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Windfall

TRAFFIC IMPACT STUDY

Windfall GP Inc.

Document Control

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1 Introduction

Tatham Engineering Limited was retained by Windfall GP Inc. to complete this Traffic Impact Study in support of the proposed Windfall residential development, located on the north side of Grey Road 19, between Grey Road 19 and Grey Road 21, in the Town of The Blue Mountains (refer Figure 1).

1.1 BACKGROUND

A number of traffic studies have been prepared and submitted in support of the Windfall development, as summarized below.

- An initial Traffic Impact Study was prepared in support of approvals for the development at the time of first engineering submission for Phase 1 works in March of 2011.
- An updated report was prepared in 2018 to address interim development conditions and confirm the operations of the future road system.
- A further update was issued in June 2020 to support an application for a red-line revision to the draft plan of subdivision for the remaining Phases 5 and 6 (Phases 1, 2 and 3 are essentially complete and occupied, and Phase 4 is under construction). Under the application, the developer is applying to increase the unit count of the development by an additional 50 units through the provision of semi-detached units in place of single-detached units. The total unit count within Windfall will therefore be increased from 609 to 659.
- This report reflects that of June 2020 with additional information and sensitivity analysis provided to address Grey County peer review comments pertaining to Windfall trip generation estimates and background growth (as prepared by R.J. Burnside dated April 6, 2021).

1.2 PURPOSE

The primary purpose of this study is to provide an overall update following completion of the phases and units to date, and to consider the transportation implications of the remaining units (including the additional 50 proposed units). In particular, the following will be discussed:

- the operations of the existing road system through the study area;
- an estimation of the growth in the traffic volumes not otherwise attributed to the development (ie. from overall growth in the area and/or other developments);
- the future operations of the study area road system without consideration for the proposed development;



- an estimation of the number of new trips the proposed development is likely to generate;
- the future operations of the study area road system upon completion of the development; and
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations.

Chapter 2 of this report addresses the existing conditions, detailing the road system and corresponding traffic operations. Chapter 3 addresses future conditions, prior to the completion of the proposed development, and will address the expected growth in the traffic levels and the resulting operating conditions. Chapter 4 address the proposed development and the ensuing vehicle trips that it will generate. Chapter 5 addresses future conditions and the associated impacts of the proposed development on the road system. Chapter 6 provides additional sensitivity analysis for future traffic operations, to address Grey County peer review comments. Lastly, Chapter 7 summarizes the report and the key findings.



2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

2.1.1 Road Sections

The immediate road network includes Grey Road 19, Grey Road 21 (Osler Bluff Road), Grey Road 119 (Scenic Caves Road), Jozo Weider Boulevard, Gord Canning Drive and Crosswinds Boulevard (the main access road serving Windfall).

Grey Road 19

Grey Road 19 is an arterial road under the jurisdiction of Grey County. The road provides a single lane in each direction with a 2.0 to 2.5 metre paved shoulder/bike lane on each side from Gord Canning Drive to Jozo Weider Boulevard and beyond. Across the front of the development site, the horizontal alignment of Grey Road 19 is relatively straight; near Gord Canning Drive, Grey Road 19 turns 90 degrees through a smooth horizontal curve and roundabout. With respect to the vertical alignment, the road section is relatively flat. The posted speed limit on Grey Road 19 is 60 km/h and hence a design speed of 70 km/h has been assumed (posted speed + 10 km/h for lower speed roads).

Grey Road 21 (Osler Bluff Road) - Simcoe Road 34

Grey Road 21 (Osler Bluff Road) - Simcoe Road 34 is also an arterial road under the joint jurisdiction of Grey County and the County of Simcoe in that it is a boundary road. It has a relatively straight and flat alignment (there are some slight vertical curves north of Grey Road 19). The road section immediately north of Grey Road 19 was recently resurfaced and provides a single lane in each direction with a 1.5 metre paved shoulder/bike lane. The posted speed limit on the road is 60 km/h and hence a design speed of 70 km/h has been assumed.

Grey Road 119 (Scenic Caves Road)

Grey Road 119 (Scenic Caves Road) is a two lane arterial road providing a means of connectivity between the base and top of Blue Mountain and areas beyond. The road was recently reconstructed to improve the road surface and alignment, and has a posted speed limit of 50 km/h (and thus a 60 km/h design speed).



Jozo Weider Boulevard

Jozo Weider Boulevard is a collector road as identified in the Town of The Blue Mountains Official Plan and under the jurisdiction of the Town. The road provides a single westbound lane and two eastbound lanes in the vicinity of Grey Road 19, with gravel shoulders and a posted speed limit of 50 km/h (60 km/h design speed). The road alignment is relatively straight and flat upon approach to Grey Road 19.

Gord Canning Drive

Gord Canning Drive is a local road, providing access to Blue Mountain Resort and the adjacent residential development. A single lane per direction is provided.

Crosswinds Boulevard

Crosswinds Boulevard is the main road providing access to the Windfall development. It provides 1 lane per direction with an existing connection to Grey Road 19 approximately 610 metres west of the Grey Road 19/21 intersection and approximately 770 metres east of the roundabout (measured centre to centre). Upon approach to Grey Road 19, Crosswinds Boulevard has a centre landscaped median, with 1 lane per direction on either side. Crosswinds Boulevard also serves the Second Nature development and provides access to Grey Road 19 opposite Jozo Weider Boulevard (it forms the east leg of the signalized intersection). A single travel lane per direction is maintained. As part of the Windfall development, Crosswinds Boulevard will be extended to connect the existing road segments in Windfall and Second Nature.

2.1.2 Intersections

The intersections of Grey Road 19 with Grey Road 21 - Simcoe Road 34, Crosswinds Boulevard, the Grey Road 19/Grey Road 119/Gord Canning Drive roundabout and Jozo Weider Boulevard have been considered in the study given their proximity and/or service to the site. It is noted that Jozo Weider Boulevard intersects Grey Road 19 at two locations, but only the easterly intersection is considered in this study. The existing intersection configurations are illustrated in Figure 2. and noted below:

Grey Road 19 & Grey Rd 21 - Simcoe Rd 34		control: traffic signals
west leg:	Grey Road 19	1 left-through shared lane and 1 right turn lane
east leg:	Mountain Road	1 left-through-right shared lane
north leg:	Grey Rd 21 - Simcoe Rd 34	1 left turn lane and 1 through-right shared lane
south leg:	Grey Rd 19 - Simcoe Rd 34	1 left turn lane and 1 through-right shared lane



Grey Road 19 & Crosswinds Boulevard	control: stop control on Crosswinds
west leg: Grey Road 19	1 left-through shared lane
east leg: Grey Road 19	1 through-right shared lane
north leg: Crosswinds Boulevard	1 left-right shared lane
Grey Roads 19 & 119 & Gord Canning Dr	roundabout with 40m diameter island
west leg: Gord Canning Drive	1 lane approach and 1 lane departure
east leg: Grey Road 19	2 lane approach (flared from 1 lane in advance of the roundabout) and 2 lane departure
north leg: Grey Road 19	2 lane approach (flared from 1 lane in advance of the roundabout) and 1 lane departure
south leg: Grey Road 119	1 lane approach and 1 lane departure
Grey Road 19 & Jozo Weider Boulevard	control: traffic signals
west leg: Jozo Weider Boulevard	1 left turn lane and 1 through-right turn lane
east leg: Crosswinds Boulevard	1 left turn lane and 1 through-right lane
north leg: Grey Road 19	1 left turn lane and 1 through-right turn lane
south leg: Grey Road 19	1 left turn lane and 1 through-right turn lane

2.2 TRAFFIC VOLUMES

2017 Traffic Counts

Traffic counts were completed at the 4 study area intersections on Friday March 17, 2017 and Saturday March 18, 2017, both of which were considered typical winter days (which are considered the peak seasonal traffic conditions given the seasonal nature of Blue Mountain). To capture the turnover relating to the end of day skiing and beginning of night skiing (which occurs at 15:30), and to capture typical winter peak operations, counts were completed from 15:00 to 18:00. The corresponding peak hours occurred in the 15:15 to 16:45 period on the Friday (ie. some intersections peaked 15:15 to 16:15 whereas others were 15:45 to 16:45) and 15:00 to 16:15 on the Saturday). The corresponding 2017 peak hour traffic volumes are provided in Figure 3 whereas additional details of the traffic counts are provided in Appendix A.

2020 Traffic Counts

A traffic count was completed at the intersection on Grey Road 19 and Crosswinds Boulevard on Friday February 28, 2020 and Saturday February 29, 2020 from 15:00 to 17:00 on both days. This



count was completed to provide updated volumes on Grey Road 19 and on Crosswinds Boulevard (the latter of which provide an indication as the volume of traffic generated by the existing Windfall development). In consideration of activity at Blue Mountain over the weekend, both days are considered representative of typical winter days. The associated traffic counts are provided in Appendix A.

2020 Traffic Volumes

In comparing the 2020 and 2017 volumes on Grey Road 19 in the vicinity of Crosswinds Boulevard, it is noted that the 2020 volumes were greatest for all directions and peak hours except eastbound during the Friday peak hour (during which the 2017 volumes were somewhat greater). To reflect 2020 conditions, the 2020 traffic volumes on Grey Road 19 (as observed from the Crosswinds Boulevard traffic count) were used to factor the 2017 intersection volumes to the east and west (volumes were factored based on the approach and departure volumes, and in consideration of traffic volumes for the key turning movements).

Recognizing that a number of area developments have advanced between 2017 and 2020, the traffic volumes were further adjusted. At the intersection of Grey Road 19 with Jozo Weider Boulevard/Crosswinds Boulevard, volumes on the east leg (which serves the Second Nature Phase 1 site) at the time of the February 2020 traffic counts were determined based on the level of completed development within Second Nature (33 of 37 units). Likewise, volumes reflective of Phase 1 of the Mountain House development (which was completed and occupied between 2017 and 2020) have been incorporated into the 2020 volumes at the intersection of Grey Road 19 with Grey Road 31 - Simcoe Road 34. Further details pertaining to both the Second Nature and Mountain House developments are provided in Section 3.2.2. The resulting 2020 winter peak hour volumes are illustrated in Figure 4.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic volumes and operations (both with and without the subject development) can be assessed. The capacity, and hence operations, of a road system is effectively dictated by its intersections. As such, the analysis focused on the operations of the intersections of Grey Road 19 with Grey Road 21 - Simcoe Road 34, Jozo Weider Boulevard, Grey Road 119/Gord Canning Drive (roundabout) and Crosswinds Boulevard. The analysis is based on the 2020 winter traffic volumes, the existing intersection configurations and control, and procedures outlined in the *2000 Highway Capacity Manual* (employing Synchro 10 traffic modelling software for the signal and stop controlled intersections, and ARCADY for the roundabout).



2020 Operations

A summary of the analysis is provided in Table 1 in the form of average delay (measured in seconds) and level of service (LOS). The results reflect the approach and overall intersection delays and levels of service - LOS A corresponds to the best operating condition with minimal delays whereas LOS F corresponds to poor operations resulting from high intersection delays. Volume to capacity ratios (v/c), which indicate the degree to which the intersection capacity is utilized, are also noted (for the roundabout, the v/c pertains to the critical approach). Detailed worksheets are included in Appendix B.

Table 1: Intersection Operations - 2020 Traffic Volumes

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	EB	signal	13	B	0.60	16	B	0.80
	WB		17	B	0.70	21	C	0.83
	NB		11	B	0.38	18	B	0.61
	SB		9	A	0.16	14	B	0.31
	overall		13	B	0.53	18	B	0.73
Grey Road 19 & Jozo Weider Blvd	EB	signal	19	B	0.22	19	B	0.26
	WB		19	B	0.05	19	B	0.08
	NB		5	A	0.3	5	A	0.43
	SB		9	A	0.23	12	B	0.35
	overall		10	B	0.24	12	B	0.34
Grey Road 19 & Grey Road 119 / Gord Canning Drive	NB	roundabout	2	A	0.26	3	A	0.41
	WB		2	A	0.20	3	A	0.34
	SB		5	A	0.23	7	A	0.41
	EB		4	A	0.12	5	A	0.15
	overall		3	A	-	4	A	-
Grey Road 19 & Crosswinds Blvd	SB	stop	20	C	0.10	58	F	0.48



Based on the 2020 winter peak hour traffic volumes, all intersections provide acceptable operations, with the exception of Grey Road 19 with Crosswinds Boulevard during the Saturday peak hour. While the volumes exiting Windfall via Crosswinds Boulevard are not significant (57 vehicles during the Saturday peak hour, which equates to approximately 1 vehicle per minute), the volumes on Grey Road 19 are such that there are limited gaps in the eastbound and westbound traffic streams and thus the delay for exiting vehicles is increased (thus resulting in a level of service F). As detailed further in this report, improvements are scheduled for this intersection to improve operations (interim signal control for the 2020 and 2021 winter seasons, followed by roundabout control in 2022).

2.4 TRANSIT OPERATIONS

The Towns of Collingwood and The Blue Mountains jointly operate a public transit service between Collingwood and the Craigleith area, including Blue Mountain Resort. As illustrated in Figure 5, the route travels westbound on Grey Road 19 towards Blue Mountain, and continues through the area on its return trip to Collingwood.

At present, there are no designated transit stops along Grey Road 19 (there is a stop in the Village Area). It is expected that the need and opportunity for such will be explored by the Towns of Collingwood and The Blue Mountains as the area develops.



3 Future Background Conditions

This section will address the future background conditions (ie. without consideration for the remaining Windfall development) expected for the 2025, 2030 and 2035 horizons, and the need for mitigating measures. The 2025 horizon has been adopted to reflect completion of the Windfall development, whereas 2030 and 2035 correspond to 5 and 10-year planning horizons to consider the longer term impacts.

3.1 ROAD NETWORK

Grey Road 19 Widening

The Town of The Blue Mountain Comprehensive Transportation Strategic Plan identified the following road improvements:

- 2013 Horizon
 - widening of Grey Road 19 to 2 lanes per direction from Grey Road 19/21 west to Jozo Weider Boulevard (east intersection)
 - additional EB/WB through lanes at Grey Road 19/Grey Road 21 intersection
 - additional NB/SB through lanes at Grey Road 19/Jozo Weider Boulevard intersection
- 2018 Horizon
 - widening of Grey Road 19 to 2 lanes per direction from Jozo Weider Boulevard north to Highway 26
 - EB and WB left turn lanes at Grey Road 19/Grey Road 21 intersection

The County of Grey is currently in process of designing the 4-lane widening of Grey Road 19 from the Grey Road 19/21 intersection to the roundabout, with construction anticipated no sooner than 2022.

3.1.1 Grey Road 19/21 Roundabout

A Municipal Class Environmental Study was completed for the intersection of Grey Road 19 and Grey Road 21 - Simcoe Road 34¹, undertaken jointly by Grey County and the County of Simcoe. As per the report, the preferred solution for the intersection is as follows:

¹ *Grey Road 19 & Grey Road 21/Simcoe Road 34 Intersection Improvements, Class Environmental Assessment Phases 1 & 2 Report*. C.C. Tatham & Associates, January 23, 2019.



- a 2-lane roundabout with a 60 metre outside diameter and 2 approach lanes and 2 departure lanes on each leg; and
- the roundabout is to be located to the north and west of Mountainside Sports to avoid impacting the existing building.

Design of the roundabout is underway with construction anticipated in 2022.

Grey Road 19/Crosswinds Boulevard

In consideration of existing and future traffic volumes and operations, a roundabout is also proposed for the intersection of Grey Road 19 and Crosswinds roundabout (as a Grey County condition of the Windfall development), with the following:

- a 50 metre outside diameter with 2 circulating lanes in the east-west direction and 1 circulating lane in the north-south direction;
- 2 approach lanes and 2 departure lanes on each of the Grey Road 19 legs and 1 approach and 1 departure lane on Crosswinds Boulevard; and
- the roundabout is to be located slightly north of the centre of the intersection so as to avoid impacts to the existing Bell installation immediately south of the intersection.

Design of the roundabout is underway, with construction anticipated in 2022 (in conjunction with the Grey Road 19/21 roundabout).

It is noted that to address traffic operations prior to the implementation of the roundabout, interim traffic signals were implemented in the fall of 2020, respecting the existing intersection configuration.

3.2 TRAFFIC VOLUMES

Background traffic volumes expected for the future horizon years have been estimated based on the existing traffic volumes and anticipated growth in the overall area.

3.2.1 Growth Rate

Growth rates for the horizon years have been determined considering the following:

- growth through the area as determined from historic traffic volumes; and
- traffic data and growth estimates presented in the *Town of The Blue Mountain Comprehensive Transportation Strategic Plan*².

² *The Town of The Blue Mountain Comprehensive Transportation Strategic Plan*. AECOM in association with C.C. Tatham & Associates, March 2010.



Historic Volumes

Historic data on Highway 26 and Simcoe Road 34 through the immediate area was reviewed to establish historic growth levels, the results of which are provided in Table 2 and Table 3 respectively, pertaining to Average Annual Daily Traffic (AADT) and Winter Average Daily Traffic (WADT) where available.

Table 2: Historic Traffic Volumes - Highway 26

ROAD SECTION	VOLUME	YEAR			ANNUAL GROWTH		
		2006	2011	2016	2006-2011	2011-2016	2006-2016
Grey Road 21 to Grey Road 19	AADT	8550	8900	8700	0.8%	-0.5%	0.2%
	WADT	7250	7900	7400	1.7%	-1.3%	0.2%
Grey Road 19 to Thornbury East Limit	AADT	7950	8600	8900	1.6%	0.7%	1.1%
	WADT	6750	7650	7500	2.5%	-0.4%	1.1%

Table 3: Historic Traffic Volumes - Simcoe Road 34

ROAD SECTION	VOLUME	YEAR			ANNUAL GROWTH		
		2012	2015	2018	2012-2015	2015-2018	2012-2018
Highway 26 to Mountain Road	AADT	2100	2500	2800	6.0%	3.8%	4.9%
Mountain Road to Simcoe Road 32	AADT	2900	3600	4600	7.5%	8.5%	8.0%

In considering the volumes on Highway 26, annual growth rates range from -1.3% (ie. decrease in volumes) to 2.5%, with a 10 year average of 0.2 to 1.1% growth. On Simcoe Road 34, a more significant growth has been realized in the corresponding summer volumes - 3.8 to 8.5% annual growth. Winter volumes were not available from Simcoe County. It is noted that the volumes on Simcoe Road 34 include development related growth that has occurred in the immediate area over the past 8 years and thus is not indicative of background growth only (ie. general growth in the area).



Projected Volumes

The *Town of The Blue Mountain Comprehensive Transportation Strategic Plan*, which prepared traffic forecasts for the years 2013, 2018 and 2028 (with consideration for overall growth, plus development specific growth), realized 4.4% annual growth from 2008 to 2013, 3.4% from 2013 to 2018 and 2.9% from 2018 to 2028 (which translates to an overall annual growth of 3.4% over the 20 year period).

Assumed Background Growth

For purposes of this study, and in considering that traffic volumes from specific area developments will be addressed separately, a 2% annual growth rate has been assumed through to the year 2035. This growth rate translates to overall increases of 10%, 22% and 35% for the 2025, 2030 and 2035 horizon years (relative to the 2020 traffic volumes).

3.2.2 Other Development

Further to the overall growth through the area, a number of other specific planned developments that will contribute traffic volumes to the study area road system have been identified. These include the following developments:

- continued growth at Blue Mountain Village (both commercial and residential);
- Blue Vista (formerly known as Nederand);
- Manorwood Block 152 and Block 153;
- Monterra Phase 2;
- Mountain House;
- Plateau East; and
- Second Nature.

An overall map illustrating the location of the above noted developments in context of the Windfall development is provided in Figure 6, whereas additional details are provided below. As previously noted, Crosswinds Boulevard is to be extended through the Windfall and Second Nature developments. Similarly, a road connection will be extended through Second Nature and Blue Vista, ultimately connecting Grey Road 19 with Grey Road 21 (via Crosswinds Boulevard).

Blue Mountain Village

The future Blue Mountain Village development consists of 1091 residential units and 9300 m² commercial space. Traffic volumes generated by the Village have been documented in the report



*Blue Mountain Resort Village Transportation Considerations*³ with adjustments to reflect the actual full build-out and level of remaining development. Trip distribution at the intersection of Grey Road 19 and Grey Road 21, which was not otherwise considered in the noted report, has been developed based on the existing traffic pattern of the intersection.

Blue Vista

Blue Vista is located on Grey Road 21 north of Le Scandinave Spa. It is currently in the conceptual design stage with the most current concept plan illustrating 133 single detached lots.

Manorwood Blocks 152 & 153

Manorwood, formerly a part of the Second Nature Development, is located on the south-east corner of Grey Road 19 with Jozo Weider Boulevard. Block 152 is to contain 60 townhouse units and Block 153 is to contain 18 townhouse units.

Monterra Phase 2

Monterra Phase 2 is a 37 unit, single family home development located at the south-west corner of Grey Road 21 with Monterra Road.

Mountain House

Mountain House is a medium density development located on the northwest corner of Grey Road 19 and Grey Road 21. Upon full build-out, it will consist of 230 condominium units constructed over 12 buildings, varying in height from 2 to 4 stories. Phase 1 is currently under construction, with Phases 2 and 3 anticipated over the next several years.

Plateau East

Plateau East is located north of the Blue Vista site and consists of 39 single detached lots. At the time of the February 2020 traffic counts, all 39 units were developed and occupied.

Second Nature

The Second Nature development is to consist of 178 single family detached units. Phase 1 is near completion (33 of 37 units complete and occupied) and Phase 3 (141 units) is under construction. Phase 2 (which is solely the construction of Crosswinds Boulevard within the Second Nature development limits) is complete.

³ *Blue Mountain Resort Village Transportation Considerations*. BA Group Transportation Consultants, Revised January 14, 2000.



3.2.3 Other Development Traffic Volumes

Trip Generation

Trip generation estimates for the continued development at the Blue Mountain Village were obtained from the report *Blue Mountain Resort Village Transportation Considerations*. For the remaining residential developments, trip estimates were obtained from a corresponding traffic impact study⁴ or prepared in consideration of the number and type of units anticipated (eg. single family, townhouses, semi-detached or condo units) and corresponding trip rates as per the ITE *Trip Generation Manual 10th Edition*. A summary of the corresponding unit totals and trip totals is provided in Table 4, whereas additional details are provided in Appendix C.

Table 4: Background Development Trip Generation Estimates

DEVELOPMENT	SIZE		FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
			In	Out	Total	In	Out	Total
Blue Vista	133	units	83	49	132	67	57	124
Manorwood	78	units	21	13	34	17	18	34
Monterra Phase 2	32	units	20	12	32	16	14	30
Mountain House	230	units	62	39	101	50	52	101
Plateau East	39	units	24	14	39	20	17	36
Second Nature	178	units	111	65	176	89	76	166
Total	690	units	321	193	514	258	233	491

Traffic Volumes

Traffic volumes associated with each of the previously noted developments have been assigned to the area road system in context of the following:

- proposed development location and access to the surrounding road system;
- trip distribution and assignments as employed in the development specific traffic studies;
- trip distribution and assignments as employed in the initial Windfall traffic study; and/or
- travel patterns realized through the traffic counts.

⁴ *Blue Vista Traffic Impact Study*. C.C. Tatham & Associates Ltd., February 27, 2019.



The resulting traffic volumes associated with each development are provided in Appendix C. Where the development (or portions thereof) was built-out and occupied at the time of the February 2020 traffic counts, such has been identified as “existing”. It is noted that the illustrated assignments do not reflect the extension and/or connections of Crosswinds Boulevard or the road through Second Nature and Blue Vista (connecting Grey Road 19 with Grey Road 21). However, these connections and the associated implications to traffic flows through the area have been considered in establishing the future traffic volumes for the horizon years for which the connections will be available.

Phasing

The planned development timelines/phasing for each of the noted background developments have also been considered in context of when the associated traffic volumes will be realized on the area road system (and hence considered in each of the future horizon design years). Phasing details were established in context of current development plans (for those under construction) and/or anticipated timelines based on development status (ie. concept, draft plan approved, etc.). A summary of the phasing, including full build-out, is provided in Table 5.

Table 5: Background Development Phasing

DEVELOPMENT	BUILD-OUT	PERCENT COMPLETE BY YEAR									
		2018	2019	2020	2021	2022	2023	2024	2025	2030	2035
Blue Mtn Commercial	2023				33	66	100	100	100	100	100
Blue Mtn Residential	2023				33	66	100	100	100	100	100
Blue Vista	2025						33	66	100	100	100
Manorwood Block 152	2022					100	100	100	100	100	100
Manorwood Block 153	2023						100	100	100	100	100
Monterra Phase 2	2022				25	50	75	100	100	100	100
Mountain House Ph 1	2019		100	100	100	100	100	100	100	100	100
Mountain House Ph 2	2020			100	100	100	100	100	100	100	100
Mountain House Ph 3	2022					100	100	100	100	100	100
Plateau East	2018	100	100	100	100	100	100	100	100	100	100
Second Nature Ph 1	2020			89	100	100	100	100	100	100	100
Second Nature Ph 2	2024				25	50	75	100	100	100	100



As noted, all of the identified background developments are assumed to be 100% complete by the year 2025 (which coincides with the expected completion of the Windfall development).

Second Nature Phase 2 consists solely of the construction of Crosswinds Boulevard within the Second Nature development and thus has not been included in the table above (ie. there are no dwelling units associated with Phase 2).

3.2.4 Background Traffic Volumes

The resulting future background traffic volumes (existing volume + general growth + other development traffic) are illustrated in Figure 7, Figure 8 and Figure 9 for the years 2025, 2030 and 2035. It is noted that the background growth rate has not been applied to the development specific volumes.

3.3 TRAFFIC OPERATIONS

3.3.1 Link Operations

As per the future background traffic projections, the peak hour traffic volumes on Grey Road 19 are projected to be in the order of 800 to 1300 vehicles per hour per lane; additional details are provided in Table 6 by horizon year, location and direction of travel. Grey Road 19 is assumed to have a capacity of 1000 vehicles per hour per lane (which is reflective of its arterial status) and thus the projected volumes are expected to exceed the noted planning capacity, indicative of the need for additional road capacity (ie. additional lanes).

Table 6: Grey Road 19 Background Traffic Volume

HORIZON YEAR	DIRECTION	CAPACITY	ROUNDBABOUT TO CROSSWINDS BLVD		CROSSWINDS BLVD TO GREY ROAD 19 /21	
			Friday	Saturday	Friday	Saturday
2025	WB	1000 vph	814	1112	832	1126
	EB	1000 vph	763	1137	776	1122
2030	WB	1000 vph	874	1203	891	1214
	EB	1000 vph	818	1231	829	1210
2035	WB	1000 vph	939	1303	956	1312
	EB	1000 vph	878	1335	889	1308



Similarly, volumes on Grey Road 19 between the roundabout and Jozo Weider Boulevard will approach or slightly exceed the 1000 vehicles per hour per lane capacity by the year 2035 (750 to 1050 vehicles per direction projected), confirming the long-term need for additional road capacity through this section of Grey Road 19 as well.

3.3.2 Intersection Operations

The operations of the key area intersections were again investigated given the expected increases in traffic volumes. The Crosswinds Boulevard intersection has not been considered under future background conditions in that it only serves the Windfall development (and thus will be considered under future total conditions with consideration for Windfall). As previously noted, a roundabout is planned for the intersection of Grey Road 19 with Grey Road 21 - Simcoe Road 34 for 2022 and hence this has been considered in the analysis (assuming the configuration as previously noted).

2025 Operations

The results of the operational analyses for the 2025 horizon year are presented in As indicated, the roundabouts and signalized intersection will provide acceptable operations given the existing or planned intersection configurations.

2030 Operations

The 2030 background operations are summarized in Table 8, whereas the corresponding worksheets are provided in Appendix E. The operations under 2030 background conditions are similar to those experienced under 2025 background conditions - both roundabouts and the signalized intersection will provide acceptable operations.

2035 Operations

The 2035 background operations are summarized in Table 9, whereas the corresponding worksheets are provided in Appendix F. While the approach delays will continue to increase given the projected increase in volumes, the operations at all intersections continue to be acceptable and hence no improvements to these intersections are necessary.



Table 7, whereas detailed worksheets are included in Appendix D. As indicated, the roundabouts and signalized intersection will provide acceptable operations given the existing or planned intersection configurations.

2030 Operations

The 2030 background operations are summarized in Table 8, whereas the corresponding worksheets are provided in Appendix E. The operations under 2030 background conditions are similar to those experienced under 2025 background conditions - both roundabouts and the signalized intersection will provide acceptable operations.

2035 Operations

The 2035 background operations are summarized in Table 9, whereas the corresponding worksheets are provided in Appendix F. While the approach delays will continue to increase given the projected increase in volumes, the operations at all intersections continue to be acceptable and hence no improvements to these intersections are necessary.



Table 7: Intersection Operations - 2025 Background Traffic Volumes

INTERSECTION AND MOVEMENT		CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
			delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Grey Road 21	WB	roundabout	3	A	0.41	4	A	0.55
	SB		3	A	0.17	3	A	0.28
	EB		3	A	0.41	5	A	0.61
	NB		3	A	0.22	4	A	0.34
	overall		3	A	-	4	A	-
Grey Road 19 & Jozo Weider Blvd	EB	signal	18	B	0.33	19	B	0.43
	WB		19	B	0.47	21	C	0.51
	NB		8	A	0.60	11	B	0.78
	SB		15	B	0.33	18	B	0.49
	overall		13	B	0.47	16	B	0.57
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	roundabout	3	A	0.42	4	A	0.58
	SB		3	A	0.35	4	A	0.51
	EB		7	A	0.33	13	B	0.58
	NB		5	A	0.15	7	A	0.21
	overall		4	A	-	5	A	-



Table 8: Intersection Operations - 2030 Background Traffic Volumes

INTERSECTION AND MOVEMENT		CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
			delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Grey Road 21	WB	roundabout	3	A	0.44	5	A	0.60
	SB		3	A	0.19	4	A	0.31
	EB		3	A	0.45	6	A	0.67
	NB		3	A	0.24	4	A	0.38
	overall		3	A	-	5	A	-
Grey Road 19 & Jozo Weider Blvd	EB	signal	18	B	0.34	21	C	0.51
	WB		19	B	0.47	21	C	0.51
	NB		9	A	0.65	14	B	0.85
	SB		16	B	0.37	21	C	0.58
	overall		14	B	0.49	18	C	0.63
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	roundabout	3	A	0.45	5	A	0.63
	SB		3	A	0.37	4	A	0.56
	EB		7	A	0.37	16	C	0.67
	NB		5	A	0.17	9	A	0.31
	overall		4	A	-	7	A	-



Table 9: Intersection Operations - 2035 Background Traffic Volumes

INTERSECTION AND MOVEMENT		CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
			delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Grey Road 21	WB	roundabout	4	A	0.48	6	A	0.66
	SB		3	A	0.21	4	A	0.36
	EB		3	A	0.48	7	A	0.74
	NB		3	A	0.27	5	A	0.4
	overall		3	A	-	6	A	-
Grey Road 19 & Jozo Weider Blvd	EB	signal	18	B	0.36	21	C	0.55
	WB		19	B	0.47	21	C	0.51
	NB		9	A	0.70	21	C	0.94
	SB		17	B	0.43	24	C	0.67
	overall		14	B	0.52	22	C	0.71
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	roundabout	3	A	0.49	5	A	0.68
	SB		3	A	0.40	5	A	0.61
	EB		8	A	0.42	25	D	0.79
	NB		6	A	0.20	9	A	0.30
	overall		4	A	-	8	A	-



4 Proposed Development

This section will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment to the road network.

4.1 SITE LOCATION

As previously illustrated in Figure 1, the proposed development is located on the north and east side of Grey Road 19, west of Grey Road 21 in the Town of The Blue Mountains.

4.2 PROPOSED LAND USE & PHASING

A breakdown of the proposed unit count by type and phase is provided in Table 10 and illustrated in Figure 10. Initially, the Windfall development was approved for 609 units; an increase in density in Phases 5 and 6 is proposed which will yield an additional 50 units (the increase in density is achieved through conversion of single units to semi-detached units).

Table 10: Proposed Land Use & Phasing

PHASE	YEAR COMPLETE	PREVIOUS PLAN			CURRENT PLAN		
		Single	Semi	Total	Single	Semi	Total
1	2016	37	0	37	37	0	37
2	2018	67	100	167	67	100	167
3	2019	29	40	69	32	34	66
4	2021	103	20	123	42	82	124
5	2023	42	82	124	63	36	99
6	2025	73	16	89	58	108	166
Total		351	258	609	299	360	656
Change					-52	+102	+50



4.3 SITE ACCESS

4.3.1 Access Locations

As shown in Figure 10, 2 access points will be provided as follows:

- Crosswinds Boulevard through the Second Nature development, connecting to Grey Road 19 at its signalized intersection with Jozo Weider Boulevard; and
- Crosswinds Boulevard connecting to Grey Road 19 approximately 610 metres west of Grey Road 21 (measured from centreline to centreline) and 770 metres east of the roundabout.

The extension of Crosswinds Boulevard to provide a continuous link between Windfall and Second Nature, with connections to Grey Road 19 at both ends, is anticipated to be completed by the end of 2020 in conjunction with the construction of Phase 4A. However, due to ongoing construction within the development and the desire to minimize potential conflict between construction and residential traffic, the extension is proposed to remain closed until such time as the roundabout construction commences (thus providing an alternative means of access to the Windfall development).

4.3.2 Access Sight Lines

Based on MTO geometric design standards, the minimum stopping sight distance for a design speed of 70 km/h is 110 metres. This requirement provides sufficient distance for an approaching vehicle to observe a stationary hazard in the road (ie. a vehicle stopped at an intersection waiting to complete a turn) and bring the vehicle to a complete stop prior to the hazard.

The available sight lines along Grey Road 19 as determined at Crosswinds Boulevard are approximately 600 metres to the east (the intersection of Grey Road 19 and Grey Road 21 is visible) and approximately 400 metres to the west (limited by the horizontal curve).

As such, adequate sight lines are provided in both directions at the site access to ensure safe operations for vehicles turning to/from the site. As a result, no improvements to address sight line constraints are required.

4.4 SITE GENERATED TRIPS

4.4.1 Trip Generation Rates

Trip generation rates for the proposed Windfall development were determined from the *ITE Trip Generation Manual 10th Edition* reflective of a “single family detached” land use (code 210) and a “multi-family housing (1 or 2 levels)” land use (code 220). In addition, site specific trip rates were established from the 2020 traffic counts at Crosswinds Boulevard and Grey Road 19 given that this intersection with Crosswinds Boulevard only serves the Windfall development. At the time



of the February 2020 traffic count, there were 133 single units and 129 semi-detached units completed and occupied with represents approximately 40% of the total unit count and thus is considered representative). The associated trip rates are noted in Table 11.

As noted, the ITE trip generation rates are somewhat greater than the site-specific Windfall trip generation rates. This is not unexpected in that the ITE rates are premised on traditional full-time, year-round residential developments, whereas the Windfall development caters to both full-time (ie. local) and part-time (ie. seasonal) residents given its location and relationship with Blue Mountain. To reflect the trip generating characteristics of the Windfall product (which includes a relative balance between single detached and semi-detached units), the “existing Windfall” trip rates have been employed for the remainder of the Windfall development. To consider a more robust Friday peak hour, the trip rates realized on the Saturday have been employed for both Friday and Saturday.

Table 11: Windfall Trip Generation Rates

LAND USE	VARIABLE	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
		In	Out	Total	In	Out	Total
ITE single family detached	units	0.62	0.37	0.99	0.50	0.43	0.93
ITE multi-family (1-2 levels)	units	0.35	0.21	0.56	0.35	0.35	0.70
existing Windfall	units	0.10	0.10	0.20	0.31	0.22	0.53

4.4.2 Trip Generation Estimates

The resulting trip estimates for the remaining Windfall development are summarized in Table 12. At the time of the February 2020 traffic counts, the following units were complete and occupied:

- Phase 1: 37 of 37 single units (no semi-detached units in Phase 1);
- Phase 2: 67 of 67 singles and 100 of 100 semi-detached units; and
- Phase 3: 29 of 32 singles and 29 of 34 semi-detached units.

The traffic volumes associated with the above occupied units are captured in the traffic counts and thus these units were not considered in deriving the remaining Windfall trip estimates.



Table 12: Windfall Trip Generation Estimates

DEVELOPMENT		UNITS		FRIDAY PM PEAK HOUR		SATURDAY PEAK HOUR			
		Total	Remain	In	Out	Total	In	Out	Total
Phase 1	singles	37	0	-	-	-	-	-	-
	semis	0	0	-	-	-	-	-	-
Phase 2	singles	67	0	-	-	-	-	-	-
	semis	100	0	-	-	-	-	-	-
Phase 3	singles	32	3	1	1	2	1	1	2
	semis	34	5	2	1	3	2	1	3
Phase 4	singles	42	42	13	9	22	13	9	22
	semis	82	82	26	18	44	26	18	44
Phase 5	singles	63	63	20	14	34	20	14	34
	semis	36	36	11	8	19	11	8	19
Phase 6	singles	58	58	18	13	31	18	13	31
	semis	108	108	34	23	58	34	23	58
Total		659	397	126	86	212	126	86	212
Additional Units		-	50	16	11	27	16	11	27

As noted, the remaining 397 units are expected to generate 212 new trips during each of the Friday PM peak hour and Saturday peak hour (total of inbound and outbound trips). The additional 50 units, as proposed under the current development plan, will generate 27 additional trips during each peak hour (which translates to less than 1 additional trip every 2 minutes).

4.4.3 Trip Distribution & Assignment

The distribution of the trips to be generated by the site to the area road system was based on the existing traffic patterns through the study area as realized through the traffic counts (assuming that the future residents will exhibit similar travel patterns as the existing residents).



The resulting distributions are summarized in Table 13. It is noted that there is a greater emphasis for travel to/from areas to the west of Windfall (ie. to the mountain) during the Saturday peak hour, which is likely attributed to winter ski activities in the immediate area.

Vehicles were assigned to the site access points based on the location of the residential units with respect to the access points and the directness of travel routes. The resulting site generated traffic volumes are illustrated in Figure 11 through Figure 14 for Phases 3 through 6 respectively, with the total additional Windfall traffic illustrated in Figure 15. As previously noted, Crosswinds Boulevard is expected to be extended and completed through to the intersection of Grey Road 19/Jozo Weider Boulevard in the period 2020-21 in conjunction with construction of Phase 4, which is reflected in the Phase 4, 5 and 6 site volumes and the total Windfall site volumes (ie. traffic volumes to/from the west are expected to utilize Crosswinds Boulevard and travel through Windfall and Second Nature to access Grey Road 19).

Table 13: Windfall Trip Distribution

DIRECTION		FRIDAY PM PEAK HOUR	SATURDAY PEAK HOUR
to/from Grey Road 19	north	15%	25%
to/from Jozo Weider Boulevard	west	10%	12.5%
to/from Gord Canning Drive	west	10%	12.5%
to/from Grey Road 119 (Scenic Caves Road)	south	2.5%	2.5%
to/from Grey Road 21	north	2.5%	2.5%
to/from Mountain Road	east	40%	30%
to/from Grey Road 19	south	20%	15%
Total		100%	100%



5 Future Total Conditions

This section will address the future total conditions (ie. with consideration for the Windfall development) and any resulting impacts of the development on the area road system. Namely, the following will be addressed:

- need for additional road improvements to accommodate the site generated volumes;
- operations of the study area intersections, including the site access points; and
- available sight lines on Grey Road 19 at the site access (Crosswinds Boulevard).

5.1 ROAD NETWORK

The road network as described under the future background conditions will be maintained, with consideration for new roads and/or connections to serve the Windfall development (ie. Crosswinds Boulevard).

5.2 TRAFFIC VOLUMES

To assess the impacts of the increased traffic volumes resulting from the proposed development, the site-generated traffic was combined with the 2025, 2030 and 2035 background traffic volumes. The resulting future total volumes are illustrated in Figure 16 through Figure 18 and consider the following:

- the completion and opening of Crosswinds Boulevard through Windfall and Second Nature by the end of 2022 (in conjunction with the construction of the Crosswinds roundabout and completion of Phase 4 Windfall); and
- the connection between Blue Vista and Second Nature by 2025 (in conjunction with build-out of Blue Vista).

It is noted that following completion of the above, the assignment of any preceding development traffic within Blue Vista, Second Nature and Windfall was revisited and adjusted accordingly to reflect anticipated usage of the noted links (eg. Phase 2 and 3 Windfall traffic will use Crosswinds Boulevard to access Grey Road 19 to the north and Jozo Weider Boulevard; Second Nature traffic will use Crosswinds Boulevard through Windfall to access areas to/from the south and east). Specifically, the following were assumed with respect to the assignment of the development traffic to the road system:

- for Blue Vista, 75% of traffic destined to/from Grey Road 19 to the north and Jozo Weider Boulevard was assumed to use Crosswinds Boulevard (as opposed to accessing Grey Road 21 and travelling around);



- for Second Nature Phases 1 and 3 (Phase 2 is the construction of Crosswinds Boulevard), 50% of traffic destined to/from Grey Road 21 to the south and Mountain Road to the east was assumed to use Crosswinds Boulevard and travel south through Windfall to access Grey Road 19 at the future roundabout;
- for Manorwood Block 152 and Block 153, 50% of traffic destined to/from Grey Road 21 to the south and Mountain Road to the east was assumed to use Crosswinds Boulevard and travel south through Windfall to access Grey Road 19 at the future roundabout;
- for Windfall Phases 1 and 2, 50% of traffic destined to/from Grey Road 19 to the north and Jozo Weider Boulevard was assumed to use Crosswinds Boulevard and travel north through Second Nature to access Grey Road 19 at Jozo Weider Boulevard; and
- for Windfall Phases 3,4, 5 and 6, 100% of traffic destined to/from Grey Road 19 to the north and Jozo Weider Boulevard was assumed to use Crosswinds Boulevard and travel north through Second Nature to access Grey Road 19 at Jozo Weider Boulevard.

5.3 TRAFFIC OPERATIONS

5.3.1 Intersection Operations

The operations of the study area intersections have been investigated based on the future total volumes and in considering the following road improvements:

- the implementation of a roundabout at the intersection of Grey Road 19 and Grey Road 21 in 2022; and
- the implementation of a roundabout at the intersection of Grey Road 19 and Crosswinds Boulevard in 2022.

2025 Operations

The results of the 2025 operational assessment are provided in Table 14, whereas detailed worksheets are provided in Appendix G. In all cases, acceptable operations will be provided.



Table 14: Intersection Operations - 2025 Total Traffic Volumes

INTERSECTION AND MOVEMENT		CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
			delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Grey Road 21	WB	roundabout	3	A	0.44	5	A	0.57
	SB		3	A	0.17	3	A	0.23
	EB		3	A	0.43	5	A	0.62
	NB		3	A	0.24	4	A	0.36
	overall		3	A	-	4	A	-
Grey Road 19 & Jozo Weider Blvd	EB	signal	19	B	0.40	21	C	0.51
	WB		18	B	0.25	19	B	0.31
	NB		7	A	0.56	9	A	0.73
	SB		14	B	0.30	16	B	0.44
	overall		13	B	0.43	15	B	0.54
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	roundabout	3	A	0.40	4	A	0.56
	SB		3	A	0.32	4	A	0.48
	EB		7	A	0.34	12	B	0.59
	NB		5	A	0.15	7	A	0.21
	overall		3	A	-	5	A	-
Grey Road 19 & Crosswinds Blvd	SB	roundabout	7	A	0.17	9	A	0.27
	EB		3	A	0.39	4	A	0.60
	WB		3	A	0.47	5	A	0.63
	overall		3	A	-	5	A	-



2030 Operations

Operations expected under the 2030 horizon year are noted in Table 15, whereas detailed worksheets are provided in Appendix H. While delays have increased slightly as compared to the 2025 total conditions, acceptable operations will be provided and hence no further intersection improvements are necessary.

Table 15: Intersection Operations - 2030 Total Traffic Volumes

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	WB	4	A	0.47	5	A	0.62	
	SB	3	A	0.19	4	A	0.32	
	EB	roundabout	3	A	0.47	6	A	0.69
	NB	3	A	0.26	4	A	0.40	
	overall	3	A	-	5	A	-	
Grey Road 19 & Jozo Weider Blvd	EB	21	C	0.43	22	C	0.57	
	WB	19	B	0.25	19	B	0.31	
	NB	signal	7	A	0.58	11	B	0.81
	SB	14	B	0.32	18	B	0.51	
	overall	13	B	0.45	17	B	0.61	
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	3	A	0.43	4	A	0.61	
	SB	3	A	0.35	4	A	0.53	
	EB	roundabout	7	A	0.38	16	C	0.67
	NB	5	A	0.17	8	A	0.25	
	overall	4	A	-	6	A	-	
Grey Road 19 & Crosswinds Blvd	SB	7	A	0.18	11	B	0.30	
	EB	roundabout	3	A	0.42	5	A	0.64
	WB	4	A	0.50	5	A	0.67	
	overall	4	A	-	6	A	-	



2035 Operations

Operations expected under the 2035 horizon year are noted in Table 16, whereas detailed worksheets are provided in Appendix I. Once again, all of the projected operating levels are within acceptable ranges and hence no further improvements are necessary.

