The Crossing Traffic Impact Study

Horizon Management Ltd.

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Executive Summary

Background	• In November of 2016, Exp Services was hired by Horizon Management Ltd to undertake a traffic impact study for a proposed mixed use development in northeast Saint John, referred to as “The Crossing”.
	• It is estimated that The Crossing will ultimately consist of approximately 850,000 ft2 of building floor area, including commercial, retail, residential, and recreational space.
	• Full build out is expected to occur in three phases, over a 15-year horizon as follows:
	  • Phase 1 completed by 2023 (approximately 250,000 ft^2)
	  • Phase 2 completed by 2028 (approximately 260,000 ft^2)
	  • Phase 3 completed by 2033 (approximately 340,000 ft^2)

TIS Study Area	• The City of Saint John requested that the TIS consider the impact that newly generated traffic from The Crossing would have on the following intersections: 1. Foster Thurston Drive / Ashburn Road 2. Foster Thurston Drive / NB Route 1 Access Ramps (Exit 128) 3. Ashburn Lake Road / NB Route 1 Access Ramps (Exit 128) 4. Rothesay Avenue / Retail Drive 5. Rothesay Avenue / Ashburn Lake Road 6. Rothesay Road / Fulton Lane 7. Ashburn Road / Jones Drive 8. Ashburn Road / Drury Cove Road 9. Ashburn Road / Rothesay Road 10. Rothesay Avenue / Rothesay Road / NB Route 1 interchange 11. All site access driveway intersections with Ashburn Road
Existing Traffic Counts	• Full turning movement counts were undertaken at each intersection within the study area using Miovision’s automated video detection equipment.
Peak Hour	• From the counts, it was determined that the peak traffic hours were 7:30 am – 8:30 am for the weekday morning, 4:15 pm – 5:15 pm for the weekday evening, and from 1:00 pm – 2:00 pm on Saturday. • An annual growth rate of 1% was applied to all existing peak hour counts to project background traffic for future horizon years.

Projected Traffic Operations *without* development	• Existing and horizon year traffic operations were projected for the Study Area **without the development in place**. The following summarizes locations where operational issues (high delays and/or queueing) already exist or are projected:
	  • **Rothesay Ave./Retail Dr.** – westbound (Retail Dr.) left-turn movement & SB (Rothesay Ave) left-turn movement (existing);
	  • **Rothesay Ave./Ashburn Lake Rd.** – northbound (Rothesay Ave.) movement (by 2028);

	• **Rothesay Ave./Rothesay Rd.** – westbound movement (existing); • **Foster Thurston Dr./Ashburn Rd.** – northbound and southbound (Ashburn Rd.) through movements (existing); • **Rothesay Ave./Rte 1 off-ramp** – eastbound and westbound (Rothesay Ave.) movements (existing); and • **Rothesay Rd./Rte 1 on-ramp (by 2033).**

Recommended Upgrades to Address Current/Future Operational Issues *without* development	• The following improvements are recommended to address existing and/or future operational issues within the study area regardless of whether the development proceeds:
	  • **Rothesay Rd./Rothesay Ave.** – upgrade intersection from current stop-controlled configuration to either traffic signals or a roundabout.
	  • **Rothesay Ave./Rte 1 off-ramp** – upgrade intersection from current stop-controlled configuration to either traffic signals or a roundabout.
	  • **Rothesay Rd./Rte 1 on-ramp –** construct weaving lane between Route 100 on-ramp and Foster Thurston off-ramp.
	  • **Rothesay Ave./Retail Dr./Ashburn Lake Rd.** – realign existing intersections into a 4-leg, fully actuated signalized intersection, with dedicated left turn lanes.

Trip Generation	• The number of newly generated vehicle trips for each phase of the proposed development were estimated as follows using standard trip generation rates published by the *Institute of Transportation Engineers*: **Phase 1** ▪ AM Peak Hour – entering: 758, exiting: 641 ▪ PM Peak Hour– entering: 841, exiting: 834 ▪ Saturday Peak Hour – entering: 1071, exiting: 1052 **Phase 2** ▪ AM Peak Hour– entering: 268, exiting: 180 ▪ PM Peak Hour– entering: 428, exiting: 389 ▪ Saturday Peak Hour – entering: 1063, exiting: 915 **Phase 3** ▪ AM Peak Hour – entering: 239, exiting: 121 ▪ PM Peak Hour– entering: 220, exiting: 287 ▪ Saturday Peak Hour – entering: 291, exiting: 251 • Generated trips were adjusted using a 20% synergy rate and a 25% pass-by rate and were assigned to the Study Area road network based on existing traffic patterns.
Projected Traffic Operations *with* development	• Horizon year traffic operations were subsequently projected for the Study Area with the development in place. The following summarizes **additional** operational issues projected to occur by 2023 **with Phase 1 of the development**:

	- **Rothesay Rd. / Rothesay Ave**. – westbound (Rothesay Ave), northbound (Route 1 off-ramp), and eastbound (development access) approaches. - **Rothesay Rd./Fulton Ln./Access** – eastbound (access) and westbound (Fulton Ln.) movements. - **Rothesay Rd./Ashburn Rd.** – eastbound (Ashburn Rd.) approach. - **Rothesay Ave./Rte 1 on-ramp intersections** – eastbound approaches. • It was determined that additional traffic generated by Phase 2 and 3 of the development could not be adequately accommodated without major modifications to the existing road network such as: 1. Major upgrades to the Route 100 interchange area to increase capacity; or 2. Construction of a new underpass near Ashburn Lake Road and Foster Thurston Road.
Impact of Ashburn Lake / Foster Thurston Underpass	• The NB Department of Transportation & Infrastructure has been assessing the long-term need for a new underpass connection in the vicinity of the Ashburn Lake Road and Foster Thurston Drive ramps. • If/when a new underpass is built, a significant amount of existing traffic is expected to divert away from the Route 100 Interchange, thus alleviating some of the existing operational issues at this location. • While a significant portion of newly generated traffic from the development would also use the new Ashburn Lake Road underpass, its **construction has merit regardless of whether the development proceeds**.
Recommended Upgrades to Accommodate Phase 1 Traffic	• The following improvements are recommended to provide acceptable levels of service and delays for Phase 1 of the development: - Rothesay Rd./Rothesay Ave. – implement actuated-coordinated traffic signals and additional turn lanes at approaches. - Rothesay Rd./Ashburn Rd. – implement actuated-coordinated traffic signals and separate left turn lane on northbound (Rothesay Rd.) approach. - Rothesay Ave./Rte 1 off-ramp – implement actuated-coordinated signal and a separate through lane pocket at the eastbound (Rothesay Ave.) approach. - Ashburn Rd. Accesses – implement separate left turn lanes at all accesses on all approaches to accommodate future traffic demand. Implement traffic signals at the main Ashburn Road access (access in line with Rothesay Ave.). - Foster Thurston Dr./Ashburn Rd. – addition of separate right turn lane on southbound (Ashburn Rd.) approach to accommodate increase in right turning traffic exiting the development. - Rothesay Rd./Fulton Ln. – align truck stop access with Fulton Ln. and make access right-in/right-out (left turners use access on

