.3 g/km	
Hydrocarbons (Total)	0.004 kg/h	0.014 g/km	
Carbon Monoxide (Total)	0.065 kg/h	0.210 g/km	
NOx (Total)	0.153 kg/h	0.497 g/km	

Network Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

Network Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total for all Sites)	148,800 veh/y	178,560 pers/y
Delay	9 veh-h/y	11 pers-h/y
Effective Stops	3,089 veh/y	3,707 pers/y
Travel Distance	147,775 veh-km/y	177,330 pers-km/y
Travel Time	2,475 veh-h/y	2,970 pers-h/y

MOVEMENT SUMMARY

Site: 101 [Hinterland Way / Granuille Rd PM Peak hour (1) - SURVEY (FRIDAY) (Site Folder: General)]

Network: N101 [Hinterland Way / Granuille Rd PM Peak SURVEY (FRIDAY) (Network Folder: General)]

AM Peak hour AM base
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: HINTERLAND WAY														
3	R2	2	5.0	2	5.0	0.002	6.5	LOS A	0.0	0.0	0.38	0.53	0.38	48.9
Approach		2	5.0	2	5.0	0.002	6.5	NA	0.0	0.0	0.38	0.53	0.38	48.9
East: GRANUILLE ROAD														
4	L2	3	5.0	3	5.0	0.003	3.1	LOS A	0.0	0.0	0.36	0.48	0.36	51.6
Approach		3	5.0	3	5.0	0.003	3.1	LOS A	0.0	0.0	0.36	0.48	0.36	51.6
North: HINTERLAND WAY														
7	L2	1	5.0	1	5.0	0.162	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
8	T1	296	10.0	296	10.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		297	10.0	297	10.0	0.162	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		302	9.9	302	9.9	0.162	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8

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

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

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

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

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

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

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

MOVEMENT SUMMARY

▼ Site: 101 [Hinterland Way / Granuille Rd PM Peak hour (2) - SURVEY (FRIDAY) (Site Folder: General)]

■ Network: N101 [Hinterland Way / Granuille Rd PM Peak SURVEY (FRIDAY) (Network Folder: General)]

Hinterland Way / Granuille Road
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Granuille Road														
1	L2	1	5.0	1	5.0	0.001	5.6	LOS A	0.0	0.0	0.00	0.29	0.00	55.0
2	T1	1	5.0	1	5.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	57.4
Approach		2	5.0	2	5.0	0.001	2.8	NA	0.0	0.0	0.00	0.29	0.00	56.6
North: Granuille Road														
8	T1	1	5.0	1	5.0	0.002	0.0	LOS A	0.0	0.0	0.02	0.44	0.02	56.1
9	R2	3	5.0	3	5.0	0.002	5.5	LOS A	0.0	0.0	0.02	0.44	0.02	52.8
Approach		4	5.0	4	5.0	0.002	4.2	NA	0.0	0.0	0.02	0.44	0.02	54.1
West: Granuille Road														
10	L2	1	5.0	1	5.0	0.001	2.2	LOS A	0.0	0.0	0.01	0.48	0.01	53.1
12	R2	1	5.0	1	5.0	0.001	1.9	LOS A	0.0	0.0	0.01	0.48	0.01	52.3
Approach		2	5.0	2	5.0	0.001	2.0	LOS A	0.0	0.0	0.01	0.48	0.01	52.7
All Vehicles		8	5.0	8	5.0	0.002	3.3	NA	0.0	0.0	0.01	0.42	0.01	54.5

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

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

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

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

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

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

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

NETWORK SUMMARY

Network: N101 [Hinterland Way / Granuille Rd AM Peak DESIGN (Network Folder: General)]

New Network
Network Category: (None)

Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS A		
Speed Efficiency	0.98		
Travel Time Index	9.77		
Congestion Coefficient	1.02		
Travel Speed (Average)	58.8 km/h		58.8 km/h
Travel Distance (Total)	330.3 veh-km/h		396.4 pers-km/h
Travel Time (Total)	5.6 veh-h/h		6.7 pers-h/h
Desired Speed (Program)	60.0 km/h		
Demand Flows (Total for all Sites)	362 veh/h		434 pers/h
Arrival Flows (Total for all Sites)	362 veh/h		434 pers/h
Demand Flows (Entry Total)	326 veh/h		
Midblock Inflows (Total)	0 veh/h		
Midblock Outflows (Total)	-1 veh/h		
Percent Heavy Vehicles (Demand)	9.0 %		
Percent Heavy Vehicles (Arrival)	9.0 %		
Degree of Saturation	0.157		
Control Delay (Total)	0.09 veh-h/h		0.11 pers-h/h
Control Delay (Average)	0.9 sec		0.9 sec
Control Delay (Worst Lane)	6.5 sec		
Control Delay (Worst Movement)	6.5 sec		6.5 sec
Geometric Delay (Average)	0.8 sec		
Stop-Line Delay (Average)	0.1 sec		
Ave. Queue Storage Ratio (Worst Lane)	0.02		
Total Effective Stops	39 veh/h		47 pers/h
Effective Stop Rate	0.11	0.12 per km	0.11
Proportion Queued	0.04		0.04
Performance Index	6.1		6.1
Cost (Total)	247.63 \$/h	0.75 \$/km	247.63 \$/h
Fuel Consumption (Total)	27.3 L/h	82.6 mL/km	
Fuel Economy	8.3 L/100km		
Carbon Dioxide (Total)	65.8 kg/h	199.1 g/km	
Hydrocarbons (Total)	0.005 kg/h	0.014 g/km	
Carbon Monoxide (Total)	0.071 kg/h	0.216 g/km	
NOx (Total)	0.166 kg/h	0.501 g/km	