Table 16: Intersection Operations - 2035 Total Traffic Volumes

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	WB	4	A	0.51	6	A	0.68	
	SB	3	A	0.21	4	A	0.37	
	EB	roundabout	4	A	0.50	7	A	0.76
	NB		3	A	0.29	5	A	0.46
	overall		4	A	-	6	A	-
Grey Road 19 & Jozo Weider Blvd	EB		20	C	0.44	27	C	0.72
	WB		19	B	0.25	19	B	0.32
	NB	signal	7	A	0.64	19	B	0.92
	SB		15	B	0.38	23	C	0.64
	overall		13	B	0.48	22	C	0.75
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB		3	A	0.47	5	A	0.66
	SB		3	A	0.38	5	A	0.58
	EB	roundabout	8	A	0.42	24	C	0.78
	NB		6	A	0.20	9	A	0.29
	overall		4	A	-	8	A	-
Grey Road 19 & Crosswinds Blvd	SB		7	A	0.19	13	B	0.33
	EB		3	A	0.45	6	A	0.70
	WB	roundabout	4	A	0.54	6	A	0.73
	overall		4	A	-	6	A	-



2022 Operations

As previously noted, the roundabout at Crosswinds Boulevard and Grey Road 19 is anticipated to be constructed in 2022 in conjunction with the roundabout at Grey Road 19/Grey Road 21 and the opening of Crosswinds Boulevard through Windfall and Second Nature (which will ensure an alternative means of access during the construction of the roundabout). To consider the interim operations, both intersections have been reviewed for the 2022 horizon years, corresponding to full build-out and occupancy of Windfall Phase 4 and 50% build-out and occupancy of Phase 5. In both cases, it is assumed that the existing intersection configurations would remain, with signal control at both (interim signals were implemented at the Crosswinds Boulevard intersection in late 2020). While the volumes to/from Windfall would warrant a left turn lane on Grey Road 19 at Crosswinds Boulevard, such is not considered necessary in context of the impending roundabout construction (in that it would be removed within 1 to 2 years following implementation to facilitate the roundabout construction). Similarly, at the intersection of Grey Road 19 and Grey Road 21, exclusive turn lanes are warranted (as they are under existing conditions) but have not been considered. It is noted that the extension of Crosswinds Boulevard through Windfall and Second Nature is also expected to be in place, albeit it has not been considered to reflect the worse case (ie. once Crosswinds Boulevard is open, traffic to/from the west and north are expected to divert to the signalized intersection of Grey Road 19/Crosswinds Boulevard/Jozo Weider Boulevard, thus reducing volumes at the Grey Road 19/Crosswinds Boulevard intersection).

The corresponding traffic volumes are illustrated in Figure 19 and the expected traffic operations are summarized in Table 17; detailed operational worksheets are provided in Appendix J.

As indicated, the intersection of Grey Road 19 and Grey Road 21 will provide good overall operations given the existing intersection configuration and control (level of service C or better). In this regard, no modifications/improvements are considered necessary - the existing intersection can accommodate the future traffic volumes until the planned roundabout is constructed.

At the Crosswinds Boulevard intersection, acceptable operations will also be provided. While the southbound movement will experience a level of service E during the Saturday peak hour (due to the delay of 58 seconds), such is not considered unbearable. As such, no further improvements at this intersection are considered necessary prior to implementing the roundabout.



Table 17: Intersection Operations - 2022 Total Traffic Volumes

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
		delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Grey Road 21	NB	17	B	0.55	32	C	0.84
	WB	20	C	0.83	35	D	0.96
	SB	13	B	0.23	19	B	0.42
	EB	15	B	0.75	23	C	0.91
	overall	17	B	0.70	28	C	0.91
Grey Road 19 & Crosswinds Blvd	WB	6	A	0.58	7	A	0.71
	SB	28	C	0.38	58	E	0.65
	EB	5	A	0.54	18	B	0.90
	overall	7	A	0.56	14	B	0.88

5.3.2 Queue Operations

2035 Operations

Queue operations have been considered for the 2035 horizon year (which represents the greatest traffic volumes and hence the greatest potential for traffic queues). The results are illustrated graphically in Figure 20 in consideration of the available separation between the key study area intersections. As evident, the anticipated queues (which reflect the 95th percentile queue length and hence will only be exceeded 5% of the time) can be readily accommodated.

In considering the left turn queues at the intersection of Grey Road 19 and Jozo Weider Boulevard, the existing north-south left turn lanes have capacity to accommodate queues of approximately 75 metres; the anticipated 95th percentile queues will be in the order of 45 to 90 metres in the northbound direction and 15 metres in the southbound direction, and thus there is the potential for queue spillback in the northbound direction during the Saturday peak hour (albeit it is expected that signal timings can be adjusted to better reflect changing demands). For the eastbound queue, the left turn lane is continuous (as there are 2 eastbound lanes on Jozo Weider Boulevard) and thus the queues can be accommodated.



2022 Operations

With the interim traffic signal control implemented at Crosswinds Boulevard, vehicles on Grey Road 19 will be required to stop, thus resulting in additional traffic queues. Upon review of the 2022 operations, the anticipated 95th percentile queues at the Crosswinds Boulevard intersection (assuming signal control with the existing lane configuration) are as follows:

- eastbound: 60 to 260 metres; and
- westbound: 70 to 116 metres.

As previously noted and as illustrated in Figure 20, there is in excess of 700 metres of separation between Crosswinds Boulevard and the roundabout to the west, and in excess of 500 metres between Crosswinds Boulevard and the intersection of Grey Road 19/Grey Road 21 to the east. As such, the noted queues can be accommodated.

5.4 TRANSIT OPERATIONS

As illustrated in Figure 5, the Collingwood-Blue Mountain transit service travels westbound on Grey Road 19 across the front of the Windfall site, en-route to the Village Area, Craighleith and then returning to Collingwood. While there are no existing transit stops on Grey Road 19 in the immediate vicinity of Windfall, such could be considered in conjunction with overall area development, subject to approvals from the Towns of Collingwood and The Blue Mountains.

Future routing through the Windfall development could also be accommodated via Crosswinds Boulevard (thus potentially serving Windfall, Second Nature, Manorwood and Blue Vista).

5.5 INTERNAL OPERATIONS

5.5.1 Access

The internal road system will consist of a primary through road (Crosswinds Boulevard) with connections to Grey Road 19 at both ends (as per Figure 10). This will ensure that 2 points of access are always provided, and motorists can readily choose the most efficient route when accessing the external road network. Other local roads are proposed to serve the individual phases.

While it is noted that only a single road connection to each of Phases 1 and 2 is provided via Crosswinds Boulevard, this is considered appropriate. As Phase 1 only consists of 37 units, and the section of “single access” road is relatively short, this is not considered problematic. Phase 2 has an emergency access connection to Phase 4 (located immediately north of Phase 2) to provide access should the Phase 2 connection to Crosswinds Boulevard be blocked.



5.5.2 Intersection Control & Operations

With respect to traffic operations, the volumes on Crosswinds Boulevard (which will accommodate the highest volumes) are projected in the order of 250 to 300 vehicles per hour per direction just north of Grey Road 19. The volumes will then be reduced as motorists deviate from Crosswinds Boulevard to access the individual phases. These volumes are within the planning capacity of the road system and thus can be accommodated. All of the intersecting roads with Crosswinds Boulevard are to be stop controlled to ensure right-of-way between motorists. A 3-way stop could be considered at the Phase 3 intersection with Crosswinds Boulevard to provide increased controlled crossing opportunities for pedestrians and cyclists given the sidewalk and trail system, and the recreation amenity being developed directly across the street (ie. The Shed).

Although, operations of the internal intersection were not assessed, given the limited volumes projected, appropriate operations are anticipated at all locations.



6 Sensitivity Analysis

This chapter has been prepared to address Grey County peer review comments (as prepared by R.J. Burnside dated April 6, 2021) pertaining to Windfall trip generation estimates and background growth. In this regard, additional operational analyses have been prepared under the following 3 scenarios:

- Scenario 1: trip generation for Windfall has been established based on ITE trip generation rates as opposed to site specific trip generation rates;
- Scenario 2: Scenario 1 + increased background growth on Grey Road 19 (north-south section) and Grey Road 21; and
- Scenario 3: Scenario 1 + increased background growth on all study area external roads.

6.1 SCENARIO 1

Scenario 1 addresses increased trip estimates for the overall Windfall development, including additional consideration for those phases already completed and occupied.

6.1.1 Windfall Trip Generation

As previously detailed in Section 4.4, the vehicle trips to be generated by the Windfall development were determined through the application of site specific trip generation rates. Recognizing that a significant portion of the Windfall development had been completed and occupied (262 of 659 units or 40% of the total), traffic counts were completed at the Crosswinds Boulevard intersection with Grey Road 19 (the only means of access to/from the development), from which site specific trip generation rates were established. In essence, the existing Windfall development was used as a proxy for the remaining Windfall development. As the remaining phases are considered consistent with those that have been completed, the existing development is considered reflective of the future development and hence indicative of future travel demands.

As reported in Section 4.4.1, the resulting trip rates were significantly less than the ITE trip generation rates for “single family detached” residential units (80% less for the Friday PM peak hour and 43% less for the Saturday peak hour), which is not unexpected given the location of the development (ie. not within the built Town limits), and the use of the residential units as seasonal homes by some of its residents. To adopt a more conservative approach, the Saturday trip rates as established from the existing Windfall development were applied to both the Friday and Saturday peak hours to establish future trip estimates.



To address peer review comments, trip estimates have also been prepared considering the ITE trip rates as previously provided in Table 11, considering the ITE “single family detached” land use (code 210) as applicable to all Windfall units (singles and semi-detached). The resulting trip estimates are presented in Table 18. It is noted that the ITE trip rates for “multi-family housing (1 or 2 levels)”, as provided in Table 11, could have been applied to the Windfall semi-detached units. Notwithstanding, to consider a more conservative approach, the greater trip rates associated with “single detached” units have been applied to all residential unit types. The resulting trip estimates are provided in Table 18.

Table 18: Windfall Trip Generation Estimates (Scenario 1)

DEVELOPMENT	UNITS	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		In	Out	Total	In	Out	Total	
Phase 1	singles	37	23	14	37	19	16	34
	semis	0	-	-	-	-	-	-
Phase 2	singles	67	42	25	66	34	29	62
	semis	100	62	37	99	50	43	93
Phase 3	singles	32	20	12	32	16	14	30
	semis	34	21	12	34	17	15	32
Phase 4	singles	42	26	15	42	21	18	39
	semis	82	51	30	81	41	35	76
Phase 5	singles	63	39	23	62	32	27	59
	semis	36	22	13	36	18	15	33
Phase 6	singles	58	36	21	57	29	25	54
	semis	108	67	40	107	54	46	100
Total	659	411	241	652	331	282	613	
Additional Units	50	31	18	50	25	21	47	



While it is acknowledged that a number of residential units were completed at the time of the February 2020 traffic counts (37 of 37 single units in Phase 1; 67 of 67 singles and 100 of 100 semi-detached units in Phase 2; and 29 of 32 singles and 29 of 34 semi-detached units in Phase 3), the trip estimates presented in Table 18 consider the Windfall development in its entirety. While travel demands and associated trip rates for existing units have been captured in the existing traffic counts, they have nonetheless been revisited, adopting the increased ITE trip rates, thus ensuring a most conservative approach to the site generated traffic volumes.

As noted, the overall Windfall development, consisting of 659 units, is expected to generate 652 trips during the Friday PM peak hour and 613 trips during the Saturday peak hour, under Scenario 1. The additional 50 units, as currently proposed within Phase 6, will generate approximately 50 additional peak hour trips.

The assignment of the Windfall traffic volumes to the study area road system, considering the extension of Crosswinds Boulevard, is illustrated in Figure 21.

6.1.2 Future Traffic Volumes

Traffic volumes have been prepared for the 2035 horizon under future total conditions considering all growth and development assumptions previously presented (ie. 2020 base traffic volumes + 2% background growth + background development traffic + Windfall development traffic + Crosswinds Boulevard extension). As 2035 is the greatest horizon year, the associated volumes will reflect the “worse case” conditions.

Recognizing that trip estimates for the entire Windfall development have been prepared and will be considered specifically, existing traffic volumes to/from Windfall via Crosswinds Boulevard have been removed from the 2020 base volumes (Crosswinds Boulevard volumes through the adjacent intersections were removed in consideration of the key movements). The revised 2020 traffic volumes are illustrated in Figure 22, whereas the original volumes are provided in Figure 4 (the noted “subtractions” are evident through a comparison). The resulting 2035 total traffic volumes under Scenario 1 are presented in Figure 23.

Traffic volumes as projected on Crosswinds Boulevard immediately north of Grey Road 19 and east of Grey Road 19 opposite Jozo Weider Boulevard are summarized in Table 19 (reflective of the Crosswinds Boulevard extension). As noted, the 2035 projections on Crosswinds Boulevard are significantly greater under Scenario 1, given the increased trip generation estimates assumed for Windfall. It is noted that Crosswinds Boulevard is designated as a collector road in the Town’s Official Plan and thus is expected to serve greater traffic volumes as compared to local roads. For planning purposes, local roads are assumed to have a capacity of 400 vehicles per hour per lane (vphpl) whereas collector roads have a capacity of 600 to 700 vphpl. For reference, arterial roads (ie. County roads) have a capacity of 900 to 1100 vphpl. In consideration of a 600 vphpl



capacity, the noted traffic projections in Table 19 can be readily accommodated, with considerable excess reserve capacity should volumes exceed the noted projections (the greatest volume is 364 vehicles vs a capacity of 600 vehicles).

Table 19: Crosswinds Traffic Volumes (Scenario 1)

LOCATION	SCENARIO	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
		NB/EB	SB/WB	Total	NB/EB	SB/WB	Total
North of Grey Road 19	Initial Scenario	148	104	252	174	130	204
	Scenario 1	364	214	578	258	221	479
East of Grey Road 19	Initial Scenario	157	97	255	156	124	281
	Scenario 1	202	119	321	197	170	368

6.1.3 Future Traffic Operations

Operations expected under the 2035 horizon year for Scenario 1 are noted in Table 20, whereas detailed worksheets are provided in Appendix K.

As noted, the roundabouts will all provide excellent operations - typically level of service A with minimal delays. In one instance, the eastbound movement at Grey Road 19 and Grey Road 119/Gord Canning Drive, a level of service C is projected. In considering the volume to capacity ratios (the degree to which the movements will operate at capacity), most approaches will operate at less than 70% capacity suggesting there remains reserve capacity to accommodate additional growth (or increased growth as compared to what has been assumed).

At the signalized intersection of Grey Road 19 with Jozo Weider Boulevard/Crosswinds Boulevard, operations will also be acceptable (level of service C or better) with delays of less than 30 seconds for each approach. In considering the volume to capacity ratios, reserve capacity also exists at this intersection.



Table 20: Intersection Operations - 2035 Total Traffic Volumes (Scenario 1)

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	WB	5	A	0.59	7	A	0.72	
	SB	3	A	0.26	5	A	0.40	
	EB	roundabout	4	A	0.54	9	A	0.79
	NB		3	A	0.34	5	A	0.49
	overall		4	A	-	7	A	-
Grey Road 19 & Jozo Weider Blvd / Crosswinds Blvd	EB		21	C	0.50	27	C	0.72
	WB		19	B	0.27	19	B	0.34
	NB	signal	8	A	0.64	19	B	0.91
	SB		15	B	0.39	23	C	0.66
	overall		14	B	0.50	22	C	0.75
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB		3	A	0.48	5	A	0.68
	SB		3	A	0.39	5	A	0.59
	EB	roundabout	9	A	0.47	25	C	0.80
	NB		6	A	0.22	9	A	0.31
	overall		4	A	-	8	A	-
Grey Road 19 & Crosswinds Blvd	SB		4	A	0.20	5	A	0.25
	EB	roundabout	3	A	0.43	4	A	0.63
	WB		4	A	0.57	5	A	0.69
	overall		3	A	-	5	A	-



6.2 SCENARIO 2

Scenario 2 builds upon Scenario 1, considering increased trip estimates for Windfall in addition to increased growth for north-south travel within the Grey Road 19 and Grey Road 21 corridor (as suggested in the Grey County peer review comments).

6.2.1 Windfall Trip Generation

Trip estimates for the Windfall development have been maintained as per Scenario 1.

6.2.2 Future Traffic Volumes

The County peer review comments suggested that based on work being undertaken by the County with respect to the 4-laning of Grey Road 19 from Grey Road 21 to Grey Road 119, growth in the area may be higher, particularly to/from the north on Grey Road 19 and Grey Road 21.

This study builds upon previous studies completed in support of the Windfall development and provides consideration for a number of developments within the immediate area (both under construction and still in the planning stage) that will result in significant growth in the overall area. The same methodology, as was previously accepted by the review agencies, and used in other area studies (including the Class Environmental Assessment completed for the Grey Road 19/21 roundabout), was employed. In consideration of the 2020 and 2035 future total traffic volumes, effective annual growth rates of 3.4% to 4.4% have been realized on Grey Road 19 between Crosswinds Boulevard and Grey Road 19, and 3.4% to 4.6% have been realized on Grey Road 21 north of Grey Road 19.

To consider additional growth in the area, a 4% annual background growth rate has been applied to the north-south volumes on Grey Road 19/Grey Road 21 through the study area (increased from 2%). The resulting traffic volumes are presented in Figure 24.

In comparison to the volumes of Scenario 1 (refer to Figure 23), the increased growth rate results in an additional 35 to 43 vehicles per hour per direction on Grey Road 19/21 during the Friday peak hour and 71 to 73 vehicles per hour per direction during the Saturday peak hour.

6.2.3 Future Traffic Operations

Traffic operations were revisited under the Scenario 2 traffic projections, the results of which are provided in Appendix L and summarized in Table 21.



Table 21: Intersection Operations - 2035 Total Traffic Volumes (Scenario 2)

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	WB	5	A	0.60	8	A	0.74	
	SB	3	A	0.29	5	A	0.46	
	EB	roundabout	4	A	0.55	10	A	0.81
	NB	3	A	0.36	6	A	0.55	
	overall	4	A	-	8	A	-	
Grey Road 19 & Jozo Weider Blvd / Crosswinds Blvd	EB	21	C	0.50	27	C	0.72	
	WB	19	B	0.27	19	B	0.34	
	NB	signal	8	A	0.64	19	B	0.91
	SB	15	B	0.39	23	C	0.66	
	overall	14	B	0.50	22	C	0.75	
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB	3	A	0.48	5	A	0.68	
	SB	3	A	0.39	5	A	0.59	
	EB	roundabout	9	A	0.47	25	C	0.80
	NB	6	A	0.22	9	A	0.31	
	overall	4	A	-	8	A	-	
Grey Road 19 & Crosswinds Blvd	SB	4	A	0.20	5	A	0.25	
	EB	roundabout	3	A	0.43	4	A	0.63
	WB	4	A	0.57	5	A	0.69	
	overall	3	A	-	5	A	-	



Notwithstanding the increased volumes on the north-south sections of Grey Road 19 and Grey Road 21, the associated roundabout will continue to provide excellent operations – level of service A with minimal delays. All other intersections will also operate acceptably (as they would under Scenario 1).

Under Scenario 2, there also remains reserve capacity at all of the study area intersections to accommodate additional traffic volumes, resulting from additional development in the area or increased growth in background volumes.

6.3 SCENARIO 3

Scenario 3 considers increased trip estimates for Windfall (as per Scenario 1) in addition to increased background growth on all of the study area roads.

6.3.1 Windfall Trip Generation

Trip estimates for the Windfall development have been maintained as per Scenario 1.

6.3.2 Future Traffic Volumes

Scenario 3 is intended to reflect a higher growth scenario within the study area, through the extension of the 4% background growth rate for north-south travel on Grey Road 19 and Grey Road 21 applied to Grey Road 19 in its entirety and Grey Road 119. For the remaining roads and associated volumes (ie. volumes to/from Gord Canning Drive, Jozo Weider Boulevard and Crosswinds Boulevard), a 3% growth rate has been applied (increased from 2%). The resulting traffic volumes for Scenario 3 are presented in Figure 25. In comparison to the Scenario 1 volumes of Figure 23, the increased growth rates result in an additional:

- 59 to 88 vehicles per hour (vph) per direction on Grey Road 19/21 (north-south) during the Friday peak hour and 91 to 142 vph per direction during the Saturday peak hour;
- 135 to 149 vph per direction during the Friday peak hour on Grey Road 19 between Grey Road 21 and Grey Road 119 and 208 to 226 vph per direction during the Saturday peak hour; and
- 113 to 138 vph per direction during the Friday peak hour on Grey Road 19 between Grey Road 119 and Jozo Weider Boulevard and 176 to 181 vph per direction during the Saturday peak hour.

6.3.3 Future Traffic Operations

Traffic operations under Scenario 3 are summarized in Table 22 with detailed operational worksheets provided in Appendix M.



Table 22: Intersection Operations - 2035 Total Traffic Volumes (Scenario 3)

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR			
		delay	LOS	v/c	delay	LOS	v/c	
Grey Road 19 & Grey Road 21	WB	6	A	0.68	15	B	0.87	
	SB	4	A	0.33	7	A	0.55	
	EB	roundabout	5	A	0.63	23	C	0.95
	NB		4	A	0.42	8	A	0.65
	overall		5	A	-	16	C	-
Grey Road 19 & Jozo Weider Blvd / Crosswinds Blvd	EB		22	C	0.54	46	D	0.87
	WB		19	B	0.31	26	C	0.53
	NB	signal	10	A	0.76	35	D	1.01
	SB		18	B	0.53	52	D	0.94
	overall		16	B	0.59	41	D	0.94
Grey Road 19 & Grey Road 119 / Gord Canning Drive	WB		4	A	0.57	8	A	0.80
	SB		3	A	0.46	7	A	0.71
	EB	roundabout	8	A	0.47	26	D	0.83
	NB		5	A	0.25	10	A	0.38
	overall		5	A	-	11	B	-
Grey Road 19 & Crosswinds Blvd	SB		4	A	0.21	6	A	0.30
	EB	roundabout	3	A	0.50	7	A	0.77
	WB		4	A	0.64	8	A	0.79
	overall		4	A	-	7	A	-



As indicated, all roundabouts will continue to operate at an overall level of service C or better. In one instance, a level of service D results from a delay of 26 seconds and in another, the volume to capacity ratio exceeds 90%. However, all operations are nonetheless considered acceptable.

Likewise, at the signalized intersection of Grey Road 19 with Jozo Weider Boulevard and Crosswinds Boulevard, acceptable overall intersection operations will be provided (level of service B or D), despite the northbound approach operating at capacity during the Saturday peak hour (which is expected in that only the required green time has been assigned to ensure improved operations for the remaining approaches). It is noted that improved operations could be realized through the provision of a separate eastbound right turn lane given the increased volumes with this movement (527 in the Friday peak hour and 739 in the Saturday peak hour). In addition to the separate right turn lane, a separate green arrow signal phase should be provided in conjunction with the northbound advance green (ie. during the northbound advance green, the eastbound right turns would also be given a green arrow). It is noted that this improvement is not associated within the Windfall development, but rather serves the increased traffic leaving the Blue Mountain Village area. A summary of the operations with the noted improvement is provided in Table 23 with worksheets provided in Appendix M. As noted, all operations will be acceptable with appropriate delays.

Table 23: Intersection Operations - 2035 Total Traffic Volumes (Scenario 3 + Improve)

INTERSECTION AND MOVEMENT	CONTROL	FRIDAY PEAK HOUR			SATURDAY PEAK HOUR		
		delay	LOS	v/c	delay	LOS	v/c
Grey Road 19 & Jozo Weider Blvd / Crosswinds Blvd	EB	17	B	0.43	32	C	0.91
	WB	20	C	0.65	30	C	0.30
	NB	7	A	0.69	14	B	0.41
	SB	15	B	0.50	30	C	0.77
	overall	13	B	0.58	24	C	0.85



7 Summary

This study has addressed the transportation impacts associated with the proposed Windfall residential development to be located on the north and east side of Grey Road 19 and on the west side of Grey Road 21, in the Town of The Blue Mountains.

Windfall Development

Initially approved for 609 units, the current proposal is seeking an additional 50 units (achieved through the conversion of single detached lots to semi-detached lots), which amounts to an increase of 8%. At the time of this study, there are approximately 262 units complete, which represents 40% of the total unit count (assuming a total of 659 units). The remaining 397 units are expected to generate 212 trips during each of the Friday PM and Saturday peak hours. In considering the total Windfall unit count of 659 (including the 262 units that were constructed and occupied at the time of the traffic counts), the site will generate 261 and 348 trips respectively. Given the ski activities during the winter in the area, winter Friday PM and Saturday peak hours have been used as the study periods.

The additional 50 residential units will generate 27 additional trips during each peak hour, which translates to slightly less than 1 additional trip every 2 minutes. In context of the ensuing reviews and traffic operations, these additional trips can be readily accommodated on the future road system without further infrastructure.

Site Access

Windfall traffic will access Grey Road 19 via Crosswinds Boulevard, which provides 1 point of access within Windfall and another within Second Nature (intersection Grey Road 19 opposite Jozo Weider Boulevard).

Horizon Years

To address the potential impacts of the proposed site, peak hour operations were reviewed for the 2025 (build out of Windfall), 2030 (5 years beyond build-out) and 2035 (10 years beyond build-out) horizons at the intersections of Grey Road 19 with Grey Road 21, Grey Road 119/Gord Canning Drive (roundabout) and Jozo Weider Boulevard, in addition to the Crosswinds Boulevard intersection. In addition to Windfall traffic, future traffic volumes considered overall growth in the area plus traffic associated with other area developments either under construction or in the planning stages, including:

- additional commercial and residential development at the Blue Mountain Village;



- Blue Vista (formerly the Nederand development);
- Manorwood Blocks 152 and 153;
- Monterra Phase 2;
- Mountain House;
- Plateau East; and
- Second Nature.

Planned Road Improvements

The following road system improvements have been previously identified and were considered in this review:

- interim signal control at the intersection of Crosswinds Boulevard with Grey Road 19 in late 2020;
- extension of Crosswinds Boulevard through Windfall to Second Nature by end of 2020 (with opening to public traffic expected by 2022);
- provision of a roundabout at the intersection of Grey Road 19 and Grey Road 21 by 2022; and
- provision of a roundabout at the intersection of Crosswinds Boulevard with Grey Road 19 by 2022.

Road Operations

With the existing and/or planned intersection improvements, acceptable operations will be provided at each study area intersection in each of the 2025, 2030 and 2035 horizon years. All of the roundabouts (1 existing and 2 proposed) will provide excellent levels of service with minimal delays. Likewise, the signalized intersection of Grey Road 19 with Jojo Weider Boulevard/Crosswinds Boulevard will also provide acceptable operations.

Recognizing that the 2 new roundabouts on Grey Road 19 will not be implemented until 2022, operations under this horizon were also considered, with signal control at both subject intersections (Grey Road 19/21 is currently signalized whereas interim signal control was implemented at Grey Road 19/Crosswinds Boulevard in 2020). At Grey Road 19/Grey Road 21, the existing intersection can accommodate the interim traffic volumes - no improvements are necessary. Similarly, at the Crosswinds Boulevard intersection, the provision of traffic signals will ensure appropriate operations prior to the implementation of the roundabout.



Sight Line Review

Sight lines were reviewed on Grey Road 19 at Crosswinds Boulevard. The available sight distances exceed the minimum stopping sight distance requirements for a design speed of 70 km/h. As such, vehicles manoeuvring to/from the development can do so in a safe and efficient manner and no further improvements to address sight lines are required.

Internal Road System

The internal road system was reviewed with respect to the rights-of-way and number of lanes proposed. Based on the projected volumes, all are considered appropriate. While single points of access are provided to a number of the internal phases, such are not considered problematic given the short road lengths considered, the limited number of units in Phase 1 (37) and the provision of an emergency access to serve Phase 2.

Sensitivity Analysis

To address peer review comments provided by Grey County, a number of additional scenarios were considered with respect to traffic volumes and operations for the 2035 horizon year (the most critical given the greatest volumes). The following were investigated:

- Scenario 1: increased trip estimates associated with the Windfall development;
- Scenario 2: increased trip estimates associated with the Windfall development + additional background growth on the north-south section of Grey Road 19 and Grey Road 21 (4% annual growth vs 2%); and
- Scenario 3: increased trip estimates associated with the Windfall development + additional background growth on Grey Road 19, Grey Road 21 and Grey Road 119 (4% annual growth vs 2%) + additional background growth to/from the remaining roads (3% vs 2%).

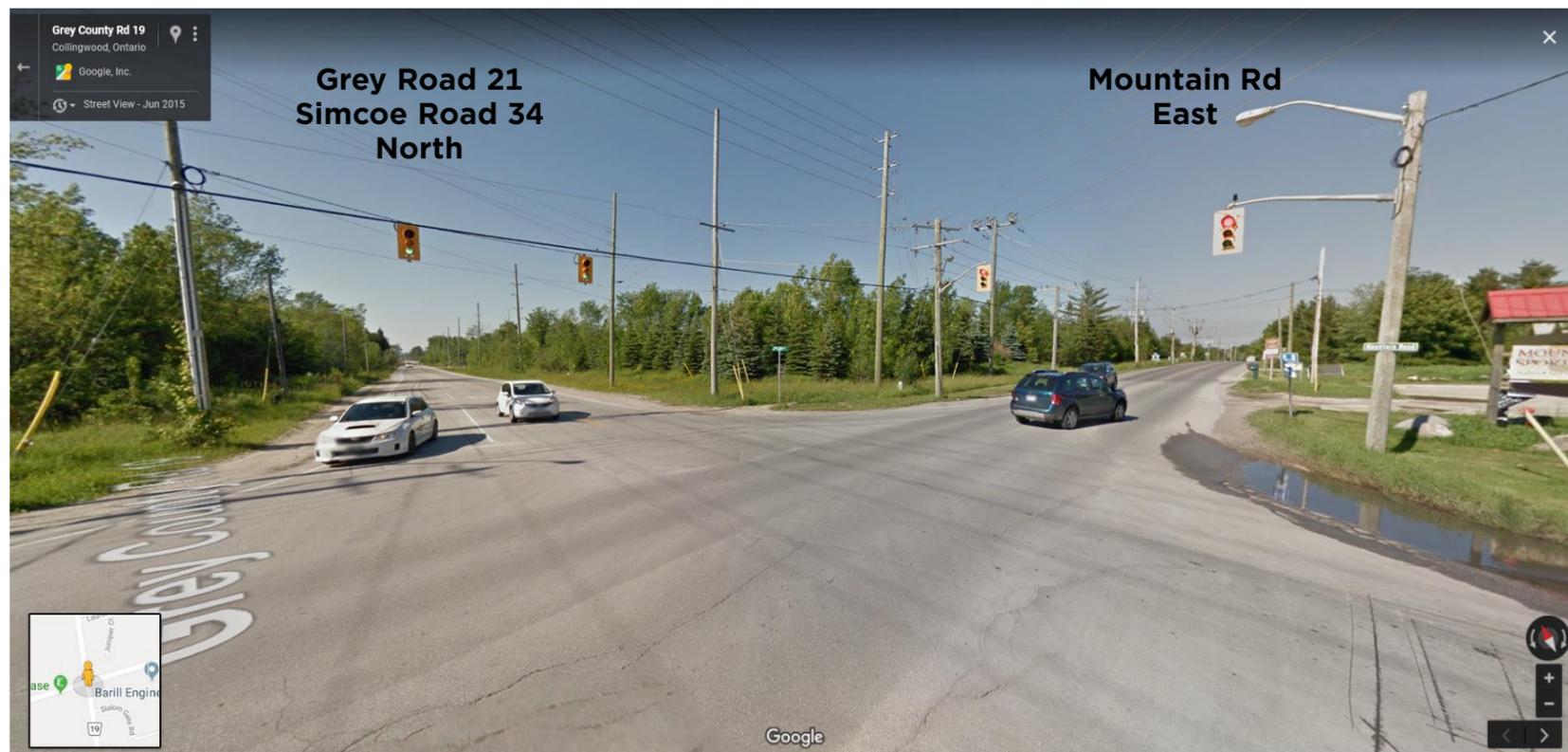
Under each scenario, traffic operations at the study area intersections were revisited. In all cases, acceptable operations will be provided and no further improvements are therefore required. Notwithstanding, it is noted that improvements to the operations of the signalized intersection at Grey Road 19 with Jozo Weider Boulevard/Crosswinds Boulevard can be realized through the provision of a separate eastbound right turn lane to accommodate the increased volumes. In conjunction with this, an overlapping signal phase should be considered (ie. eastbound rights to have a green arrow in concert with the northbound advance green). The associated movements (both eastbound right and northbound left turns) are largely attributed to the Blue Mountain Village development and thus not resulting from the Windfall development.