	Ashburn Rd.) to prevent left turners from blocking through movement and causing queuing back to Rothesay Rd./Rothesay Ave. intersection. • Detailed analysis related to these improvements are found in the Phase 1 Report
Recommended Upgrades to Accommodate Phase 2 & 3 Traffic	• The following improvements are recommended to provide acceptable levels of service and delays for Phase 2 and 3 of the development: • **Ashburn Underpass –** implement this connection to redistribute significant traffic from Rte 100 interchange. • **Rothesay Ave./Retail Dr./Ashburn Lake Rd. –** additional slip lanes anticipated to accommodate increase in traffic to/from Ashburn underpass. This upgrade will be required independent from the development. • **Ashburn Underpass Ramp Terminals –** anticipated that traffic signals and turning lanes/pockets will be required at Ashburn underpass ramp terminals. These upgrades will be required independent from the development. • **Route 1 ramps –** extend acceleration lane from Ashburn Lake EB on-ramp to start of deceleration lane for the Route 100 off-ramp; extend acceleration lane from Route 100 WB on-ramp to start of deceleration lane for the Foster Thurston WB off-ramp. This will introduce weaving areas and will reduce congestion for the WB and EB on-ramps and reduce flow interruptions on the lanes. These upgrades are required independent of the development. • **Ashburn Accesses –** signalize second access on Ashburn Road to accommodate increase in left turning traffic onto Ashburn Road towards Foster Thurston Drive (Ashburn underpass). • Detailed analysis found in Phase 2 and 3 Report.
Conclusion	• Projected traffic generated by Phase 1 of The Crossing can be adequately accommodated with relatively minor improvements to the existing road network (e.g. changes to traffic control, additional turn lanes, intersection realignment, etc). • Projected traffic generated by Phases 2 and 3 of the development will require major modifications to the existing road network such as: 1. Major upgrades to the Route 100 interchange area to increase capacity; *or* 2. Construction of a new underpass near Ashburn Lake Road and Foster Thurston Road. • Final details regarding recommended improvements will need to be tweaked as details of the development and the Ashburn underpass are finalized.

1 Introduction

1.1 Background

Horizon Management Ltd. is proposing a mixed use development in northeast Saint John (called “The Crossing”), consisting of residential, commercial, and park land. The proposed development site, currently zoned Rural (RU) and Future Development (FD), covers approximately 163 acres. Approximately 120 acres located between Ashburn Road and Highway Route 1 is to be rezoned to Commercial Corridor (CC) and Mid-Rise Residential (RM), while the remaining land located along Marsh Creek is to be rezoned to Park (P). A more detailed breakdown of land development is as follows:

- 87.2 acres rezoned to Commercial Corridor
- 31.6 acres rezoned to Mid-Rise Residential
- 42.7 acres rezoned to Park

The proposed development is designed to promote commuters using Rothesay Road and Route 1 to visit the City of Saint John rather than pass through. The area is strategically located adjacent to Rothesay Road and Route 1, as well as several other arterial roadways within the City, making it an ideal location ideal for creating a “gateway” to the City.

It is estimated that a total of approximately 80,000 m^2 of building floor area will be constructed at the development site over multiple phases during the next 15-20 years.

Although he development is expected to result in substantial economic benefits for the City of Saint John, concerns have been raised regarding its impacts on traffic circulation. Of particular concern, are the areas between Route 1 and the Kennebecasis Valley and the UNB/Regional Hospital. The development is expected to add significant traffic to this section of the roadway network which already has significant traffic flows.

The City of Saint John has requested a Traffic Impact Study (TIS) be completed and submitted by Horizon Management Ltd. before approval for the proposed development can be granted from the City. The TIS will identify any deficiencies associated with the proposed development and make recommendations to mitigate any expected long-term traffic flow deficiencies within the surrounding area.

The TIS is only one of the technical studies required for the proposed development approval. The required studies are expected to take 3 to 5 years in total to complete.

1.2 Study Objectives

The objective of this study is to evaluate existing and future transportation issues and identify any traffic impacts associated with the proposed development within the Study Area. Improvement options to address any deficiencies are to be selected, evaluated, and recommended to ensure a desired level of service to all transportation users within the Study Area over the development horizon.

1.3 Study Area

The primary Study Area was identified by the City of Saint John and includes the following intersections:

12. Foster Thurston Drive / Ashburn Road
13. Foster Thurston Drive / NB Route 1 Access Ramps (Exit 128)
14. Ashburn Lake Road / NB Route 1 Access Ramps (Exit 128)
15. Rothesay Avenue / Retail Drive
16. Rothesay Avenue / Ashburn Lake Road
17. Rothesay Road / Fulton Lane
18. Ashburn Road / Jones Drive
19. Ashburn Road / Drury Cove Road
20. Ashburn Road / Rothesay Road
21. Rothesay Avenue / Rothesay Road / NB Route 1 interchange (Exit 129)
22. All site access driveway intersections with Ashburn Road and Rothesay Road

Also included in the Study Area are the existing trails surrounding Marsh Creek, existing transit routes within the area, and parking lots associated with the proposed development. The entire Study Area is shown in Figure 1; with the labels corresponding to the intersection numbers listed above. A detailed site plan can be found in Appendix A.

1.4 Horizon Period

Construction of the development is expected to begin in 2018 and be a gradual process with a full build-out completion time of 15 years. As such, this TIS utilizes a horizon year of 2033 with and without the proposed development to determine future traffic conditions within the Study Area at full build-out (i.e. Phases 1, 2, and 3 complete). Similarly, an assumed 2023 Phase 1 horizon year (5 years after construction is expected to begin) and 2028 Phase 2 horizon year (10 years after the construction is expected to begin) were utilized to capture any traffic impacts within the Study Area throughout the construction process. Comparing future traffic both with and without the development allows for a more accurate assessment of any traffic impacts directly attributed by the proposed development.

An annual growth rate of 1% has been used to project future background traffic for the horizon periods on the Study Area street network.