Network Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

Network Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total for all Sites)	173,760 veh/y	208,512 pers/y
Delay	44 veh-h/y	53 pers-h/y
Effective Stops	18,901 veh/y	22,681 pers/y
Travel Distance	158,552 veh-km/y	190,262 pers-km/y
Travel Time	2,699 veh-h/y	3,238 pers-h/y

MOVEMENT SUMMARY

▼ Site: 101 [Hinterland Way / Granuille Rd AM Peak hour (1) - DESIGN (Site Folder: General)]

■ Network: N101 [Hinterland Way / Granuille Rd AM Peak DESIGN (Network Folder: General)]

AM Peak hour AM base
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: HINTERLAND WAY														
3	R2	18	5.0	18	5.0	0.014	6.5	LOSA	0.0	0.2	0.38	0.57	0.38	49.0
Approach		18	5.0	18	5.0	0.014	6.5	NA	0.0	0.2	0.38	0.57	0.38	49.0
East: GRANUILLE ROAD														
4	L2	18	5.0	18	5.0	0.015	3.1	LOSA	0.0	0.2	0.36	0.51	0.36	51.6
Approach		18	5.0	18	5.0	0.015	3.1	LOSA	0.0	0.2	0.36	0.51	0.36	51.6
North: HINTERLAND WAY														
7	L2	1	5.0	1	5.0	0.157	5.6	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
8	T1	287	10.0	287	10.0	0.157	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
Approach		288	10.0	288	10.0	0.157	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		324	9.4	324	9.4	0.157	0.6	NA	0.0	0.2	0.04	0.06	0.04	59.2

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Hinterland Way / Granuille Rd AM Peak hour (2) - DESIGN (Site Folder: General)]

Network: N101 [Hinterland Way / Granuille Rd AM Peak DESIGN (Network Folder: General)]

Hinterland Way / Granuille Road
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Granuille Road														
1	L2	1	5.0	1	5.0	0.001	5.6	LOSA	0.0	0.0	0.00	0.29	0.00	55.0
2	T1	1	5.0	1	5.0	0.001	0.0	LOSA	0.0	0.0	0.00	0.29	0.00	57.4
Approach		2	5.0	2	5.0	0.001	2.8	NA	0.0	0.0	0.00	0.29	0.00	56.6
North: Granuille Road														
8	T1	1	5.0	1	5.0	0.010	0.0	LOSA	0.0	0.1	0.02	0.55	0.02	55.2
9	R2	17	5.0	17	5.0	0.010	5.5	LOSA	0.0	0.1	0.02	0.55	0.02	51.2
Approach		18	5.0	18	5.0	0.010	5.2	NA	0.0	0.1	0.02	0.55	0.02	51.6
West: Granuille Road														
10	L2	17	5.0	17	5.0	0.011	2.2	LOSA	0.0	0.1	0.01	0.48	0.01	53.0
12	R2	1	5.0	1	5.0	0.011	2.0	LOSA	0.0	0.1	0.01	0.48	0.01	52.2
Approach		18	5.0	18	5.0	0.011	2.1	LOSA	0.0	0.1	0.01	0.48	0.01	53.0
All Vehicles		38	5.0	38	5.0	0.011	3.6	NA	0.0	0.1	0.01	0.51	0.01	52.6

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

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

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

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

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

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

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

NETWORK SUMMARY

Network: N101 [Hinterland Way / Granuille Rd PM Peak DESIGN (Network Folder: General)]

New Network
Network Category: (None)

Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS A		
Speed Efficiency	0.98		
Travel Time Index	9.76		
Congestion Coefficient	1.02		
Travel Speed (Average)	58.7 km/h		58.7 km/h
Travel Distance (Total)	341.5 veh-km/h		409.8 pers-km/h
Travel Time (Total)	5.8 veh-h/h		7.0 pers-h/h
Desired Speed (Program)	60.0 km/h		
Demand Flows (Total for all Sites)	375 veh/h		450 pers/h
Arrival Flows (Total for all Sites)	375 veh/h		450 pers/h
Demand Flows (Entry Total)	338 veh/h		
Midblock Inflows (Total)	0 veh/h		
Midblock Outflows (Total)	-3 veh/h		
Percent Heavy Vehicles (Demand)	8.9 %		
Percent Heavy Vehicles (Arrival)	8.9 %		
Degree of Saturation	0.162		
Control Delay (Total)	0.10 veh-h/h		0.12 pers-h/h
Control Delay (Average)	0.9 sec		0.9 sec
Control Delay (Worst Lane)	6.6 sec		
Control Delay (Worst Movement)	6.6 sec		6.6 sec
Geometric Delay (Average)	0.8 sec		
Stop-Line Delay (Average)	0.1 sec		
Ave. Queue Storage Ratio (Worst Lane)	0.03		
Total Effective Stops	42 veh/h		50 pers/h
Effective Stop Rate	0.11	0.12 per km	0.11
Proportion Queued	0.04		0.04
Performance Index	6.3		6.3
Cost (Total)	256.06 \$/h	0.75 \$/km	256.06 \$/h
Fuel Consumption (Total)	28.2 L/h	82.6 mL/km	
Fuel Economy	8.3 L/100km		
Carbon Dioxide (Total)	68.0 kg/h	199.0 g/km	
Hydrocarbons (Total)	0.005 kg/h	0.014 g/km	
Carbon Monoxide (Total)	0.074 kg/h	0.216 g/km	
NOx (Total)	0.171 kg/h	0.501 g/km	

Network Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

Network Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total for all Sites)	180,000 veh/y	216,000 pers/y
Delay	47 veh-h/y	56 pers-h/y
Effective Stops	20,054 veh/y	24,065 pers/y
Travel Distance	163,913 veh-km/y	196,695 pers-km/y
Travel Time	2,791 veh-h/y	3,350 pers-h/y

MOVEMENT SUMMARY

Site: 101 [Hinterland Way / Granuille Rd PM Peak hour (1) - DESIGN (Site Folder: General)]

Network: N101 [Hinterland Way / Granuille Rd PM Peak DESIGN (Network Folder: General)]

AM Peak hour AM base
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: HINTERLAND WAY														
3	R2	18	5.0	18	5.0	0.014	6.6	LOSA	0.0	0.2	0.39	0.57	0.39	48.9
Approach		18	5.0	18	5.0	0.014	6.6	NA	0.0	0.2	0.39	0.57	0.39	48.9
East: GRANUILLE ROAD														
4	L2	19	5.0	19	5.0	0.016	3.2	LOSA	0.0	0.2	0.36	0.52	0.36	51.5
Approach		19	5.0	19	5.0	0.016	3.2	LOSA	0.0	0.2	0.36	0.52	0.36	51.5
North: HINTERLAND WAY														
7	L2	1	5.0	1	5.0	0.162	5.6	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
8	T1	296	10.0	296	10.0	0.162	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
Approach		297	10.0	297	10.0	0.162	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		334	9.4	334	9.4	0.162	0.6	NA	0.0	0.2	0.04	0.06	0.04	59.2

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Hinterland Way / Granuille Rd PM Peak hour (2) - DESIGN (Site Folder: General)]

Network: N101 [Hinterland Way / Granuille Rd PM Peak DESIGN (Network Folder: General)]

Hinterland Way / Granuille Road
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Granuille Road														
1	L2	1	5.0	1	5.0	0.001	5.6	LOSA	0.0	0.0	0.00	0.29	0.00	55.0
2	T1	1	5.0	1	5.0	0.001	0.0	LOSA	0.0	0.0	0.00	0.29	0.00	57.4
Approach		2	5.0	2	5.0	0.001	2.8	NA	0.0	0.0	0.00	0.29	0.00	56.6
North: Granuille Road														
8	T1	1	5.0	1	5.0	0.012	0.0	LOSA	0.0	0.2	0.02	0.56	0.02	55.2
9	R2	20	5.0	20	5.0	0.012	5.5	LOSA	0.0	0.2	0.02	0.56	0.02	51.2
Approach		21	5.0	21	5.0	0.012	5.3	NA	0.0	0.2	0.02	0.56	0.02	51.5
West: Granuille Road														
10	L2	17	5.0	17	5.0	0.011	2.2	LOSA	0.0	0.1	0.01	0.48	0.01	53.0
12	R2	1	5.0	1	5.0	0.011	2.0	LOSA	0.0	0.1	0.01	0.48	0.01	52.2
Approach		18	5.0	18	5.0	0.011	2.1	LOSA	0.0	0.1	0.01	0.48	0.01	53.0
All Vehicles		41	5.0	41	5.0	0.012	3.8	NA	0.0	0.2	0.01	0.51	0.01	52.5

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

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

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

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

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

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

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