WINDFALL
Figure 1: Site Location





WINDFALL

Figure 2A: Area Road Network - Grey Road 19 & Grey Road 21





WINDFALL

Figure 2B: Area Road Network – Grey Road 19 & Crosswinds Boulevard





WINDFALL

Figure 2C: Area Road Network – Grey Road 19, Grey Road 119 & Gord Canning Drive

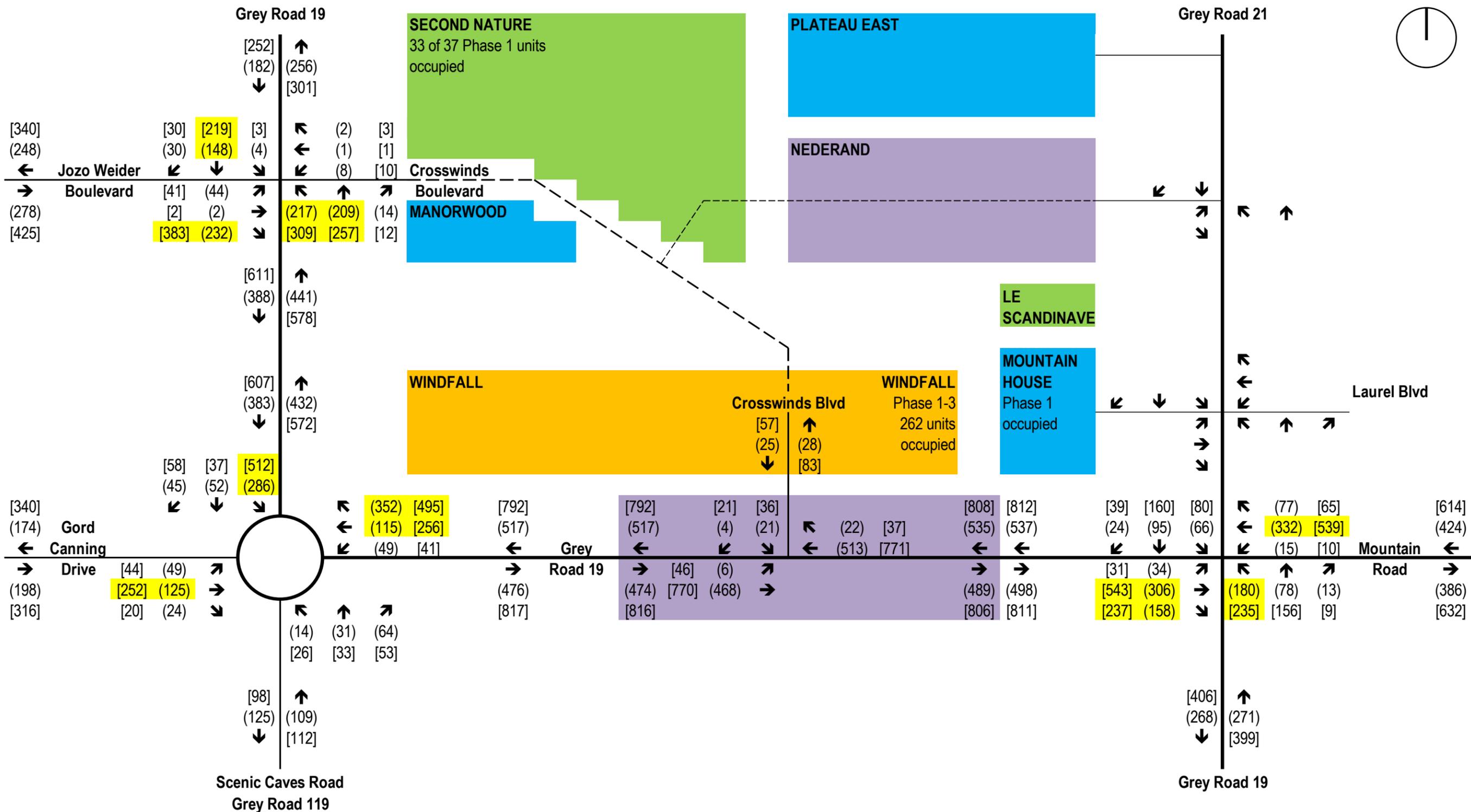




WINDFALL

Figure 2D: Area Road Network - Grey Road 19 & Jozo Weider Boulevard

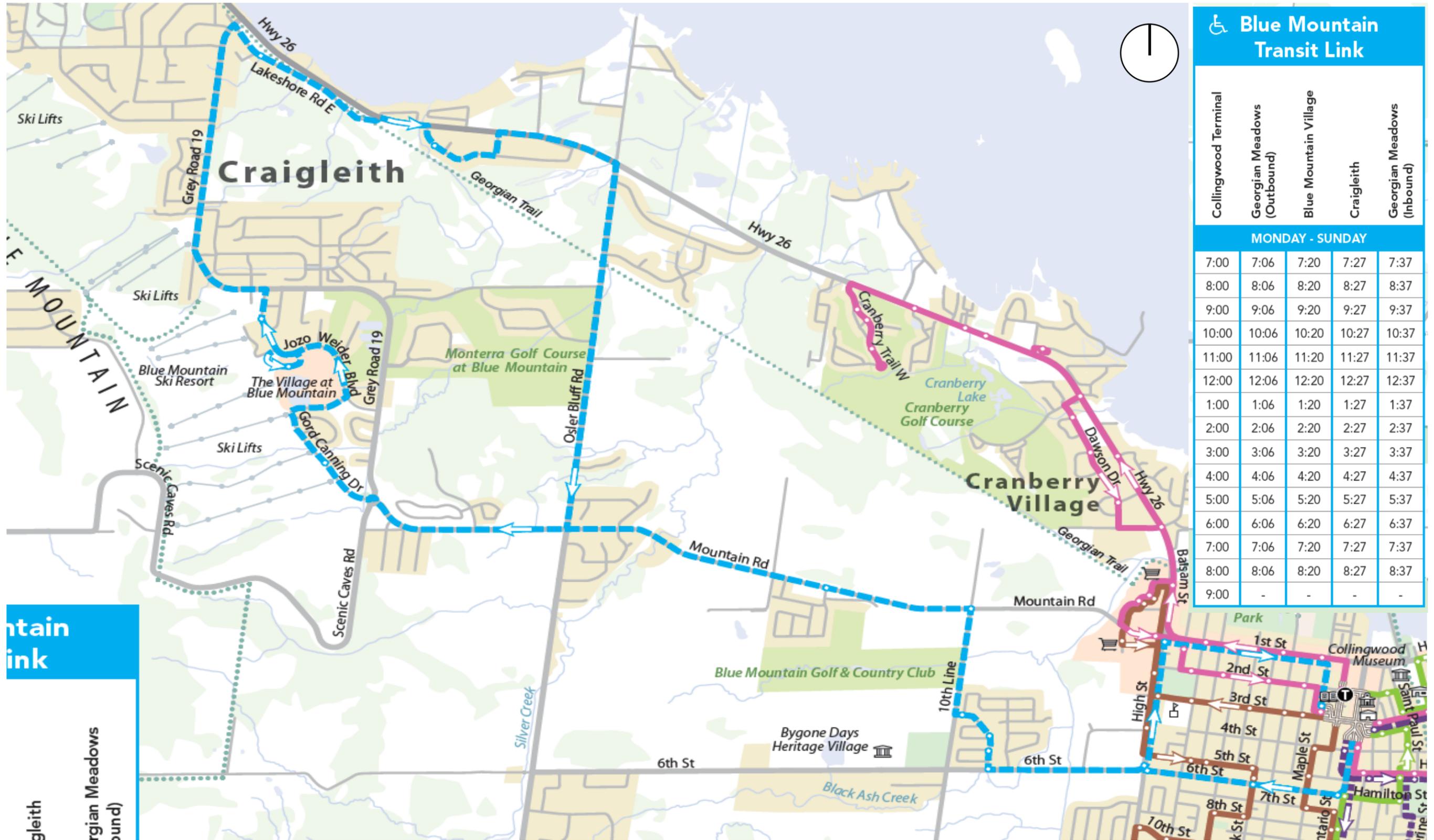




(100) Friday PM peak hour
[100] Saturday peak hour

WINDFALL
Figure 4: 2020 Traffic Volumes





WINDFALL

Figure 5: Collingwood-Blue Mountain Transit Link

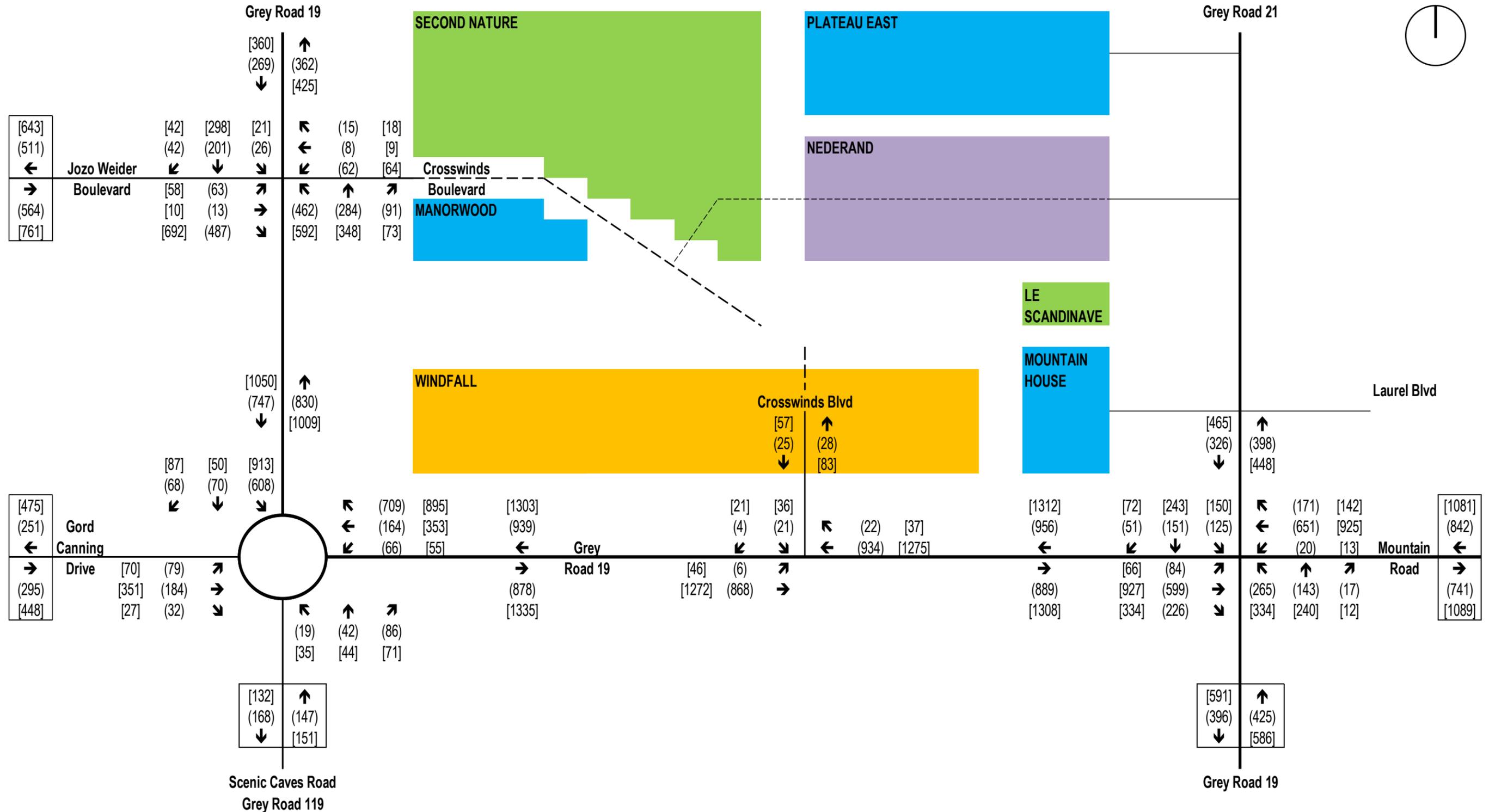




WINDFALL

Figure 6: Background Developments

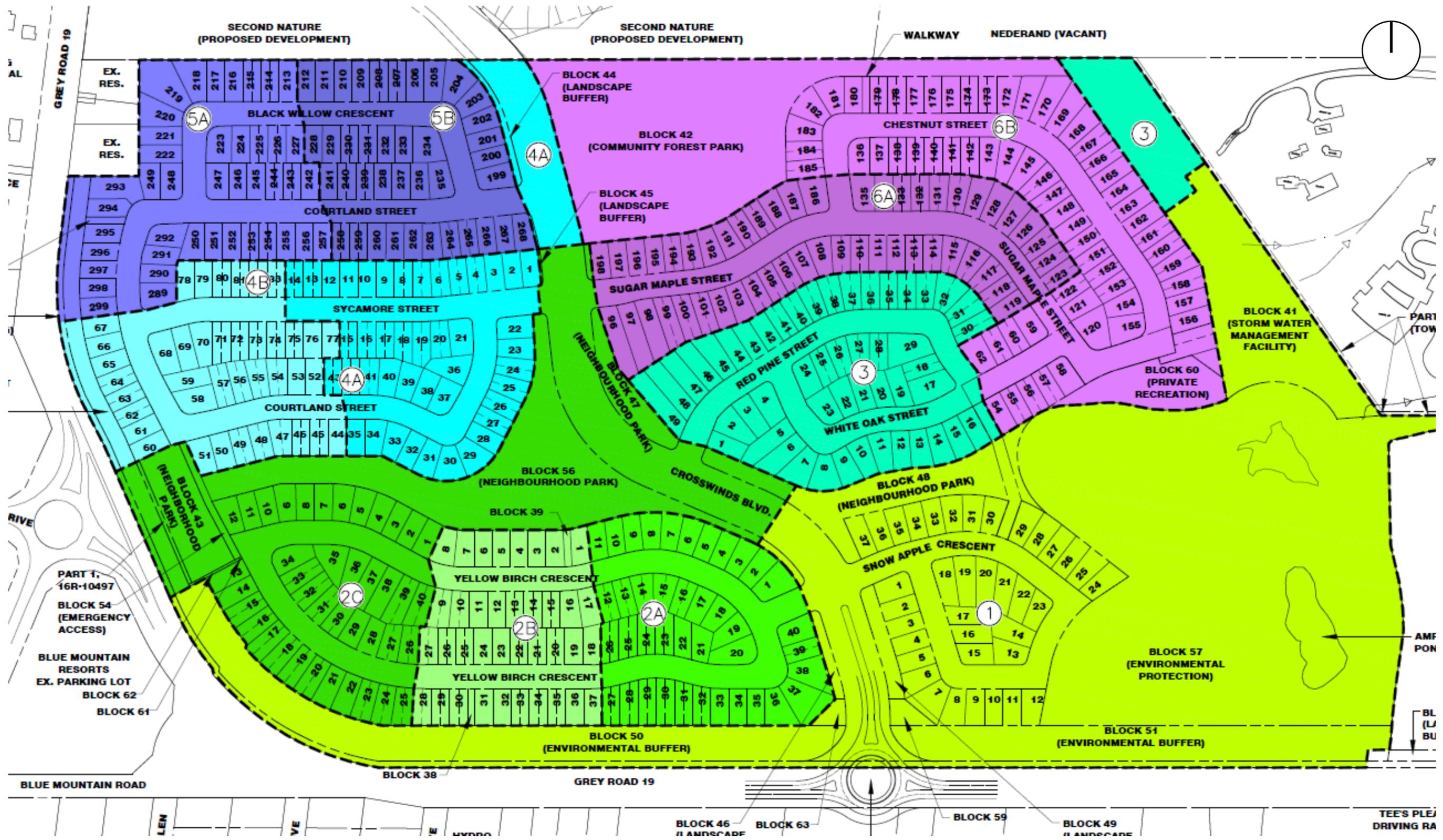




(100) Friday PM peak hour
 [100] Saturday peak hour

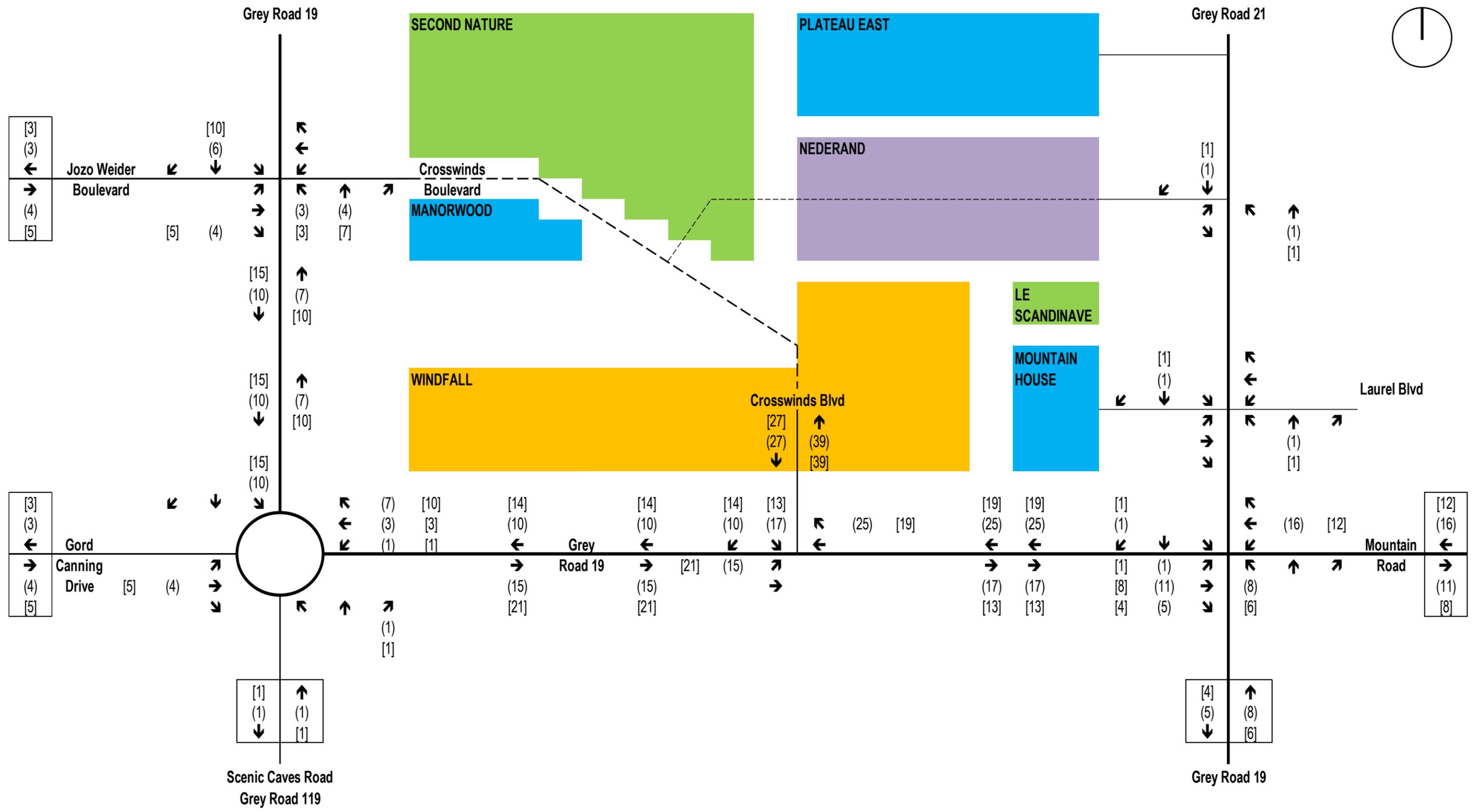
WINDFALL
 Figure 9: 2035 Background Traffic Volumes





WINDFALL
Figure 10: Development Site Plan

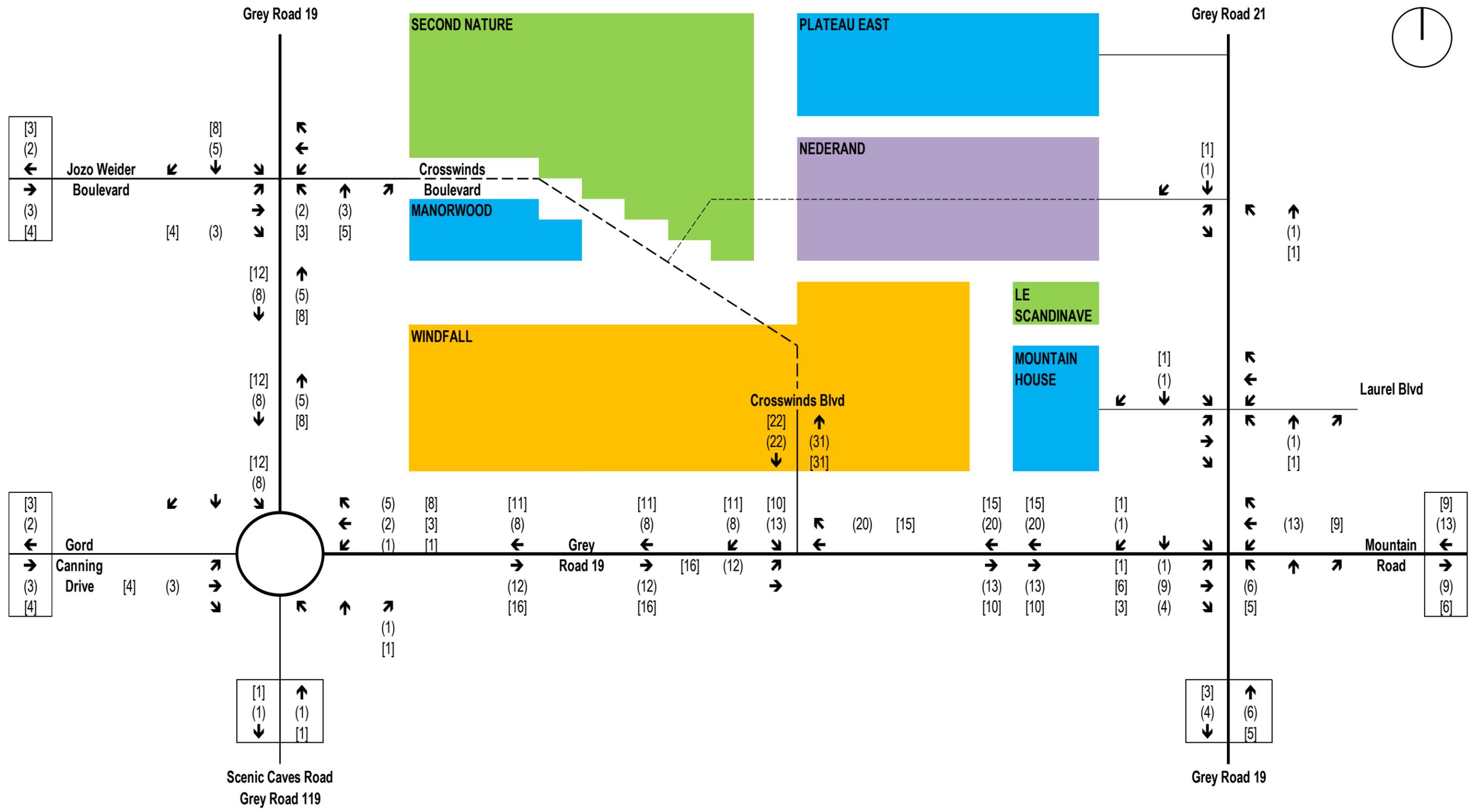




(100) Friday PM peak hour
 [100] Saturday peak hour

WINDFALL
 Figure 12: Windfall Phase 4 Traffic Volumes

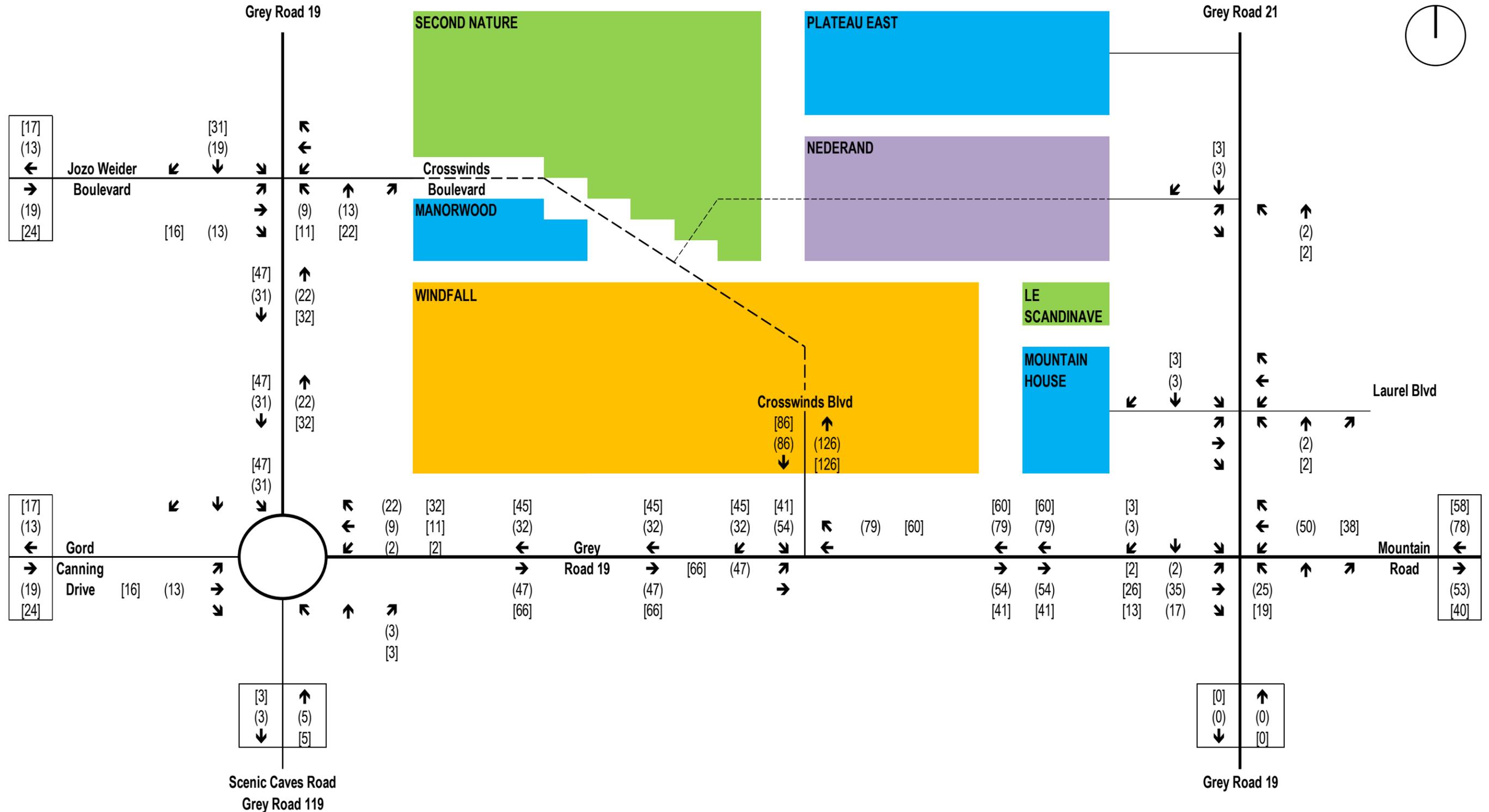




(100) Friday PM peak hour
 [100] Saturday peak hour

WINDFALL
 Figure 13: Windfall Phase 5 Traffic Volumes



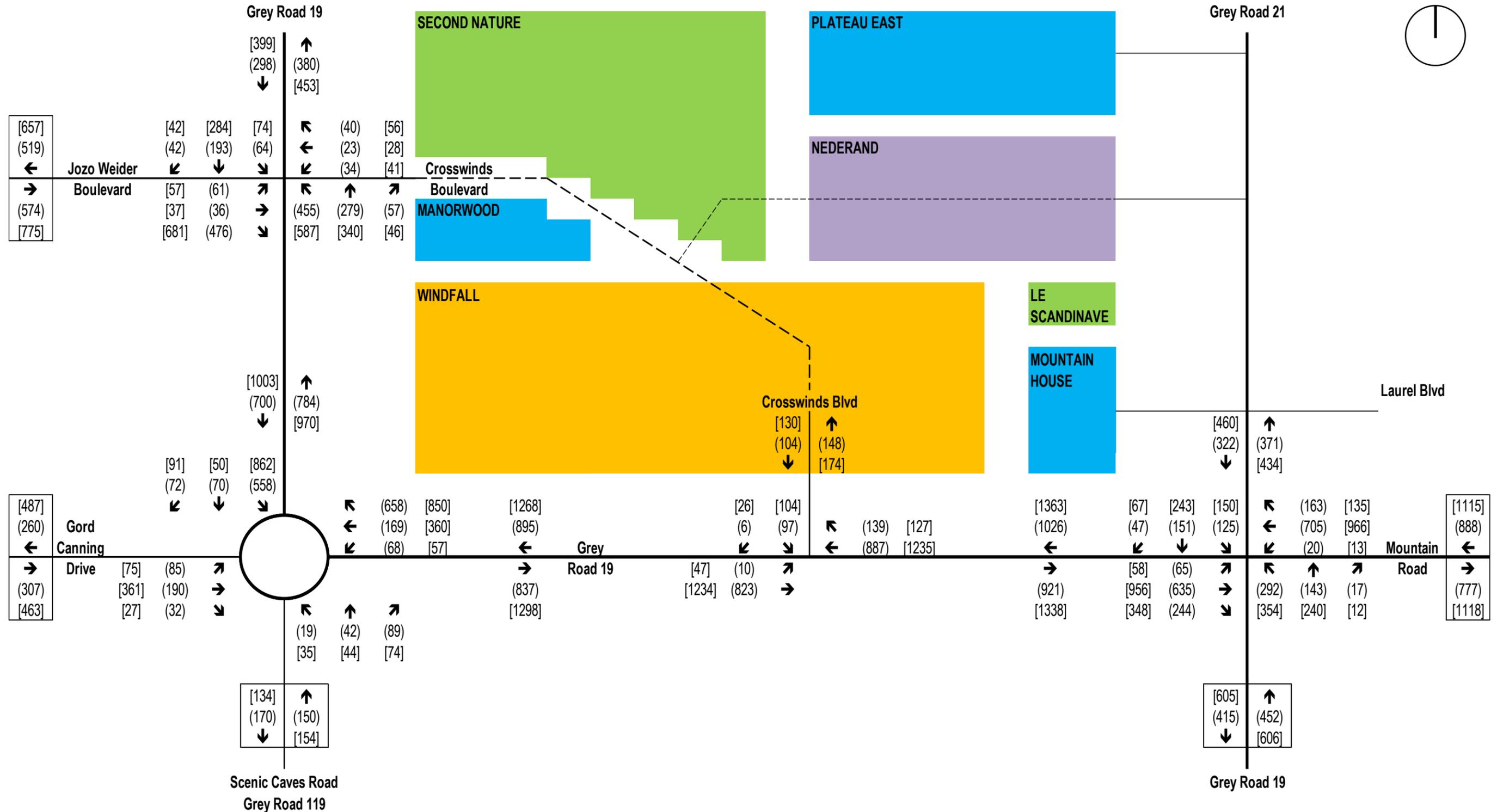


(100) Friday PM peak hour
 [100] Saturday peak hour

WINDFALL

Figure 15: Windfall Remaining Phases 3 to 6 Traffic Volumes





(100) Friday PM peak hour
 [100] Saturday peak hour

with Crosswinds Blvd extension

WINDFALL
 Figure 18: 2035 Future Total Traffic Volumes

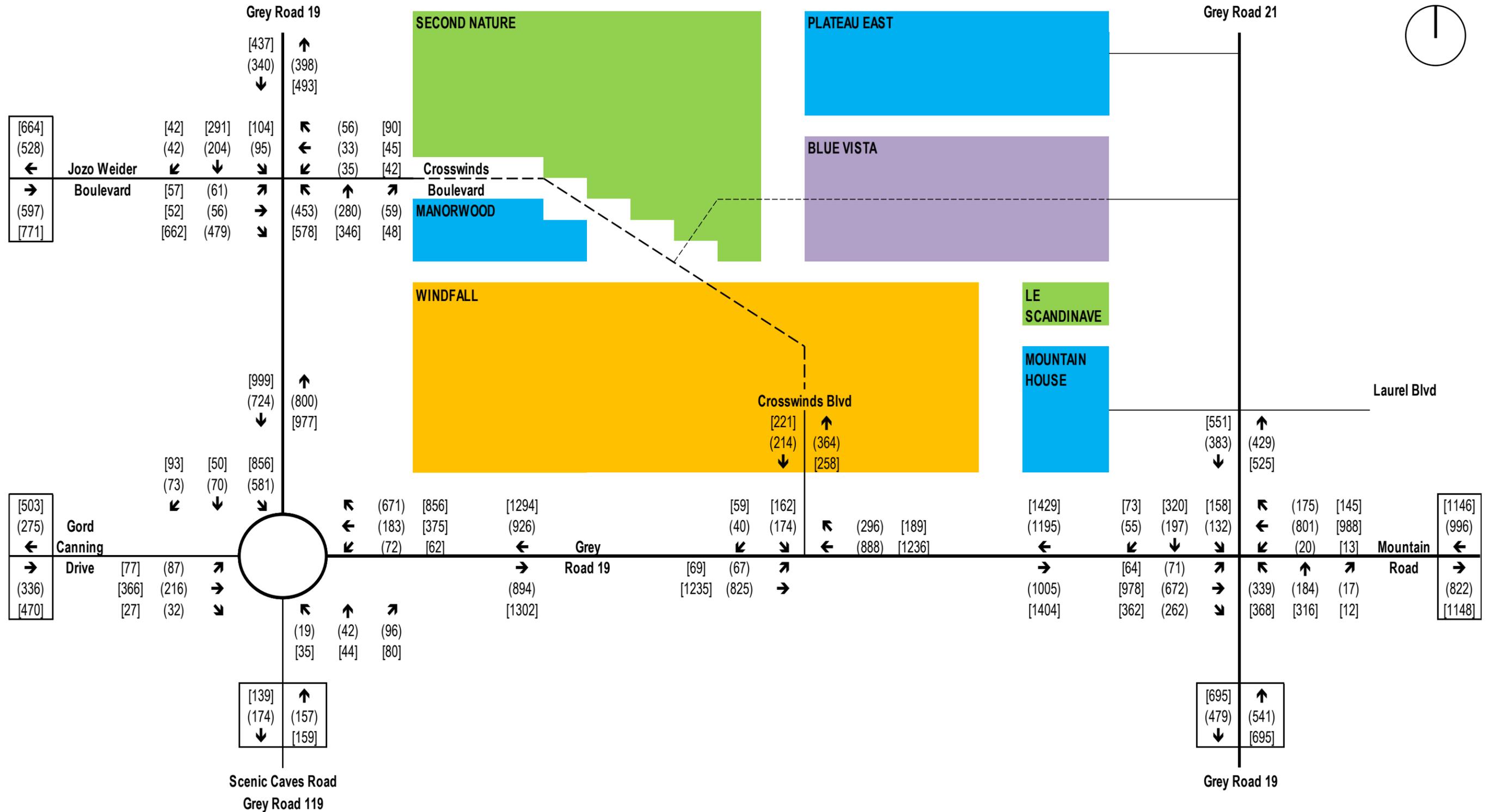




WINDFALL

Figure 20: 2035 Future Total Queue Operations





(100) Friday PM peak hour
 [100] Saturday peak hour

with additional background growth on N-S GR 19/21
 with Crosswinds Blvd extension

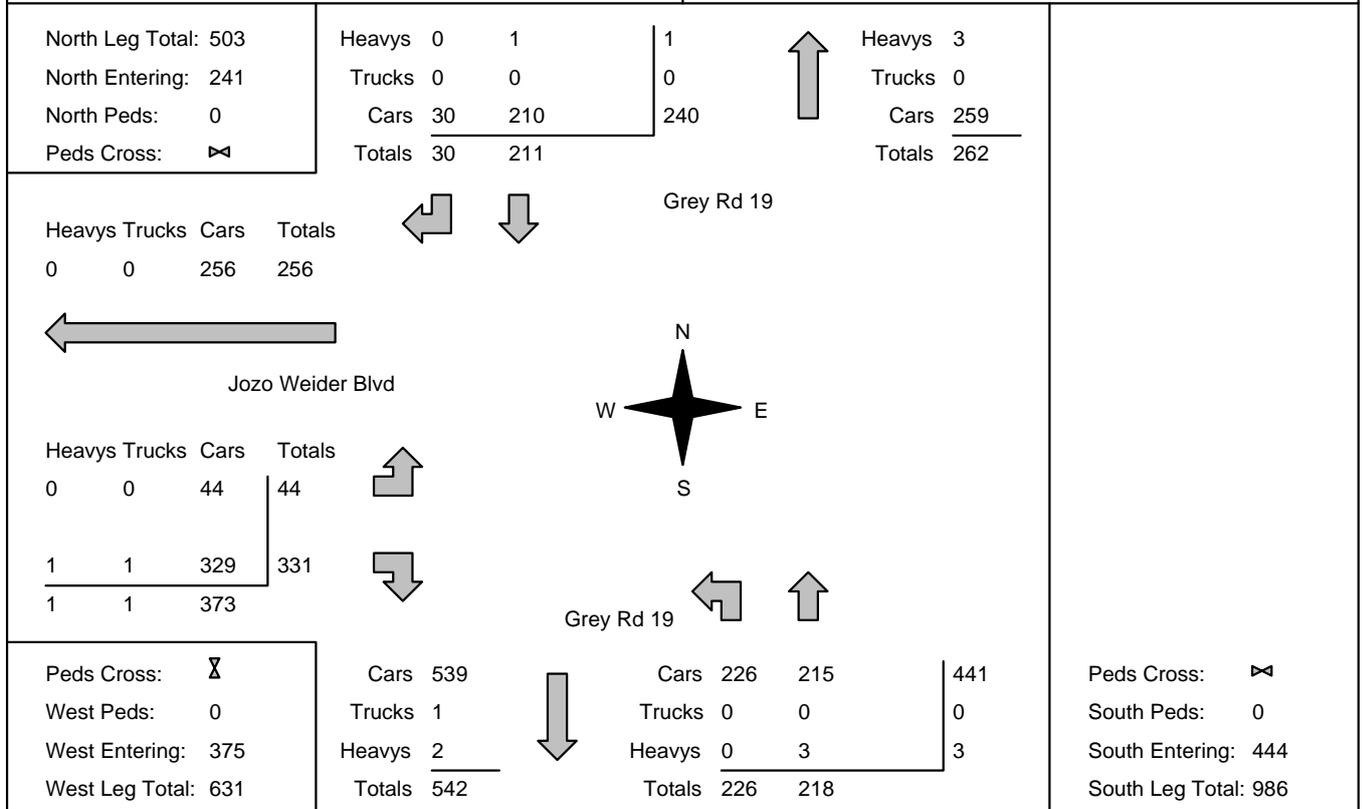
WINDFALL
 Figure 24: 2035 Future Total Traffic Volumes (Scenario 2)



Appendix A: Traffic Counts

Accu-Traffic Inc.

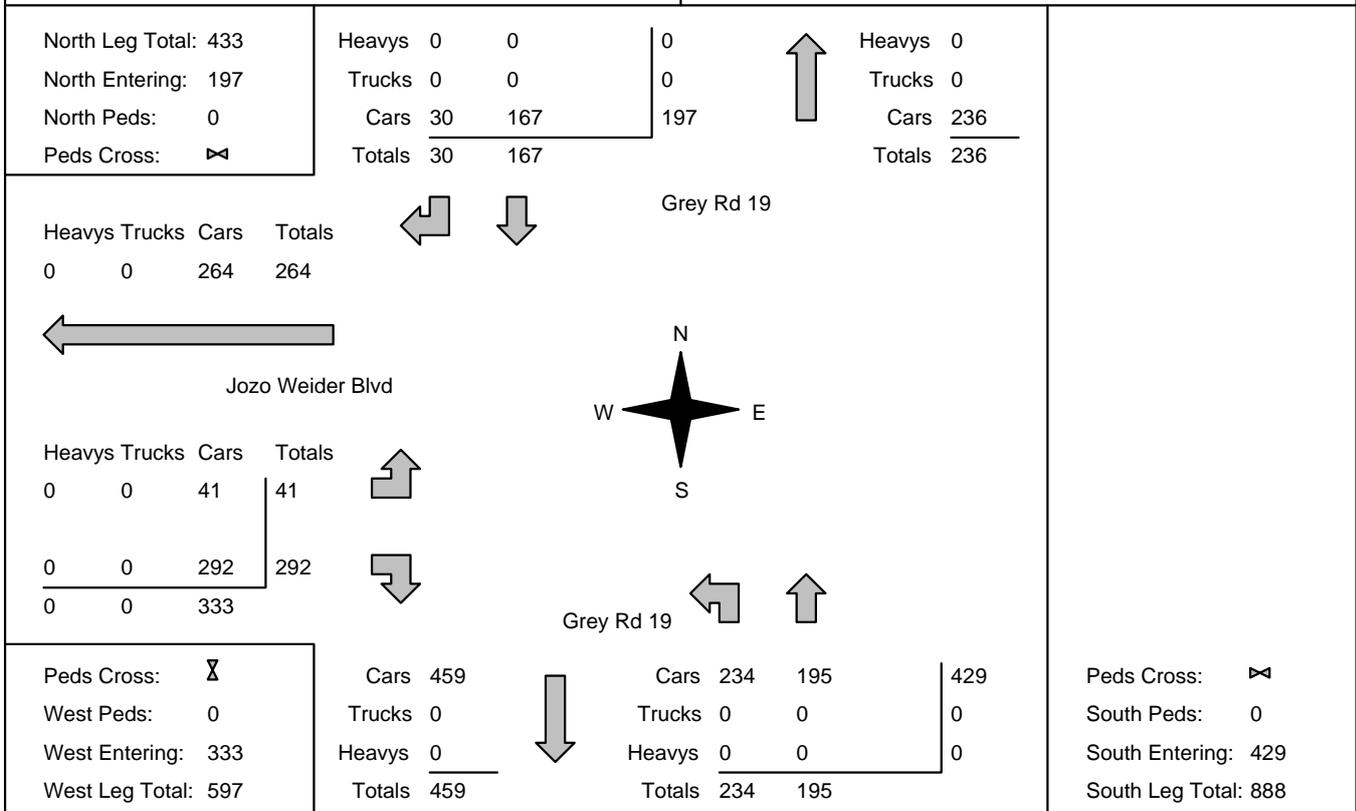
Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:45:00 To: 16:45:00
Municipality: Blue Mountain Site #: 1705600001 Intersection: Grey Rd 19 & Jozo Weider Blvd TFR File #: 1 Count date: 17-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Grey Rd 19 runs N/S



Comments

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:00:00 To: 16:00:00
Municipality: Blue Mountain Site #: 1705600001 Intersection: Grey Rd 19 & Jozo Weider Blvd TFR File #: 1 Count date: 18-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Grey Rd 19 runs N/S



Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Grey Rd 19 & Jozo Weider Blvd Count Date: 18-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	167	30	197	0	626	16:00:00	234	195	0	429	0	
17:00:00	0	172	48	220	2	593	17:00:00	198	175	0	373	1	
18:00:00	0	126	32	158	0	445	18:00:00	144	143	0	287	0	
Totals:						1664	S Totals:						1
East Approach Totals <th rowspan="3" style="text-align: center;">East/West Total Approaches</th> <th colspan="6" style="text-align: center;">West Approach Totals</th>						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	0	0	0	0	333	16:00:00	41	0	292	333	0	
17:00:00	0	0	0	0	0	328	17:00:00	45	0	283	328	4	
18:00:00	0	0	0	0	0	338	18:00:00	52	0	286	338	0	
Totals:						999	W Totals:						4
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00	
Crossing Values:	0	41	48	52					0	0	0	0	

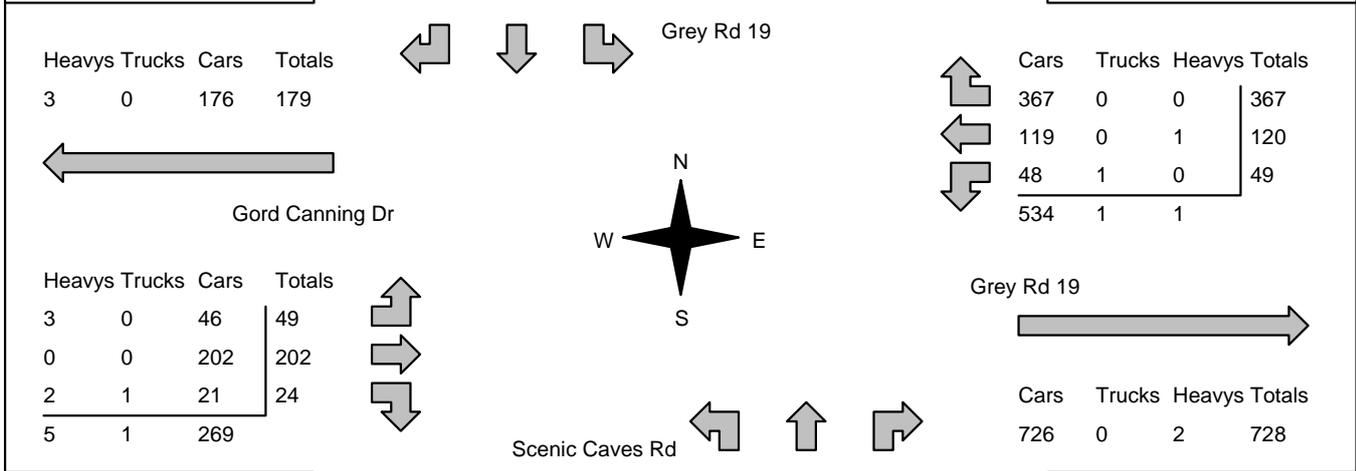
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:45:00 To: 16:45:00
-------------------------------	---	--

Municipality: Blue Mountain Site #: 1705600002 Intersection: Grey Rd 19 & Scenic Caves Rd TFR File #: 1 Count date: 17-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
--	---

** Non-Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
--	--

North Leg Total: 1006 North Entering: 559 North Peds: 0 Peds Cross: ☒	<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>45</td><td>51</td><td>460</td><td>556</td></tr> <tr><td>Totals</td><td>45</td><td>52</td><td>462</td><td></td></tr> </table>	Heavys	0	0	2	2	Trucks	0	1	0	1	Cars	45	51	460	556	Totals	45	52	462			<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>3</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>444</td></tr> <tr><td>Totals</td><td>447</td></tr> </table>	Heavys	3	Trucks	0	Cars	444	Totals	447	East Leg Total: 1264 East Entering: 536 East Peds: 6 Peds Cross: ☒
Heavys	0	0	2	2																												
Trucks	0	1	0	1																												
Cars	45	51	460	556																												
Totals	45	52	462																													
Heavys	3																															
Trucks	0																															
Cars	444																															
Totals	447																															



Peds Cross: ☒ West Peds: 0 West Entering: 275 West Leg Total: 454	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>120</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Heavys</td><td>2</td></tr> <tr><td>Totals</td><td>125</td></tr> </table>	Cars	120	Trucks	3	Heavys	2	Totals	125		<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>12</td><td>31</td><td>64</td><td>107</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Heavys</td><td>2</td><td>0</td><td>0</td><td>2</td></tr> <tr><td>Totals</td><td>14</td><td>31</td><td>64</td><td></td></tr> </table>	Cars	12	31	64	107	Trucks	0	0	0	0	Heavys	2	0	0	2	Totals	14	31	64		Peds Cross: ☒ South Peds: 12 South Entering: 109 South Leg Total: 234
Cars	120																															
Trucks	3																															
Heavys	2																															
Totals	125																															
Cars	12	31	64	107																												
Trucks	0	0	0	0																												
Heavys	2	0	0	2																												
Totals	14	31	64																													

Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc. Traffic Count Summary

Intersection: Grey Rd 19 & Scenic Caves Rd Count Date: 17-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals								
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds			
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total				
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0			
16:00:00	434	39	41	514	0	609	16:00:00	14	25	56	95	4			
17:00:00	454	42	35	531	0	631	17:00:00	13	28	59	100	12			
18:00:00	425	35	20	480	0	560	18:00:00	9	21	50	80	7			
Totals:						1800	S Totals:								
						1313	116	96	1525	0	36	74	165	275	23
East Approach Totals						East/West Total Approaches	West Approach Totals								
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds			
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total				
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0			
16:00:00	37	134	349	520	3	795	16:00:00	55	203	17	275	0			
17:00:00	47	106	363	516	6	801	17:00:00	41	225	19	285	0			
18:00:00	36	78	343	457	5	632	18:00:00	29	132	14	175	1			
Totals:						2228	W Totals:								
						120	318	1055	1493	14	125	560	50	735	1
Calculated Values for Traffic Crossing Major Street															
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00			
Crossing Values:	0	490	515	475					0	0	0	0			

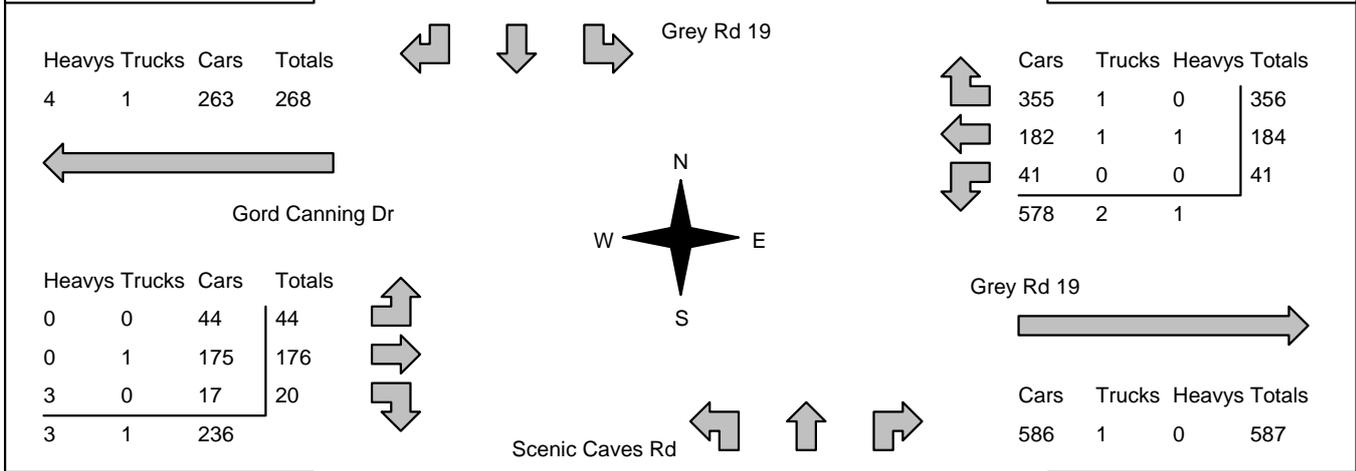
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:15:00 To: 16:15:00
-------------------------------	---	--

Municipality: Blue Mountain Site #: 1705600002 Intersection: Grey Rd 19 & Scenic Caves Rd TFR File #: 1 Count date: 18-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
--	---

** Non-Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
--	--

North Leg Total: 886 North Entering: 453 North Peds: 1 Peds Cross: \boxtimes	<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>58</td><td>37</td><td>358</td><td>453</td></tr> <tr><td>Totals</td><td>58</td><td>37</td><td>358</td><td></td></tr> </table>	Heavys	0	0	0	0	Trucks	0	0	0	0	Cars	58	37	358	453	Totals	58	37	358			<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>432</td></tr> <tr><td>Totals</td><td>433</td></tr> </table>	Heavys	0	Trucks	1	Cars	432	Totals	433	East Leg Total: 1168 East Entering: 581 East Peds: 0 Peds Cross: \boxtimes
Heavys	0	0	0	0																												
Trucks	0	0	0	0																												
Cars	58	37	358	453																												
Totals	58	37	358																													
Heavys	0																															
Trucks	1																															
Cars	432																															
Totals	433																															



Peds Cross: \boxtimes West Peds: 1 West Entering: 240 West Leg Total: 508	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>95</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>3</td></tr> <tr><td>Totals</td><td>98</td></tr> </table>	Cars	95	Trucks	0	Heavys	3	Totals	98		<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>23</td><td>33</td><td>53</td><td>109</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Heavys</td><td>3</td><td>0</td><td>0</td><td>3</td></tr> <tr><td>Totals</td><td>26</td><td>33</td><td>53</td><td></td></tr> </table>	Cars	23	33	53	109	Trucks	0	0	0	0	Heavys	3	0	0	3	Totals	26	33	53		Peds Cross: \boxtimes South Peds: 5 South Entering: 112 South Leg Total: 210
Cars	95																															
Trucks	0																															
Heavys	3																															
Totals	98																															
Cars	23	33	53	109																												
Trucks	0	0	0	0																												
Heavys	3	0	0	3																												
Totals	26	33	53																													

Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Grey Rd 19 & Scenic Caves Rd Count Date: 18-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	373	43	56	472	1	579	16:00:00	20	32	55	107	4
17:00:00	385	40	39	464	1	573	17:00:00	16	28	65	109	13
18:00:00	376	23	18	417	0	488	18:00:00	7	16	48	71	7
Totals:						1640	S Totals:					
						43						
						76						
						168						
						287						
						24						
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	40	178	349	567	0	786	16:00:00	43	160	16	219	1
17:00:00	34	125	315	474	2	688	17:00:00	32	162	20	214	0
18:00:00	24	82	261	367	0	549	18:00:00	24	150	8	182	0
Totals:						2023	W Totals:					
						99						
						472						
						44						
						615						
						1						
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00
Crossing Values:	0	437	443	406					0	0	0	0

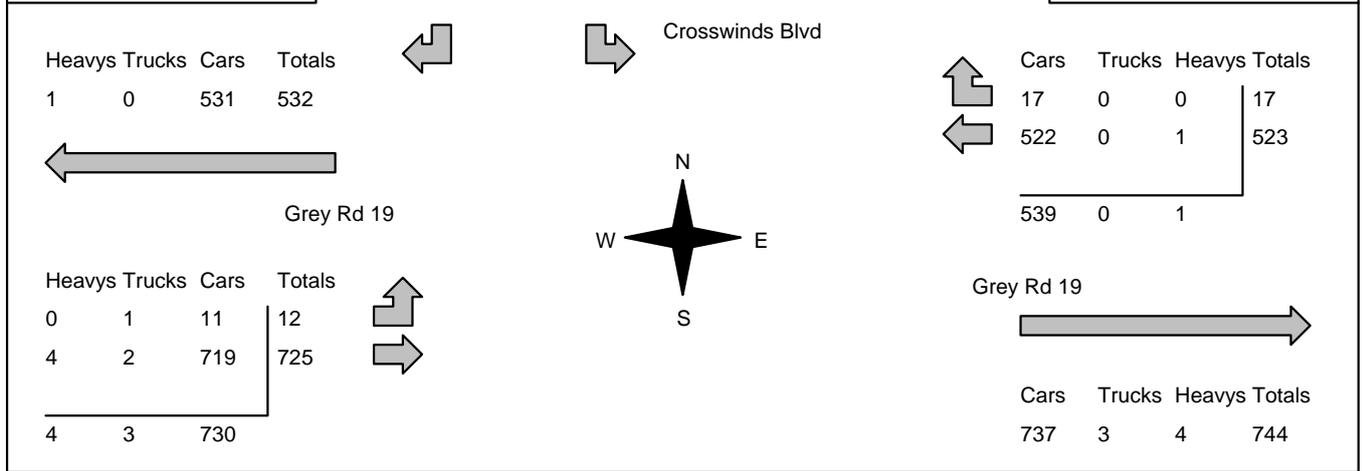
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:15:00 To: 16:15:00
-------------------------------	---	--

Municipality: Blue Mountain Site #: 1705600003 Intersection: Grey Rd 19 & Crosswinds Blvd TFR File #: 1 Count date: 17-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
--	---

** Non-Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
--	--

North Leg Total: 57 North Entering: 28 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Cars</td><td>9</td><td>18</td><td>27</td></tr> <tr><td>Totals</td><td>9</td><td>19</td><td></td></tr> </table>	Heavys	0	0	0	Trucks	0	1	1	Cars	9	18	27	Totals	9	19			Heavys 0 Trucks 1 Cars 28 Totals 29	East Leg Total: 1284 East Entering: 540 East Peds: 0 Peds Cross: ☒
Heavys	0	0	0																	
Trucks	0	1	1																	
Cars	9	18	27																	
Totals	9	19																		