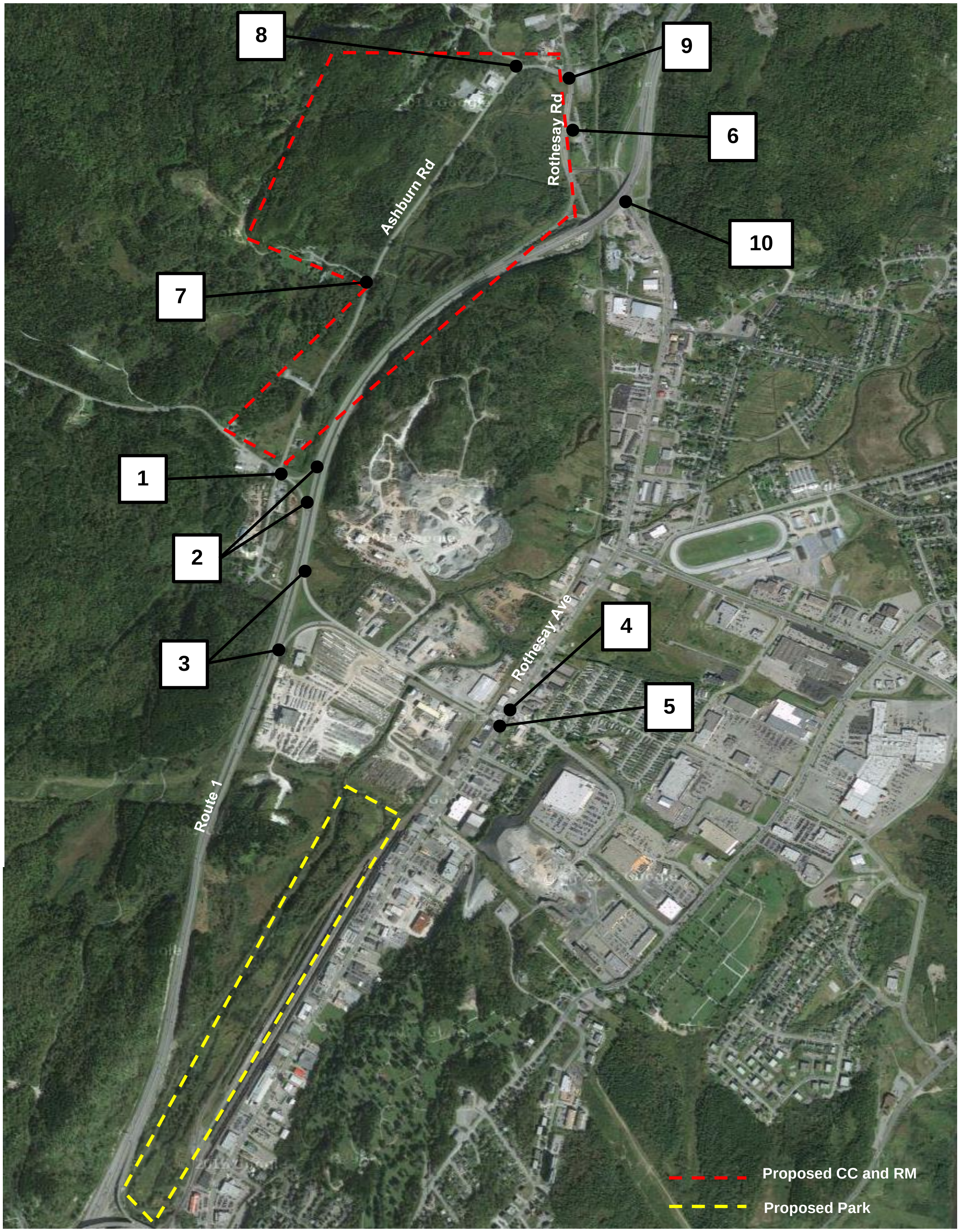

Figure 1 – Study Area

2 Information Gathering

2.1 Existing Traffic Volumes

Exp staff conducted AM and PM peak hour traffic counts at Rothesay Road / Ashburn Road, Ashburn Road / Drury Cove Road, Rothesay Avenue / Retail Drive, and Rothesay Ave / Ashburn Lake on Friday, October 14th, 2016 and Friday, October 21st, 2016. All other AM and PM counts required for this study were already collected by exp staff for previous studies (including the Move Saint John Transportation Plan and the Route 1 Corridor Study). A 1% per annum growth rate was applied to all counts collected prior to 2016 to project 2016 base year traffic volumes.

Exp staff conducted Saturday peak hour traffic counts at all intersections within the Study Area (excluding those estimated using Trip Generation) on Saturday, October 15th, 2016, Saturday October 22nd, 2016, and Saturday, October 28th, 2016.

Peak period counts were collected during the following times at all locations:

- AM Peak Period – Between 7:00 am and 9:00 am on the Friday,
- PM Peak Period – Between 4:00 pm and 6:00 pm on the Friday, and
- Saturday Peak Period – Between 1:00 pm and 5:00 pm on the Saturday.

In addition, counts were estimated using *ITE's Trip Generation Manual* for the intersections of Rothesay Road / Fulton Lane or Ashburn Road / Jones Drive. **Figures 2** and **3** show the existing 2016 AM, PM, and Saturday peak hour traffic volumes for all Study Area intersections.

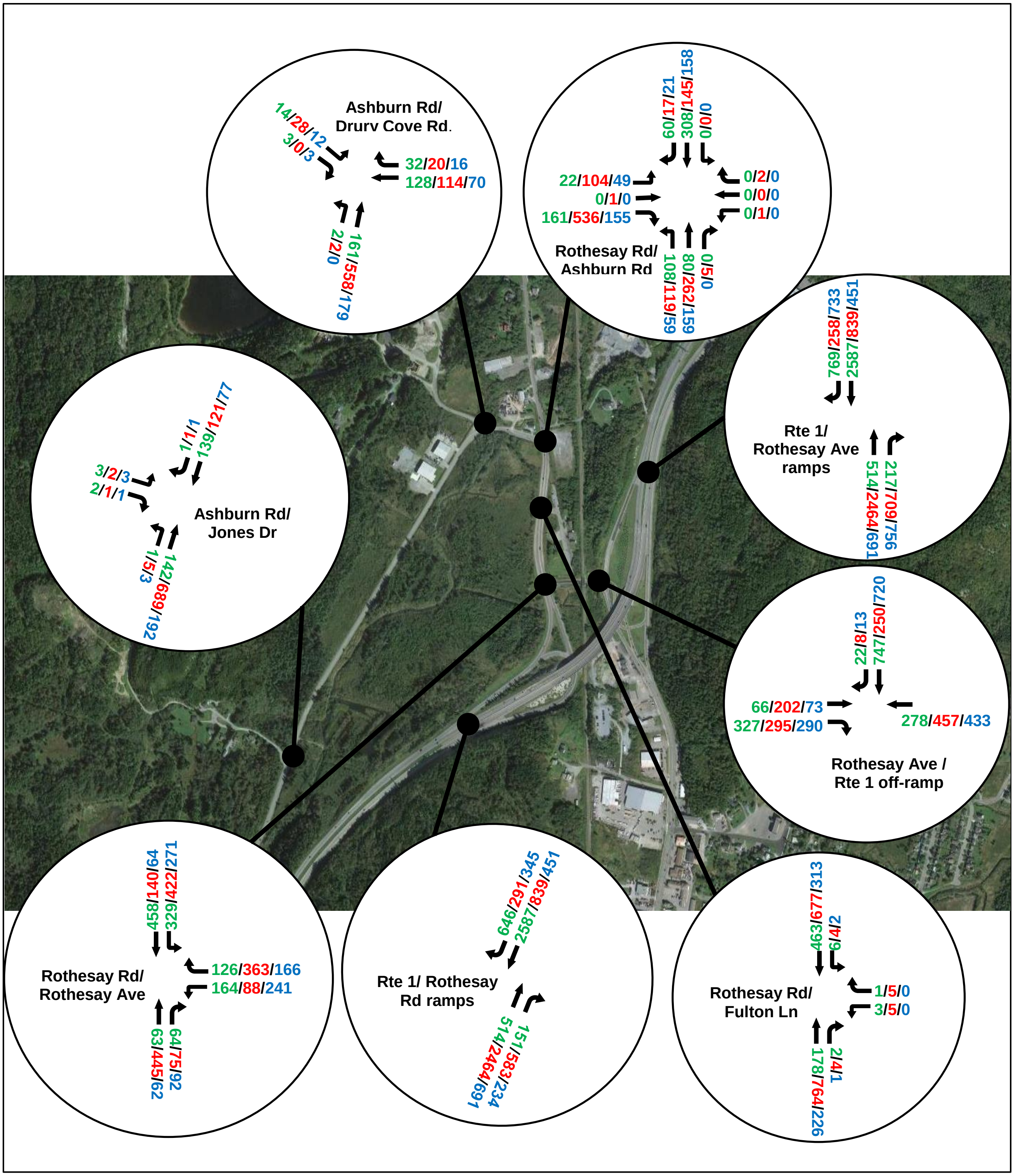

Figure 2 – Existing 2016 Traffic Volumes (1 of 2) AM/PM/SAT

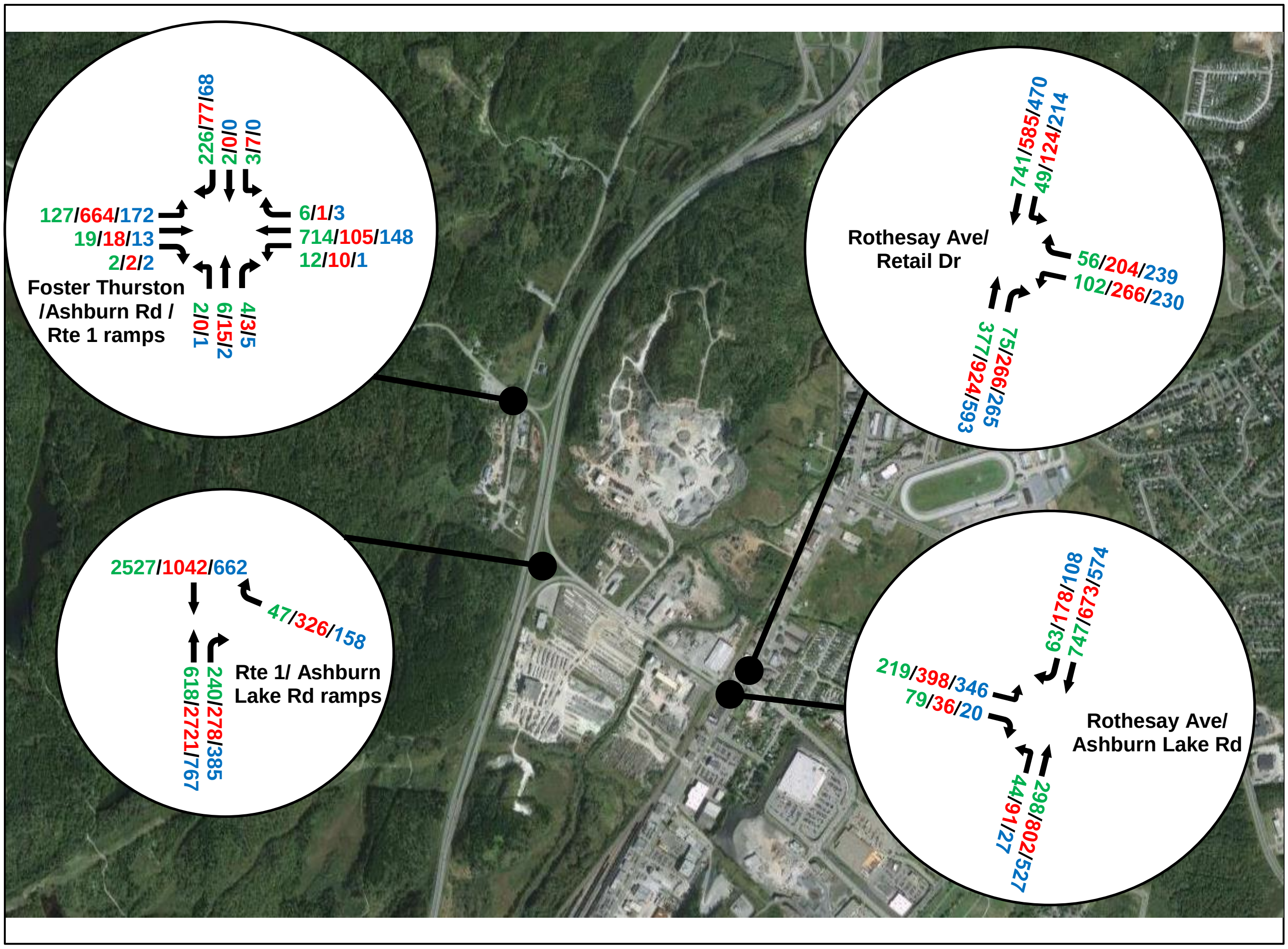

Figure 3 – Existing 2016 Traffic Volumes (2 of 2) AM/PM/SAT

2.2 Horizon Year Traffic Volumes

Projected background 2023, 2028, and 2033 AM, PM, and Saturday peak hour traffic volumes were required to evaluate future traffic conditions without the proposed project. Projected volumes were estimated using a 1% per annum growth rate.

Figures 4 and **5** show the projected background 2023 AM, PM, and Saturday peak hour traffic volumes without the proposed development. **Figures 6** and **7** show the projected background 2028 AM, PM, and Saturday peak hour traffic volumes without the proposed development. **Figures 8** and **9** show the projected background 2033 AM, PM, and Saturday peak hour traffic volumes without the proposed development.