Peds Cross: ☒ West Peds: 0 West Entering: 737 West Leg Total: 1269	
---	--

Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Grey Rd 19 & Crosswinds Blvd Count Date: 17-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	15	0	7	22	0	22	16:00:00	0	0	0	0	0
17:00:00	17	0	4	21	1	21	17:00:00	0	0	0	0	0
18:00:00	9	0	6	15	0	15	18:00:00	0	0	0	0	0
Totals:	41	0	17	58	1	58	S Totals:	0	0	0	0	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	520	13	533	0	1231	16:00:00	10	688	0	698	0
17:00:00	0	520	15	535	0	1282	17:00:00	8	739	0	747	0
18:00:00	0	461	16	477	0	1089	18:00:00	2	610	0	612	0
Totals:	0	1501	44	1545	0	3602	W Totals:	20	2037	0	2057	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	15:00	16:00	17:00	18:00		0:00	0:00	0:00	0:00			
Crossing Values:	0	15	17	9		0	0	0	0			

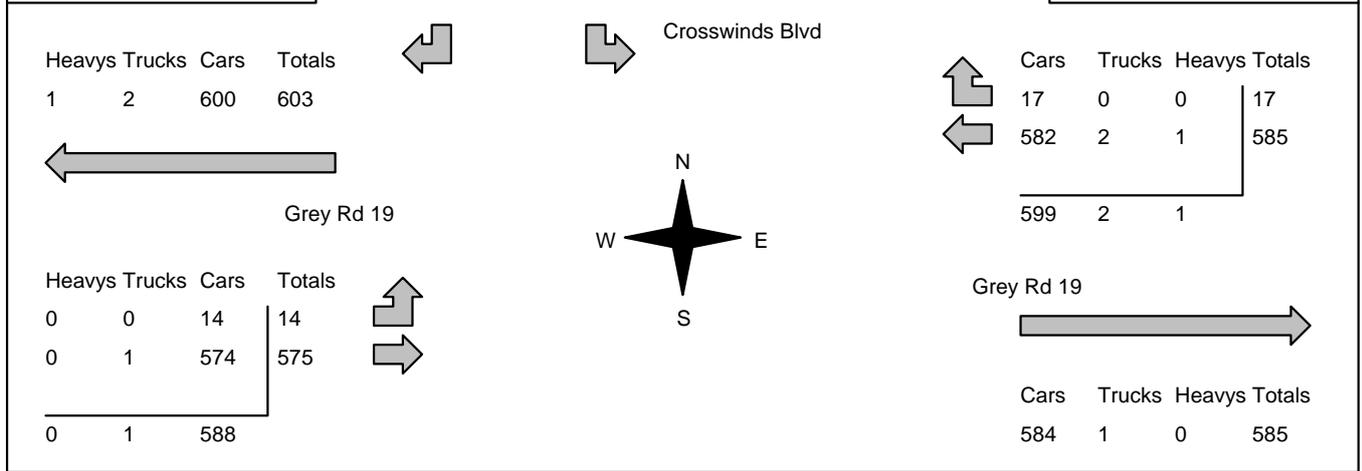
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:15:00 To: 16:15:00
-------------------------------	---	--

Municipality: Blue Mountain Site #: 1705600003 Intersection: Grey Rd 19 & Crosswinds Blvd TFR File #: 1 Count date: 18-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
--	---

** Non-Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
--	--

North Leg Total: 59 North Entering: 28 North Peds: 1 Peds Cross: \times	<table style="margin: auto;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>18</td><td>10</td><td>28</td></tr> <tr><td>Totals</td><td>18</td><td>10</td><td></td></tr> </table>	Heavys	0	0	0	Trucks	0	0	0	Cars	18	10	28	Totals	18	10			Heavys 0 Trucks 0 Cars 31 Totals 31	East Leg Total: 1187 East Entering: 602 East Peds: 0 Peds Cross: \times
Heavys	0	0	0																	
Trucks	0	0	0																	
Cars	18	10	28																	
Totals	18	10																		



Peds Cross: \times West Peds: 0 West Entering: 589 West Leg Total: 1192	
--	--

Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc. Traffic Count Summary

Intersection: Grey Rd 19 & Crosswinds Blvd Count Date: 18-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	8	0	14	22	1	22	16:00:00	0	0	0	0	0	
17:00:00	14	0	11	25	0	25	17:00:00	0	0	0	0	0	
18:00:00	3	0	11	14	0	14	18:00:00	0	0	0	0	0	
Totals:						61	S Totals:						0
East Approach Totals <th rowspan="3" style="text-align: center;">East/West Total Approaches</th> <th colspan="6" style="text-align: center;">West Approach Totals</th>						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	567	16	583	0	1172	16:00:00	19	570	0	589	0	
17:00:00	0	472	9	481	0	1093	17:00:00	7	605	0	612	0	
18:00:00	0	370	8	378	0	959	18:00:00	10	571	0	581	0	
Totals:						3224	W Totals:						0
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00	
Crossing Values:	0	8	14	3					0	0	0	0	

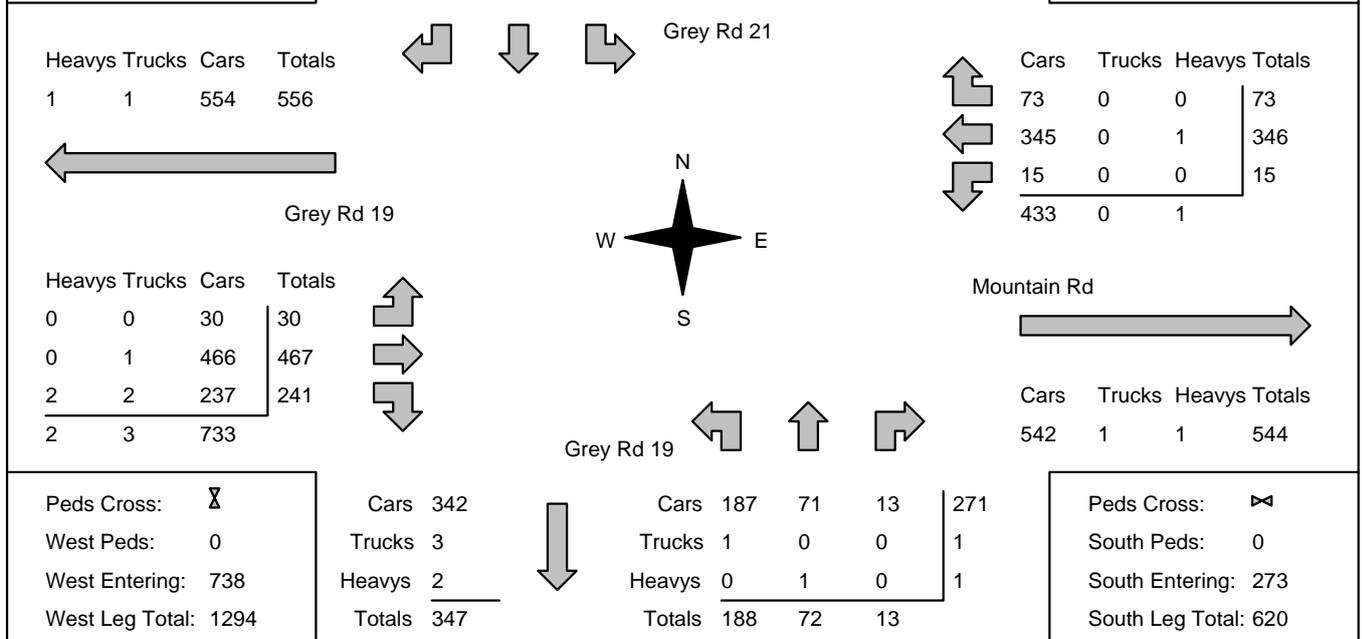
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:30:00 To: 16:30:00
-------------------------------	---	--

Municipality: Blue Mountain Site #: 1705600004 Intersection: Grey Rd 19 & Grey Rd 21 TFR File #: 1 Count date: 17-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
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** Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
--------------------------------------	--

North Leg Total: 352 North Entering: 177 North Peds: 1 Peds Cross: \boxtimes	<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>22</td><td>90</td><td>63</td><td>175</td></tr> <tr><td>Totals</td><td>22</td><td>91</td><td>64</td><td></td></tr> </table>	Heavys	0	0	1	1	Trucks	0	1	0	1	Cars	22	90	63	175	Totals	22	91	64			<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>174</td></tr> <tr><td>Totals</td><td>175</td></tr> </table>	Heavys	1	Trucks	0	Cars	174	Totals	175	East Leg Total: 978 East Entering: 434 East Peds: 2 Peds Cross: \boxtimes
Heavys	0	0	1	1																												
Trucks	0	1	0	1																												
Cars	22	90	63	175																												
Totals	22	91	64																													
Heavys	1																															
Trucks	0																															
Cars	174																															
Totals	175																															



Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc. Traffic Count Summary

Intersection: Grey Rd 19 & Grey Rd 21 Count Date: 17-Mar-17 Municipality: Blue Mountain

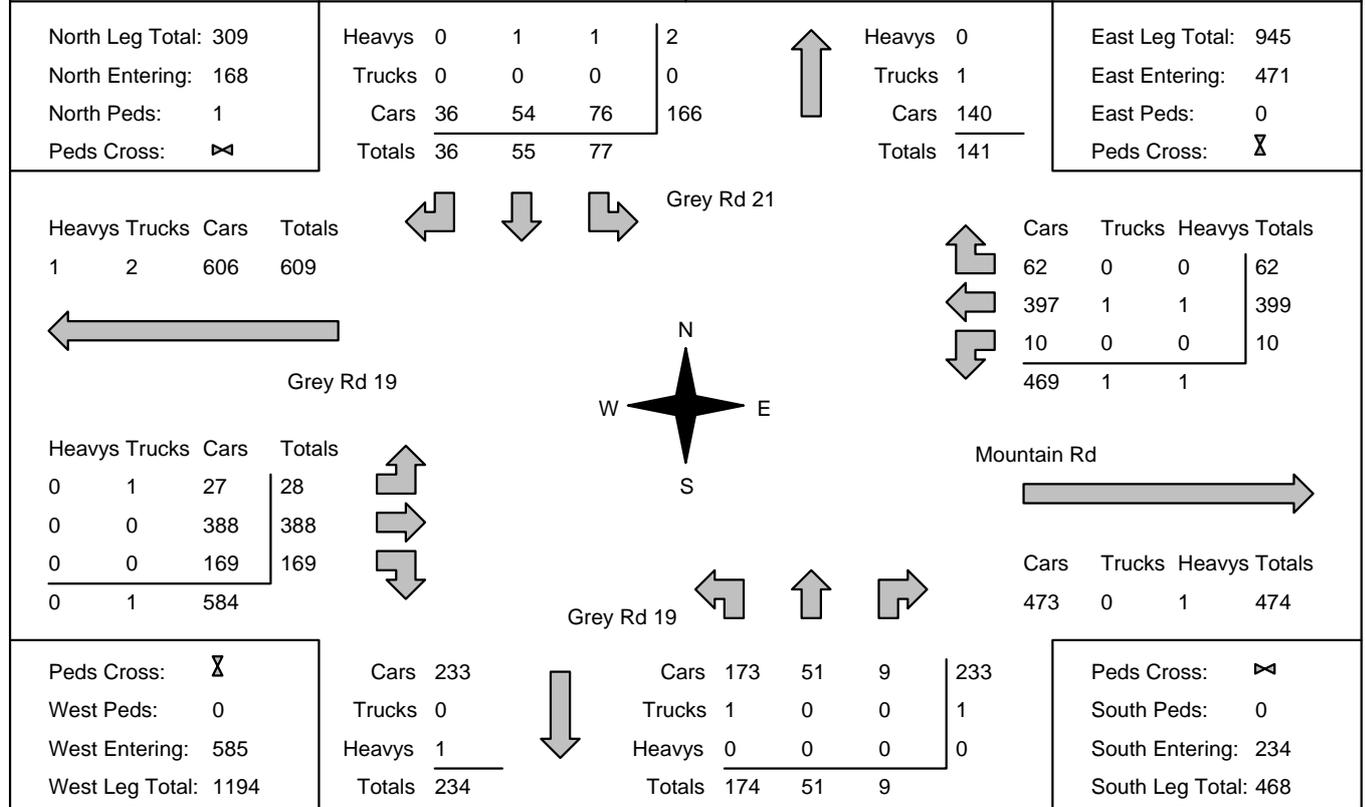
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	78	72	27	177	1	426	16:00:00	165	75	9	249	2	
17:00:00	61	92	15	168	0	460	17:00:00	198	78	16	292	0	
18:00:00	44	77	24	145	0	322	18:00:00	107	57	13	177	0	
Totals:						1208	S Totals:						2
East Approach Totals <th rowspan="3" style="text-align: center;">East/West Total Approaches</th> <th colspan="6" style="text-align: center;">West Approach Totals</th>						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	20	344	69	433	1	1141	16:00:00	28	450	230	708	0	
17:00:00	14	324	63	401	2	1154	17:00:00	20	487	246	753	0	
18:00:00	10	347	55	412	0	1030	18:00:00	15	394	209	618	6	
Totals:						3325	W Totals:						6
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00	
Crossing Values:	0	319	353	234					0	0	0	0	

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:15:00 To: 16:15:00
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Municipality: Blue Mountain Site #: 1705600004 Intersection: Grey Rd 19 & Grey Rd 21 TFR File #: 1 Count date: 18-Mar-17	Weather conditions: Person counted: Person prepared: Person checked:
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** Signalized Intersection **	Major Road: Grey Rd 19 runs W/E
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Comments



Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

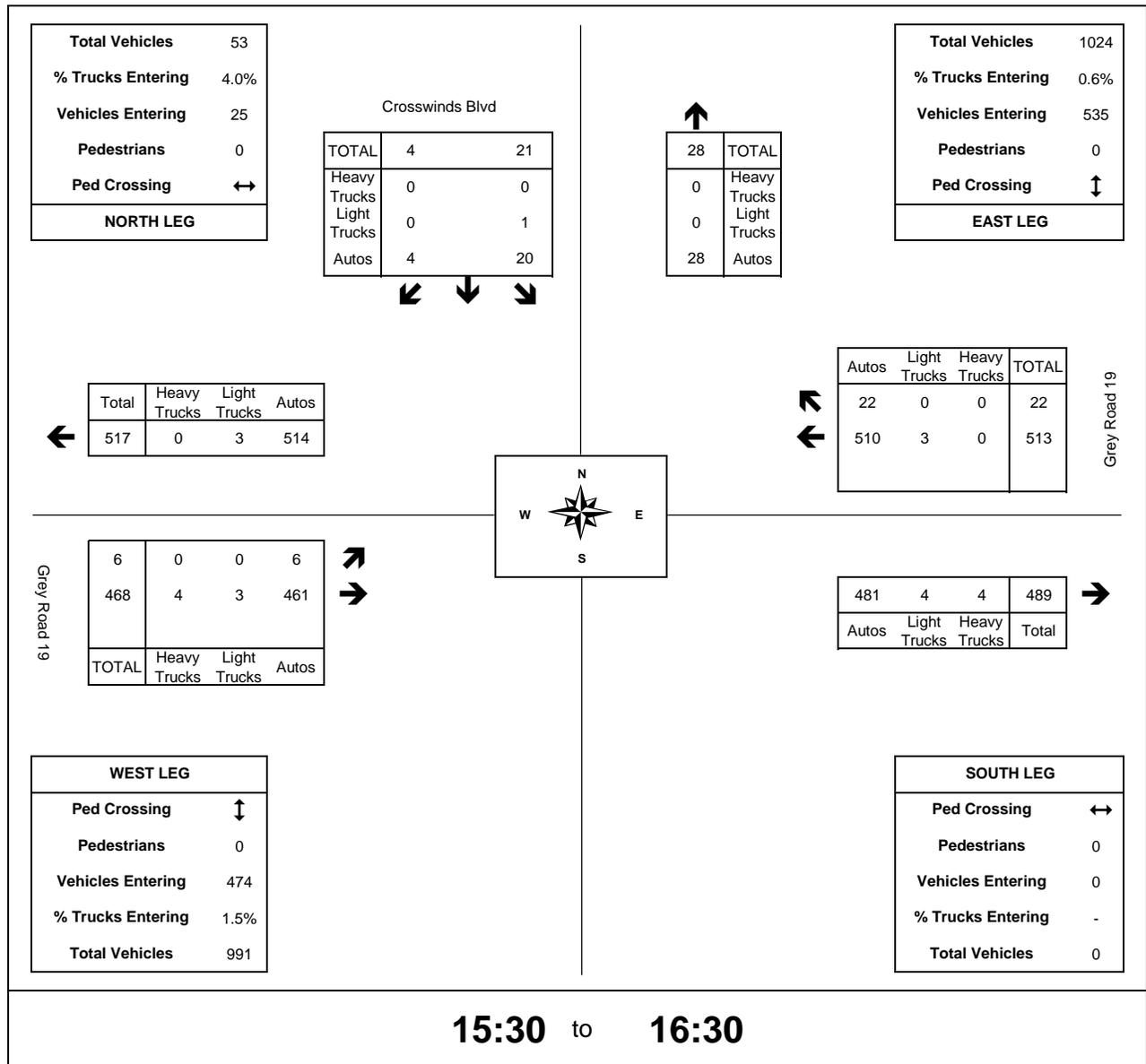
Accu-Traffic Inc.

Traffic Count Summary

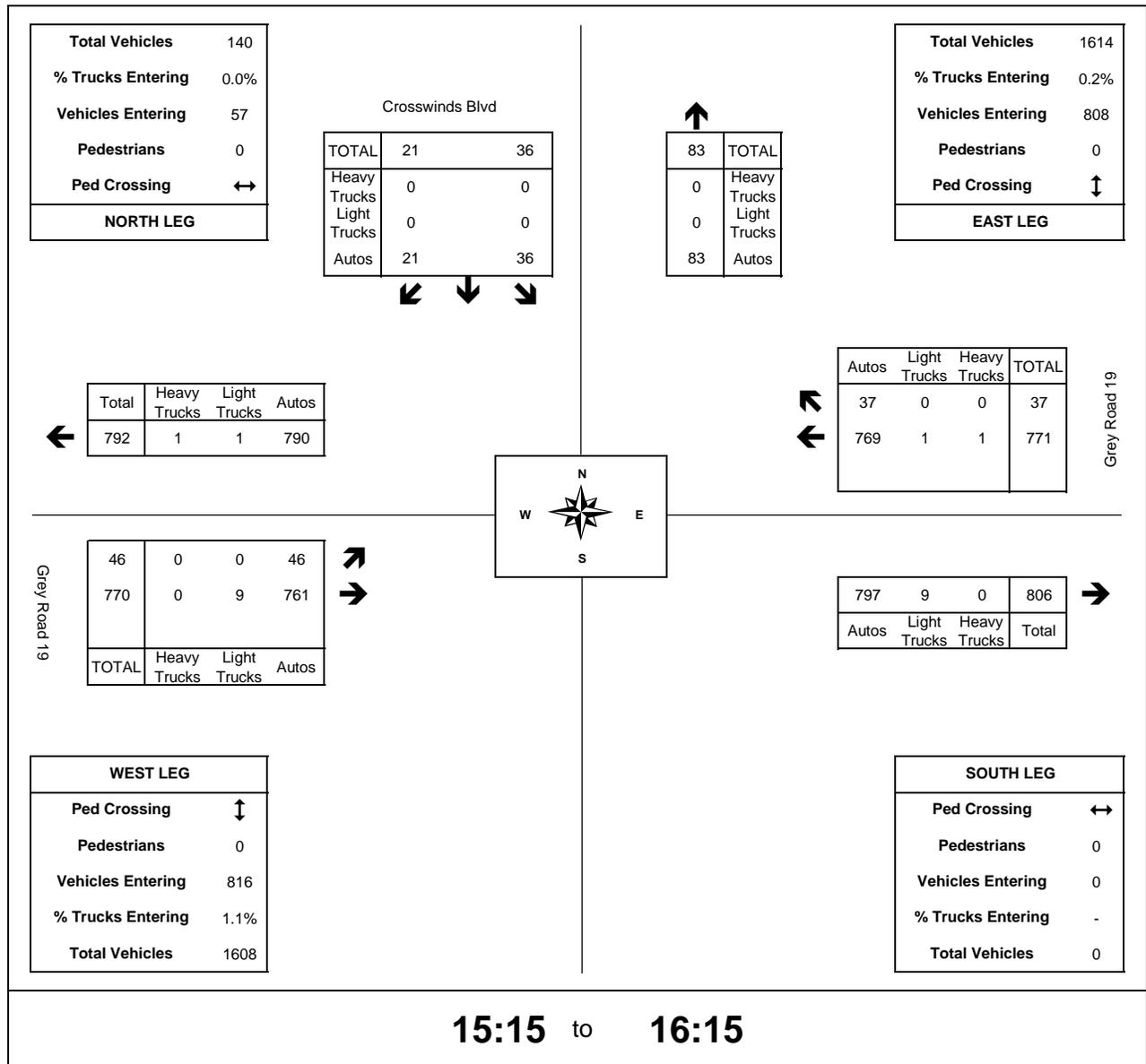
Intersection: Grey Rd 19 & Grey Rd 21 Count Date: 18-Mar-17 Municipality: Blue Mountain

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	77	49	31	157	1	389	16:00:00	169	51	12	232	0	
17:00:00	62	55	34	151	1	343	17:00:00	135	48	9	192	0	
18:00:00	43	56	13	112	0	259	18:00:00	95	46	6	147	0	
Totals:						991	S Totals:						0
East Approach Totals <th rowspan="3" style="text-align: center;">East/West Total Approaches</th> <th colspan="6" style="text-align: center;">West Approach Totals</th>						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	15	388	62	465	0	1042	16:00:00	25	388	164	577	0	
17:00:00	14	316	59	389	1	1005	17:00:00	34	398	184	616	1	
18:00:00	10	274	42	326	0	899	18:00:00	16	375	182	573	2	
Totals:						2946	W Totals:						3
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	15:00	16:00	17:00	18:00					0:00	0:00	0:00	0:00	
Crossing Values:	0	297	254	196					0	0	0	0	

GENERAL INFORMATION			
Surveyor Name	Alanna Carreira	Jurisdiction/Date	TOBM Feb 28/29, 2020
Weather Conditions	Feb 28: Snowing, -8oC. Feb 29: clear, -6oC	Major Street	Grey Road 19 E-W
Project Name	Windfall	Minor Street	Crosswinds Blvd N-S
Project Number	111179	Intersection Control	stop control on minor street
Additional Comments southbound traffic turning left had long wait times (~3 mins?). Some gave up and turned right.			



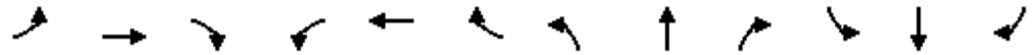
GENERAL INFORMATION			
Surveyor Name	Alanna Carreira	Jurisdiction/Date	TOBM Feb 28/29, 2020
Weather Conditions	Feb 28: Snowing, -8oC. Feb 29: clear, -6oC	Major Street	Grey Road 19 E-W
Project Name	Windfall	Minor Street	Crosswinds Blvd N-S
Project Number	111179	Intersection Control	stop control on minor street
Additional Comments southbound traffic turning left had long wait times (~3 mins?). Some gave up and turned right.			



Appendix B: Traffic Operations - 2020

HCM Signalized Intersection Capacity Analysis
 1: Grey Road 19 & Mountain Road & Grey Road 21

2020 - Existing
 Friday PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	
Traffic Volume (vph)	34	306	158	15	332	77	180	78	13	66	95	24
Future Volume (vph)	34	306	158	15	332	77	180	78	13	66	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.98		1.00	0.97	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1853	1583		1814		1770	1822		1770	1807	
Flt Permitted		0.93	1.00		0.98		0.68	1.00		0.69	1.00	
Satd. Flow (perm)		1731	1583		1776		1261	1822		1294	1807	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	322	166	16	349	81	189	82	14	69	100	25
RTOR Reduction (vph)	0	0	109	0	18	0	0	8	0	0	13	0
Lane Group Flow (vph)	0	358	57	0	428	0	189	88	0	69	112	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		15.8	15.8		15.8		18.2	18.2		18.2	18.2	
Effective Green, g (s)		15.8	15.8		15.8		18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.34	0.34		0.34		0.40	0.40		0.40	0.40	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		594	543		610		498	720		511	714	
v/s Ratio Prot								0.05			0.06	
v/s Ratio Perm		0.21	0.04		c0.24		c0.15			0.05		
v/c Ratio		0.60	0.11		0.70		0.38	0.12		0.14	0.16	
Uniform Delay, d1		12.5	10.3		13.1		9.9	8.8		8.9	9.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.7	0.1		3.7		2.2	0.3		0.5	0.5	
Delay (s)		14.2	10.4		16.7		12.1	9.2		9.4	9.4	
Level of Service		B	B		B		B	A		A	A	
Approach Delay (s)		13.0			16.7			11.1			9.4	
Approach LOS		B			B			B			A	

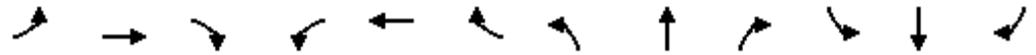
Intersection Summary

HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2020 - Existing
 Friday PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	2	232	8	1	2	217	209	14	4	148	30
Future Volume (vph)	44	2	232	8	1	2	217	209	14	4	148	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.90		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1586		1770	1676		1770	1845		1770	1815	
Flt Permitted	0.76	1.00		0.54	1.00		0.59	1.00		0.61	1.00	
Satd. Flow (perm)	1408	1586		1005	1676		1090	1845		1141	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	2	244	8	1	2	228	220	15	4	156	32
RTOR Reduction (vph)	0	208	0	0	2	0	0	3	0	0	11	0
Lane Group Flow (vph)	46	38	0	8	1	0	228	232	0	4	177	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.5	7.5		7.5	7.5		31.1	31.1		21.8	21.8	
Effective Green, g (s)	7.5	7.5		7.5	7.5		31.1	31.1		21.8	21.8	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.61		0.43	0.43	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	208	235		148	248		768	1133		491	781	
v/s Ratio Prot		0.02			0.00		c0.04	c0.13			0.10	
v/s Ratio Perm	c0.03			0.01			0.14			0.00		
v/c Ratio	0.22	0.16		0.05	0.01		0.30	0.20		0.01	0.23	
Uniform Delay, d1	19.0	18.8		18.5	18.4		4.4	4.3		8.2	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3		0.2	0.0		0.2	0.4		0.0	0.7	
Delay (s)	19.5	19.1		18.7	18.4		4.6	4.7		8.3	9.8	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		19.2			18.6			4.6			9.7	
Approach LOS		B			B			A			A	

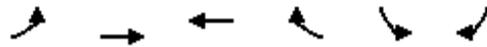
Intersection Summary

HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 4: Grey Road 19 & Crosswinds Blvd

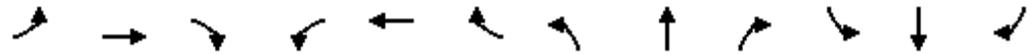
2020 - Existing
 Friday PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	468	513	22	21	4
Future Volume (Veh/h)	6	468	513	22	21	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	493	540	23	22	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	563				1056	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563				1056	552
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				91	99
cM capacity (veh/h)	1008				248	534
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	499	563	26			
Volume Left	6	0	22			
Volume Right	0	23	4			
cSH	1008	1700	270			
Volume to Capacity	0.01	0.33	0.10			
Queue Length 95th (m)	0.1	0.0	2.4			
Control Delay (s)	0.2	0.0	19.7			
Lane LOS	A		C			
Approach Delay (s)	0.2	0.0	19.7			
Approach LOS			C			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		39.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
 1: Grey Road 19 & Mountain Road & Grey Road 21

2020 Existing
 Saturday Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	
Traffic Volume (vph)	31	543	237	10	539	65	235	156	9	80	160	39
Future Volume (vph)	31	543	237	10	539	65	235	156	9	80	160	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.99		1.00	0.97	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1858	1583		1835		1770	1848		1770	1808	
Flt Permitted		0.95	1.00		0.99		0.63	1.00		0.65	1.00	
Satd. Flow (perm)		1771	1583		1812		1168	1848		1207	1808	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	572	249	11	567	68	247	164	9	84	168	41
RTOR Reduction (vph)	0	0	143	0	8	0	0	3	0	0	14	0
Lane Group Flow (vph)	0	605	106	0	638	0	247	170	0	84	195	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		22.5	22.5		22.5		18.2	18.2		18.2	18.2	
Effective Green, g (s)		22.5	22.5		22.5		18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.43	0.43		0.43		0.35	0.35		0.35	0.35	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		756	675		773		403	638		416	624	
v/s Ratio Prot								0.09			0.11	
v/s Ratio Perm		0.34	0.07		0.35		0.21			0.07		
v/c Ratio		0.80	0.16		0.83		0.61	0.27		0.20	0.31	
Uniform Delay, d1		13.1	9.3		13.4		14.3	12.4		12.1	12.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.1	0.1		7.2		6.8	1.0		1.1	1.3	
Delay (s)		19.2	9.4		20.5		21.1	13.5		13.2	14.0	
Level of Service		B	A		C		C	B		B	B	
Approach Delay (s)		16.4			20.5			18.0			13.8	
Approach LOS		B			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	52.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2020 Existing
Saturday Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	2	383	10	1	3	309	257	13	3	219	30
Future Volume (vph)	41	2	383	10	1	3	309	257	13	3	219	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.89		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585		1770	1653		1770	1849		1770	1829	
Flt Permitted	0.76	1.00		0.47	1.00		0.55	1.00		0.59	1.00	
Satd. Flow (perm)	1407	1585		877	1653		1016	1849		1090	1829	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	43	2	403	11	1	3	325	271	14	3	231	32
RTOR Reduction (vph)	0	338	0	0	3	0	0	3	0	0	7	0
Lane Group Flow (vph)	43	67	0	11	1	0	325	282	0	3	256	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.5	8.5		8.5	8.5		32.2	32.2		21.1	21.1	
Effective Green, g (s)	8.5	8.5		8.5	8.5		32.2	32.2		21.1	21.1	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.61	0.61		0.40	0.40	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	255		141	266		750	1129		436	732	
v/s Ratio Prot		c0.04			0.00		c0.07	0.15			c0.14	
v/s Ratio Perm	0.03			0.01			0.19			0.00		
v/c Ratio	0.19	0.26		0.08	0.01		0.43	0.25		0.01	0.35	
Uniform Delay, d1	19.1	19.4		18.8	18.6		4.9	4.7		9.5	11.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		0.2	0.0		0.4	0.5		0.0	1.3	
Delay (s)	19.5	19.9		19.0	18.6		5.3	5.2		9.5	12.3	
Level of Service	B	B		B	B		A	A		A	B	
Approach Delay (s)		19.9			18.9			5.3			12.3	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	52.7	Sum of lost time (s)	14.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Grey Road 19 & Crosswinds Blvd

2020 Existing
Saturday Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	46	770	771	37	36	21
Future Volume (Veh/h)	46	770	771	37	36	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	48	811	812	39	38	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	851				1738	832
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	851				1738	832
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				58	94
cM capacity (veh/h)	788				90	369
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	859	851	60			
Volume Left	48	0	38			
Volume Right	0	39	22			
cSH	788	1700	125			
Volume to Capacity	0.06	0.50	0.48			
Queue Length 95th (m)	1.5	0.0	16.7			
Control Delay (s)	1.6	0.0	58.3			
Lane LOS	A		F			
Approach Delay (s)	1.6	0.0	58.3			
Approach LOS			F			
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			88.2%	ICU Level of Service	E	
Analysis Period (min)			15			

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday										
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	
GR19 & GR119 - 2020 Existing																			
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	[3 - Gord Canning Dr - West approach]	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A				
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A				
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A				
GR19 & GR119 - 2025 BG																			
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	[3 - Gord Canning Dr - West approach]	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A				
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B				
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A				
GR19 & GR119 - 2030 BG																			
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	[3 - Gord Canning Dr - West approach]	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A				
GR19 & GR119 - 2035 BG																			
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	[3 - Gord Canning Dr - West approach]	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A				
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D				
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A				
GR19 & GR119 - 2025 TT																			
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	[3 - Gord Canning Dr - West approach]	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A				
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B				
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A				
GR19 & GR119 - 2030 TT																			
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	[3 - Gord Canning Dr - West approach]	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A				
GR19 & GR119 - 2035 TT																			
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	[3 - Gord Canning Dr - West approach]	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A				
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C				
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

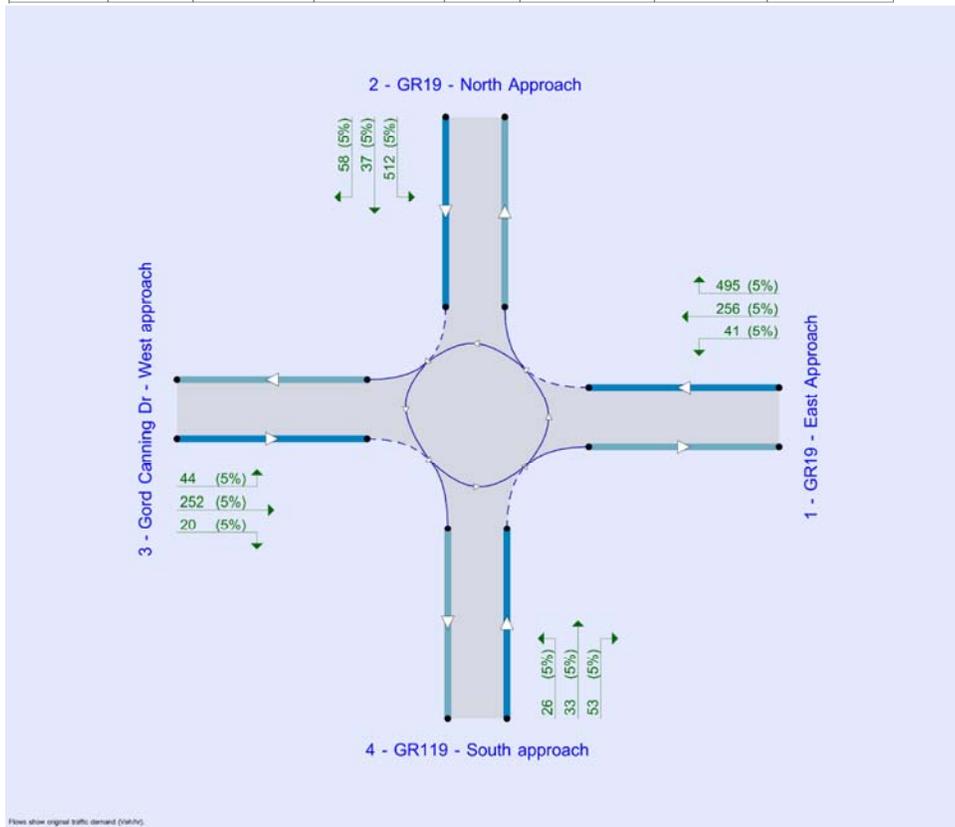
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/hr).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2020 Existing, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	2.84	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	157	3 - Gord Canning Dr - West approach

Legs

Legs

Leg	Name	Description
1	GR19 - East Approach	
2	GR19 - North Approach	
3	Gord Canning Dr - West approach	
4	GR119 - South approach	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - GR19 - East Approach	4.00	8.50	30.0	40.0	60.0	15.0	
2 - GR19 - North Approach	4.00	8.50	30.0	55.0	60.0	15.0	
3 - Gord Canning Dr - West approach	2.25	4.50	15.0	25.0	60.0	15.0	
4 - GR119 - South approach	2.00	5.00	25.0	30.0	60.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - GR19 - East Approach	0.680	2296
2 - GR19 - North Approach	0.685	2311
3 - Gord Canning Dr - West approach	0.489	1213
4 - GR119 - South approach	0.514	1349

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	516	100.000
2 - GR19 - North Approach		✓	383	100.000
3 - Gord Canning Dr - West approach		✓	198	100.000
4 - GR119 - South approach		✓	109	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	516	0.92	SecondQuarter
2 - GR19 - North Approach	383	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	198	0.92	SecondQuarter
4 - GR119 - South approach	109	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	352	115	49
	2 - GR19 - North Approach	286	0	45	52
	3 - Gord Canning Dr - West approach	125	49	0	24
	4 - GR119 - South approach	64	31	14	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
1 - GR19 - East Approach		0	5	5	5

	2 - GR19 - North Approach	5	0	5	5
From	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.26	2.31	0.4	1.4	A
2 - GR19 - North Approach	0.20	2.18	0.3	0.6	A
3 - Gord Canning Dr - West approach	0.23	4.90	0.3	1.3	A
4 - GR119 - South approach	0.12	3.96	0.1	0.5	A

GR19 & GR119 - 2020 Existing, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.72	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	64	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2020 Existing	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	792	100.000
2 - GR19 - North Approach		✓	607	100.000
3 - Gord Canning Dr - West approach		✓	316	100.000
4 - GR119 - South approach		✓	112	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	792	0.92	SecondQuarter
2 - GR19 - North Approach	607	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	316	0.92	SecondQuarter
4 - GR119 - South approach	112	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	495	256	41
	2 - GR19 - North Approach	512	0	58	37
	3 - Gord Canning Dr - West approach	252	44	0	20
	4 - GR119 - South approach	53	33	26	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.41	2.88	0.7	1.5	A
2 - GR19 - North Approach	0.34	2.77	0.5	2.1	A
3 - Gord Canning Dr - West approach	0.41	7.20	0.7	1.9	A
4 - GR119 - South approach	0.15	5.05	0.2	0.5	A

Appendix C: Other Development Traffic

SITE TRIP ESTIMATES - BACKGROUND DEVELOPMENT

TRIP ESTIMATES - TRIP RATES												
Proposed Land Use	ITE Code	Variable	AM Peak Hour			PM Peak Hour			Saturday Peak			Notes
			in	out	total	in	out	total	in	out	total	
single family detached	210	units	0.19	0.56	0.74	0.62	0.37	0.99	0.50	0.43	0.93	10th Ed
multifamily housing (low-rise) - (1 or 2 levels)	220	units	0.11	0.35	0.46	0.35	0.21	0.56	0.35	0.35	0.70	10th Ed
multifamily housing (mid-rise) - (3-10 levels)	221	units	0.09	0.27	0.36	0.27	0.17	0.44	0.22	0.22	0.44	10th Ed

TRIP ESTIMATES - MOUNTAIN HOUSE				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
Building A - Phase 1	221	14	units	14		14	4	2	6	3	3	6	4	2	6	3	3	6						
B - 1	221	21	units	21		21	6	4	9	5	5	9	6	4	9	5	5	9						
C - 1	221	21	units	21		21	6	4	9	5	5	9	6	4	9	5	5	9						
D - 2	221	28	units		28	28	8	5	12	6	6	12							8	5	12	6	6	12
E - 3	221	24	units		24	24	6	4	11	5	5	11							6	4	11	5	5	11
F - 3	221	28	units		28	28	8	5	12	6	6	12							8	5	12	6	6	12
G - 2	221	21	units		21	21	6	4	9	5	5	9							6	4	9	5	5	9
H - 3	221	21	units		21	21	6	4	9	5	5	9							6	4	9	5	5	9
I - 3	221	12	units		12	12	3	2	5	3	3	5							3	2	5	3	3	5
J - 2	221	12	units		12	12	3	2	5	3	3	5							3	2	5	3	3	5
K - 2	221	14	units		14	14	4	2	6	3	3	6							4	2	6	3	3	6
L - 1	221	14	units	14		14	4	2	6	3	3	6	4	2	6	3	3	6						
TOTAL		230	units	70	160	230	62	39	101	50	52	101	19	12	31	15	16	31	43	27	70	34	36	70
Phase 1		70	units	70		70	19	12	31	15	16	31	19	12	31	15	16	31						
Phase 2		75	units		75	75	20	13	33	16	17	33							20	13	33	16	17	33
Phase 3		85	units		85	85	23	15	37	18	19	37							23	15	37	18	19	37

TRIP ESTIMATES - SECOND NATURE				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
Phase 1	210	37	units	33	4	37	23	14	37	19	16	34	21	12	33	17	14	31	2	1	4	2	2	4
Phase 2			Crosswinds Blvd construction																					
Phase 3	210	141	units		141	141	88	52	140	71	60	131							88	52	140	71	60	131
TOTAL - TRIP ESTIMATES - SECOND NATURE		178		33	145	178	111	65	176	89	76	166	21	12	33	17	14	31	90	53	144	73	62	135

TRIP ESTIMATES - MONTERRA PHASE 2				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
singles	210	32	units		32	32	20	12	32	16	14	30							20	12	32	16	14	30
semis	221		units																					
TOTAL - TRIP ESTIMATES - MONTERRA PHASE 2		32			32	32	20	12	32	16	14	30							20	12	32	16	14	30

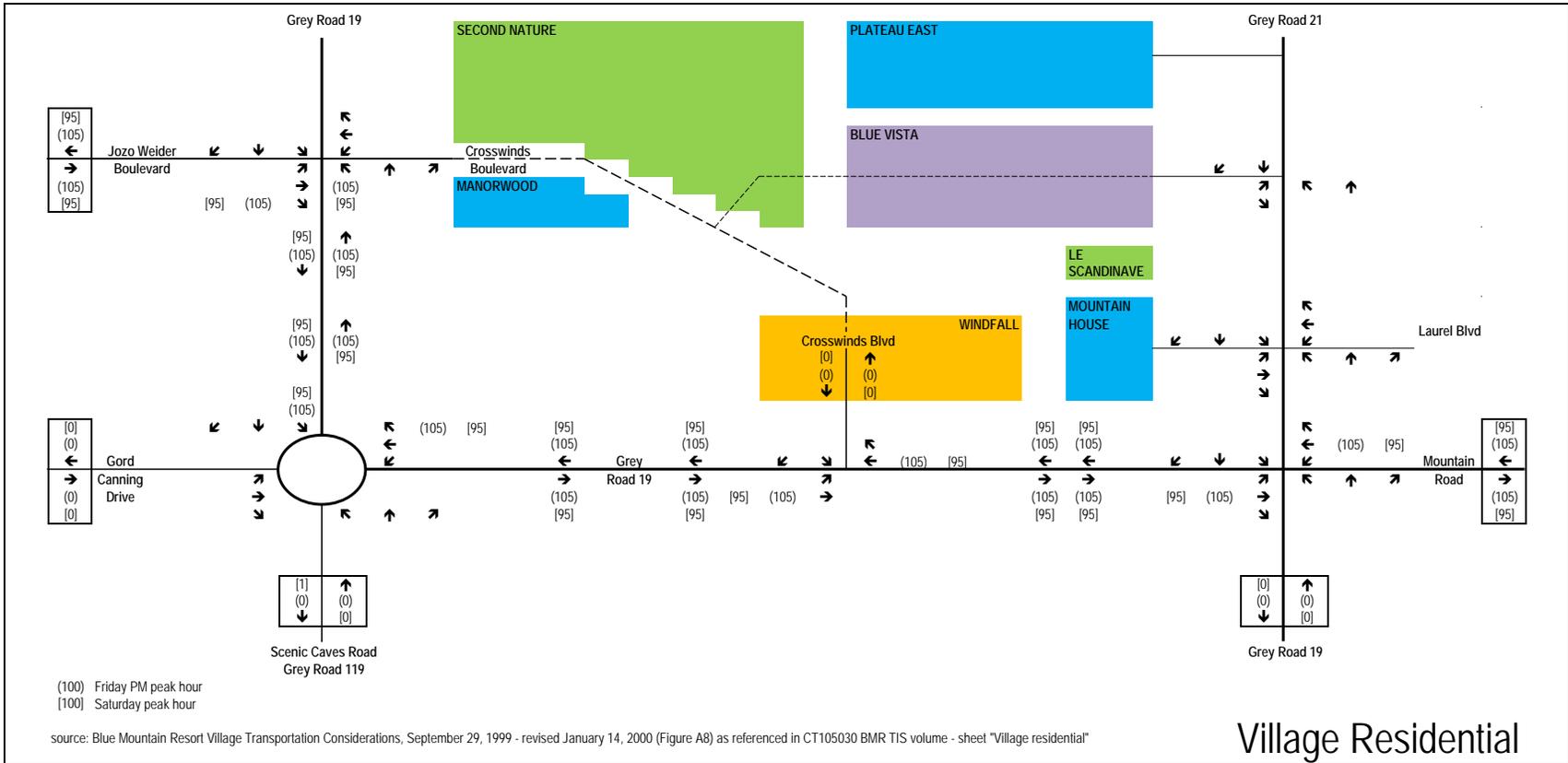
TRIP ESTIMATES - BLUE VISTA				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
singles	210	133	units		133	133	83	49	132	67	57	124							83	49	132	67	57	124
semis	221		units																					
TOTAL - TRIP ESTIMATES - BLUE VISTA		133			133	133	83	49	132	67	57	124							83	49	132	67	57	124

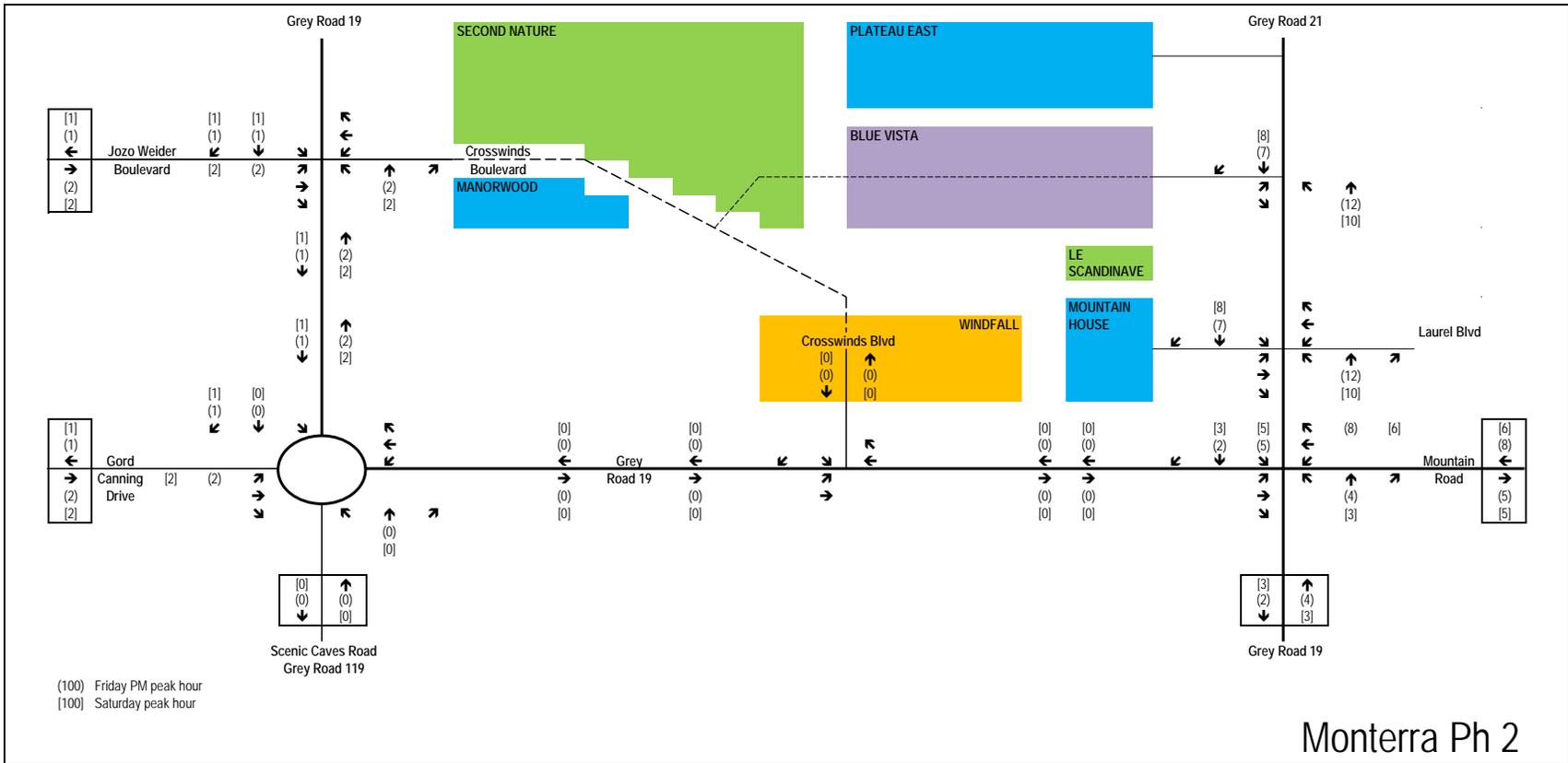
SITE TRIP ESTIMATES - BACKGROUND DEVELOPMENT

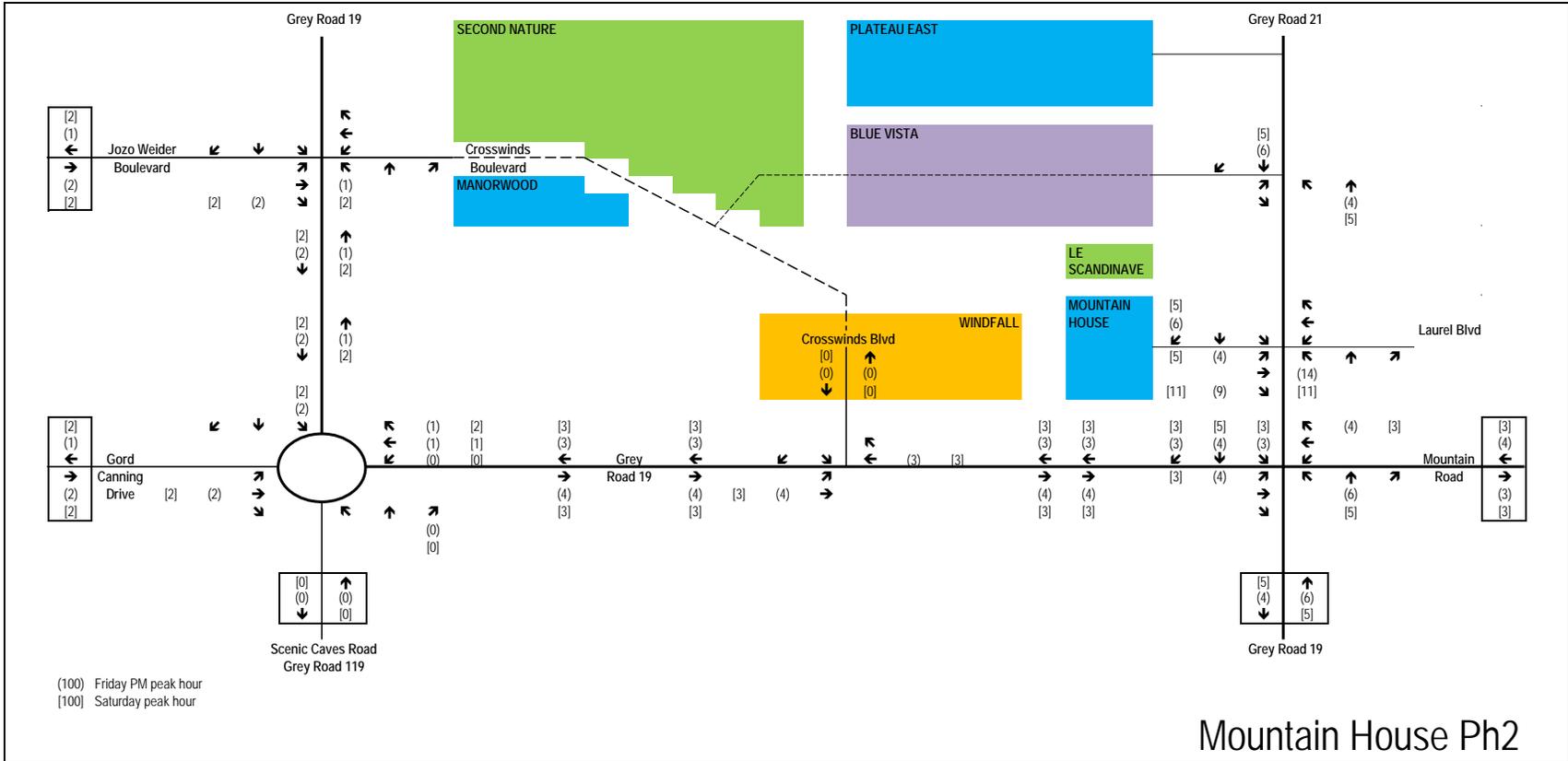
TRIP ESTIMATES - PLATEAU EAST				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
singles	210	39	units	39		39	24	14	39	20	17	36	24	14	39	20	17	36						
semis	230		units																					
TOTAL - TRIP ESTIMATES - PLATEAU EAST				39		39	24	14	39	20	17	36	24	14	39	20	17	36						

TRIP ESTIMATES - MANORWOOD HOMES				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Proposed Land Use	ITE Code Applied	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak		
							in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total
Block 152	221	60	units		60	60	16	10	26	13	13	26				16	10	26	13	13	26			
Block 153	221	18	units		18	18	5	3	8	4	4	8				5	3	8	4	4	8			
TOTAL - TRIP ESTIMATES - MANORWOOD HOMES				78		78	21	13	34	17	18	34				21	13	34	17	18	34			

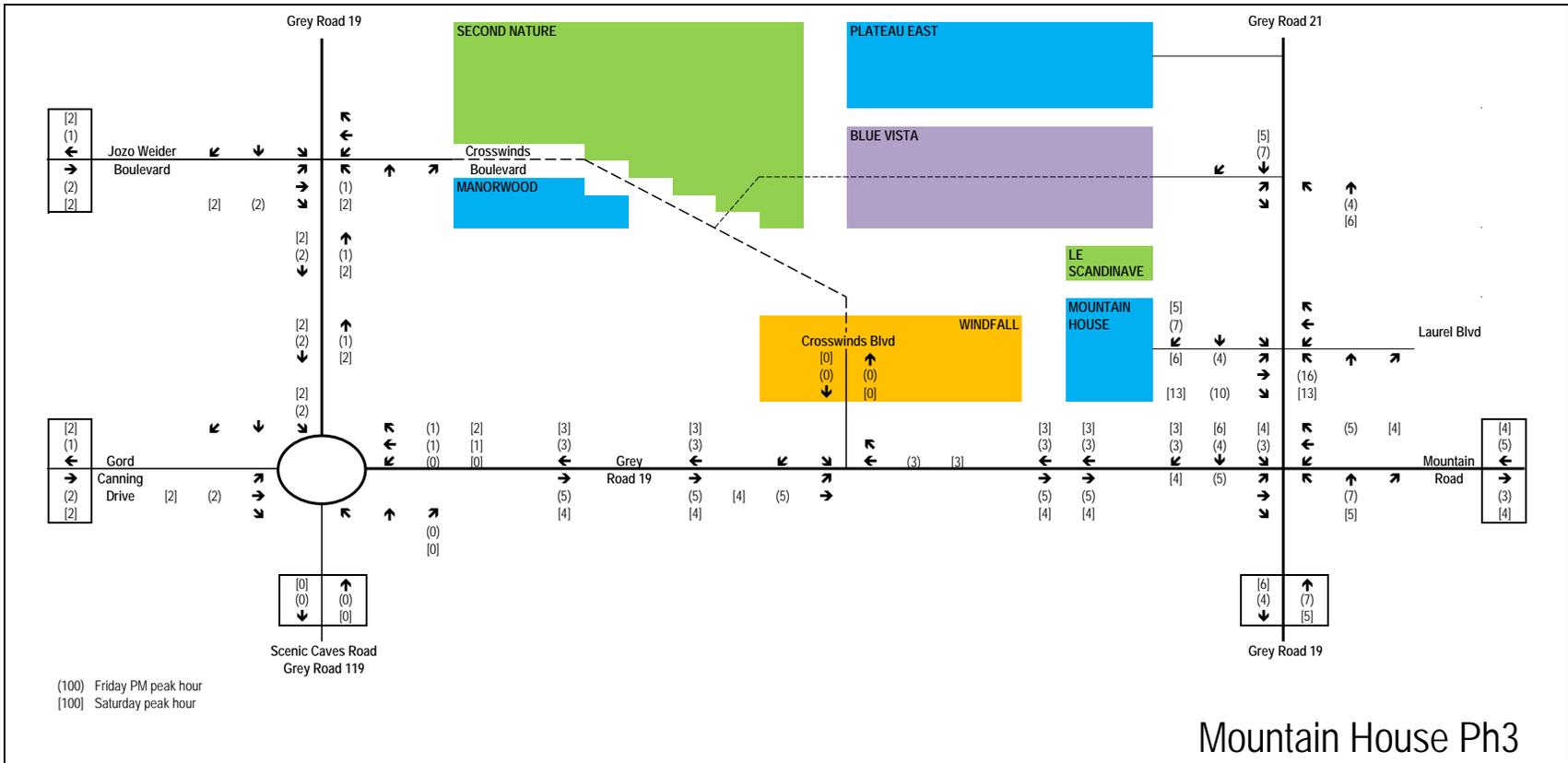
TRIP ESTIMATES - BACKGROUND DEVELOPMENTS				Unit Count as of Feb 2020			Trip Estimates for Total Units						Trip Estimates for Existing Units						Trip Estimates for Remaining Units					
Development	Proposed Size	Variable	Existing	Remaining	Total	PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			PM Peak Hour			Saturday Peak			
						in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	in	out	total	
Blue Vista	133	units		133	133	83	49	132	67	57	124				83	49	132	67	57	124				
Manorwood	78	units		78	78	21	13	34	17	18	34				21	13	34	17	18	34				
Monterra Phase 2	32	units		32	32	20	12	32	16	14	30				20	12	32	16	14	30				
Mountain House	230	units	70	160	230	62	39	101	50	52	101	19	12	31	15	16	31	43	27	70	34	36	70	
Plateau East	39	units	39		39	24	14	39	20	17	36	24	14	39	20	17	36							
Second Nature	178	units	33	145	178	111	65	176	89	76	166	21	12	33	17	14	31	90	53	144	73	62	135	
TOTAL				690		690	321	193	514	258	233	491	64	38	102	51	47	98	257	154	412	207	186	393







Mountain House Ph2



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Grey Road 19

Grey Road 21

SECOND NATURE

Crosswinds Boulevard

MANORWOOD

PLATEAU EAST

BLUE VISTA

Crosswinds Blvd

WINDFALL

LE SCANDINAVE

MOUNTAIN HOUSE



Scenic Caves Road
Grey Road 119

Grey Road 19

Grey Road 19

Laurel Blvd

Mountain Road

Jozo Weider Boulevard

Gord Canning Drive

Crosswinds Boulevard

Crosswinds Blvd

LE SCANDINAVE

MOUNTAIN HOUSE

Laurel Blvd

Mountain Road

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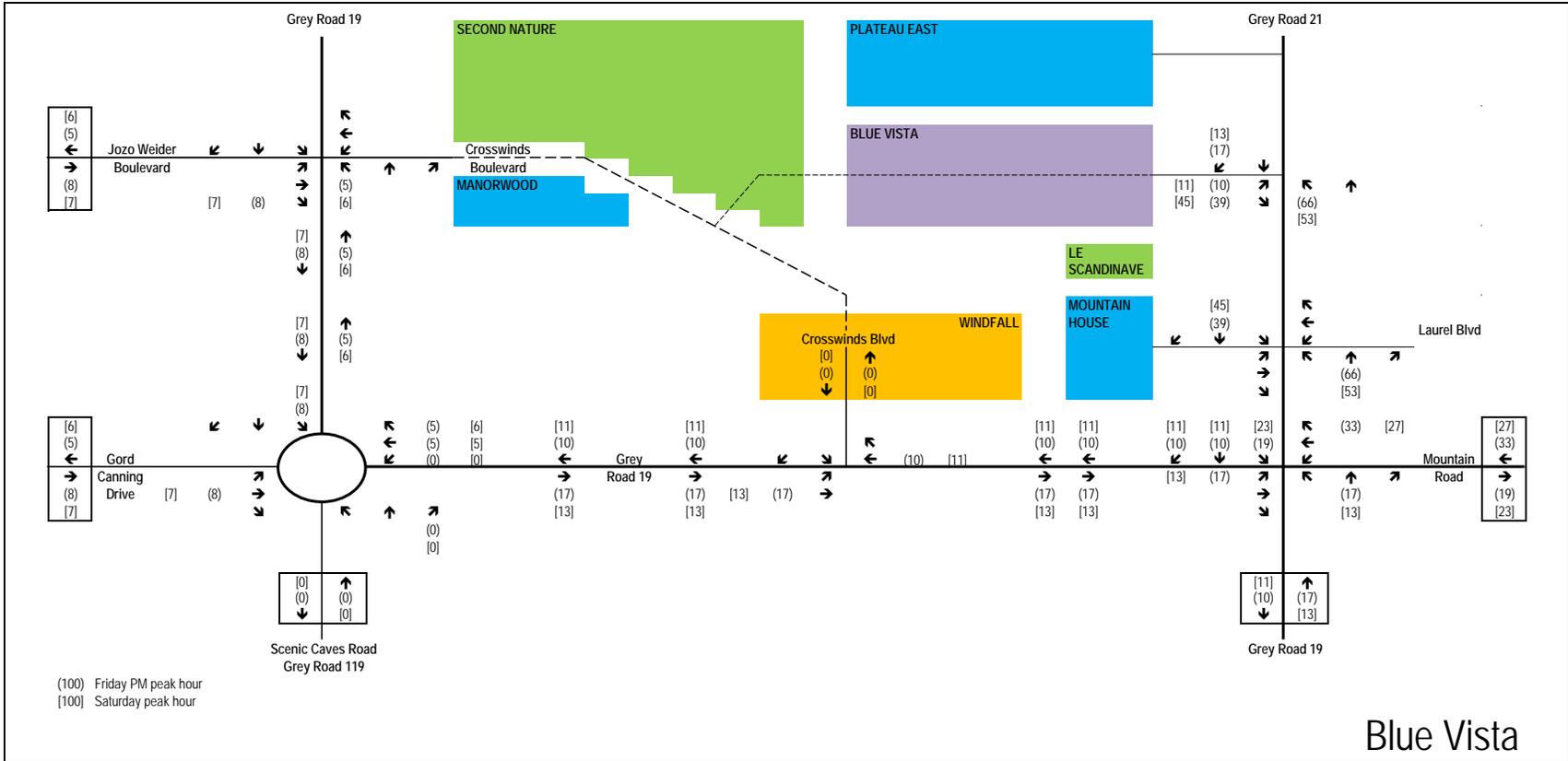
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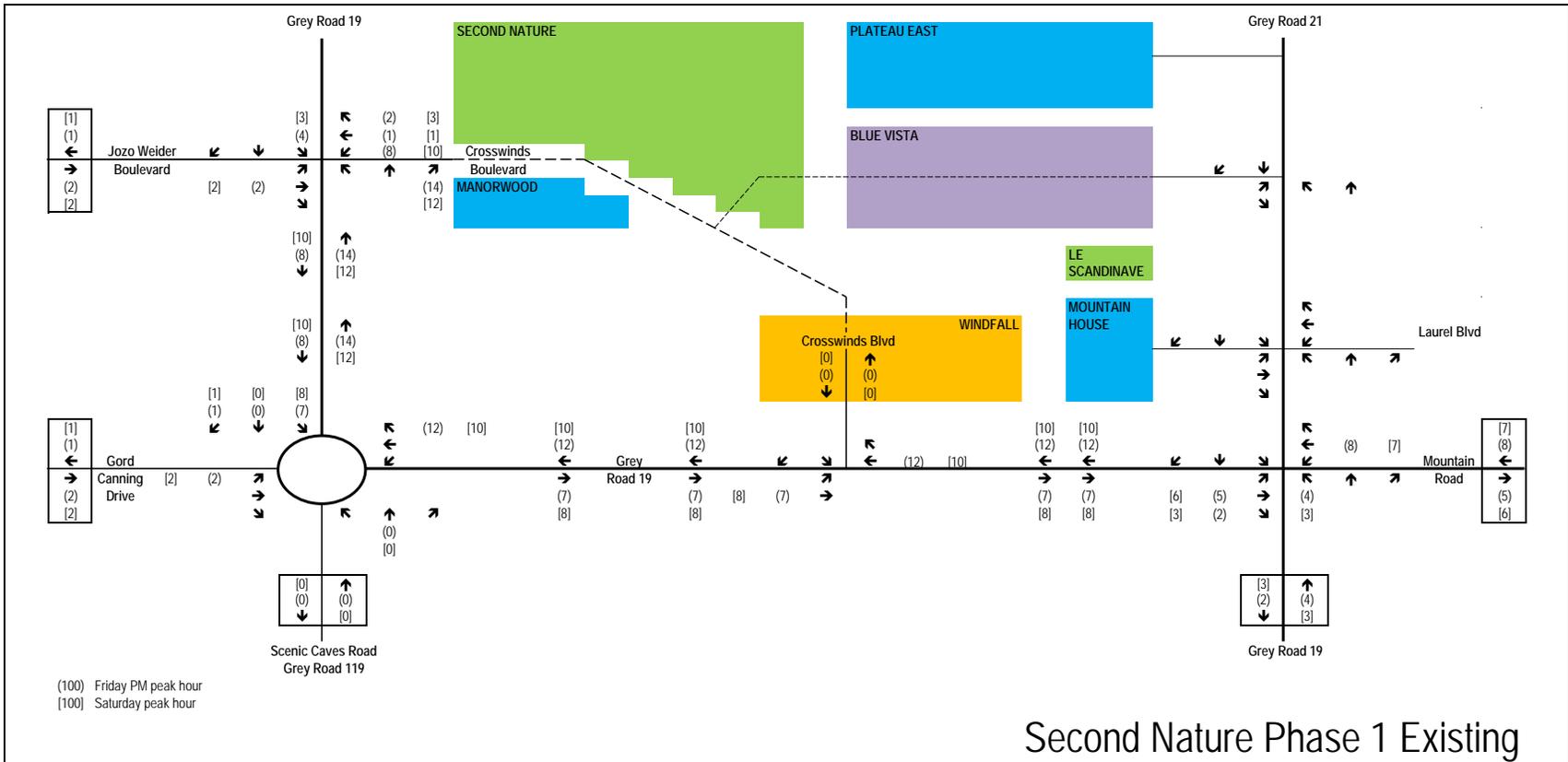
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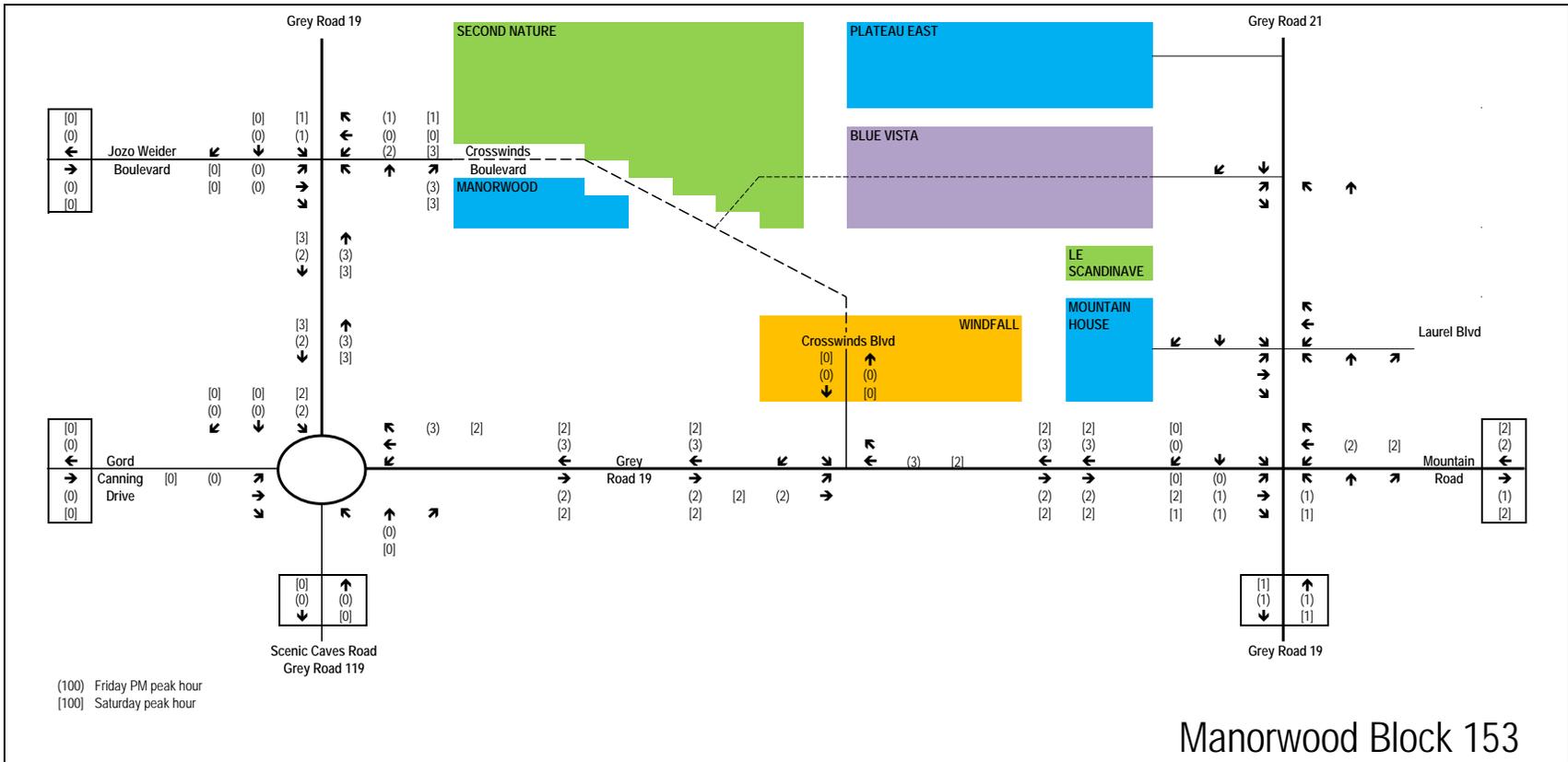
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Second Nature Phase 1 Existing



Appendix D: Traffic Operations - 2025 Background

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2025 Background
Friday PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	13	431	61	8	15	409	233	90	26	166	34
Future Volume (vph)	53	13	431	61	8	15	409	233	90	26	166	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.90		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1592		1770	1676		1770	1785		1770	1815	
Flt Permitted	0.74	1.00		0.33	1.00		0.56	1.00		0.56	1.00	
Satd. Flow (perm)	1381	1592		621	1676		1051	1785		1036	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	14	454	64	8	16	431	245	95	27	175	36
RTOR Reduction (vph)	0	353	0	0	12	0	0	21	0	0	11	0
Lane Group Flow (vph)	56	115	0	64	12	0	431	319	0	27	200	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.0	12.0		12.0	12.0		30.2	30.2		18.3	18.3	
Effective Green, g (s)	12.0	12.0		12.0	12.0		30.2	30.2		18.3	18.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.56	0.56		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	352		137	371		716	994		349	612	
v/s Ratio Prot		0.07			0.01		c0.11	0.18				0.11
v/s Ratio Perm	0.04			c0.10			0.23			0.03		
v/c Ratio	0.18	0.33		0.47	0.03		0.60	0.32		0.08	0.33	
Uniform Delay, d1	17.1	17.7		18.3	16.5		7.1	6.5		12.2	13.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		2.5	0.0		1.4	0.9		0.4	1.4	
Delay (s)	17.4	18.2		20.8	16.6		8.5	7.3		12.6	14.8	
Level of Service	B	B		C	B		A	A		B	B	
Approach Delay (s)		18.2			19.7			8.0			14.5	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2025 Background
 Saturday Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	10	599	64	9	18	516	286	72	21	245	34
Future Volume (vph)	48	10	599	64	9	18	516	286	72	21	245	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.85		1.00	0.90		1.00	0.97		1.00	0.98	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1588		1770	1673		1770	1806		1770	1829	
Fl _t Permitted	0.74	1.00		0.33	1.00		0.48	1.00		0.54	1.00	
Satd. Flow (perm)	1377	1588		611	1673		894	1806		1002	1829	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	51	11	631	67	9	19	543	301	76	22	258	36
RTOR Reduction (vph)	0	495	0	0	15	0	0	14	0	0	8	0
Lane Group Flow (vph)	51	147	0	67	13	0	543	363	0	22	286	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2		32.2	32.2		18.1	18.1	
Effective Green, g (s)	12.2	12.2		12.2	12.2		32.2	32.2		18.1	18.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.32	0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	343		132	361		698	1031		321	586	
v/s Ratio Prot		0.09			0.01		c0.17	0.20			c0.16	
v/s Ratio Perm	0.04			c0.11			0.28			0.02		
v/c Ratio	0.17	0.43		0.51	0.04		0.78	0.35		0.07	0.49	
Uniform Delay, d ₁	18.0	19.1		19.5	17.5		7.7	6.5		13.3	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.3	0.9		3.1	0.0		5.5	0.9		0.4	2.9	
Delay (s)	18.3	20.0		22.5	17.5		13.2	7.4		13.7	18.3	
Level of Service	B	B		C	B		B	A		B	B	
Approach Delay (s)		19.8			21.0			10.8			18.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR21.j9
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- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

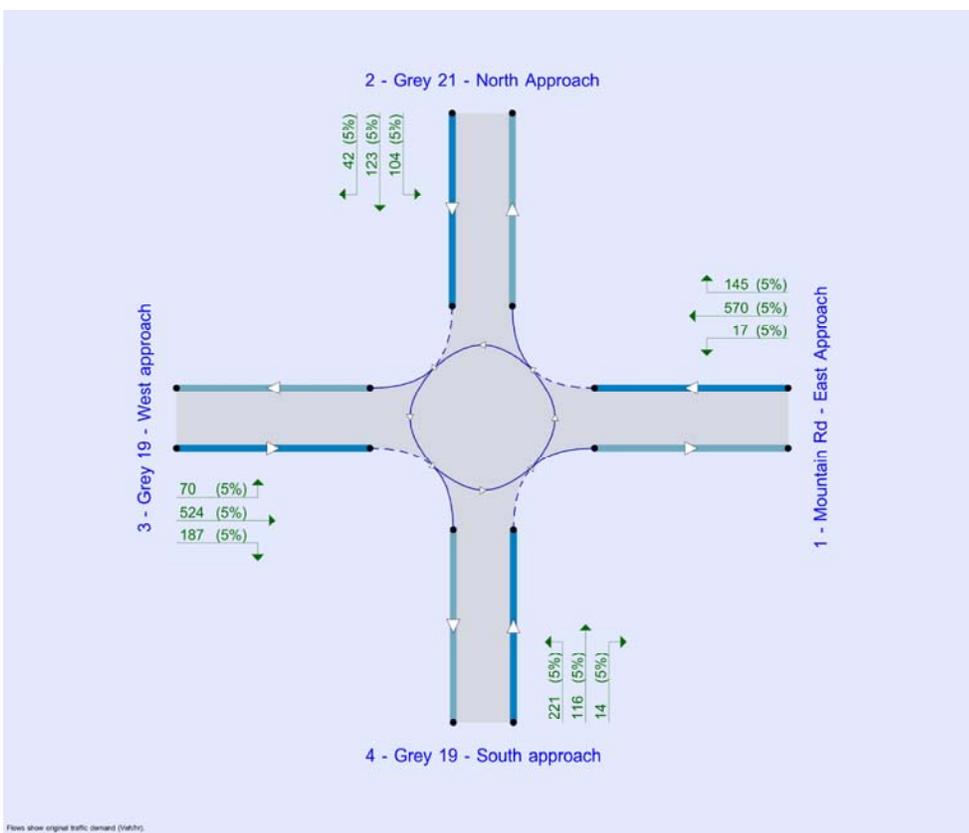
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2025 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	2.92	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	102	1 - Mountain Rd - East Approach

Legs

Legs

Leg	Name	Description
1	Mountain Rd - East Approach	
2	Grey 21 - North Approach	
3	Grey 19 - West approach	
4	Grey 19 - South approach	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Mountain Rd - East Approach	4.00	8.00	100.0	15.0	60.0	18.5	
2 - Grey 21 - North Approach	3.50	8.00	97.0	28.0	60.0	6.0	
3 - Grey 19 - West approach	4.00	8.00	101.0	15.0	60.0	17.5	
4 - Grey 19 - South approach	3.50	8.00	118.0	20.0	60.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - Mountain Rd - East Approach	0.674	2340
2 - Grey 21 - North Approach	0.715	2466
3 - Grey 19 - West approach	0.677	2350
4 - Grey 19 - South approach	0.691	2394

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	732	100.000
2 - Grey 21 - North Approach		✓	269	100.000
3 - Grey 19 - West approach		✓	781	100.000
4 - Grey 19 - South approach		✓	351	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	732	0.92	SecondQuarter
2 - Grey 21 - North Approach	269	0.92	SecondQuarter
3 - Grey 19 - West approach	781	0.92	SecondQuarter
4 - Grey 19 - South approach	351	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	145	570	17
	2 - Grey 21 - North Approach	104	0	42	123
	3 - Grey 19 - West approach	524	70	0	187
	4 - Grey 19 - South approach	14	116	221	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.41	3.17	0.7	1.5	A
2 - Grey 21 - North Approach	0.17	2.52	0.2	0.5	A
3 - Grey 19 - West approach	0.41	2.97	0.7	1.5	A
4 - Grey 19 - South approach	0.22	2.62	0.3	1.1	A

GR19 & GR21 - 2025 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	4.17	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	51	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	925	100.000
2 - Grey 21 - North Approach		✓	382	100.000
3 - Grey 19 - West approach		✓	1127	100.000
4 - Grey 19 - South approach		✓	483	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	925	0.92	SecondQuarter
2 - Grey 21 - North Approach	382	0.92	SecondQuarter
3 - Grey 19 - West approach	1127	0.92	SecondQuarter
4 - Grey 19 - South approach	483	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	120	794	11
	2 - Grey 21 - North Approach	125	0	59	198
	3 - Grey 19 - West approach	796	54	0	277
	4 - Grey 19 - South approach	10	196	277	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.55	4.28	1.2	1.6	A
2 - Grey 21 - North Approach	0.28	3.29	0.4	1.1	A
3 - Grey 19 - West approach	0.61	4.67	1.6	2.9	A
4 - Grey 19 - South approach	0.34	3.51	0.5	2.0	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday										
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	
GR19 & GR119 - 2020 Existing																			
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	[3 - Gord Canning Dr - West approach]	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A				
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A				
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A				
GR19 & GR119 - 2025 BG																			
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	[3 - Gord Canning Dr - West approach]	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A				
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B				
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A				
GR19 & GR119 - 2030 BG																			
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	[3 - Gord Canning Dr - West approach]	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A				
GR19 & GR119 - 2035 BG																			
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	[3 - Gord Canning Dr - West approach]	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A				
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D				
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A				
GR19 & GR119 - 2025 TT																			
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	[3 - Gord Canning Dr - West approach]	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A				
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B				
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A				
GR19 & GR119 - 2030 TT																			
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	[3 - Gord Canning Dr - West approach]	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A				
GR19 & GR119 - 2035 TT																			
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	[3 - Gord Canning Dr - West approach]	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A				
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C				
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

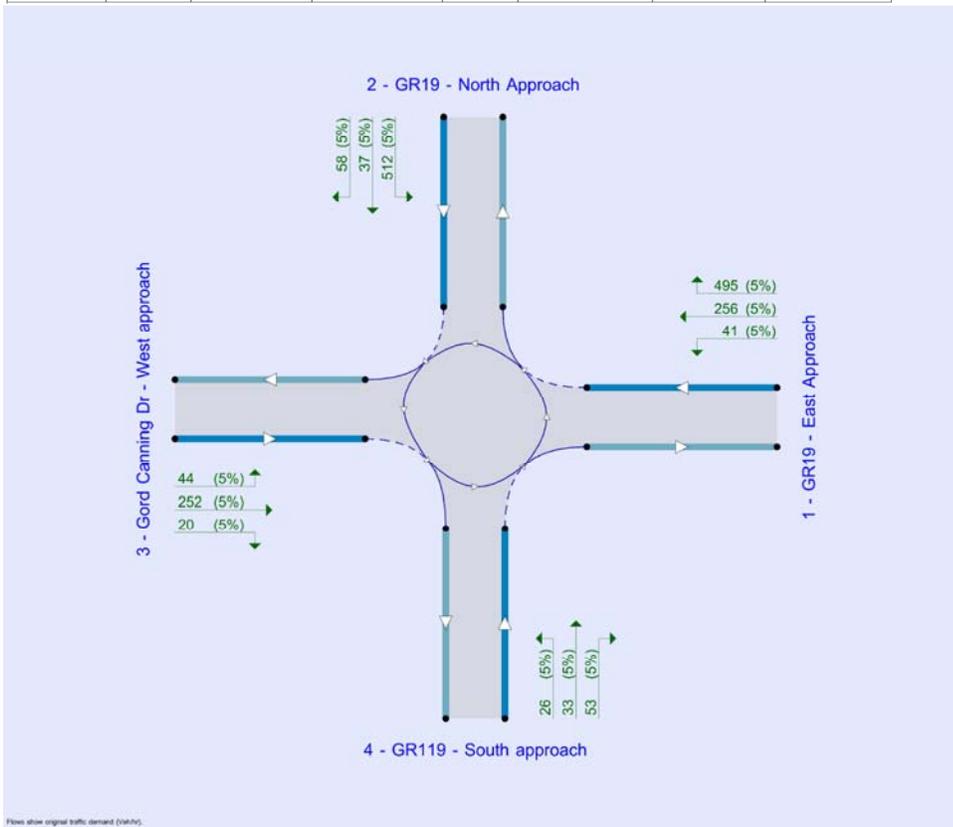
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2025 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.48	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	76	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2025 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	813	100.000
2 - GR19 - North Approach		✓	652	100.000
3 - Gord Canning Dr - West approach		✓	246	100.000
4 - GR119 - South approach		✓	120	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	813	0.92	SecondQuarter
2 - GR19 - North Approach	652	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	246	0.92	SecondQuarter
4 - GR119 - South approach	120	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	623	136	54
	2 - GR19 - North Approach	538	0	57	57
	3 - Gord Canning Dr - West approach	153	67	0	26
	4 - GR119 - South approach	71	34	15	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.42	2.95	0.7	1.5	A
2 - GR19 - North Approach	0.35	2.69	0.5	2.1	A
3 - Gord Canning Dr - West approach	0.33	6.62	0.5	1.9	A
4 - GR119 - South approach	0.15	4.92	0.2	0.5	A

GR19 & GR119 - 2025 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	5.31	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	24	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2025 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1110	100.000
2 - GR19 - North Approach		✓	902	100.000
3 - Gord Canning Dr - West approach		✓	370	100.000
4 - GR119 - South approach		✓	124	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1110	0.92	SecondQuarter
2 - GR19 - North Approach	902	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	370	0.92	SecondQuarter
4 - GR119 - South approach	124	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	774	291	45
	2 - GR19 - North Approach	788	0	73	41
	3 - Gord Canning Dr - West approach	289	59	0	22
	4 - GR119 - South approach	59	36	29	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.58	4.04	1.3	2.1	A
2 - GR19 - North Approach	0.51	3.79	1.0	1.5	A
3 - Gord Canning Dr - West approach	0.58	12.28	1.3	2.1	B
4 - GR119 - South approach	0.21	6.96	0.3	1.1	A

Appendix E: Traffic Operations - 2030 Background

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2030 Background
Friday PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	13	457	61	8	15	434	257	90	26	182	38
Future Volume (vph)	58	13	457	61	8	15	434	257	90	26	182	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.85		1.00	0.90		1.00	0.96		1.00	0.97	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1591		1770	1676		1770	1790		1770	1815	
Fl _t Permitted	0.74	1.00		0.31	1.00		0.55	1.00		0.54	1.00	
Satd. Flow (perm)	1381	1591		578	1676		1030	1790		1012	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	14	481	64	8	16	457	271	95	27	192	40
RTOR Reduction (vph)	0	369	0	0	12	0	0	19	0	0	11	0
Lane Group Flow (vph)	61	126	0	64	12	0	457	347	0	27	221	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.9	12.9		12.9	12.9		30.3	30.3		18.1	18.1	
Effective Green, g (s)	12.9	12.9		12.9	12.9		30.3	30.3		18.1	18.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.55	0.55		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	371		135	391		702	982		331	595	
v/s Ratio Prot		0.08			0.01		c0.12	0.19				0.12
v/s Ratio Perm	0.04			c0.11			0.24			0.03		
v/c Ratio	0.19	0.34		0.47	0.03		0.65	0.35		0.08	0.37	
Uniform Delay, d ₁	17.0	17.6		18.2	16.3		7.6	7.0		12.8	14.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.3	0.6		2.6	0.0		2.2	1.0		0.5	1.8	
Delay (s)	17.2	18.2		20.8	16.4		9.8	8.0		13.3	16.0	
Level of Service	B	B		C	B		A	A		B	B	
Approach Delay (s)		18.1			19.6			9.0			15.7	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

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HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2030 Background
Saturday Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	10	643	64	9	18	552	316	72	21	270	38
Future Volume (vph)	53	10	643	64	9	18	552	316	72	21	270	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.90		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1588		1770	1673		1770	1811		1770	1828	
Flt Permitted	0.74	1.00		0.33	1.00		0.42	1.00		0.52	1.00	
Satd. Flow (perm)	1377	1588		611	1673		789	1811		973	1828	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	11	677	67	9	19	581	333	76	22	284	40
RTOR Reduction (vph)	0	513	0	0	15	0	0	12	0	0	8	0
Lane Group Flow (vph)	56	175	0	67	13	0	581	397	0	22	316	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2		32.2	32.2		16.8	16.8	
Effective Green, g (s)	12.2	12.2		12.2	12.2		32.2	32.2		16.8	16.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.30	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	343		132	361		683	1033		289	544	
v/s Ratio Prot		c0.11			0.01		c0.20	0.22			c0.17	
v/s Ratio Perm	0.04			0.11			0.28			0.02		
v/c Ratio	0.19	0.51		0.51	0.04		0.85	0.38		0.08	0.58	
Uniform Delay, d1	18.1	19.5		19.5	17.5		8.2	6.6		14.2	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		3.1	0.0		9.9	1.1		0.5	4.5	
Delay (s)	18.4	20.7		22.5	17.5		18.1	7.7		14.7	21.3	
Level of Service	B	C		C	B		B	A		B	C	
Approach Delay (s)		20.5			21.0			13.8			20.9	
Approach LOS		C			C			B			C	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		

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Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21.j9
 Path: C:\Users\IDPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:14:22 PM

- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

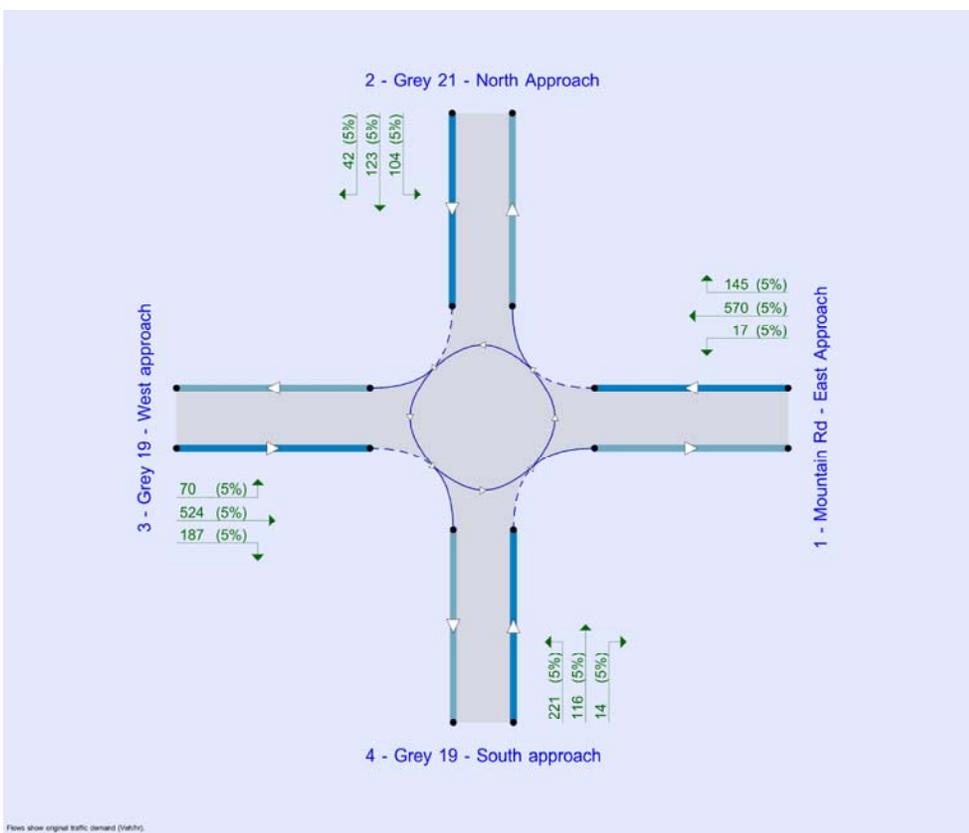
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2030 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	3.11	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	89	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2030 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	780	100.000
2 - Grey 21 - North Approach		✓	289	100.000
3 - Grey 19 - West approach		✓	837	100.000
4 - Grey 19 - South approach		✓	383	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	780	0.92	SecondQuarter
2 - Grey 21 - North Approach	289	0.92	SecondQuarter
3 - Grey 19 - West approach	837	0.92	SecondQuarter
4 - Grey 19 - South approach	383	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	153	609	18
	2 - Grey 21 - North Approach	112	0	44	133
	3 - Grey 19 - West approach	559	73	0	205
	4 - Grey 19 - South approach	16	125	242	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.44	3.40	0.8	1.5	A
2 - Grey 21 - North Approach	0.19	2.65	0.2	0.5	A
3 - Grey 19 - West approach	0.45	3.17	0.8	1.5	A
4 - Grey 19 - South approach	0.24	2.76	0.3	1.3	A