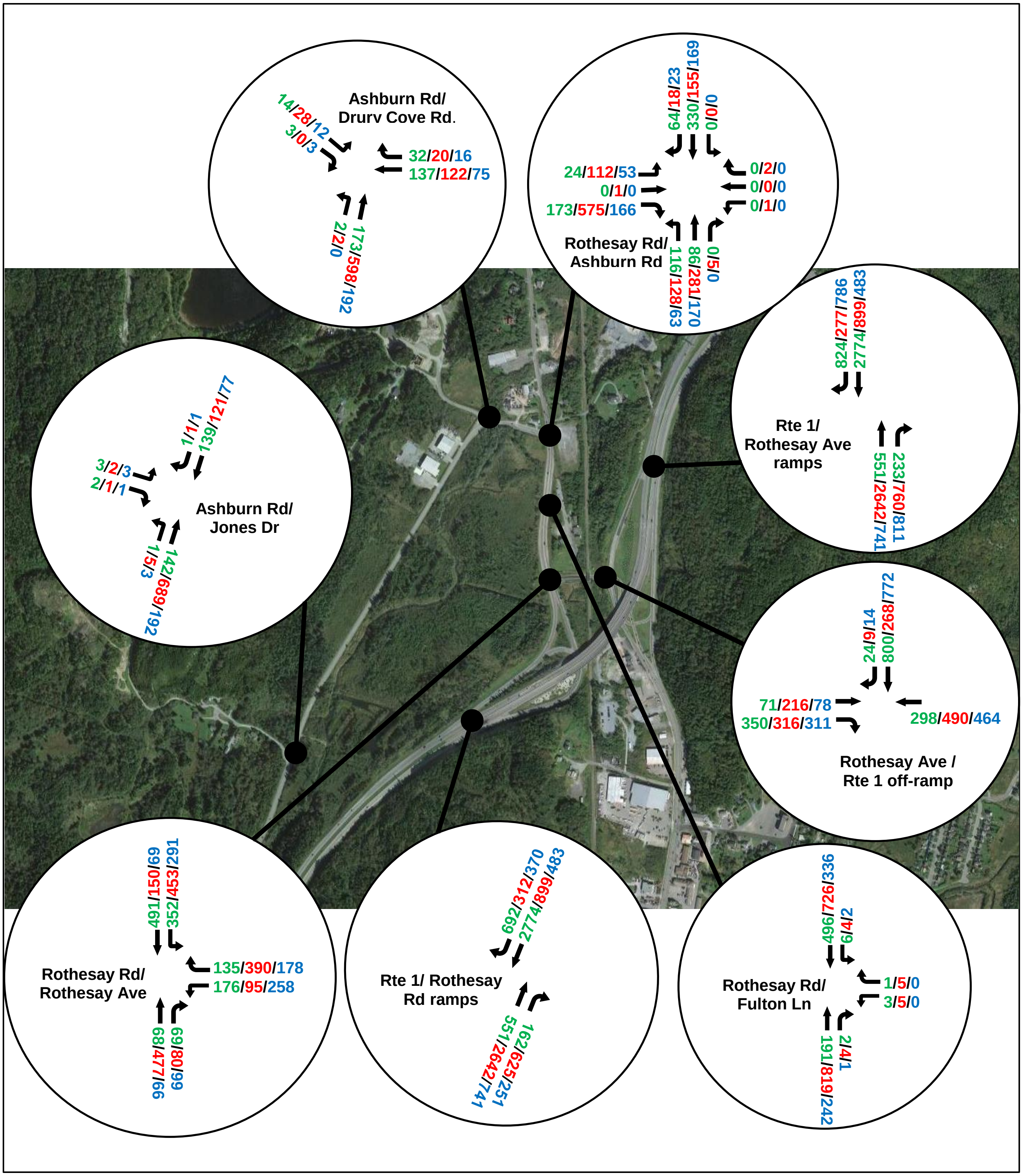

Figure 4 – Projected 2023 Horizon Year Traffic Volumes (1 of 2) AM/PM/SAT

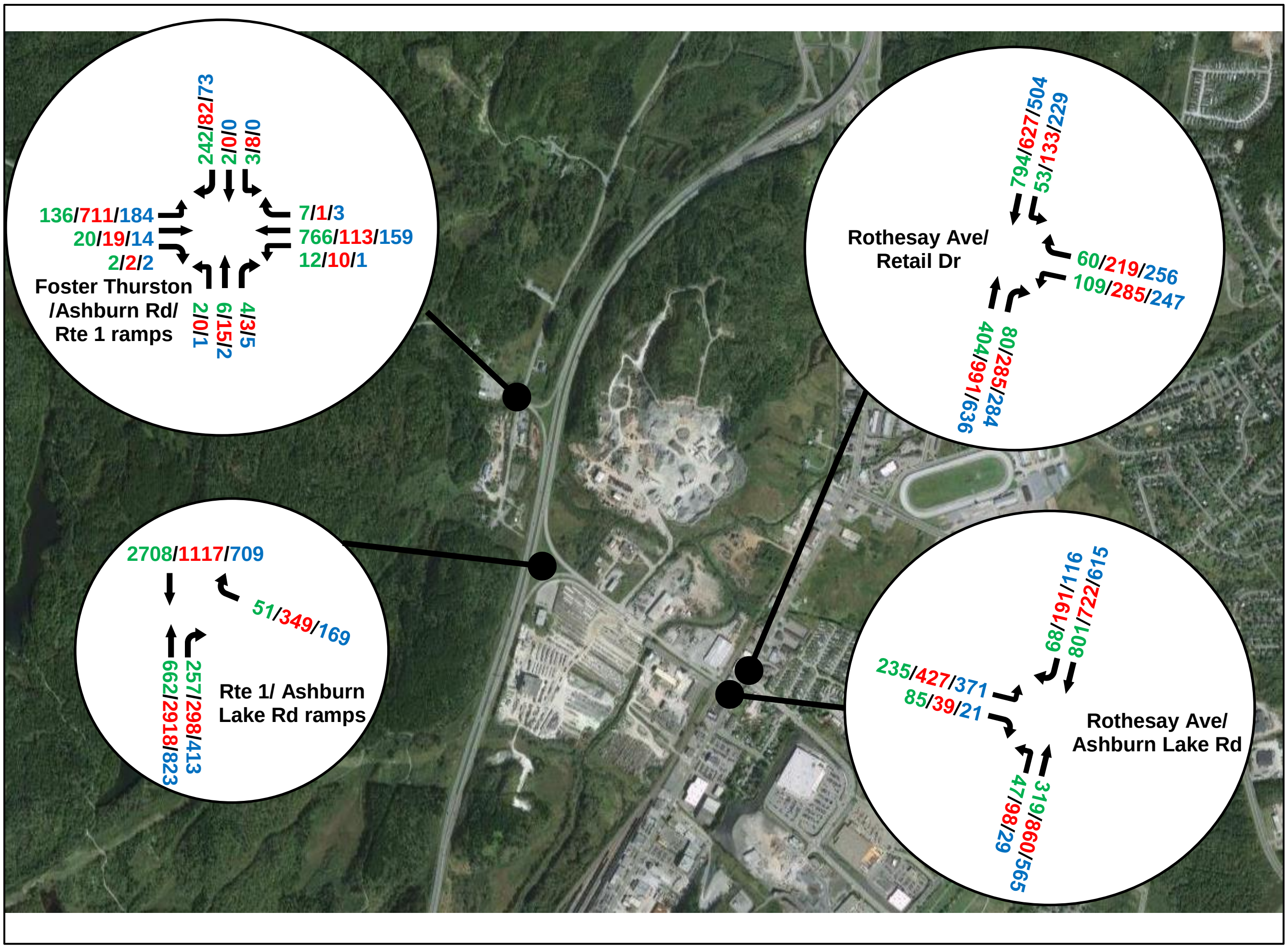

Figure 5 – Projected 2023 Horizon Year Traffic Volumes (2 of 2) AM/PM/SAT

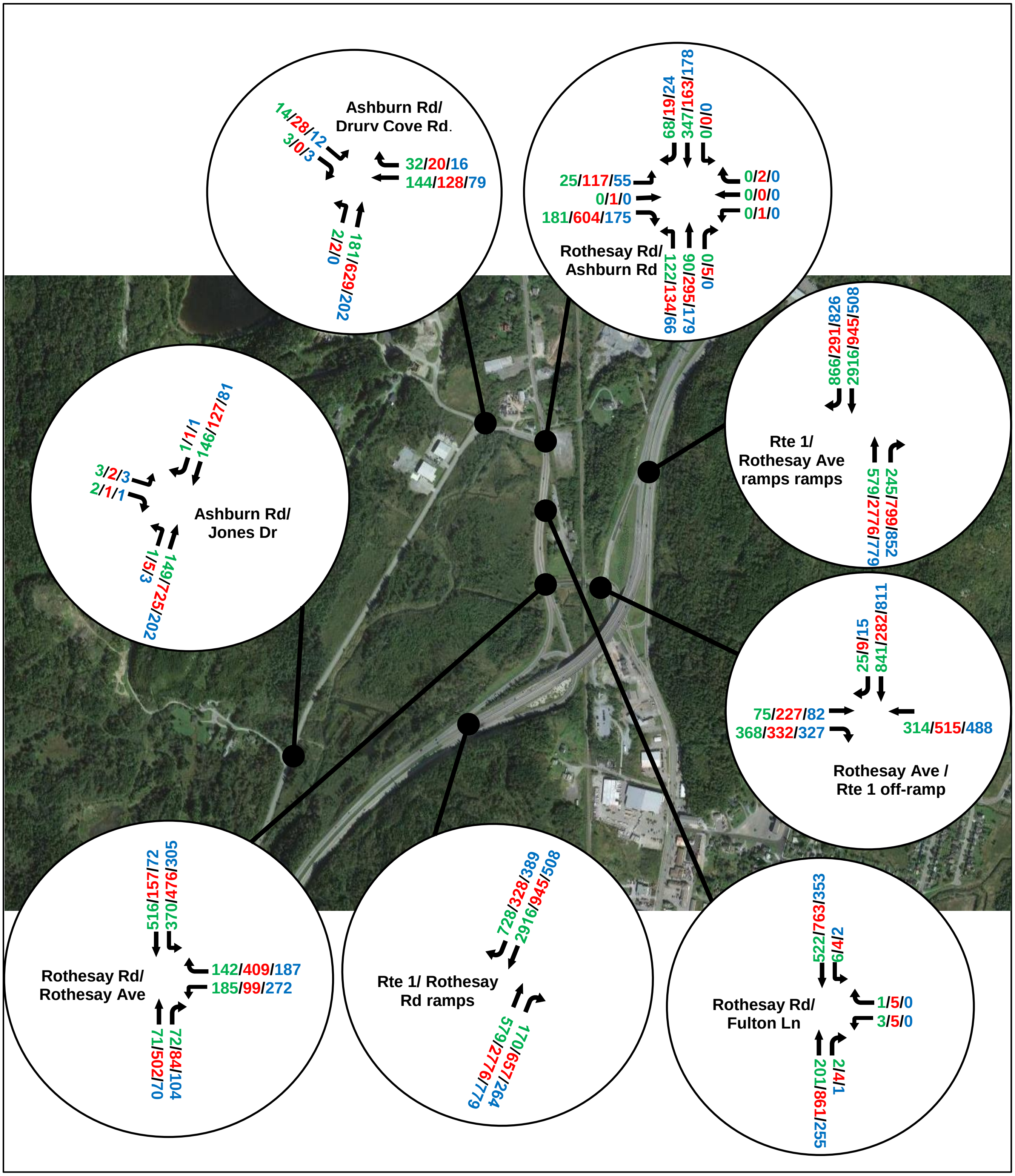

Figure 6 – Projected 2028 Horizon Year Traffic Volumes (1 of 2) AM/PM/SAT

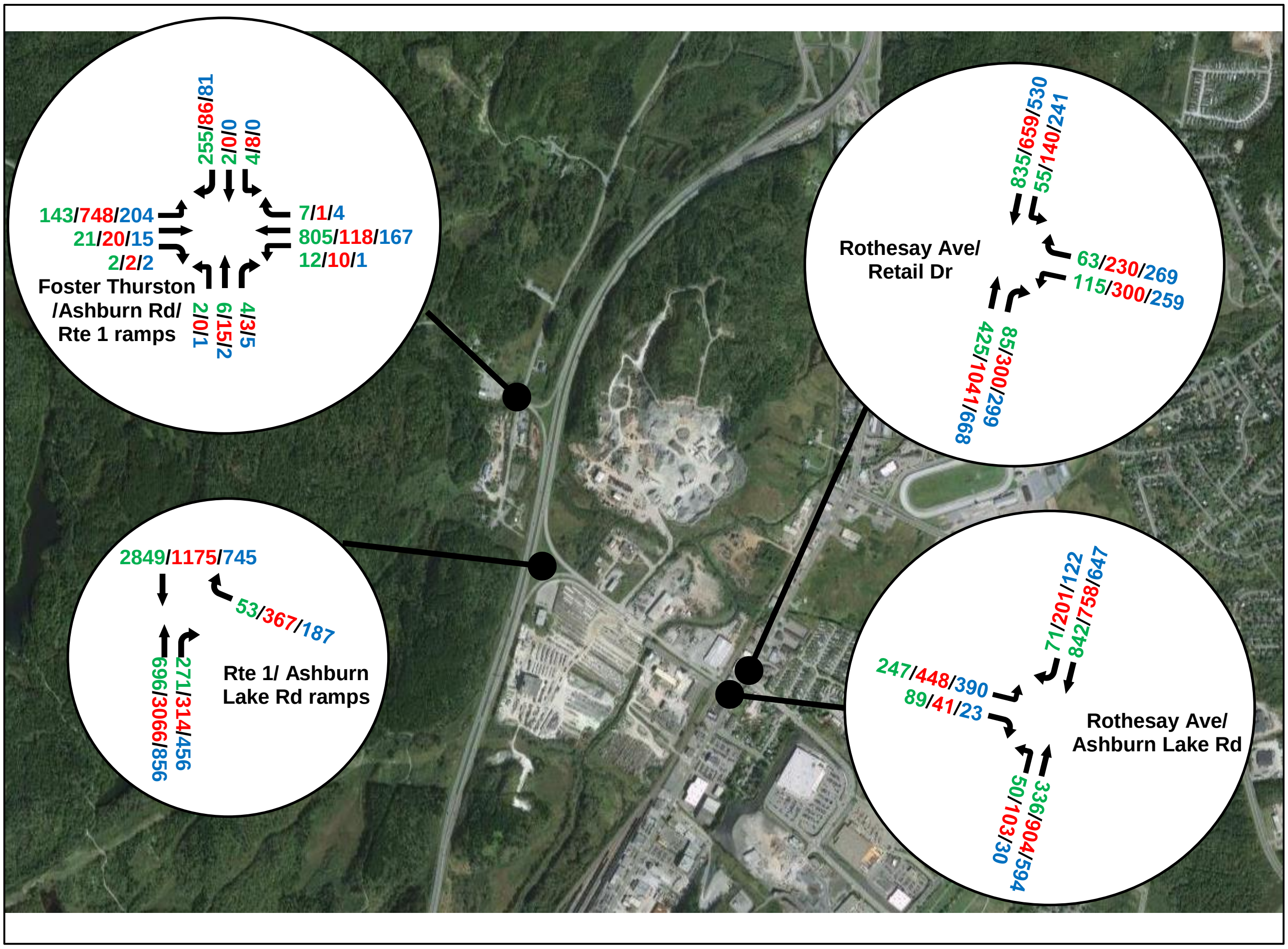

Figure 7 – Projected 2028 Horizon Year Traffic Volumes (2 of 2) AM/PM/SAT

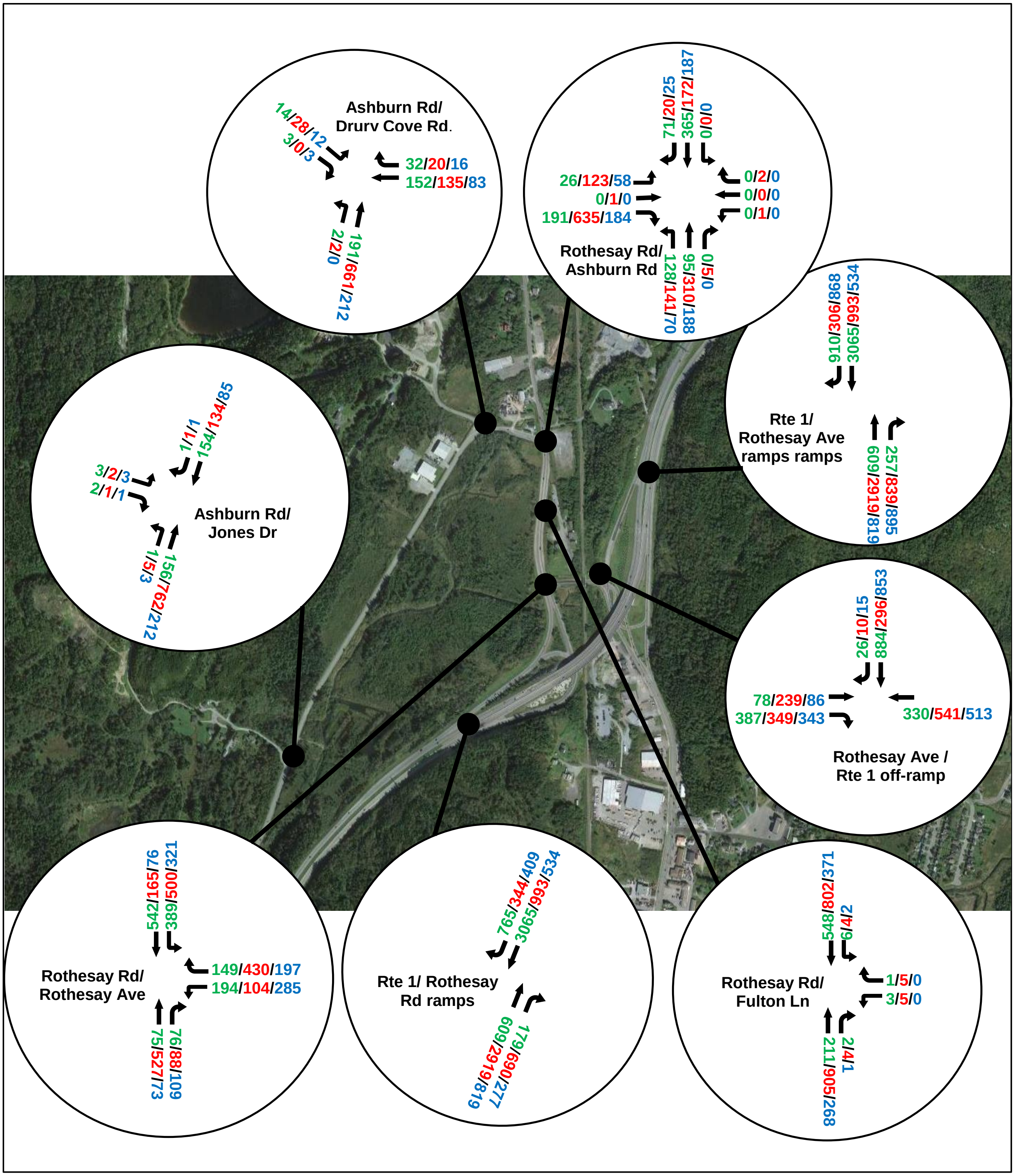

Figure 8 – Projected 2033 Horizon Year Traffic Volumes (1 of 2) AM/PM/SAT

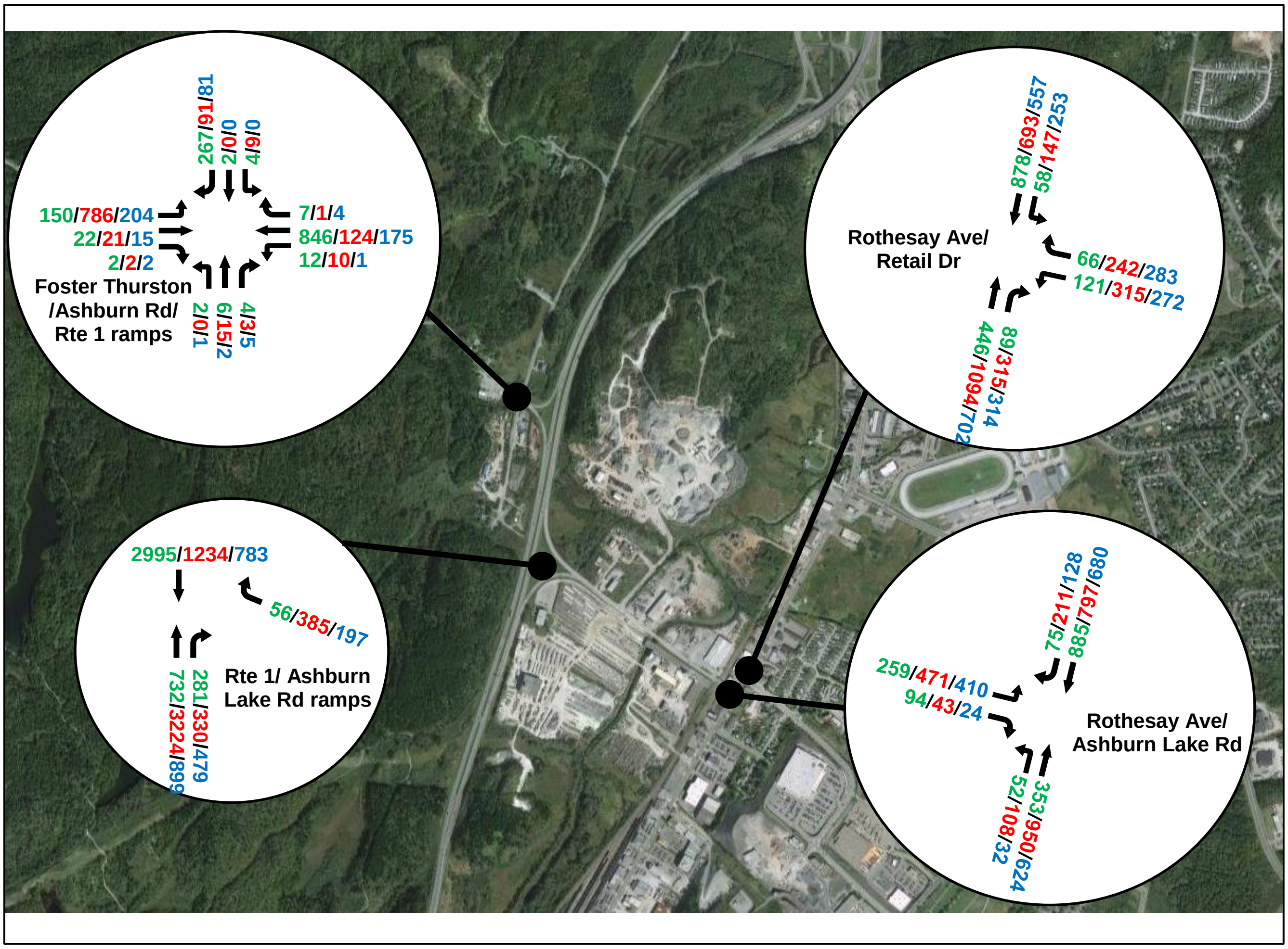

Figure 9 – Projected 2033 Horizon Year Traffic Volumes (2 of 2) AM/PM/SAT

2.3 Street and Intersection Characteristics

2.3.1 Study Area Roads

NB Route 1

Route 1 is classified as a freeway and is maintained by the New Brunswick Department of Transportation and Infrastructure (NBDTI). It provides a bypass route for vehicles passing through the City of Saint John. Route 