GR19 & GR21 - 2030 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	4.82	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	40	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2030 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	995	100.000
2 - Grey 21 - North Approach		✓	413	100.000
3 - Grey 19 - West approach		✓	1219	100.000
4 - Grey 19 - South approach		✓	529	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	995	0.92	SecondQuarter
2 - Grey 21 - North Approach	413	0.92	SecondQuarter
3 - Grey 19 - West approach	1219	0.92	SecondQuarter
4 - Grey 19 - South approach	529	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	127	856	12
	2 - Grey 21 - North Approach	134	0	63	216
	3 - Grey 19 - West approach	858	57	0	304
	4 - Grey 19 - South approach	11	214	304	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.60	4.93	1.5	2.3	A
2 - Grey 21 - North Approach	0.31	3.63	0.5	1.7	A
3 - Grey 19 - West approach	0.67	5.52	2.0	4.4	A
4 - Grey 19 - South approach	0.38	3.91	0.6	2.0	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday										
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	
GR19 & GR119 - 2020 Existing																			
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	[3 - Gord Canning Dr - West approach]	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A				
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A				
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A				
GR19 & GR119 - 2025 BG																			
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	[3 - Gord Canning Dr - West approach]	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A				
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B				
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A				
GR19 & GR119 - 2030 BG																			
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	[3 - Gord Canning Dr - West approach]	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A				
GR19 & GR119 - 2035 BG																			
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	[3 - Gord Canning Dr - West approach]	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A				
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D				
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A				
GR19 & GR119 - 2025 TT																			
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	[3 - Gord Canning Dr - West approach]	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A				
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B				
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A				
GR19 & GR119 - 2030 TT																			
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	[3 - Gord Canning Dr - West approach]	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A				
GR19 & GR119 - 2035 TT																			
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	[3 - Gord Canning Dr - West approach]	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A				
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C				
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

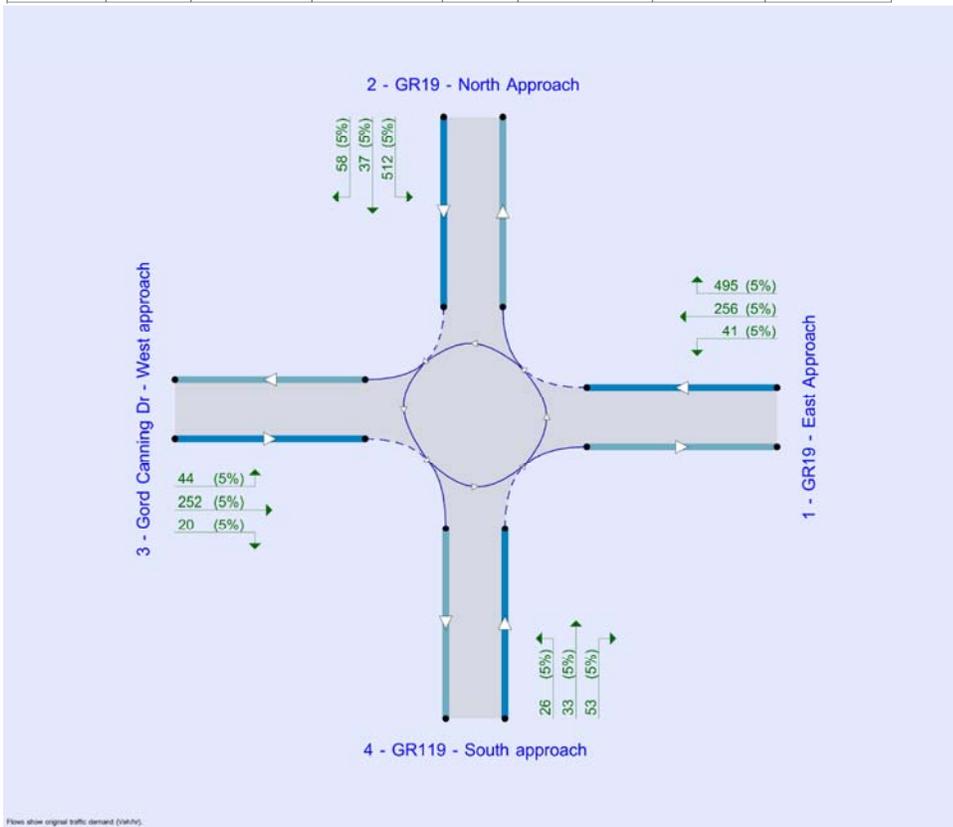
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/min).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2030 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.73	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	63	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2030 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	872	100.000
2 - GR19 - North Approach		✓	695	100.000
3 - Gord Canning Dr - West approach		✓	269	100.000
4 - GR119 - South approach		✓	133	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	872	0.92	SecondQuarter
2 - GR19 - North Approach	695	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	269	0.92	SecondQuarter
4 - GR119 - South approach	133	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	663	149	60
	2 - GR19 - North Approach	570	0	62	63
	3 - Gord Canning Dr - West approach	167	73	0	29
	4 - GR119 - South approach	78	38	17	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.45	3.14	0.8	1.5	A
2 - GR19 - North Approach	0.37	2.82	0.6	2.0	A
3 - Gord Canning Dr - West approach	0.37	7.26	0.6	2.0	A
4 - GR119 - South approach	0.17	5.23	0.2	0.5	A

GR19 & GR119 - 2030 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	6.55	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	14	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2030 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1201	100.000
2 - GR19 - North Approach		✓	972	100.000
3 - Gord Canning Dr - West approach		✓	406	100.000
4 - GR119 - South approach		✓	170	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1201	0.92	SecondQuarter
2 - GR19 - North Approach	972	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	406	0.92	SecondQuarter
4 - GR119 - South approach	170	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	831	320	50
	2 - GR19 - North Approach	847	0	80	45
	3 - Gord Canning Dr - West approach	318	64	0	24
	4 - GR119 - South approach	65	40	65	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.63	4.73	1.7	3.4	A
2 - GR19 - North Approach	0.56	4.37	1.3	1.8	A
3 - Gord Canning Dr - West approach	0.67	16.29	2.0	8.1	C
4 - GR119 - South approach	0.31	8.64	0.4	1.7	A

Appendix F: Traffic Operations - 2035 Background

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Background
Friday PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	13	487	61	8	15	461	284	90	26	201	42
Future Volume (vph)	63	13	487	61	8	15	461	284	90	26	201	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.85		1.00	0.90		1.00	0.96		1.00	0.97	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1591		1770	1676		1770	1795		1770	1815	
Fl _t Permitted	0.74	1.00		0.31	1.00		0.53	1.00		0.53	1.00	
Satd. Flow (perm)	1381	1591		578	1676		988	1795		986	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	14	513	64	8	16	485	299	95	27	212	44
RTOR Reduction (vph)	0	393	0	0	12	0	0	17	0	0	12	0
Lane Group Flow (vph)	66	134	0	64	12	0	485	377	0	27	244	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.9	12.9		12.9	12.9		30.2	30.2		17.3	17.3	
Effective Green, g (s)	12.9	12.9		12.9	12.9		30.2	30.2		17.3	17.3	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.55	0.55		0.31	0.31	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	372		135	392		696	983		309	569	
v/s Ratio Prot		0.08			0.01		c0.14	0.21			0.13	
v/s Ratio Perm	0.05			c0.11			0.24			0.03		
v/c Ratio	0.20	0.36		0.47	0.03		0.70	0.38		0.09	0.43	
Uniform Delay, d ₁	17.0	17.6		18.2	16.3		7.8	7.1		13.3	15.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.3	0.6		2.6	0.0		3.0	1.1		0.6	2.4	
Delay (s)	17.3	18.2		20.8	16.3		10.9	8.3		13.9	17.3	
Level of Service	B	B		C	B		B	A		B	B	
Approach Delay (s)		18.1			19.6			9.7			17.0	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Background
Saturday Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	10	643	64	9	18	591	348	72	21	297	42
Future Volume (vph)	58	10	643	64	9	18	591	348	72	21	297	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.85		1.00	0.90		1.00	0.97		1.00	0.98	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1588		1770	1673		1770	1815		1770	1828	
Fl _t Permitted	0.74	1.00		0.33	1.00		0.37	1.00		0.51	1.00	
Satd. Flow (perm)	1377	1588		611	1673		684	1815		944	1828	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	11	677	67	9	19	622	366	76	22	313	44
RTOR Reduction (vph)	0	498	0	0	15	0	0	12	0	0	9	0
Lane Group Flow (vph)	61	190	0	67	13	0	622	430	0	22	348	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2		32.2	32.2		16.1	16.1	
Effective Green, g (s)	12.2	12.2		12.2	12.2		32.2	32.2		16.1	16.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.29	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	343		132	361		662	1036		269	521	
v/s Ratio Prot		c0.12			0.01		c0.23	0.24			c0.19	
v/s Ratio Perm	0.04			0.11			0.30			0.02		
v/c Ratio	0.21	0.55		0.51	0.04		0.94	0.42		0.08	0.67	
Uniform Delay, d ₁	18.1	19.7		19.5	17.5		8.8	6.8		14.7	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.3	1.9		3.1	0.0		21.1	1.2		0.6	6.7	
Delay (s)	18.5	21.6		22.5	17.5		29.9	8.0		15.3	24.5	
Level of Service	B	C		C	B		C	A		B	C	
Approach Delay (s)		21.4			21.0			20.8			23.9	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	113.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21.j9
 Path: C:\Users\IDPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:14:22 PM

- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

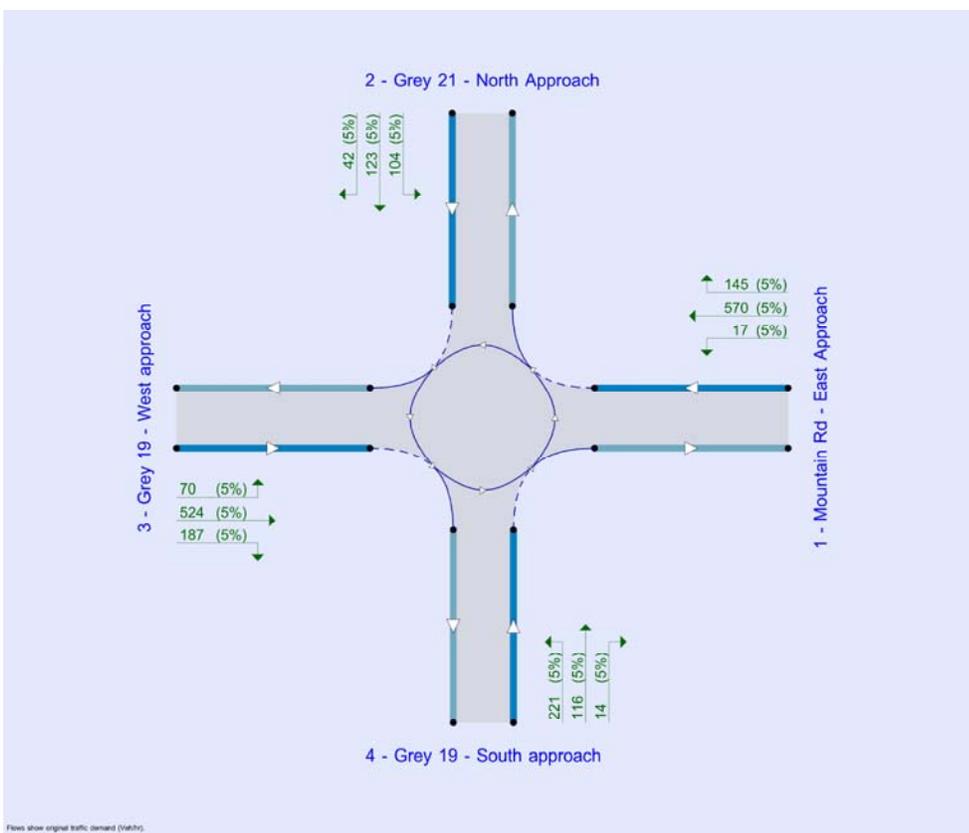
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/h).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2035 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	3.35	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	76	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2035 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	834	100.000
2 - Grey 21 - North Approach		✓	312	100.000
3 - Grey 19 - West approach		✓	900	100.000
4 - Grey 19 - South approach		✓	415	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	834	0.92	SecondQuarter
2 - Grey 21 - North Approach	312	0.92	SecondQuarter
3 - Grey 19 - West approach	900	0.92	SecondQuarter
4 - Grey 19 - South approach	415	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	163	651	20
	2 - Grey 21 - North Approach	120	0	47	145
	3 - Grey 19 - West approach	598	77	0	225
	4 - Grey 19 - South approach	17	134	264	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.48	3.69	0.9	1.5	A
2 - Grey 21 - North Approach	0.21	2.80	0.3	1.0	A
3 - Grey 19 - West approach	0.48	3.42	0.9	1.5	A
4 - Grey 19 - South approach	0.27	2.92	0.4	1.5	A

GR19 & GR21 - 2035 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	5.82	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	29	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2035 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1073	100.000
2 - Grey 21 - North Approach		✓	447	100.000
3 - Grey 19 - West approach		✓	1322	100.000
4 - Grey 19 - South approach		✓	578	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1073	0.92	SecondQuarter
2 - Grey 21 - North Approach	447	0.92	SecondQuarter
3 - Grey 19 - West approach	1322	0.92	SecondQuarter
4 - Grey 19 - South approach	578	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	135	925	13
	2 - Grey 21 - North Approach	144	0	67	236
	3 - Grey 19 - West approach	927	61	0	334
	4 - Grey 19 - South approach	12	233	333	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.66	5.91	1.9	3.7	A
2 - Grey 21 - North Approach	0.36	4.10	0.6	2.1	A
3 - Grey 19 - West approach	0.74	6.91	2.7	6.5	A
4 - Grey 19 - South approach	0.44	4.47	0.8	1.5	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday										
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	
GR19 & GR119 - 2020 Existing																			
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	[3 - Gord Canning Dr - West approach]	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A				
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A				
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A				
GR19 & GR119 - 2025 BG																			
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	[3 - Gord Canning Dr - West approach]	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A				
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B				
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A				
GR19 & GR119 - 2030 BG																			
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	[3 - Gord Canning Dr - West approach]	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A				
GR19 & GR119 - 2035 BG																			
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	[3 - Gord Canning Dr - West approach]	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A				
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D				
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A				
GR19 & GR119 - 2025 TT																			
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	[3 - Gord Canning Dr - West approach]	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A				
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B				
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A				
GR19 & GR119 - 2030 TT																			
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	[3 - Gord Canning Dr - West approach]	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A				
GR19 & GR119 - 2035 TT																			
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	[3 - Gord Canning Dr - West approach]	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A				
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C				
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

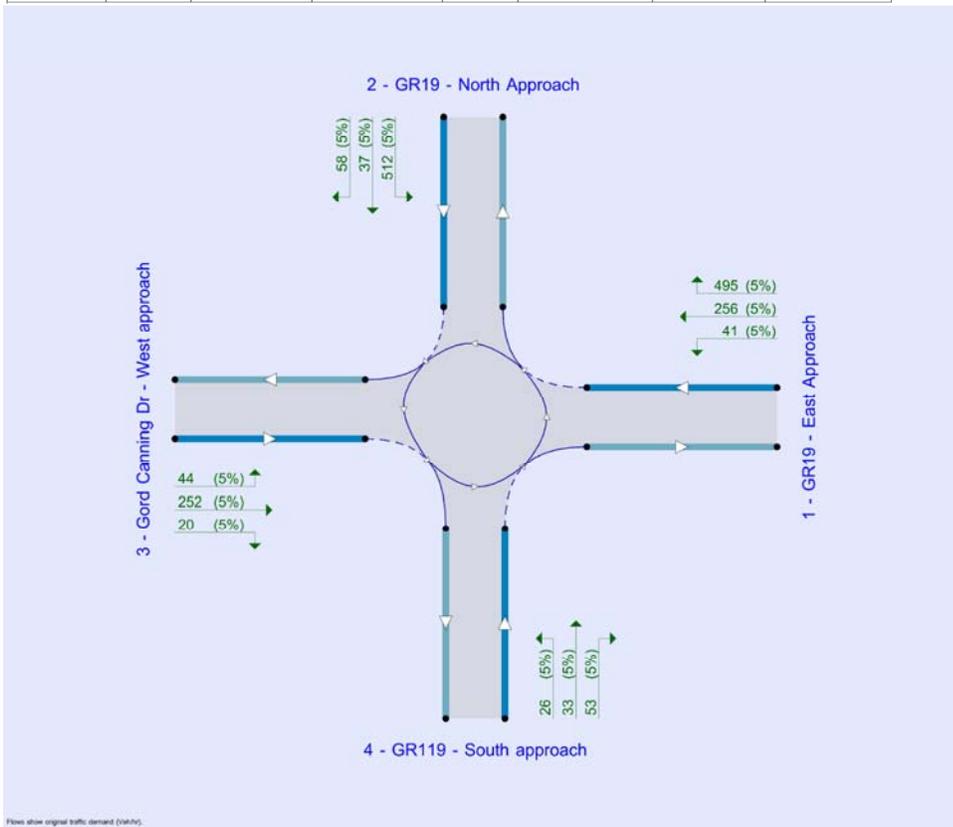
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/min).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2035 BG, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	4.05	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	51	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2035 BG	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	938	100.000
2 - GR19 - North Approach		✓	745	100.000
3 - Gord Canning Dr - West approach		✓	294	100.000
4 - GR119 - South approach		✓	147	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	938	0.92	SecondQuarter
2 - GR19 - North Approach	745	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	294	0.92	SecondQuarter
4 - GR119 - South approach	147	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	708	164	66
	2 - GR19 - North Approach	607	0	68	70
	3 - Gord Canning Dr - West approach	183	79	0	32
	4 - GR119 - South approach	86	42	19	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.49	3.38	1.0	1.5	A
2 - GR19 - North Approach	0.40	2.98	0.7	1.6	A
3 - Gord Canning Dr - West approach	0.42	8.13	0.7	1.9	A
4 - GR119 - South approach	0.20	5.62	0.2	1.1	A

GR19 & GR119 - 2035 BG, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	8.39	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	5	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2035 BG	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1301	100.000
2 - GR19 - North Approach		✓	1049	100.000
3 - Gord Canning Dr - West approach		✓	447	100.000
4 - GR119 - South approach		✓	150	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1301	0.92	SecondQuarter
2 - GR19 - North Approach	1049	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	447	0.92	SecondQuarter
4 - GR119 - South approach	150	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	893	353	55
	2 - GR19 - North Approach	912	0	87	50
	3 - Gord Canning Dr - West approach	350	70	0	27
	4 - GR119 - South approach	71	44	35	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.68	5.38	2.1	4.8	A
2 - GR19 - North Approach	0.61	4.90	1.5	2.7	A
3 - Gord Canning Dr - West approach	0.79	25.01	3.3	17.9	D
4 - GR119 - South approach	0.30	9.40	0.4	1.5	A

**Appendix G:
Traffic Operations - 2025 Total**

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2025 Total
Friday PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	36	420	33	23	40	402	228	56	63	157	34
Future Volume (vph)	53	36	420	33	23	40	402	228	56	63	157	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.86		1.00	0.90		1.00	0.97		1.00	0.97	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1605		1770	1685		1770	1808		1770	1813	
Fl _t Permitted	0.71	1.00		0.40	1.00		0.57	1.00		0.58	1.00	
Satd. Flow (perm)	1330	1605		745	1685		1059	1808		1076	1813	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	38	442	35	24	42	423	240	59	66	165	36
RTOR Reduction (vph)	0	357	0	0	34	0	0	13	0	0	12	0
Lane Group Flow (vph)	56	123	0	35	32	0	423	286	0	66	189	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		30.2	30.2		18.0	18.0	
Effective Green, g (s)	10.0	10.0		10.0	10.0		30.2	30.2		18.0	18.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.58	0.58		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	254	307		142	322		751	1046		371	625	
v/s Ratio Prot		c0.08			0.02		c0.11	0.16				0.10
v/s Ratio Perm	0.04			0.05			0.22			0.06		
v/c Ratio	0.22	0.40		0.25	0.10		0.56	0.27		0.18	0.30	
Uniform Delay, d ₁	17.8	18.5		17.9	17.4		6.2	5.5		11.9	12.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.4	0.9		0.9	0.1		1.0	0.6		1.0	1.2	
Delay (s)	18.3	19.3		18.8	17.5		7.1	6.2		13.0	13.8	
Level of Service	B	B		B	B		A	A		B	B	
Approach Delay (s)		19.2			18.0			6.7			13.6	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2025 Total
Saturday Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	36	588	40	27	55	513	278	45	72	231	34
Future Volume (vph)	47	36	588	40	27	55	513	278	45	72	231	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1599		1770	1674		1770	1824		1770	1827	
Fl _t Permitted	0.70	1.00		0.38	1.00		0.51	1.00		0.56	1.00	
Satd. Flow (perm)	1306	1599		703	1674		952	1824		1036	1827	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	38	619	42	28	58	540	293	47	76	243	36
RTOR Reduction (vph)	0	499	0	0	47	0	0	9	0	0	8	0
Lane Group Flow (vph)	49	158	0	42	39	0	540	331	0	76	271	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.6	10.6		10.6	10.6		32.2	32.2		18.4	18.4	
Effective Green, g (s)	10.6	10.6		10.6	10.6		32.2	32.2		18.4	18.4	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.59	0.59		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	252	309		135	323		735	1071		347	613	
v/s Ratio Prot		c0.10			0.02		c0.16	0.18			0.15	
v/s Ratio Perm	0.04			0.06			0.27			0.07		
v/c Ratio	0.19	0.51		0.31	0.12		0.73	0.31		0.22	0.44	
Uniform Delay, d ₁	18.5	19.8		19.0	18.3		6.8	5.7		13.0	14.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.4	1.4		1.3	0.2		3.8	0.8		1.4	2.3	
Delay (s)	18.9	21.2		20.3	18.4		10.7	6.4		14.5	16.5	
Level of Service	B	C		C	B		B	A		B	B	
Approach Delay (s)		21.0			19.0			9.0			16.1	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & Crosswinds Blvd.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:54:41 PM

- »GR19 & Crosswinds Blvd - 2025 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2025 TT, Saturday
- »GR19 & Crosswinds Blvd - 2030 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2030 TT, Saturday
- »GR19 & Crosswinds Blvd - 2035 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & Crosswinds Blvd - 2025 TT																		
1 - Crosswinds Blvd	D1	0.2	0.5	6.48	0.17	A	3.34	A	93 % [1 - Crosswinds Blvd]	D2	0.4	1.2	9.50	0.27	A	4.84	A	42 % [1 - Crosswinds Blvd]
2 - GR19		0.6	1.8	2.95	0.39	A					1.5	2.6	4.44	0.60	A			
3 - GR19		0.9	1.5	3.30	0.47	A					1.7	3.3	4.70	0.63	A			
GR19 & Crosswinds Blvd - 2030 TT																		
1 - Crosswinds Blvd	D3	0.2	0.6	6.86	0.18	A	3.52	A	82 % [1 - Crosswinds Blvd]	D4	0.4	1.6	10.79	0.30	B	5.48	A	33 % [1 - Crosswinds Blvd]
2 - GR19		0.7	1.5	3.10	0.42	A					1.8	3.7	5.04	0.64	A			
3 - GR19		1.0	1.5	3.51	0.50	A					2.0	4.6	5.37	0.67	A			
GR19 & Crosswinds Blvd - 2035 TT																		
1 - Crosswinds Blvd	D5	0.2	0.9	7.32	0.19	A	3.75	A	71 % [1 - Crosswinds Blvd]	D6	0.5	1.9	12.67	0.33	B	6.43	A	25 % [1 - Crosswinds Blvd]
2 - GR19		0.8	1.5	3.29	0.45	A					2.3	5.3	5.90	0.70	A			
3 - GR19		1.2	1.7	3.77	0.54	A					2.6	6.4	6.35	0.73	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

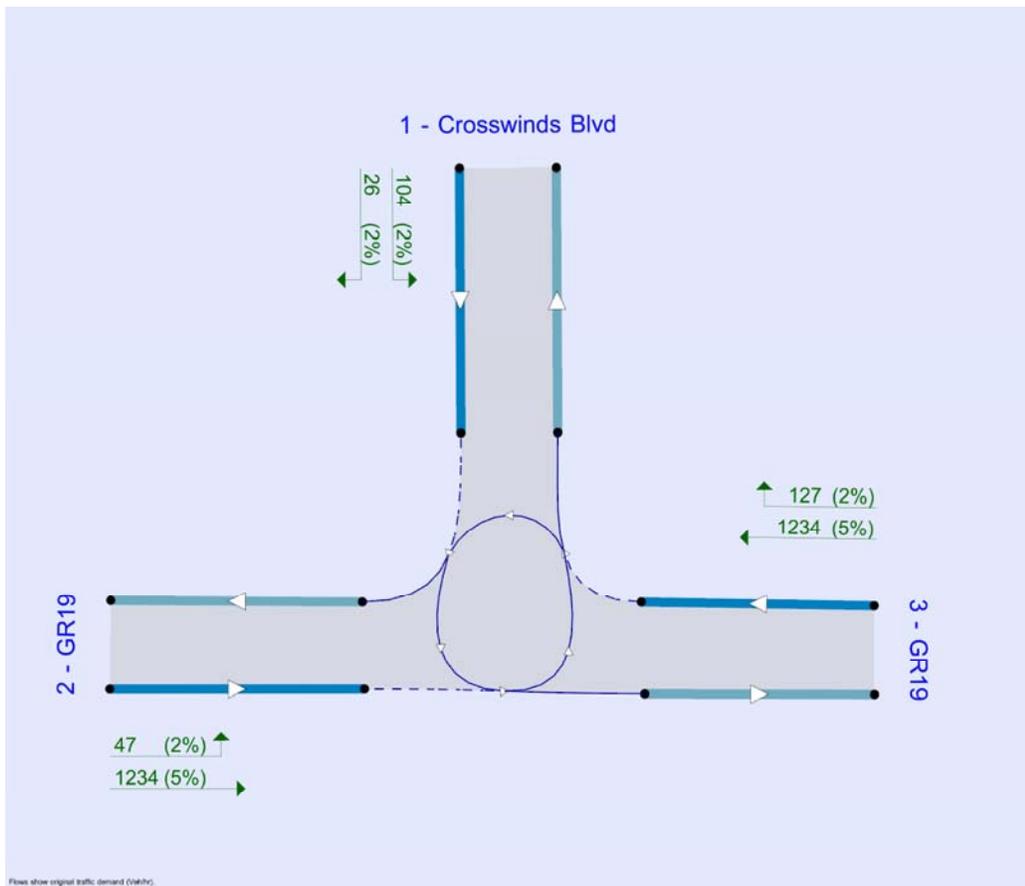
File summary

File Description

Title	
Location	
Site number	
Date	6/12/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 TT	Friday PM	PHF	16:00	17:00	15
D2	2025 TT	Saturday	PHF	13:00	14:00	15
D3	2030 TT	Friday PM	PHF	16:00	17:00	15
D4	2030 TT	Saturday	PHF	13:00	14:00	15
D5	2035 TT	Friday PM	PHF	16:00	17:00	15
D6	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & Crosswinds Blvd	100.000

GR19 & Crosswinds Blvd - 2025 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	3.34	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	93	1 - Crosswinds Blvd

Legs

Legs

Leg	Name	Description
1	Crosswinds Blvd	
2	GR19	
3	GR19	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Crosswinds Blvd	2.00	4.00	15.0	20.0	60.0	15.0	
2 - GR19	4.00	8.00	30.0	20.0	60.0	15.0	
3 - GR19	4.00	8.00	30.0	20.0	60.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - Crosswinds Blvd	0.464	1084
2 - GR19	0.652	2169
3 - GR19	0.652	2169

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	103	100.000
2 - GR19		✓	720	100.000
3 - GR19		✓	901	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	103	0.92	SecondQuarter
2 - GR19	720	0.92	SecondQuarter
3 - GR19	901	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	6	97
	2 - GR19	10	0	710
	3 - GR19	138	763	0

Vehicle Mix

Truck Percentages

From	To		
	1 - Crosswinds Blvd	2 - GR19	3 - GR19
1 - Crosswinds Blvd	0	2	2
2 - GR19	2	0	5
3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.17	6.48	0.2	0.5	A
2 - GR19	0.39	2.95	0.6	1.8	A
3 - GR19	0.47	3.30	0.9	1.5	A

GR19 & Crosswinds Blvd - 2025 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	4.84	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	42	1 - Crosswinds Blvd

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	130	100.000
2 - GR19		✓	1094	100.000
3 - GR19		✓	1176	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	130	0.92	SecondQuarter
2 - GR19	1094	0.92	SecondQuarter
3 - GR19	1176	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

	From	To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
	1 - Crosswinds Blvd	0	26	104
	2 - GR19	47	0	1047
	3 - GR19	127	1049	0

Vehicle Mix

Truck Percentages

	From	To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.27	9.50	0.4	1.2	A
2 - GR19	0.60	4.44	1.5	2.6	A
3 - GR19	0.63	4.70	1.7	3.3	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21.j9
 Path: C:\Users\IDPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:14:22 PM

- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

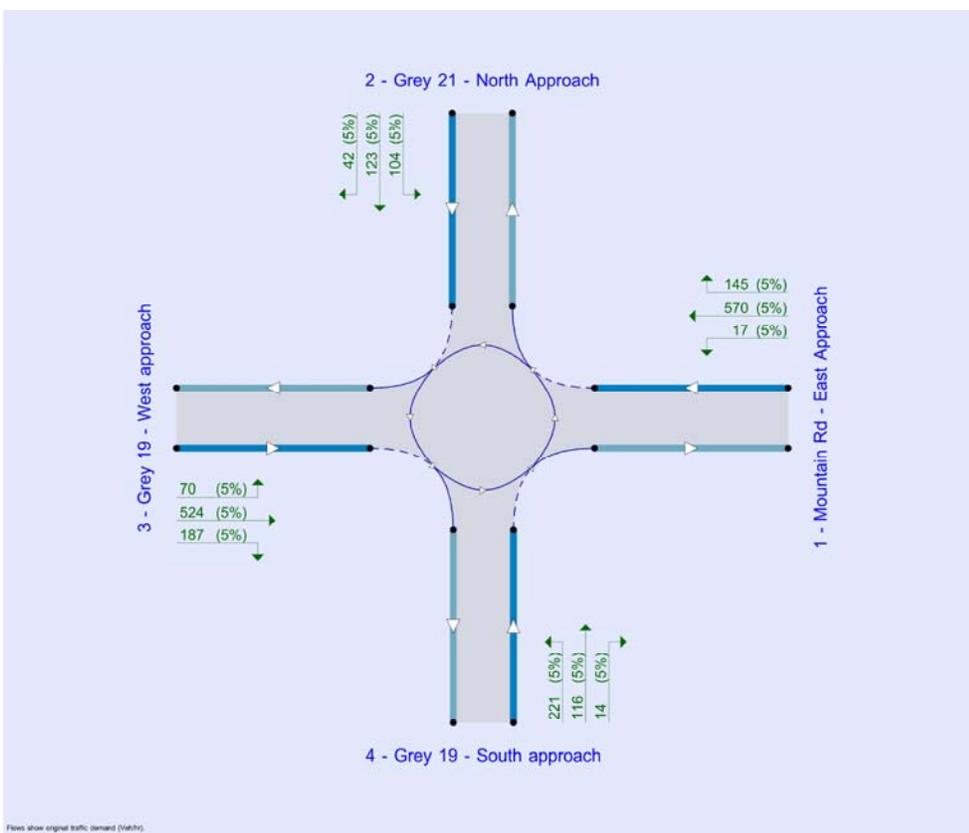
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/h).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2025 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	3.05	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	93	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2025 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	778	100.000
2 - Grey 21 - North Approach		✓	265	100.000
3 - Grey 19 - West approach		✓	819	100.000
4 - Grey 19 - South approach		✓	378	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	778	0.92	SecondQuarter
2 - Grey 21 - North Approach	265	0.92	SecondQuarter
3 - Grey 19 - West approach	819	0.92	SecondQuarter
4 - Grey 19 - South approach	378	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	137	624	17
	2 - Grey 21 - North Approach	104	0	38	123
	3 - Grey 19 - West approach	561	52	0	206
	4 - Grey 19 - South approach	14	116	248	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.44	3.33	0.8	1.5	A
2 - Grey 21 - North Approach	0.17	2.63	0.2	0.5	A
3 - Grey 19 - West approach	0.43	3.08	0.8	1.5	A
4 - Grey 19 - South approach	0.24	2.70	0.3	1.3	A

GR19 & GR21 - 2025 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	4.26	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	53	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2025 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	960	100.000
2 - Grey 21 - North Approach		✓	308	100.000
3 - Grey 19 - West approach		✓	1162	100.000
4 - Grey 19 - South approach		✓	503	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	960	0.92	SecondQuarter
2 - Grey 21 - North Approach	308	0.92	SecondQuarter
3 - Grey 19 - West approach	1162	0.92	SecondQuarter
4 - Grey 19 - South approach	503	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	114	835	11
	2 - Grey 21 - North Approach	125	0	55	128
	3 - Grey 19 - West approach	824	47	0	291
	4 - Grey 19 - South approach	10	196	297	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.57	4.54	1.3	1.8	A
2 - Grey 21 - North Approach	0.23	3.19	0.3	1.2	A
3 - Grey 19 - West approach	0.62	4.59	1.6	3.0	A
4 - Grey 19 - South approach	0.36	3.65	0.6	2.1	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR119 - 2020 Existing																		
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A			
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A			
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A			
GR19 & GR119 - 2025 BG																		
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A			
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B			
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A			
GR19 & GR119 - 2030 BG																		
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A			
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C			
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A			
GR19 & GR119 - 2035 BG																		
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A			
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D			
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A			
GR19 & GR119 - 2025 TT																		
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A			
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B			
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A			
GR19 & GR119 - 2030 TT																		
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A			
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C			
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A			
GR19 & GR119 - 2035 TT																		
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A			
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C			
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

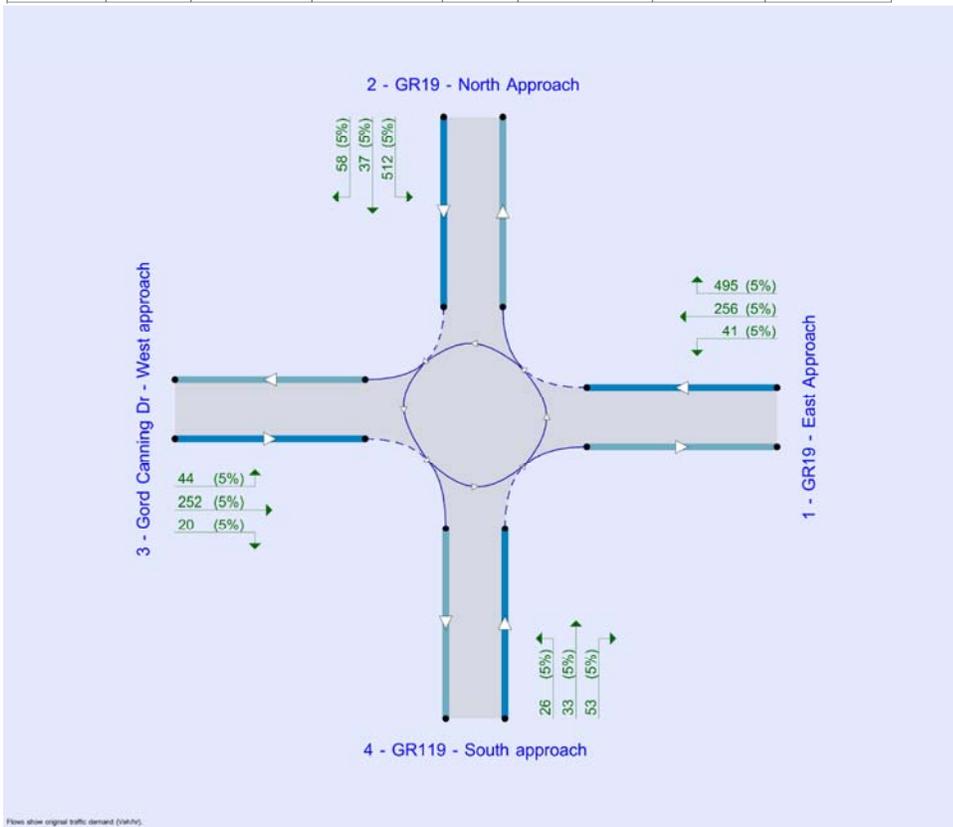
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/min).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2025 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.43	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	79	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2025 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	769	100.000
2 - GR19 - North Approach		✓	607	100.000
3 - Gord Canning Dr - West approach		✓	258	100.000
4 - GR119 - South approach		✓	123	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	769	0.92	SecondQuarter
2 - GR19 - North Approach	607	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	258	0.92	SecondQuarter
4 - GR119 - South approach	123	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	572	141	56
	2 - GR19 - North Approach	489	0	61	57
	3 - Gord Canning Dr - West approach	159	73	0	26
	4 - GR119 - South approach	74	34	15	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.40	2.85	0.7	1.7	A
2 - GR19 - North Approach	0.32	2.60	0.5	1.9	A
3 - Gord Canning Dr - West approach	0.34	6.47	0.5	2.0	A
4 - GR119 - South approach	0.15	4.81	0.2	0.5	A

GR19 & GR119 - 2025 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	5.22	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	25	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2025 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1075	100.000
2 - GR19 - North Approach		✓	856	100.000
3 - Gord Canning Dr - West approach		✓	386	100.000
4 - GR119 - South approach		✓	127	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1075	0.92	SecondQuarter
2 - GR19 - North Approach	856	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	386	0.92	SecondQuarter
4 - GR119 - South approach	127	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	730	298	47
	2 - GR19 - North Approach	738	0	77	41
	3 - Gord Canning Dr - West approach	300	64	0	22
	4 - GR119 - South approach	62	36	29	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.56	3.89	1.3	1.9	A
2 - GR19 - North Approach	0.48	3.62	0.9	1.5	A
3 - Gord Canning Dr - West approach	0.59	11.95	1.4	2.1	B
4 - GR119 - South approach	0.21	6.76	0.3	1.1	A

**Appendix H:
Traffic Operations - 2030 Total**

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2030 Total
Friday PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	36	447	33	23	40	427	252	56	63	174	38
Future Volume (vph)	56	36	447	33	23	40	427	252	56	63	174	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.86		1.00	0.90		1.00	0.97		1.00	0.97	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1604		1770	1685		1770	1812		1770	1813	
Fl _t Permitted	0.71	1.00		0.41	1.00		0.56	1.00		0.56	1.00	
Satd. Flow (perm)	1330	1604		768	1685		1046	1812		1052	1813	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	38	471	35	24	42	449	265	59	66	183	40
RTOR Reduction (vph)	0	386	0	0	34	0	0	12	0	0	11	0
Lane Group Flow (vph)	59	123	0	35	32	0	449	312	0	66	212	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.7	9.7		9.7	9.7		32.2	32.2		19.5	19.5	
Effective Green, g (s)	9.7	9.7		9.7	9.7		32.2	32.2		19.5	19.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.60	0.60		0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	288		138	303		768	1082		380	655	
v/s Ratio Prot		c0.08			0.02		c0.12	0.17				0.12
v/s Ratio Perm	0.04			0.05			0.23			0.06		
v/c Ratio	0.25	0.43		0.25	0.10		0.58	0.29		0.17	0.32	
Uniform Delay, d ₁	19.0	19.6		19.0	18.5		5.9	5.3		11.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.5	1.0		1.0	0.2		1.1	0.7		1.0	1.3	
Delay (s)	19.5	20.6		20.0	18.6		7.1	6.0		12.7	13.7	
Level of Service	B	C		B	B		A	A		B	B	
Approach Delay (s)		20.5			19.1			6.6			13.5	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2030 Total
Saturday Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	36	632	40	27	55	548	308	45	72	256	38
Future Volume (vph)	52	36	632	40	27	55	548	308	45	72	256	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1598		1770	1674		1770	1827		1770	1827	
Fl _t Permitted	0.70	1.00		0.37	1.00		0.46	1.00		0.54	1.00	
Satd. Flow (perm)	1306	1598		690	1674		864	1827		1007	1827	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	55	38	665	42	28	58	577	324	47	76	269	40
RTOR Reduction (vph)	0	525	0	0	47	0	0	8	0	0	8	0
Lane Group Flow (vph)	55	178	0	42	39	0	577	363	0	76	301	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.8	10.8		10.8	10.8		32.2	32.2		17.7	17.7	
Effective Green, g (s)	10.8	10.8		10.8	10.8		32.2	32.2		17.7	17.7	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.59	0.59		0.32	0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	313		135	328		711	1069		324	587	
v/s Ratio Prot		c0.11			0.02		c0.18	0.20			c0.16	
v/s Ratio Perm	0.04			0.06			0.29			0.08		
v/c Ratio	0.21	0.57		0.31	0.12		0.81	0.34		0.23	0.51	
Uniform Delay, d ₁	18.5	20.0		18.9	18.2		7.3	5.9		13.7	15.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.4	2.4		1.3	0.2		7.0	0.9		1.7	3.2	
Delay (s)	19.0	22.4		20.2	18.4		14.3	6.8		15.4	18.3	
Level of Service	B	C		C	B		B	A		B	B	
Approach Delay (s)		22.1			19.0			11.3			17.7	
Approach LOS		C			B			B			B	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & Crosswinds Blvd.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:54:41 PM

- »GR19 & Crosswinds Blvd - 2025 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2025 TT, Saturday
- »GR19 & Crosswinds Blvd - 2030 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2030 TT, Saturday
- »GR19 & Crosswinds Blvd - 2035 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & Crosswinds Blvd - 2025 TT																		
1 - Crosswinds Blvd	D1	0.2	0.5	6.48	0.17	A	3.34	A	93 % [1 - Crosswinds Blvd]	D2	0.4	1.2	9.50	0.27	A	4.84	A	42 % [1 - Crosswinds Blvd]
2 - GR19		0.6	1.8	2.95	0.39	A					1.5	2.6	4.44	0.60	A			
3 - GR19		0.9	1.5	3.30	0.47	A					1.7	3.3	4.70	0.63	A			
GR19 & Crosswinds Blvd - 2030 TT																		
1 - Crosswinds Blvd	D3	0.2	0.6	6.86	0.18	A	3.52	A	82 % [1 - Crosswinds Blvd]	D4	0.4	1.6	10.79	0.30	B	5.48	A	33 % [1 - Crosswinds Blvd]
2 - GR19		0.7	1.5	3.10	0.42	A					1.8	3.7	5.04	0.64	A			
3 - GR19		1.0	1.5	3.51	0.50	A					2.0	4.6	5.37	0.67	A			
GR19 & Crosswinds Blvd - 2035 TT																		
1 - Crosswinds Blvd	D5	0.2	0.9	7.32	0.19	A	3.75	A	71 % [1 - Crosswinds Blvd]	D6	0.5	1.9	12.67	0.33	B	6.43	A	25 % [1 - Crosswinds Blvd]
2 - GR19		0.8	1.5	3.29	0.45	A					2.3	5.3	5.90	0.70	A			
3 - GR19		1.2	1.7	3.77	0.54	A					2.6	6.4	6.35	0.73	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

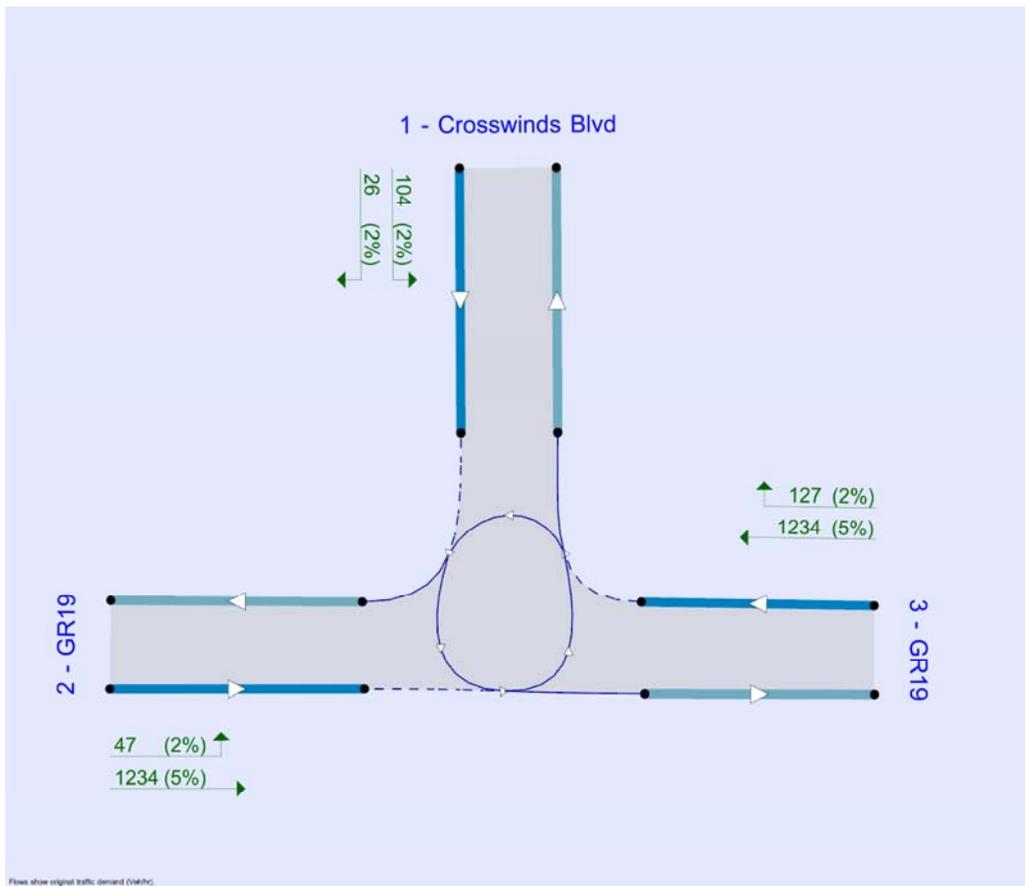
File summary

File Description

Title	
Location	
Site number	
Date	6/12/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 TT	Friday PM	PHF	16:00	17:00	15
D2	2025 TT	Saturday	PHF	13:00	14:00	15
D3	2030 TT	Friday PM	PHF	16:00	17:00	15
D4	2030 TT	Saturday	PHF	13:00	14:00	15
D5	2035 TT	Friday PM	PHF	16:00	17:00	15
D6	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & Crosswinds Blvd	100.000

GR19 & Crosswinds Blvd - 2030 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	3.52	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	82	1 - Crosswinds Blvd

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2030 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	103	100.000
2 - GR19		✓	773	100.000
3 - GR19		✓	960	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	103	0.92	SecondQuarter
2 - GR19	773	0.92	SecondQuarter
3 - GR19	960	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	6	97
	2 - GR19	10	0	763
	3 - GR19	138	822	0

Vehicle Mix

Truck Percentages

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.18	6.86	0.2	0.6	A
2 - GR19	0.42	3.10	0.7	1.5	A
3 - GR19	0.50	3.51	1.0	1.5	A

GR19 & Crosswinds Blvd - 2030 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	5.48	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	33	1 - Crosswinds Blvd

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2030 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	130	100.000
2 - GR19		✓	1183	100.000
3 - GR19		✓	1264	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	130	0.92	SecondQuarter
2 - GR19	1183	0.92	SecondQuarter
3 - GR19	1264	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	26	104
	2 - GR19	47	0	1136
	3 - GR19	127	1137	0

Vehicle Mix

Truck Percentages

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.30	10.79	0.4	1.6	B
2 - GR19	0.64	5.04	1.8	3.7	A
3 - GR19	0.67	5.37	2.0	4.6	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21.j9
 Path: C:\Users\IDPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:14:22 PM

- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

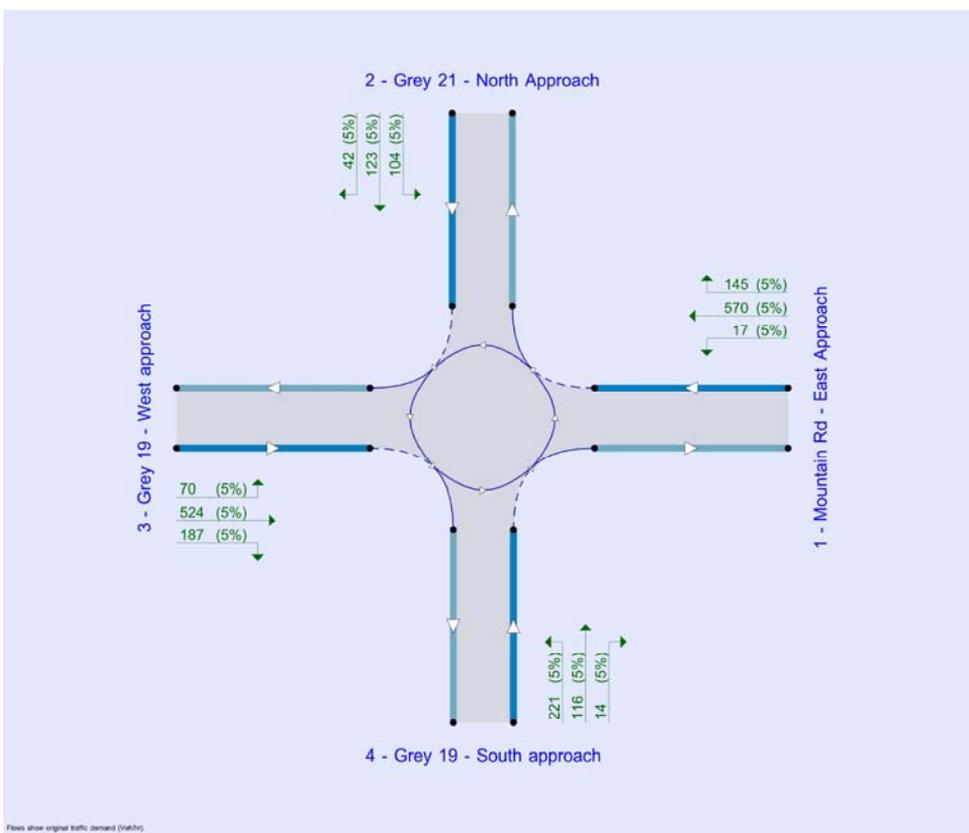
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/h).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2030 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	3.25	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	81	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2030 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	825	100.000
2 - Grey 21 - North Approach		✓	285	100.000
3 - Grey 19 - West approach		✓	876	100.000
4 - Grey 19 - South approach		✓	410	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	825	0.92	SecondQuarter
2 - Grey 21 - North Approach	285	0.92	SecondQuarter
3 - Grey 19 - West approach	876	0.92	SecondQuarter
4 - Grey 19 - South approach	410	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	145	662	18
	2 - Grey 21 - North Approach	112	0	40	133
	3 - Grey 19 - West approach	596	56	0	224
	4 - Grey 19 - South approach	16	125	269	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.47	3.58	0.9	1.5	A
2 - Grey 21 - North Approach	0.19	2.76	0.2	0.5	A
3 - Grey 19 - West approach	0.47	3.29	0.9	1.5	A
4 - Grey 19 - South approach	0.26	2.85	0.4	1.4	A

GR19 & GR21 - 2030 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	5.11	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	37	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D10	2030 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1030	100.000
2 - Grey 21 - North Approach		✓	409	100.000
3 - Grey 19 - West approach		✓	1254	100.000
4 - Grey 19 - South approach		✓	549	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1030	0.92	SecondQuarter
2 - Grey 21 - North Approach	409	0.92	SecondQuarter
3 - Grey 19 - West approach	1254	0.92	SecondQuarter
4 - Grey 19 - South approach	549	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	121	897	12
	2 - Grey 21 - North Approach	134	0	59	216
	3 - Grey 19 - West approach	886	50	0	318
	4 - Grey 19 - South approach	11	214	324	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.62	5.27	1.6	2.8	A
2 - Grey 21 - North Approach	0.32	3.80	0.5	1.8	A
3 - Grey 19 - West approach	0.69	5.85	2.2	4.9	A
4 - Grey 19 - South approach	0.40	4.08	0.7	1.8	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR119.j9
 Path: C:\Users\DPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday										
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	
GR19 & GR119 - 2020 Existing																			
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	[3 - Gord Canning Dr - West approach]	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A				
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A				
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A				
GR19 & GR119 - 2025 BG																			
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	[3 - Gord Canning Dr - West approach]	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A				
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B				
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A				
GR19 & GR119 - 2030 BG																			
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	[3 - Gord Canning Dr - West approach]	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A				
GR19 & GR119 - 2035 BG																			
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	[3 - Gord Canning Dr - West approach]	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A				
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D				
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A				
GR19 & GR119 - 2025 TT																			
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	[3 - Gord Canning Dr - West approach]	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A				
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B				
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A				
GR19 & GR119 - 2030 TT																			
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	[3 - Gord Canning Dr - West approach]	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A				
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C				
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A				
GR19 & GR119 - 2035 TT																			
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	[3 - Gord Canning Dr - West approach]	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A				
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C				
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

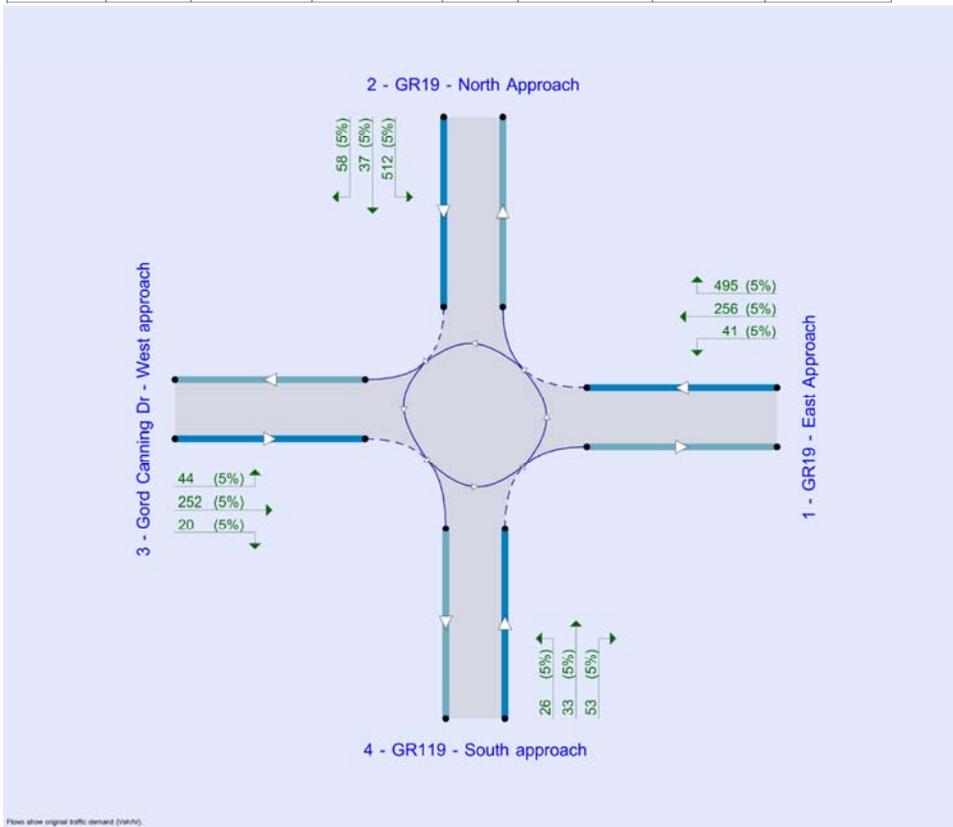
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (2016-18)

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2030 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.68	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	66	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2030 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	829	100.000
2 - GR19 - North Approach		✓	651	100.000
3 - Gord Canning Dr - West approach		✓	281	100.000
4 - GR119 - South approach		✓	136	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	829	0.92	SecondQuarter
2 - GR19 - North Approach	651	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	281	0.92	SecondQuarter
4 - GR119 - South approach	136	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	613	154	62
	2 - GR19 - North Approach	522	0	66	63
	3 - Gord Canning Dr - West approach	174	78	0	29
	4 - GR119 - South approach	81	38	17	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.43	3.03	0.8	1.5	A
2 - GR19 - North Approach	0.35	2.73	0.5	2.1	A
3 - Gord Canning Dr - West approach	0.38	7.09	0.6	2.0	A
4 - GR119 - South approach	0.17	5.10	0.2	0.5	A

GR19 & GR119 - 2030 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	6.25	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	15	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2030 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1167	100.000
2 - GR19 - North Approach		✓	926	100.000
3 - Gord Canning Dr - West approach		✓	422	100.000
4 - GR119 - South approach		✓	140	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1167	0.92	SecondQuarter
2 - GR19 - North Approach	926	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	422	0.92	SecondQuarter
4 - GR119 - South approach	140	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	787	328	52
	2 - GR19 - North Approach	797	0	84	45
	3 - Gord Canning Dr - West approach	329	69	0	24
	4 - GR119 - South approach	68	40	32	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.61	4.40	1.5	2.8	A
2 - GR19 - North Approach	0.53	4.04	1.1	1.5	A
3 - Gord Canning Dr - West approach	0.67	15.73	2.0	7.9	C
4 - GR119 - South approach	0.25	7.70	0.3	1.4	A

**Appendix I:
Traffic Operations - 2035 Total**

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Total
Friday PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	36	476	33	23	40	455	279	56	63	193	42
Future Volume (vph)	61	36	476	33	23	40	455	279	56	63	193	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.86		1.00	0.90		1.00	0.97		1.00	0.97	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1603		1770	1685		1770	1816		1770	1813	
Fl _t Permitted	0.71	1.00		0.40	1.00		0.55	1.00		0.55	1.00	
Satd. Flow (perm)	1330	1603		745	1685		1017	1816		1024	1813	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	38	501	35	24	42	479	294	59	66	203	44
RTOR Reduction (vph)	0	407	0	0	34	0	0	10	0	0	12	0
Lane Group Flow (vph)	64	132	0	35	32	0	479	343	0	66	235	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		31.2	31.2		18.2	18.2	
Effective Green, g (s)	10.0	10.0		10.0	10.0		31.2	31.2		18.2	18.2	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.59	0.59		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	301		140	316		752	1065		350	620	
v/s Ratio Prot		c0.08			0.02		c0.13	0.19				0.13
v/s Ratio Perm	0.05			0.05			0.24			0.06		
v/c Ratio	0.26	0.44		0.25	0.10		0.64	0.32		0.19	0.38	
Uniform Delay, d ₁	18.4	19.1		18.4	17.9		6.3	5.6		12.3	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.5	1.0		0.9	0.1		1.8	0.8		1.2	1.8	
Delay (s)	19.0	20.1		19.3	18.0		8.1	6.4		13.5	15.0	
Level of Service	B	C		B	B		A	A		B	B	
Approach Delay (s)		20.0			18.5			7.4			14.7	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Total
Saturday Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	36	681	40	27	55	587	340	45	72	284	42
Future Volume (vph)	57	36	681	40	27	55	587	340	45	72	284	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1597		1770	1674		1770	1830		1770	1827	
Flt Permitted	0.70	1.00		0.33	1.00		0.39	1.00		0.52	1.00	
Satd. Flow (perm)	1306	1597		606	1674		719	1830		976	1827	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	38	717	42	28	58	618	358	47	76	299	44
RTOR Reduction (vph)	0	504	0	0	45	0	0	7	0	0	9	0
Lane Group Flow (vph)	60	251	0	42	41	0	618	398	0	76	334	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Effective Green, g (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.28	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	347		131	364		672	1042		278	520	
v/s Ratio Prot		c0.16			0.02		c0.23	0.22			c0.18	
v/s Ratio Perm	0.05			0.07			0.29			0.08		
v/c Ratio	0.21	0.72		0.32	0.11		0.92	0.38		0.27	0.64	
Uniform Delay, d1	18.1	20.5		18.6	17.7		8.7	6.7		15.7	17.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	7.3		1.4	0.1		17.6	1.1		2.4	6.0	
Delay (s)	18.5	27.8		20.0	17.9		26.3	7.7		18.1	23.7	
Level of Service	B	C		C	B		C	A		B	C	
Approach Delay (s)		27.1			18.6			19.0			22.7	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			22.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			56.5				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			107.4%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

Junctions 9

ARCADY 9 - Roundabout Module

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Filename: GR19 & Crosswinds Blvd.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:54:41 PM

- »GR19 & Crosswinds Blvd - 2025 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2025 TT, Saturday
- »GR19 & Crosswinds Blvd - 2030 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2030 TT, Saturday
- »GR19 & Crosswinds Blvd - 2035 TT, Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & Crosswinds Blvd - 2025 TT																		
1 - Crosswinds Blvd	D1	0.2	0.5	6.48	0.17	A	3.34	A	93 % [1 - Crosswinds Blvd]	D2	0.4	1.2	9.50	0.27	A	4.84	A	42 % [1 - Crosswinds Blvd]
2 - GR19		0.6	1.8	2.95	0.39	A					1.5	2.6	4.44	0.60	A			
3 - GR19		0.9	1.5	3.30	0.47	A					1.7	3.3	4.70	0.63	A			
GR19 & Crosswinds Blvd - 2030 TT																		
1 - Crosswinds Blvd	D3	0.2	0.6	6.86	0.18	A	3.52	A	82 % [1 - Crosswinds Blvd]	D4	0.4	1.6	10.79	0.30	B	5.48	A	33 % [1 - Crosswinds Blvd]
2 - GR19		0.7	1.5	3.10	0.42	A					1.8	3.7	5.04	0.64	A			
3 - GR19		1.0	1.5	3.51	0.50	A					2.0	4.6	5.37	0.67	A			
GR19 & Crosswinds Blvd - 2035 TT																		
1 - Crosswinds Blvd	D5	0.2	0.9	7.32	0.19	A	3.75	A	71 % [1 - Crosswinds Blvd]	D6	0.5	1.9	12.67	0.33	B	6.43	A	25 % [1 - Crosswinds Blvd]
2 - GR19		0.8	1.5	3.29	0.45	A					2.3	5.3	5.90	0.70	A			
3 - GR19		1.2	1.7	3.77	0.54	A					2.6	6.4	6.35	0.73	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

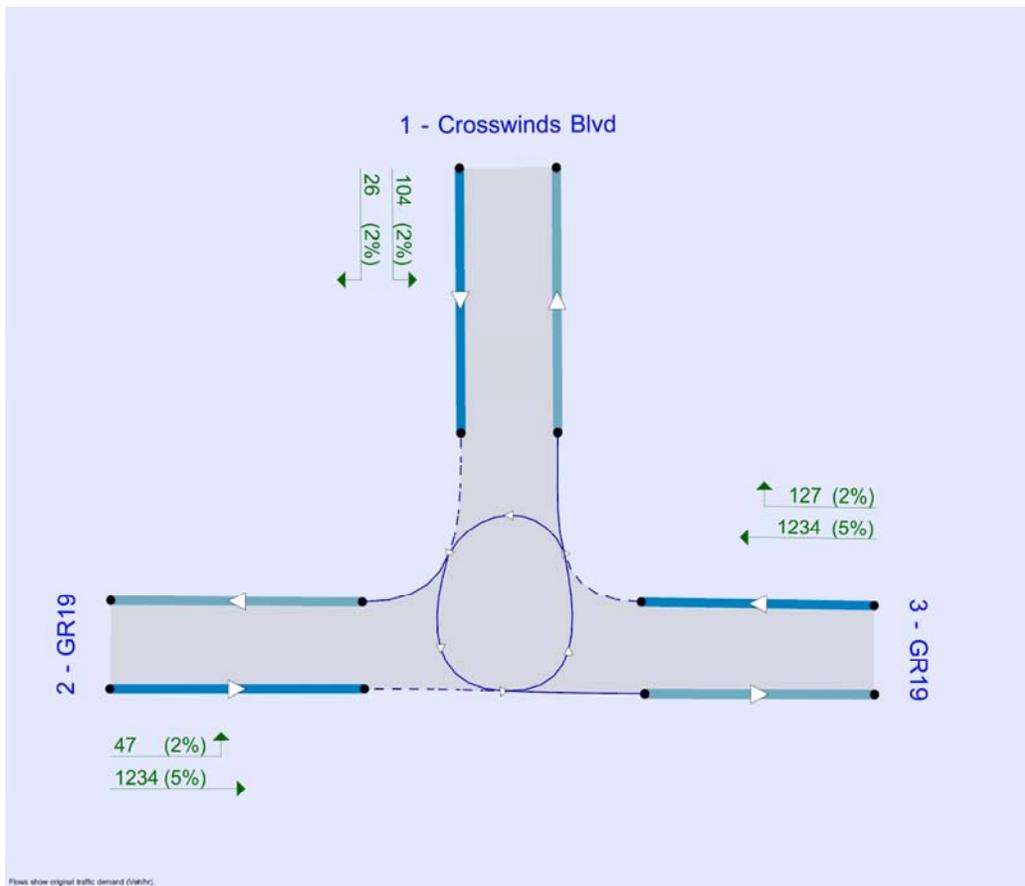
File summary

File Description

Title	
Location	
Site number	
Date	6/12/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 TT	Friday PM	PHF	16:00	17:00	15
D2	2025 TT	Saturday	PHF	13:00	14:00	15
D3	2030 TT	Friday PM	PHF	16:00	17:00	15
D4	2030 TT	Saturday	PHF	13:00	14:00	15
D5	2035 TT	Friday PM	PHF	16:00	17:00	15
D6	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & Crosswinds Blvd	100.000

GR19 & Crosswinds Blvd - 2035 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	3.75	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	71	1 - Crosswinds Blvd

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	103	100.000
2 - GR19		✓	833	100.000
3 - GR19		✓	1025	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	103	0.92	SecondQuarter
2 - GR19	833	0.92	SecondQuarter
3 - GR19	1025	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	6	97
	2 - GR19	10	0	823
	3 - GR19	138	887	0

Vehicle Mix

Truck Percentages

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.19	7.32	0.2	0.9	A
2 - GR19	0.45	3.29	0.8	1.5	A
3 - GR19	0.54	3.77	1.2	1.7	A

GR19 & Crosswinds Blvd - 2035 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	6.43	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	25	1 - Crosswinds Blvd

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	130	100.000
2 - GR19		✓	1281	100.000
3 - GR19		✓	1361	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	130	0.92	SecondQuarter
2 - GR19	1281	0.92	SecondQuarter
3 - GR19	1361	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	26	104
	2 - GR19	47	0	1234
	3 - GR19	127	1234	0

Vehicle Mix

Truck Percentages

From		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.33	12.67	0.5	1.9	B
2 - GR19	0.70	5.90	2.3	5.3	A
3 - GR19	0.73	6.35	2.6	6.4	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21.j9
 Path: C:\Users\IDPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:14:22 PM

- »GR19 & GR21 - 2025 BG, Friday PM
- »GR19 & GR21 - 2025 BG, Saturday
- »GR19 & GR21 - 2030 BG, Friday PM
- »GR19 & GR21 - 2030 BG, Saturday
- »GR19 & GR21 - 2035 BG, Friday PM
- »GR19 & GR21 - 2035 BG, Saturday
- »GR19 & GR21 - 2025 TT, Friday PM
- »GR19 & GR21 - 2025 TT, Saturday
- »GR19 & GR21 - 2030 TT, Friday PM
- »GR19 & GR21 - 2030 TT, Saturday
- »GR19 & GR21 - 2035 TT, Friday PM
- »GR19 & GR21 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2025 BG																		
1 - Mountain Rd - East Approach	D1	0.7	1.5	3.17	0.41	A	2.92	A	102 %	D2	1.2	1.6	4.28	0.55	A	4.17	A	51 %
2 - Grey 21 - North Approach		0.2	0.5	2.52	0.17	A					0.4	1.1	3.29	0.28	A			
3 - Grey 19 - West approach		0.7	1.5	2.97	0.41	A					1.6	2.9	4.67	0.61	A			
4 - Grey 19 - South approach		0.3	1.1	2.62	0.22	A					0.5	2.0	3.51	0.34	A			
GR19 & GR21 - 2030 BG																		
1 - Mountain Rd - East Approach	D3	0.8	1.5	3.40	0.44	A	3.11	A	89 %	D4	1.5	2.3	4.93	0.60	A	4.82	A	40 %
2 - Grey 21 - North Approach		0.2	0.5	2.65	0.19	A					0.5	1.7	3.63	0.31	A			
3 - Grey 19 - West approach		0.8	1.5	3.17	0.45	A					2.0	4.4	5.52	0.67	A			
4 - Grey 19 - South approach		0.3	1.3	2.76	0.24	A					0.6	2.0	3.91	0.38	A			
GR19 & GR21 - 2035 BG																		
1 - Mountain Rd - East Approach	D5	0.9	1.5	3.69	0.48	A	3.35	A	76 %	D6	1.9	3.7	5.91	0.66	A	5.82	A	29 %
2 - Grey 21 - North Approach		0.3	1.0	2.80	0.21	A					0.6	2.1	4.10	0.36	A			
3 - Grey 19 - West approach		0.9	1.5	3.42	0.48	A					2.7	6.5	6.91	0.74	A			
4 - Grey 19 - South approach		0.4	1.5	2.92	0.27	A					0.8	1.5	4.47	0.44	A			
GR19 & GR21 - 2025 TT																		
1 - Mountain Rd - East Approach	D7	0.8	1.5	3.33	0.44	A	3.05	A	93 %	D8	1.3	1.8	4.54	0.57	A	4.26	A	53 %
2 - Grey 21 - North Approach		0.2	0.5	2.63	0.17	A					0.3	1.2	3.19	0.23	A			
3 - Grey 19 - West approach		0.8	1.5	3.08	0.43	A					1.6	3.0	4.59	0.62	A			
4 - Grey 19 - South approach		0.3	1.3	2.70	0.24	A					0.6	2.1	3.65	0.36	A			
GR19 & GR21 - 2030 TT																		
1 - Mountain Rd - East Approach	D9	0.9	1.5	3.58	0.47	A	3.25	A	81 %	D10	1.6	2.8	5.27	0.62	A	5.11	A	37 %
2 - Grey 21 - North Approach		0.2	0.5	2.76	0.19	A					0.5	1.8	3.80	0.32	A			
3 - Grey 19 - West approach		0.9	1.5	3.29	0.47	A					2.2	4.9	5.85	0.69	A			
4 - Grey 19 - South approach		0.4	1.4	2.85	0.26	A					0.7	1.8	4.08	0.40	A			
GR19 & GR21 - 2035 TT																		
1 - Mountain Rd - East Approach	D11	1.0	1.5	3.91	0.51	A	3.52	A	69 %	D12	2.1	4.3	6.39	0.68	A	6.24	A	26 %
2 - Grey 21 - North Approach		0.3	1.1	2.94	0.21	A					0.6	2.1	4.31	0.37	A			
3 - Grey 19 - West approach		1.0	1.5	3.57	0.50	A					3.0	7.3	7.43	0.76	A			
4 - Grey 19 - South approach		0.4	1.4	3.03	0.29	A					0.8	1.5	4.69	0.46	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

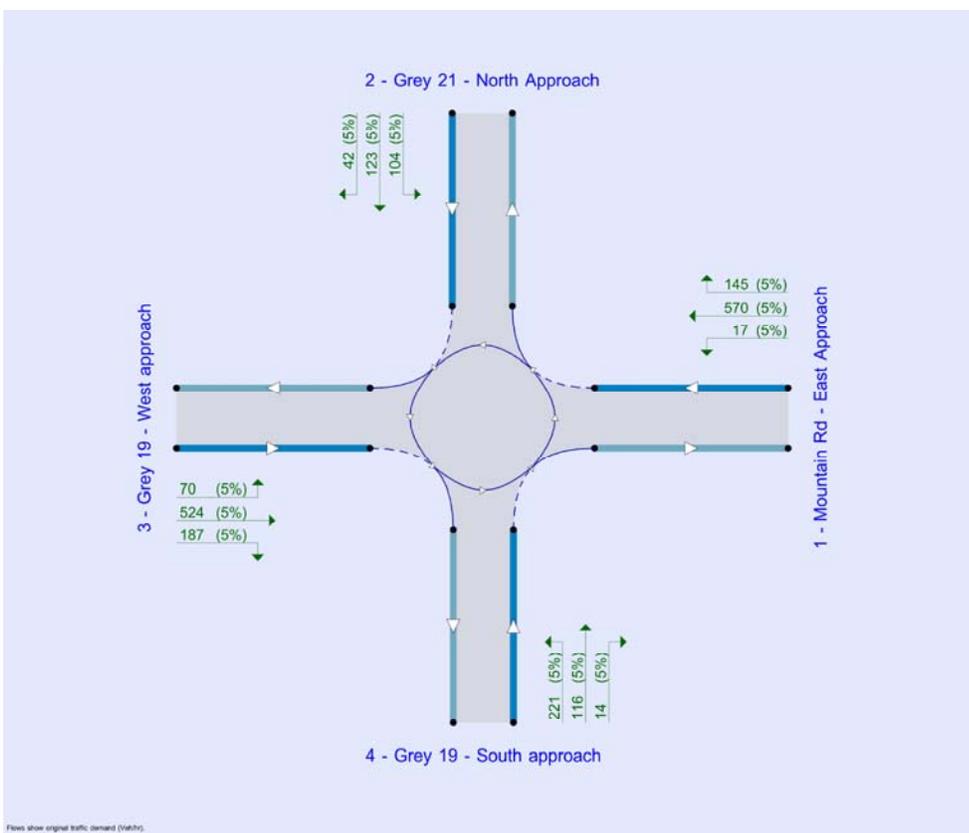
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/h).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 BG	Friday PM	PHF	16:00	17:00	15
D2	2025 BG	Saturday	PHF	13:00	14:00	15
D3	2030 BG	Friday PM	PHF	16:00	17:00	15
D4	2030 BG	Saturday	PHF	13:00	14:00	15
D5	2035 BG	Friday PM	PHF	16:00	17:00	15
D6	2035 BG	Saturday	PHF	13:00	14:00	15
D7	2025 TT	Friday PM	PHF	16:00	17:00	15
D8	2025 TT	Saturday	PHF	13:00	14:00	15
D9	2030 TT	Friday PM	PHF	16:00	17:00	15
D10	2030 TT	Saturday	PHF	13:00	14:00	15
D11	2035 TT	Friday PM	PHF	16:00	17:00	15
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR21	100.000

GR19 & GR21 - 2035 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	3.52	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	69	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	880	100.000
2 - Grey 21 - North Approach		✓	308	100.000
3 - Grey 19 - West approach		✓	939	100.000
4 - Grey 19 - South approach		✓	442	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	880	0.92	SecondQuarter
2 - Grey 21 - North Approach	308	0.92	SecondQuarter
3 - Grey 19 - West approach	939	0.92	SecondQuarter
4 - Grey 19 - South approach	442	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	155	705	20
	2 - Grey 21 - North Approach	120	0	43	145
	3 - Grey 19 - West approach	635	60	0	244
	4 - Grey 19 - South approach	17	134	291	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.51	3.91	1.0	1.5	A
2 - Grey 21 - North Approach	0.21	2.94	0.3	1.1	A
3 - Grey 19 - West approach	0.50	3.57	1.0	1.5	A
4 - Grey 19 - South approach	0.29	3.03	0.4	1.4	A

GR19 & GR21 - 2035 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	6.24	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	26	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1107	100.000
2 - Grey 21 - North Approach		✓	443	100.000
3 - Grey 19 - West approach		✓	1357	100.000
4 - Grey 19 - South approach		✓	599	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1107	0.92	SecondQuarter
2 - Grey 21 - North Approach	443	0.92	SecondQuarter
3 - Grey 19 - West approach	1357	0.92	SecondQuarter
4 - Grey 19 - South approach	599	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	129	965	13
	2 - Grey 21 - North Approach	144	0	63	236
	3 - Grey 19 - West approach	955	54	0	348
	4 - Grey 19 - South approach	12	233	354	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.68	6.39	2.1	4.3	A
2 - Grey 21 - North Approach	0.37	4.31	0.6	2.1	A
3 - Grey 19 - West approach	0.76	7.43	3.0	7.3	A
4 - Grey 19 - South approach	0.46	4.69	0.8	1.5	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: GR19 & GR119.j9
 Path: C:\Users\DPPerks\Desktop\Work From Home\111179 - Windfall\2020\ARCADY
 Report generation date: 6/12/2020 1:07:25 PM

- »GR19 & GR119 - 2020 Existing, Friday PM
- »GR19 & GR119 - 2020 Existing, Saturday
- »GR19 & GR119 - 2025 BG, Friday PM
- »GR19 & GR119 - 2025 BG, Saturday
- »GR19 & GR119 - 2030 BG, Friday PM
- »GR19 & GR119 - 2030 BG, Saturday
- »GR19 & GR119 - 2035 BG, Friday PM
- »GR19 & GR119 - 2035 BG, Saturday
- »GR19 & GR119 - 2025 TT, Friday PM
- »GR19 & GR119 - 2025 TT, Saturday
- »GR19 & GR119 - 2030 TT, Friday PM
- »GR19 & GR119 - 2030 TT, Saturday
- »GR19 & GR119 - 2035 TT, Friday PM
- »GR19 & GR119 - 2035 TT, Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR119 - 2020 Existing																		
1 - GR19 - East Approach	D1	0.4	1.4	2.31	0.26	A	2.84	A	157 %	D2	0.7	1.5	2.88	0.41	A	3.72	A	64 %
2 - GR19 - North Approach		0.3	0.6	2.18	0.20	A					0.5	2.1	2.77	0.34	A			
3 - Gord Canning Dr - West approach		0.3	1.3	4.90	0.23	A					0.7	1.9	7.20	0.41	A			
4 - GR119 - South approach		0.1	0.5	3.96	0.12	A					0.2	0.5	5.05	0.15	A			
GR19 & GR119 - 2025 BG																		
1 - GR19 - East Approach	D3	0.7	1.5	2.95	0.42	A	3.48	A	76 %	D4	1.3	2.1	4.04	0.58	A	5.31	A	24 %
2 - GR19 - North Approach		0.5	2.1	2.69	0.35	A					1.0	1.5	3.79	0.51	A			
3 - Gord Canning Dr - West approach		0.5	1.9	6.62	0.33	A					1.3	2.1	12.28	0.58	B			
4 - GR119 - South approach		0.2	0.5	4.92	0.15	A					0.3	1.1	6.96	0.21	A			
GR19 & GR119 - 2030 BG																		
1 - GR19 - East Approach	D5	0.8	1.5	3.14	0.45	A	3.73	A	63 %	D6	1.7	3.4	4.73	0.63	A	6.55	A	14 %
2 - GR19 - North Approach		0.6	2.0	2.82	0.37	A					1.3	1.8	4.37	0.56	A			
3 - Gord Canning Dr - West approach		0.6	2.0	7.26	0.37	A					2.0	8.1	16.29	0.67	C			
4 - GR119 - South approach		0.2	0.5	5.23	0.17	A					0.4	1.7	8.64	0.31	A			
GR19 & GR119 - 2035 BG																		
1 - GR19 - East Approach	D7	1.0	1.5	3.38	0.49	A	4.05	A	51 %	D8	2.1	4.8	5.38	0.68	A	8.39	A	5 %
2 - GR19 - North Approach		0.7	1.6	2.98	0.40	A					1.5	2.7	4.90	0.61	A			
3 - Gord Canning Dr - West approach		0.7	1.9	8.13	0.42	A					3.3	17.9	25.01	0.79	D			
4 - GR119 - South approach		0.2	1.1	5.62	0.20	A					0.4	1.5	9.40	0.30	A			
GR19 & GR119 - 2025 TT																		
1 - GR19 - East Approach	D9	0.7	1.7	2.85	0.40	A	3.43	A	79 %	D10	1.3	1.9	3.89	0.56	A	5.22	A	25 %
2 - GR19 - North Approach		0.5	1.9	2.60	0.32	A					0.9	1.5	3.62	0.48	A			
3 - Gord Canning Dr - West approach		0.5	2.0	6.47	0.34	A					1.4	2.1	11.95	0.59	B			
4 - GR119 - South approach		0.2	0.5	4.81	0.15	A					0.3	1.1	6.76	0.21	A			
GR19 & GR119 - 2030 TT																		
1 - GR19 - East Approach	D11	0.8	1.5	3.03	0.43	A	3.68	A	66 %	D12	1.5	2.8	4.40	0.61	A	6.25	A	15 %
2 - GR19 - North Approach		0.5	2.1	2.73	0.35	A					1.1	1.5	4.04	0.53	A			
3 - Gord Canning Dr - West approach		0.6	2.0	7.09	0.38	A					2.0	7.9	15.73	0.67	C			
4 - GR119 - South approach		0.2	0.5	5.10	0.17	A					0.3	1.4	7.70	0.25	A			
GR19 & GR119 - 2035 TT																		
1 - GR19 - East Approach	D13	0.9	1.5	3.24	0.47	A	3.97	A	53 %	D14	1.9	4.3	5.12	0.66	A	8.11	A	6 %
2 - GR19 - North Approach		0.6	2.0	2.88	0.38	A					1.4	2.0	4.62	0.58	A			
3 - Gord Canning Dr - West approach		0.7	1.8	7.90	0.42	A					3.2	17.4	23.55	0.78	C			
4 - GR119 - South approach		0.2	1.0	5.47	0.20	A					0.4	1.5	9.01	0.29	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

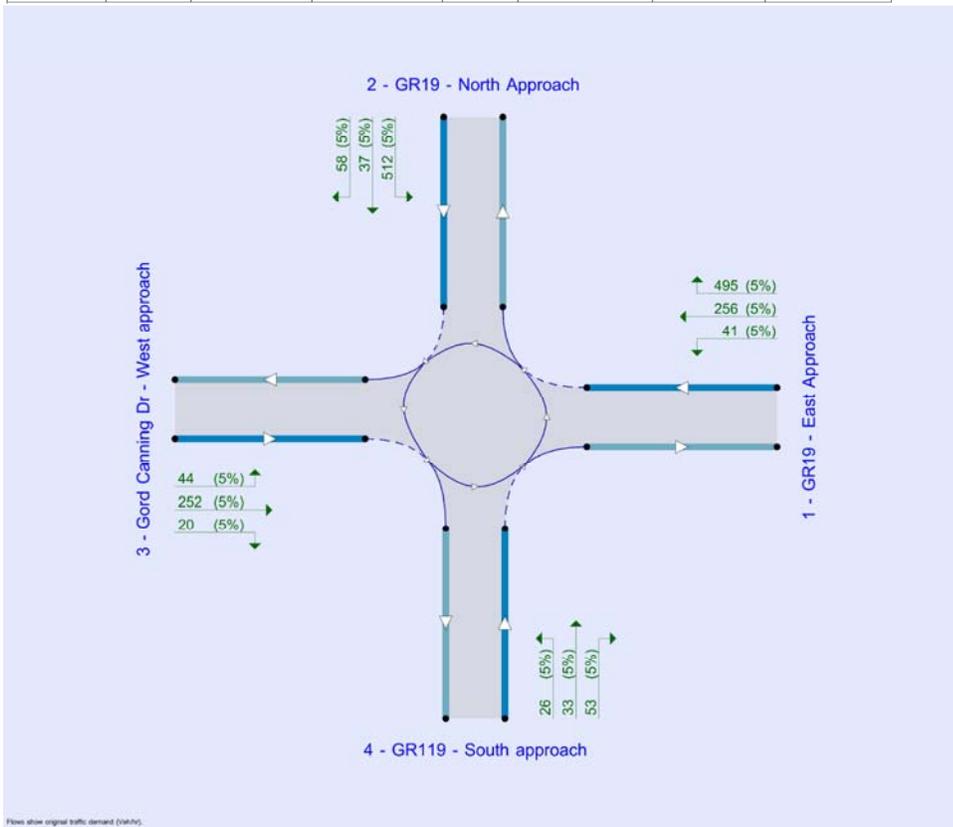
File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (veh/hr).

The intersection diagram reflects the last run of Intersections.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020 Existing	Friday PM	PHF	16:00	17:00	15
D2	2020 Existing	Saturday	PHF	13:00	14:00	15
D3	2025 BG	Friday PM	PHF	16:00	17:00	15
D4	2025 BG	Saturday	PHF	13:00	14:00	15
D5	2030 BG	Friday PM	PHF	16:00	17:00	15
D6	2030 BG	Saturday	PHF	13:00	14:00	15
D7	2035 BG	Friday PM	PHF	16:00	17:00	15
D8	2035 BG	Saturday	PHF	13:00	14:00	15
D9	2025 TT	Friday PM	PHF	16:00	17:00	15
D10	2025 TT	Saturday	PHF	13:00	14:00	15
D11	2030 TT	Friday PM	PHF	16:00	17:00	15
D12	2030 TT	Saturday	PHF	13:00	14:00	15
D13	2035 TT	Friday PM	PHF	16:00	17:00	15
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	GR19 & GR119	100.000

GR19 & GR119 - 2035 TT, Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.97	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	53	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D13	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	894	100.000
2 - GR19 - North Approach		✓	699	100.000
3 - Gord Canning Dr - West approach		✓	305	100.000
4 - GR119 - South approach		✓	150	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	894	0.92	SecondQuarter
2 - GR19 - North Approach	699	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	305	0.92	SecondQuarter
4 - GR119 - South approach	150	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	657	169	68
	2 - GR19 - North Approach	558	0	71	70
	3 - Gord Canning Dr - West approach	189	84	0	32
	4 - GR119 - South approach	89	42	19	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.47	3.24	0.9	1.5	A
2 - GR19 - North Approach	0.38	2.88	0.6	2.0	A
3 - Gord Canning Dr - West approach	0.42	7.90	0.7	1.8	A
4 - GR119 - South approach	0.20	5.47	0.2	1.0	A

GR19 & GR119 - 2035 TT, Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	8.11	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	6	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1267	100.000
2 - GR19 - North Approach		✓	1002	100.000
3 - Gord Canning Dr - West approach		✓	462	100.000
4 - GR119 - South approach		✓	153	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1267	0.92	SecondQuarter
2 - GR19 - North Approach	1002	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	462	0.92	SecondQuarter
4 - GR119 - South approach	153	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	850	360	57
	2 - GR19 - North Approach	861	0	91	50
	3 - Gord Canning Dr - West approach	361	74	0	27
	4 - GR119 - South approach	74	44	35	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

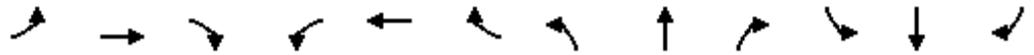
Results Summary for whole modelled period

Leg	Max VIC Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.66	5.12	1.9	4.3	A
2 - GR19 - North Approach	0.58	4.62	1.4	2.0	A
3 - Gord Canning Dr - West approach	0.78	23.55	3.2	17.4	C
4 - GR119 - South approach	0.29	9.01	0.4	1.5	A

**Appendix J:
Traffic Operations - 2022 Total**

HCM Signalized Intersection Capacity Analysis
 1: Grey Road 19 & Mountain Road & Grey Road 21

2022 Total
 Friday PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	
Traffic Volume (vph)	56	456	179	16	499	109	211	101	14	83	111	35
Future Volume (vph)	56	456	179	16	499	109	211	101	14	83	111	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.98		1.00	0.96	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1853	1583		1816		1770	1828		1770	1796	
Flt Permitted		0.88	1.00		0.98		0.66	1.00		0.68	1.00	
Satd. Flow (perm)		1644	1583		1783		1228	1828		1265	1796	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	480	188	17	525	115	222	106	15	87	117	37
RTOR Reduction (vph)	0	0	106	0	15	0	0	8	0	0	17	0
Lane Group Flow (vph)	0	539	82	0	642	0	222	113	0	87	137	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		22.6	22.6		22.6		17.2	17.2		17.2	17.2	
Effective Green, g (s)		22.6	22.6		22.6		17.2	17.2		17.2	17.2	
Actuated g/C Ratio		0.44	0.44		0.44		0.33	0.33		0.33	0.33	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		717	690		777		407	606		420	596	
v/s Ratio Prot								0.06			0.08	
v/s Ratio Perm		0.33	0.05		0.36		0.18			0.07		
v/c Ratio		0.75	0.12		0.83		0.55	0.19		0.21	0.23	
Uniform Delay, d1		12.2	8.7		12.9		14.1	12.3		12.4	12.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.5	0.1		7.2		5.2	0.7		1.1	0.9	
Delay (s)		16.7	8.8		20.1		19.3	13.0		13.5	13.4	
Level of Service		B	A		C		B	B		B	B	
Approach Delay (s)		14.7			20.1			17.1			13.4	
Approach LOS		B			C			B			B	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Grey Road 19 & Crosswinds Blvd

2022 Total
Friday PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	27	634	684	56	45	18
Future Volume (vph)	27	634	684	56	45	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.99		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1859	1844		1729	
Flt Permitted		0.96	1.00		0.97	
Satd. Flow (perm)		1786	1844		1729	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	667	720	59	47	19
RTOR Reduction (vph)	0	0	4	0	18	0
Lane Group Flow (vph)	0	695	775	0	48	0
Turn Type	Perm	NA	NA		Prot	
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		42.9	42.9		4.4	
Effective Green, g (s)		42.9	42.9		4.4	
Actuated g/C Ratio		0.72	0.72		0.07	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		1292	1334		128	
v/s Ratio Prot			c0.42		c0.03	
v/s Ratio Perm		0.39				
v/c Ratio		0.54	0.58		0.38	
Uniform Delay, d1		3.7	3.9		26.1	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		1.6	1.9		1.9	
Delay (s)		5.3	5.8		28.0	
Level of Service		A	A		C	
Approach Delay (s)		5.3	5.8		28.0	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Grey Road 19 & Mountain Road & Grey Road 21

2022 Total
Saturday Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	
Traffic Volume (vph)	44	703	261	10	706	91	263	178	9	100	182	51
Future Volume (vph)	44	703	261	10	706	91	263	178	9	100	182	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.99		1.00	0.97	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1857	1583		1833		1770	1850		1770	1801	
Flt Permitted		0.93	1.00		0.96		0.58	1.00		0.63	1.00	
Satd. Flow (perm)		1724	1583		1756		1079	1850		1182	1801	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	740	275	11	743	96	277	187	9	105	192	54
RTOR Reduction (vph)	0	0	137	0	7	0	0	3	0	0	15	0
Lane Group Flow (vph)	0	786	138	0	843	0	277	193	0	105	231	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		31.3	31.3		31.3		19.1	19.1		19.1	19.1	
Effective Green, g (s)		31.3	31.3		31.3		19.1	19.1		19.1	19.1	
Actuated g/C Ratio		0.50	0.50		0.50		0.31	0.31		0.31	0.31	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		864	794		880		330	566		361	551	
v/s Ratio Prot								0.10			0.13	
v/s Ratio Perm		0.46	0.09		c0.48		c0.26			0.09		
v/c Ratio		0.91	0.17		0.96		0.84	0.34		0.29	0.42	
Uniform Delay, d1		14.3	8.5		14.9		20.2	16.8		16.5	17.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		13.3	0.1		20.5		21.9	1.6		2.0	2.3	
Delay (s)		27.5	8.6		35.4		42.1	18.4		18.5	19.6	
Level of Service		C	A		D		D	B		B	B	
Approach Delay (s)		22.6			35.4			32.3			19.3	
Approach LOS		C			D			C			B	

Intersection Summary

HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Grey Road 19 & Crosswinds Blvd

2022 Total
Saturday Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	75	947	949	63	54	42
Future Volume (vph)	75	947	949	63	54	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	
Lane Util. Factor		1.00	1.00		1.00	
Frt		1.00	0.99		0.94	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1856	1847		1705	
Flt Permitted		0.79	1.00		0.97	
Satd. Flow (perm)		1463	1847		1705	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	997	999	66	57	44
RTOR Reduction (vph)	0	0	2	0	32	0
Lane Group Flow (vph)	0	1076	1063	0	69	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		4	8			
Permitted Phases	4				6	
Actuated Green, G (s)		80.3	80.3		6.2	
Effective Green, g (s)		80.3	80.3		6.2	
Actuated g/C Ratio		0.82	0.82		0.06	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		1192	1505		107	
v/s Ratio Prot			0.58			
v/s Ratio Perm		c0.74			c0.04	
v/c Ratio		0.90	0.71		0.65	
Uniform Delay, d1		6.4	4.0		45.1	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		11.2	2.8		12.6	
Delay (s)		17.5	6.8		57.7	
Level of Service		B	A		E	
Approach Delay (s)		17.5	6.8		57.7	
Approach LOS		B	A		E	

Intersection Summary

HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

**Appendix K:
Traffic Operations - 2035 Total
(Scenario 1)**

Junctions 9

ARCADY 9 - Roundabout Module

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Filename: GR19 & GR21 - 2035TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:09:50 PM

- »GR19 & GR21 - 2035 TT (Scenario 1), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 1), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 2), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 2), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 3), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2035 TT (Scenario 1)																		
1 - Mountain Rd - East Approach	D11	1.4	2.3	4.86	0.59	A	4.07	A	48 % [1 - Mountain Rd - East Approach]	D12	2.5	5.3	7.25	0.72	A	7.07	A	21 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.3	1.4	3.34	0.26	A					0.7	1.9	4.68	0.40	A			
3 - Grey 19 - West approach		1.2	1.6	3.90	0.54	A					3.6	12.9	8.62	0.79	A			
4 - Grey 19 - South approach		0.5	2.0	3.35	0.34	A					1.0	1.5	5.10	0.49	A			
GR19 & GR21 - 2035 TT (Scenario 2)																		
1 - Mountain Rd - East Approach	D13	1.5	2.4	5.03	0.60	A	4.20	A	46 % [1 - Mountain Rd - East Approach]	D14	2.8	6.9	8.07	0.74	A	7.87	A	18 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.4	1.4	3.49	0.29	A					0.9	1.5	5.21	0.46	A			
3 - Grey 19 - West approach		1.2	1.7	4.04	0.55	A					4.1	17.8	9.81	0.81	A			
4 - Grey 19 - South approach		0.6	2.1	3.47	0.36	A					1.2	1.5	5.71	0.55	A			
GR19 & GR21 - 2035 TT (Scenario 3)																		
1 - Mountain Rd - East Approach	D15	2.1	4.3	6.40	0.68	A	5.13	A	32 % [1 - Mountain Rd - East Approach]	D16	5.8	31.5	14.70	0.87	B	15.69	C	4 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.5	1.9	3.98	0.33	A					1.2	1.5	7.02	0.55	A			
3 - Grey 19 - West approach		1.7	3.2	4.90	0.63	A					12.0	57.1	23.16	0.95	C			
4 - Grey 19 - South approach		0.7	1.6	3.98	0.42	A					1.8	2.6	8.01	0.65	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & GR21 - 2035 TT (Scenario 1), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	4.07	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	48	1 - Mountain Rd - East Approach

Legs

Legs

Leg	Name	Description
1	Mountain Rd - East Approach	
2	Grey 21 - North Approach	
3	Grey 19 - West approach	
4	Grey 19 - South approach	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Mountain Rd - East Approach	4.00	8.00	100.0	15.0	60.0	18.5	
2 - Grey 21 - North Approach	3.50	8.00	97.0	28.0	60.0	6.0	
3 - Grey 19 - West approach	4.00	8.00	101.0	15.0	60.0	17.5	
4 - Grey 19 - South approach	3.50	8.00	118.0	20.0	60.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - Mountain Rd - East Approach	0.674	2340
2 - Grey 21 - North Approach	0.715	2466
3 - Grey 19 - West approach	0.677	2350
4 - Grey 19 - South approach	0.691	2394

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D11	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	996	100.000
2 - Grey 21 - North Approach		✓	341	100.000
3 - Grey 19 - West approach		✓	1005	100.000
4 - Grey 19 - South approach		✓	505	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	996	0.92	SecondQuarter
2 - Grey 21 - North Approach	341	0.92	SecondQuarter
3 - Grey 19 - West approach	1005	0.92	SecondQuarter
4 - Grey 19 - South approach	505	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

	To

		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	175	801	20
	2 - Grey 21 - North Approach	132	0	55	154
	3 - Grey 19 - West approach	672	71	0	262
	4 - Grey 19 - South approach	17	149	339	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.59	4.86	1.4	2.3	A
2 - Grey 21 - North Approach	0.26	3.34	0.3	1.4	A
3 - Grey 19 - West approach	0.54	3.90	1.2	1.6	A
4 - Grey 19 - South approach	0.34	3.35	0.5	2.0	A

GR19 & GR21 - 2035 TT (Scenario 1), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	7.07	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	21	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D12	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1146	100.000
2 - Grey 21 - North Approach		✓	478	100.000
3 - Grey 19 - West approach		✓	1404	100.000
4 - Grey 19 - South approach		✓	625	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1146	0.92	SecondQuarter
2 - Grey 21 - North Approach	478	0.92	SecondQuarter
3 - Grey 19 - West approach	1404	0.92	SecondQuarter
4 - Grey 19 - South approach	625	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	145	988	13
	2 - Grey 21 - North Approach	158	0	73	247
	3 - Grey 19 - West approach	978	64	0	362
	4 - Grey 19 - South approach	12	245	368	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.72	7.25	2.5	5.3	A
2 - Grey 21 - North Approach	0.40	4.68	0.7	1.9	A
3 - Grey 19 - West approach	0.79	8.62	3.6	12.9	A
4 - Grey 19 - South approach	0.49	5.10	1.0	1.5	A

Junctions 9

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Filename: GR19 & GR119 - 2035TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:23:21 PM

- »GR19 & GR119 - 2035 TT (Scenario 1), Friday PM
- »GR19 & GR119 - 2035 TT (Scenario 1), Saturday
- »GR19 & GR119 - 2035 TT (Scenario 3), Friday PM
- »GR19 & GR119 - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR119 - 2035 TT (Scenario 1)																		
1 - GR19 - East Approach	D13	0.9	1.5	3.35	0.48	A	3.77	A	64 %	D14	2.1	4.8	5.35	0.68	A	6.32	A	20 %
2 - GR19 - North Approach		0.6	1.8	2.97	0.39	A					1.4	2.1	4.69	0.59	A			
3 - Gord Canning Dr - West approach		0.6	2.0	6.28	0.39	A					1.7	4.6	12.34	0.64	B			
4 - GR119 - South approach		0.2	0.5	4.56	0.18	A					0.3	1.3	6.66	0.24	A			
GR19 & GR119 - 2035 TT (Scenario 3)																		
1 - GR19 - East Approach	D15	1.3	1.9	4.04	0.57	A	4.50	A	44 %	D16	3.8	13.7	8.45	0.80	A	10.76	B	3 %
2 - GR19 - North Approach		0.9	1.5	3.39	0.46	A					2.4	5.3	6.85	0.71	A			
3 - Gord Canning Dr - West approach		0.9	1.4	7.78	0.47	A					4.2	22.6	26.39	0.83	D			
4 - GR119 - South approach		0.3	1.4	5.39	0.25	A					0.6	2.2	9.71	0.38	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & GR119 - 2035 TT (Scenario 1, Friday PM)

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	3.77	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	64	3 - Gord Canning Dr - West approach

Legs

Legs

Leg	Name	Description
1	GR19 - East Approach	
2	GR19 - North Approach	
3	Gord Canning Dr - West approach	
4	GR119 - South approach	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - GR19 - East Approach	4.00	8.50	30.0	40.0	60.0	15.0	
2 - GR19 - North Approach	4.00	8.50	30.0	55.0	60.0	15.0	
3 - Gord Canning Dr - West approach	3.75	4.50	15.0	25.0	60.0	15.0	
4 - GR119 - South approach	3.75	5.00	25.0	30.0	60.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - GR19 - East Approach	0.680	2296
2 - GR19 - North Approach	0.685	2311
3 - Gord Canning Dr - West approach	0.524	1415
4 - GR119 - South approach	0.551	1563

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D13	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	926	100.000
2 - GR19 - North Approach		✓	724	100.000
3 - Gord Canning Dr - West approach		✓	335	100.000
4 - GR119 - South approach		✓	157	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	926	0.92	SecondQuarter
2 - GR19 - North Approach	724	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	335	0.92	SecondQuarter
4 - GR119 - South approach	157	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	671	183	72
	2 - GR19 - North Approach	581	0	73	70
	3 - Gord Canning Dr - West approach	216	87	0	32
	4 - GR119 - South approach	96	42	19	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.48	3.35	0.9	1.5	A
2 - GR19 - North Approach	0.39	2.97	0.6	1.8	A
3 - Gord Canning Dr - West approach	0.39	6.28	0.6	2.0	A
4 - GR119 - South approach	0.18	4.56	0.2	0.5	A

GR19 & GR119 - 2035 TT (Scenario 1), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	6.32	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	20	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D14	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1293	100.000
2 - GR19 - North Approach		✓	999	100.000
3 - Gord Canning Dr - West approach		✓	470	100.000
4 - GR119 - South approach		✓	159	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1293	0.92	SecondQuarter
2 - GR19 - North Approach	999	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	470	0.92	SecondQuarter
4 - GR119 - South approach	159	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	856	375	62
	2 - GR19 - North Approach	856	0	93	50
	3 - Gord Canning Dr - West approach	366	77	0	27
	4 - GR119 - South approach	80	44	35	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.68	5.35	2.1	4.8	A
2 - GR19 - North Approach	0.59	4.69	1.4	2.1	A
3 - Gord Canning Dr - West approach	0.64	12.34	1.7	4.6	B
4 - GR119 - South approach	0.24	6.66	0.3	1.3	A

Filename: GR19 & Crosswinds Blvd - 2035 TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:17:06 PM

- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Saturday
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & Crosswinds Blvd - 2035 TT (Scenario 1)																		
1 - Crosswinds Blvd	D5	0.2	0.8	3.75	0.20	A	3.37	A	72 %	D6	0.3	1.4	5.11	0.25	A	4.77	A	43 %
2 - GR19		0.8	1.4	2.84	0.43	A					1.7	3.6	4.34	0.63	A			
3 - GR19		1.3	2.1	3.70	0.57	A					2.2	5.3	5.11	0.69	A			
GR19 & Crosswinds Blvd - 2035 TT (Scenario 3)																		
1 - Crosswinds Blvd	D7	0.3	1.1	4.21	0.21	A	3.93	A	53 %	D8	0.4	1.5	6.48	0.30	A	7.18	A	25 %
2 - GR19		1.0	1.5	3.22	0.50	A					3.3	8.5	6.95	0.77	A			
3 - GR19		1.8	3.8	4.43	0.64	A					3.7	11.1	7.51	0.79	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	6/12/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Crosswinds Blvd - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	3.37	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	72	3 - GR19

Legs

Legs

Leg	Name	Description
1	Crosswinds Blvd	
2	GR19	
3	GR19	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Crosswinds Blvd	5.00	6.10	113.5	14.9	51.0	21.6	
2 - GR19	3.50	8.10	96.8	27.3	46.0	5.0	
3 - GR19	3.50	8.10	86.3	28.6	46.0	13.8	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - Crosswinds Blvd	0.638	1861
2 - GR19	0.809	2497
3 - GR19	0.783	2411

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2035 TT	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	214	100.000
2 - GR19		✓	892	100.000
3 - GR19		✓	1184	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	214	0.92	SecondQuarter
2 - GR19	892	0.92	SecondQuarter
3 - GR19	1184	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

	To		
	1 - Crosswinds Blvd	2 - GR19	3 - GR19

	1 - Crosswinds Blvd	0	40	174
From	2 - GR19	67	0	825
	3 - GR19	296	888	0

Vehicle Mix

Truck Percentages

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.20	3.75	0.2	0.8	A
2 - GR19	0.43	2.84	0.8	1.4	A
3 - GR19	0.57	3.70	1.3	2.1	A

GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Crosswinds Blvd - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	4.77	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	43	3 - GR19

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2035 TT	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	221	100.000
2 - GR19		✓	1304	100.000
3 - GR19		✓	1425	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	221	0.92	SecondQuarter
2 - GR19	1304	0.92	SecondQuarter
3 - GR19	1425	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	59	162
	2 - GR19	69	0	1235
	3 - GR19	189	1236	0

Vehicle Mix

Truck Percentages

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.25	5.11	0.3	1.4	A
2 - GR19	0.63	4.34	1.7	3.6	A
3 - GR19	0.69	5.11	2.2	5.3	A

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Friday PM Total - Scenario 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	56	479	35	33	56	453	280	59	95	204	42
Future Volume (vph)	61	56	479	35	33	56	453	280	59	95	204	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.91		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1613		1770	1687		1770	1814		1770	1815	
Flt Permitted	0.70	1.00		0.39	1.00		0.54	1.00		0.55	1.00	
Satd. Flow (perm)	1297	1613		730	1687		1008	1814		1020	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	59	504	37	35	59	477	295	62	100	215	44
RTOR Reduction (vph)	0	408	0	0	48	0	0	11	0	0	11	0
Lane Group Flow (vph)	64	155	0	37	46	0	477	346	0	100	248	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.2	10.2		10.2	10.2		31.2	31.2		18.6	18.6	
Effective Green, g (s)	10.2	10.2		10.2	10.2		31.2	31.2		18.6	18.6	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.58	0.58		0.35	0.35	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	308		139	322		740	1059		355	632	
v/s Ratio Prot		c0.10			0.03		c0.13	0.19			0.14	
v/s Ratio Perm	0.05			0.05			0.25			0.10		
v/c Ratio	0.26	0.50		0.27	0.14		0.64	0.33		0.28	0.39	
Uniform Delay, d1	18.4	19.3		18.4	18.0		6.4	5.7		12.6	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.3		1.0	0.2		1.9	0.8		2.0	1.8	
Delay (s)	18.9	20.6		19.4	18.2		8.3	6.5		14.5	15.0	
Level of Service	B	C		B	B		A	A		B	B	
Approach Delay (s)		20.5			18.5			7.6			14.8	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	53.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 SaturdayTotal - Scenario 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	52	662	42	45	90	578	346	48	104	291	42
Future Volume (vph)	57	52	662	42	45	90	578	346	48	104	291	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1604		1770	1676		1770	1828		1770	1828	
Flt Permitted	0.67	1.00		0.33	1.00		0.38	1.00		0.52	1.00	
Satd. Flow (perm)	1241	1604		606	1676		700	1828		967	1828	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	55	697	44	47	95	608	364	51	109	306	44
RTOR Reduction (vph)	0	500	0	0	74	0	0	8	0	0	9	0
Lane Group Flow (vph)	60	252	0	44	68	0	608	407	0	109	341	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Effective Green, g (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.28	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	349		131	364		665	1041		275	520	
v/s Ratio Prot		c0.16			0.04		c0.23	0.22			c0.19	
v/s Ratio Perm	0.05			0.07			0.29			0.11		
v/c Ratio	0.22	0.72		0.34	0.19		0.91	0.39		0.40	0.66	
Uniform Delay, d1	18.2	20.5		18.7	18.0		8.7	6.7		16.3	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	7.2		1.5	0.2		17.1	1.1		4.2	6.4	
Delay (s)	18.6	27.7		20.2	18.3		25.8	7.8		20.5	24.1	
Level of Service	B	C		C	B		C	A		C	C	
Approach Delay (s)		27.0			18.7			18.5			23.3	
Approach LOS		C			B			B			C	

Intersection Summary

HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

**Appendix L:
Traffic Operations - 2035 Total
(Scenario 2)**

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR21 - 2035TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:09:50 PM

- »GR19 & GR21 - 2035 TT (Scenario 1), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 1), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 2), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 2), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 3), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2035 TT (Scenario 1)																		
1 - Mountain Rd - East Approach	D11	1.4	2.3	4.86	0.59	A	4.07	A	48 %	D12	2.5	5.3	7.25	0.72	A	7.07	A	21 %
2 - Grey 21 - North Approach		0.3	1.4	3.34	0.26	A					0.7	1.9	4.68	0.40	A			
3 - Grey 19 - West approach		1.2	1.6	3.90	0.54	A					3.6	12.9	8.62	0.79	A			
4 - Grey 19 - South approach		0.5	2.0	3.35	0.34	A					1.0	1.5	5.10	0.49	A			
GR19 & GR21 - 2035 TT (Scenario 2)																		
1 - Mountain Rd - East Approach	D13	1.5	2.4	5.03	0.60	A	4.20	A	46 %	D14	2.8	6.9	8.07	0.74	A	7.87	A	18 %
2 - Grey 21 - North Approach		0.4	1.4	3.49	0.29	A					0.9	1.5	5.21	0.46	A			
3 - Grey 19 - West approach		1.2	1.7	4.04	0.55	A					4.1	17.8	9.81	0.81	A			
4 - Grey 19 - South approach		0.6	2.1	3.47	0.36	A					1.2	1.5	5.71	0.55	A			
GR19 & GR21 - 2035 TT (Scenario 3)																		
1 - Mountain Rd - East Approach	D15	2.1	4.3	6.40	0.68	A	5.13	A	32 %	D16	5.8	31.5	14.70	0.87	B	15.69	C	4 %
2 - Grey 21 - North Approach		0.5	1.9	3.98	0.33	A					1.2	1.5	7.02	0.55	A			
3 - Grey 19 - West approach		1.7	3.2	4.90	0.63	A					12.0	57.1	23.16	0.95	C			
4 - Grey 19 - South approach		0.7	1.6	3.98	0.42	A					1.8	2.6	8.01	0.65	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & GR21 - 2035 TT (Scenario 2), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	4.20	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	46	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D13	2035 TT (4%)	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	996	100.000
2 - Grey 21 - North Approach		✓	384	100.000
3 - Grey 19 - West approach		✓	1005	100.000
4 - Grey 19 - South approach		✓	540	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	996	0.92	SecondQuarter
2 - Grey 21 - North Approach	384	0.92	SecondQuarter
3 - Grey 19 - West approach	1005	0.92	SecondQuarter
4 - Grey 19 - South approach	540	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	175	801	20
	2 - Grey 21 - North Approach	132	0	55	197
	3 - Grey 19 - West approach	672	71	0	262
	4 - Grey 19 - South approach	17	184	339	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.60	5.03	1.5	2.4	A
2 - Grey 21 - North Approach	0.29	3.49	0.4	1.4	A
3 - Grey 19 - West approach	0.55	4.04	1.2	1.7	A
4 - Grey 19 - South approach	0.36	3.47	0.6	2.1	A

GR19 & GR21 - 2035 TT (Scenario 2), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	7.87	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	18	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D14	2035 TT (4%)	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1146	100.000
2 - Grey 21 - North Approach		✓	551	100.000
3 - Grey 19 - West approach		✓	1404	100.000
4 - Grey 19 - South approach		✓	696	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1146	0.92	SecondQuarter
2 - Grey 21 - North Approach	551	0.92	SecondQuarter
3 - Grey 19 - West approach	1404	0.92	SecondQuarter
4 - Grey 19 - South approach	696	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	145	988	13
	2 - Grey 21 - North Approach	158	0	73	320
	3 - Grey 19 - West approach	978	64	0	362
	4 - Grey 19 - South approach	12	316	368	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.74	8.07	2.8	6.9	A
2 - Grey 21 - North Approach	0.46	5.21	0.9	1.5	A
3 - Grey 19 - West approach	0.81	9.81	4.1	17.8	A
4 - Grey 19 - South approach	0.55	5.71	1.2	1.5	A

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Friday PM Total - Scenario 2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	56	479	35	33	56	453	280	59	95	204	42
Future Volume (vph)	61	56	479	35	33	56	453	280	59	95	204	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.91		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1613		1770	1687		1770	1814		1770	1815	
Flt Permitted	0.70	1.00		0.39	1.00		0.54	1.00		0.55	1.00	
Satd. Flow (perm)	1297	1613		730	1687		1008	1814		1020	1815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	59	504	37	35	59	477	295	62	100	215	44
RTOR Reduction (vph)	0	408	0	0	48	0	0	11	0	0	11	0
Lane Group Flow (vph)	64	155	0	37	46	0	477	346	0	100	248	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.2	10.2		10.2	10.2		31.2	31.2		18.6	18.6	
Effective Green, g (s)	10.2	10.2		10.2	10.2		31.2	31.2		18.6	18.6	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.58	0.58		0.35	0.35	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	308		139	322		740	1059		355	632	
v/s Ratio Prot		c0.10			0.03		c0.13	0.19			0.14	
v/s Ratio Perm	0.05			0.05			0.25			0.10		
v/c Ratio	0.26	0.50		0.27	0.14		0.64	0.33		0.28	0.39	
Uniform Delay, d1	18.4	19.3		18.4	18.0		6.4	5.7		12.6	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.3		1.0	0.2		1.9	0.8		2.0	1.8	
Delay (s)	18.9	20.6		19.4	18.2		8.3	6.5		14.5	15.0	
Level of Service	B	C		B	B		A	A		B	B	
Approach Delay (s)		20.5			18.5			7.6			14.8	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	53.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 SaturdayTotal - Scenario 2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	52	662	42	45	90	578	346	48	104	291	42
Future Volume (vph)	57	52	662	42	45	90	578	346	48	104	291	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1604		1770	1676		1770	1828		1770	1828	
Flt Permitted	0.67	1.00		0.33	1.00		0.38	1.00		0.52	1.00	
Satd. Flow (perm)	1241	1604		606	1676		700	1828		967	1828	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	55	697	44	47	95	608	364	51	109	306	44
RTOR Reduction (vph)	0	500	0	0	74	0	0	8	0	0	9	0
Lane Group Flow (vph)	60	252	0	44	68	0	608	407	0	109	341	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Effective Green, g (s)	12.3	12.3		12.3	12.3		32.2	32.2		16.1	16.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.57	0.57		0.28	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	349		131	364		665	1041		275	520	
v/s Ratio Prot		c0.16			0.04		c0.23	0.22			c0.19	
v/s Ratio Perm	0.05			0.07			0.29			0.11		
v/c Ratio	0.22	0.72		0.34	0.19		0.91	0.39		0.40	0.66	
Uniform Delay, d1	18.2	20.5		18.7	18.0		8.7	6.7		16.3	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	7.2		1.5	0.2		17.1	1.1		4.2	6.4	
Delay (s)	18.6	27.7		20.2	18.3		25.8	7.8		20.5	24.1	
Level of Service	B	C		C	B		C	A		C	C	
Approach Delay (s)		27.0			18.7			18.5			23.3	
Approach LOS		C			B			B			C	

Intersection Summary

HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

**Appendix M:
Traffic Operations - 2035 Total
(Scenario 3)**

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:09:50 PM

- »GR19 & GR21 - 2035 TT (Scenario 1), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 1), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 2), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 2), Saturday
- »GR19 & GR21 - 2035 TT (Scenario 3), Friday PM
- »GR19 & GR21 - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR21 - 2035 TT (Scenario 1)																		
1 - Mountain Rd - East Approach	D11	1.4	2.3	4.86	0.59	A	4.07	A	48 % [1 - Mountain Rd - East Approach]	D12	2.5	5.3	7.25	0.72	A	7.07	A	21 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.3	1.4	3.34	0.26	A					0.7	1.9	4.68	0.40	A			
3 - Grey 19 - West approach		1.2	1.6	3.90	0.54	A					3.6	12.9	8.62	0.79	A			
4 - Grey 19 - South approach		0.5	2.0	3.35	0.34	A					1.0	1.5	5.10	0.49	A			
GR19 & GR21 - 2035 TT (Scenario 2)																		
1 - Mountain Rd - East Approach	D13	1.5	2.4	5.03	0.60	A	4.20	A	46 % [1 - Mountain Rd - East Approach]	D14	2.8	6.9	8.07	0.74	A	7.87	A	18 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.4	1.4	3.49	0.29	A					0.9	1.5	5.21	0.46	A			
3 - Grey 19 - West approach		1.2	1.7	4.04	0.55	A					4.1	17.8	9.81	0.81	A			
4 - Grey 19 - South approach		0.6	2.1	3.47	0.36	A					1.2	1.5	5.71	0.55	A			
GR19 & GR21 - 2035 TT (Scenario 3)																		
1 - Mountain Rd - East Approach	D15	2.1	4.3	6.40	0.68	A	5.13	A	32 % [1 - Mountain Rd - East Approach]	D16	5.8	31.5	14.70	0.87	B	15.69	C	4 % [3 - Grey 19 - West approach]
2 - Grey 21 - North Approach		0.5	1.9	3.98	0.33	A					1.2	1.5	7.02	0.55	A			
3 - Grey 19 - West approach		1.7	3.2	4.90	0.63	A					12.0	57.1	23.16	0.95	C			
4 - Grey 19 - South approach		0.7	1.6	3.98	0.42	A					1.8	2.6	8.01	0.65	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & GR21 - 2035 TT (Scenario 3), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	5.13	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	32	1 - Mountain Rd - East Approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D15	2035 TT (Scenario 3)	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1103	100.000
2 - Grey 21 - North Approach		✓	403	100.000
3 - Grey 19 - West approach		✓	1140	100.000
4 - Grey 19 - South approach		✓	590	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1103	0.92	SecondQuarter
2 - Grey 21 - North Approach	403	0.92	SecondQuarter
3 - Grey 19 - West approach	1140	0.92	SecondQuarter
4 - Grey 19 - South approach	590	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	191	889	23
	2 - Grey 21 - North Approach	146	0	60	197
	3 - Grey 19 - West approach	758	78	0	304
	4 - Grey 19 - South approach	20	184	386	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.68	6.40	2.1	4.3	A
2 - Grey 21 - North Approach	0.33	3.98	0.5	1.9	A
3 - Grey 19 - West approach	0.63	4.90	1.7	3.2	A
4 - Grey 19 - South approach	0.42	3.98	0.7	1.6	A

GR19 & GR21 - 2035 TT (Scenario 3), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Mountain Rd - East Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - Grey 21 - North Approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Grey 19 - West approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - Grey 19 - South approach - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/21	Standard Roundabout		1, 2, 3, 4	15.69	C

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	4	3 - Grey 19 - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D16	2035 TT (Scenario 3)	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Mountain Rd - East Approach		✓	1301	100.000
2 - Grey 21 - North Approach		✓	577	100.000
3 - Grey 19 - West approach		✓	1624	100.000
4 - Grey 19 - South approach		✓	760	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Mountain Rd - East Approach	1301	0.92	SecondQuarter
2 - Grey 21 - North Approach	577	0.92	SecondQuarter
3 - Grey 19 - West approach	1624	0.92	SecondQuarter
4 - Grey 19 - South approach	760	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	159	1126	16
	2 - Grey 21 - North Approach	175	0	82	320
	3 - Grey 19 - West approach	1123	71	0	430
	4 - Grey 19 - South approach	14	316	430	0

Vehicle Mix

Truck Percentages

		To			
		1 - Mountain Rd - East Approach	2 - Grey 21 - North Approach	3 - Grey 19 - West approach	4 - Grey 19 - South approach
From	1 - Mountain Rd - East Approach	0	5	5	5
	2 - Grey 21 - North Approach	5	0	5	5
	3 - Grey 19 - West approach	5	5	0	5
	4 - Grey 19 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Mountain Rd - East Approach	0.87	14.70	5.8	31.5	B
2 - Grey 21 - North Approach	0.55	7.02	1.2	1.5	A
3 - Grey 19 - West approach	0.95	23.16	12.0	57.1	C
4 - Grey 19 - South approach	0.65	8.01	1.8	2.6	A

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: GR19 & GR119 - 2035TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:23:21 PM

- »GR19 & GR119 - 2035 TT (Scenario 1), Friday PM
- »GR19 & GR119 - 2035 TT (Scenario 1), Saturday
- »GR19 & GR119 - 2035 TT (Scenario 3), Friday PM
- »GR19 & GR119 - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM								Saturday									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & GR119 - 2035 TT (Scenario 1)																		
1 - GR19 - East Approach	D13	0.9	1.5	3.35	0.48	A	3.77	A	64 %	D14	2.1	4.8	5.35	0.68	A	6.32	A	20 %
2 - GR19 - North Approach		0.6	1.8	2.97	0.39	A					1.4	2.1	4.69	0.59	A			
3 - Gord Canning Dr - West approach		0.6	2.0	6.28	0.39	A					1.7	4.6	12.34	0.64	B			
4 - GR119 - South approach		0.2	0.5	4.56	0.18	A					0.3	1.3	6.66	0.24	A			
GR19 & GR119 - 2035 TT (Scenario 3)																		
1 - GR19 - East Approach	D15	1.3	1.9	4.04	0.57	A	4.50	A	44 %	D16	3.8	13.7	8.45	0.80	A	10.76	B	3 %
2 - GR19 - North Approach		0.9	1.5	3.39	0.46	A					2.4	5.3	6.85	0.71	A			
3 - Gord Canning Dr - West approach		0.9	1.4	7.78	0.47	A					4.2	22.6	26.39	0.83	D			
4 - GR119 - South approach		0.3	1.4	5.39	0.25	A					0.6	2.2	9.71	0.38	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Grey Rd 19/21 Roundabout
Location	Grey County
Site number	
Date	3/3/2020
Version	
Status	
Identifier	
Client	
Jobnumber	
Analyst	
Description	2019 Conditions

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & GR119 - 2035 TT (Scenario 3), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	4.50	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	44	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D15	2035 TT (Scenario 3)	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1075	100.000
2 - GR19 - North Approach		✓	837	100.000
3 - Gord Canning Dr - West approach		✓	378	100.000
4 - GR119 - South approach		✓	204	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1075	0.92	SecondQuarter
2 - GR19 - North Approach	837	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	378	0.92	SecondQuarter
4 - GR119 - South approach	204	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	785	208	82
	2 - GR19 - North Approach	660	0	83	94
	3 - Gord Canning Dr - West approach	243	98	0	37
	4 - GR119 - South approach	126	56	22	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.57	4.04	1.3	1.9	A
2 - GR19 - North Approach	0.46	3.39	0.9	1.5	A
3 - Gord Canning Dr - West approach	0.47	7.78	0.9	1.4	A
4 - GR119 - South approach	0.25	5.39	0.3	1.4	A

GR19 & GR119 - 2035 TT (Scenario 3), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	Grey Road 19/119	Standard Roundabout		1, 2, 3, 4	10.76	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	3	3 - Gord Canning Dr - West approach

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D16	2035 TT (Scenario 3)	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - GR19 - East Approach		✓	1507	100.000
2 - GR19 - North Approach		✓	1180	100.000
3 - Gord Canning Dr - West approach		✓	533	100.000
4 - GR119 - South approach		✓	204	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - GR19 - East Approach	1507	0.92	SecondQuarter
2 - GR19 - North Approach	1180	0.92	SecondQuarter
3 - Gord Canning Dr - West approach	533	0.92	SecondQuarter
4 - GR119 - South approach	204	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	1008	428	71
	2 - GR19 - North Approach	1008	0	105	67
	3 - Gord Canning Dr - West approach	416	86	0	31
	4 - GR119 - South approach	104	59	41	0

Vehicle Mix

Truck Percentages

		To			
		1 - GR19 - East Approach	2 - GR19 - North Approach	3 - Gord Canning Dr - West approach	4 - GR119 - South approach
From	1 - GR19 - East Approach	0	5	5	5
	2 - GR19 - North Approach	5	0	5	5
	3 - Gord Canning Dr - West approach	5	5	0	5
	4 - GR119 - South approach	5	5	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - GR19 - East Approach	0.80	8.45	3.8	13.7	A
2 - GR19 - North Approach	0.71	6.85	2.4	5.3	A
3 - Gord Canning Dr - West approach	0.83	26.39	4.2	22.6	D
4 - GR119 - South approach	0.38	9.71	0.6	2.2	A

Filename: GR19 & Crosswinds Blvd - 2035 TT.j9
 Path: I:\2011 Projects\111179 - Windfall Development\Design\Traffic Operations\2020 TIS update Sensitivity
 Report generation date: 5/17/2021 4:17:06 PM

- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 1), Saturday
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Friday PM
- »GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Saturday

Summary of intersection performance

	Friday PM									Saturday								
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
GR19 & Crosswinds Blvd - 2035 TT (Scenario 1)																		
1 - Crosswinds Blvd	D5	0.2	0.8	3.75	0.20	A	3.37	A	72 %	D6	0.3	1.4	5.11	0.25	A	4.77	A	43 %
2 - GR19		0.8	1.4	2.84	0.43	A			[3 - GR19]		1.7	3.6	4.34	0.63	A			[3 - GR19]
3 - GR19		1.3	2.1	3.70	0.57	A			2.2		5.3	5.11	0.69	A				
GR19 & Crosswinds Blvd - 2035 TT (Scenario 3)																		
1 - Crosswinds Blvd	D7	0.3	1.1	4.21	0.21	A	3.93	A	53 %	D8	0.4	1.5	6.48	0.30	A	7.18	A	25 %
2 - GR19		1.0	1.5	3.22	0.50	A			[3 - GR19]		3.3	8.5	6.95	0.77	A			[3 - GR19]
3 - GR19		1.8	3.8	4.43	0.64	A			3.7		11.1	7.51	0.79	A				

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	6/12/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Friday PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Crosswinds Blvd - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	3.93	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	53	3 - GR19

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2035 TT (Scenario 3)	Friday PM	PHF	16:00	17:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	214	100.000
2 - GR19		✓	1028	100.000
3 - GR19		✓	1331	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	214	0.92	SecondQuarter
2 - GR19	1028	0.92	SecondQuarter
3 - GR19	1331	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	40	174
	2 - GR19	67	0	961
	3 - GR19	296	1035	0

Vehicle Mix

Truck Percentages

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.21	4.21	0.3	1.1	A
2 - GR19	0.50	3.22	1.0	1.5	A
3 - GR19	0.64	4.43	1.8	3.8	A

GR19 & Crosswinds Blvd - 2035 TT (Scenario 3), Saturday

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - Crosswinds Blvd - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	2 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - GR19 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	GR19 & Crosswinds Blvd	Standard Roundabout		1, 2, 3	7.18	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	25	3 - GR19

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2035 TT (Scenario 3)	Saturday	PHF	13:00	14:00	15

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Crosswinds Blvd		✓	221	100.000
2 - GR19		✓	1597	100.000
3 - GR19		✓	1637	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
1 - Crosswinds Blvd	221	0.92	SecondQuarter
2 - GR19	1597	0.92	SecondQuarter
3 - GR19	1637	0.92	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	59	162
	2 - GR19	69	0	1528
	3 - GR19	189	1448	0

Vehicle Mix

Truck Percentages

		To		
		1 - Crosswinds Blvd	2 - GR19	3 - GR19
From	1 - Crosswinds Blvd	0	2	2
	2 - GR19	2	0	5
	3 - GR19	2	5	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Crosswinds Blvd	0.30	6.48	0.4	1.5	A
2 - GR19	0.77	6.95	3.3	8.5	A
3 - GR19	0.79	7.51	3.7	11.1	A

HCM Signalized Intersection Capacity Analysis

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 Friday PM Total - Scenario 3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	57	527	40	34	57	498	373	67	97	269	48
Future Volume (vph)	71	57	527	40	34	57	498	373	67	97	269	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.91		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1611		1770	1688		1770	1820		1770	1820	
Flt Permitted	0.69	1.00		0.38	1.00		0.44	1.00		0.50	1.00	
Satd. Flow (perm)	1294	1611		703	1688		820	1820		925	1820	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	60	555	42	36	60	524	393	71	102	283	51
RTOR Reduction (vph)	0	448	0	0	48	0	0	9	0	0	10	0
Lane Group Flow (vph)	75	167	0	42	48	0	524	455	0	102	324	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.6	10.6		10.6	10.6		32.2	32.2		18.3	18.3	
Effective Green, g (s)	10.6	10.6		10.6	10.6		32.2	32.2		18.3	18.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.59	0.59		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	311		135	326		688	1069		308	607	
v/s Ratio Prot		c0.10			0.03		c0.17	0.25			c0.18	
v/s Ratio Perm	0.06			0.06			0.28			0.11		
v/c Ratio	0.30	0.54		0.31	0.15		0.76	0.43		0.33	0.53	
Uniform Delay, d1	18.9	19.9		19.0	18.3		7.0	6.2		13.7	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.8		1.3	0.2		5.0	1.2		2.9	3.3	
Delay (s)	19.6	21.7		20.3	18.6		11.9	7.5		16.5	18.1	
Level of Service	B	C		C	B		B	A		B	B	
Approach Delay (s)		21.5			19.1			9.8			17.8	
Approach LOS		C			B			A			B	

Intersection Summary

HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd

2035 SaturdayTotal - Scenario 3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	53	739	48	46	91	641	459	54	106	384	48
Future Volume (vph)	65	53	739	48	46	91	641	459	54	106	384	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1602		1770	1676		1770	1833		1770	1831	
Flt Permitted	0.67	1.00		0.22	1.00		0.18	1.00		0.46	1.00	
Satd. Flow (perm)	1239	1602		412	1676		337	1833		862	1831	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	56	778	51	48	96	675	483	57	112	404	51
RTOR Reduction (vph)	0	508	0	0	74	0	0	5	0	0	6	0
Lane Group Flow (vph)	68	326	0	51	70	0	675	535	0	112	449	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1		47.2	47.2		20.1	20.1	
Effective Green, g (s)	18.1	18.1		18.1	18.1		47.2	47.2		20.1	20.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.61	0.61		0.26	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	375		96	392		671	1119		224	476	
v/s Ratio Prot		c0.20			0.04		c0.33	0.29			c0.25	
v/s Ratio Perm	0.05			0.12			0.29			0.13		
v/c Ratio	0.23	0.87		0.53	0.18		1.01	0.48		0.50	0.94	
Uniform Delay, d1	24.0	28.5		25.9	23.7		19.5	8.3		24.3	28.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	18.9		5.5	0.2		36.2	1.5		7.8	29.3	
Delay (s)	24.4	47.3		31.4	23.9		55.7	9.7		32.1	57.4	
Level of Service	C	D		C	C		E	A		C	E	
Approach Delay (s)		45.6			25.9			35.3			52.4	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	14.0
Intersection Capacity Utilization	126.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2035 Friday Total - Scenario 3 + Improve

2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd



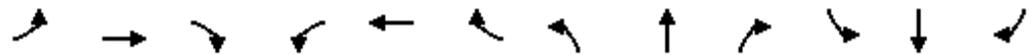
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	57	527	40	34	57	498	373	67	97	269	48
Future Volume (vph)	71	57	527	40	34	57	498	373	67	97	269	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	2.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1688		1770	1820		1770	1820	
Flt Permitted	0.69	1.00	1.00	0.72	1.00		0.46	1.00		0.50	1.00	
Satd. Flow (perm)	1294	1863	1583	1337	1688		862	1820		925	1820	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	60	555	42	36	60	524	393	71	102	283	51
RTOR Reduction (vph)	0	0	173	0	52	0	0	8	0	0	10	0
Lane Group Flow (vph)	75	60	382	42	44	0	524	456	0	102	324	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.0	7.0	19.1	7.0	7.0		32.6	32.6		18.5	18.5	
Effective Green, g (s)	7.0	7.0	19.1	7.0	7.0		32.6	32.6		18.5	18.5	
Actuated g/C Ratio	0.14	0.14	0.37	0.14	0.14		0.63	0.63		0.36	0.36	
Clearance Time (s)	6.0	6.0	2.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	252	585	181	228		757	1149		331	652	
v/s Ratio Prot		0.03	c0.15		0.03		c0.16	0.25			c0.18	
v/s Ratio Perm	0.06		0.09	0.03			0.27			0.11		
v/c Ratio	0.43	0.24	0.65	0.23	0.19		0.69	0.40		0.31	0.50	
Uniform Delay, d1	20.5	19.9	13.5	19.9	19.8		5.2	4.7		11.9	12.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.5	2.6	0.7	0.4		2.7	1.0		2.4	2.7	
Delay (s)	22.2	20.4	16.1	20.6	20.2		8.0	5.7		14.3	15.6	
Level of Service	C	C	B	C	C		A	A		B	B	
Approach Delay (s)		17.2			20.3			6.9			15.3	
Approach LOS		B			C			A			B	

Intersection Summary

HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2035 SaturdayTotal - Scenario 3 + Improve 2: Grey Road 19 & Jozo Weider Blvd/Crosswinds Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	53	739	48	46	91	641	459	54	106	384	48
Future Volume (vph)	65	53	739	48	46	91	641	459	54	106	384	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	2.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.90		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1676		1770	1833		1770	1831	
Flt Permitted	0.67	1.00	1.00	0.72	1.00		0.25	1.00		0.46	1.00	
Satd. Flow (perm)	1239	1863	1583	1342	1676		460	1833		862	1831	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	56	778	51	48	96	675	483	57	112	404	51
RTOR Reduction (vph)	0	0	73	0	84	0	0	4	0	0	5	0
Lane Group Flow (vph)	68	56	705	51	60	0	675	536	0	112	450	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	9.4	9.4	36.0	9.4	9.4		52.1	52.1		23.5	23.5	
Effective Green, g (s)	9.4	9.4	36.0	9.4	9.4		52.1	52.1		23.5	23.5	
Actuated g/C Ratio	0.13	0.13	0.49	0.13	0.13		0.71	0.71		0.32	0.32	
Clearance Time (s)	6.0	6.0	2.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	158	238	775	171	214		800	1299		275	585	
v/s Ratio Prot		0.03	c0.33		0.04		0.31	0.29			c0.25	
v/s Ratio Perm	0.05		0.12	0.04			0.29			0.13		
v/c Ratio	0.43	0.24	0.91	0.30	0.28		0.84	0.41		0.41	0.77	
Uniform Delay, d1	29.6	28.8	17.3	29.1	29.0		12.1	4.4		19.6	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.5	14.5	1.0	0.7		8.1	1.0		4.4	9.4	
Delay (s)	31.5	29.3	31.7	30.0	29.7		20.2	5.4		24.0	31.9	
Level of Service	C	C	C	C	C		C	A		C	C	
Approach Delay (s)		31.6			29.8			13.6			30.3	
Approach LOS		C			C			B			C	

Intersection Summary

HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group