1 is a divided, 4-lane highway with a posted speed limit of 100 km/h. Four on/off ramps are present within the Study Area, which provide access to/from Rothesay Avenue, Rothesay Road, Foster Thurston Drive, and Ashburn Lake Road. The estimated average daily traffic on Route 1 is 33,900 vehicles according to traffic counts collected by NBDTI in 2013.

Rothesay Avenue

Rothesay Avenue is classified as a major arterial. This road provides a route through the commercial area on the east side of Saint John. The roadway has a 4-lane cross-section and operates with a posted speed limit of 50 km/h. There are several driveways present along this road within the Study Area leading to commercial buildings. The three main intersecting roads with Rothesay Avenue used in this Study are Retail Drive which leads to a number of retail stores and Ashburn Lake Road which leads to the on/off ramps to/from Route 1, and Rothesay Road. Separated sidewalks are present along the west side of Rothesay Avenue throughout the entire Study Area, as well as on the east side (continuing south) beginning at the intersection with Tim Street.

Rothesay Road

Rothesay Road is classified as an arterial roadway that runs along the Kennebecasis River towards the Rothesay community area. It is a 2-lane cross-section roadway with a posted speed limit of 50 km/h for the majority of the roadway, and changes to 60 km/h south of the intersection with Ashburn Road leading to the Route 1 on-ramp. Rothesay Road intersects with Ashburn Road, Fulton Lane, and Rothesay Avenue within the Study Area. There are no separate sidewalks on Rothesay Road, although there are paved shoulders on both sides.

Ashburn Road

Ashburn Road is classified as a collector road within the Study Area. It provides access to a number of smaller residential areas as well as a few businesses. Ashburn Road is posted at a speed limit of 60 km/h with a 2-lane cross-section. Gravel shoulders are present along the entire length of the roadway.

Foster Thurston Drive

Foster Thurston Drive is classified as an arterial road within the Study Area. It provides access directly off/on Route 1 to/from northern Saint John. Foster Thurston Drive is posted at a speed limit of 50 km/h with a 2-lane cross-section. Narrow gravel shoulders are present along the entire length of the roadway.

Ashburn Lake Road

Ashburn Lake Road is classified as a collector road within the Study Area. It provides access directly off/on Route 1 to/from southern Saint John (Rothesay Avenue), which is primarily a commercial area. Ashburn Lake Road is posted a speed limit of 50 km/h with a 2-lane cross section. Railway tracks are present on Ashburn Lake Road approximately 50 m north of Rothesay Avenue.

2.3.2 Study Area Intersections

Route 1 Ramps

Four on and four off ramps to/from Route 1 are present within the Study Area. These ramps connect to Rothesay Road (exit 129), Rothesay Avenue (exit 129), Ashburn Lake Road (northbound exit 128), and Foster Thurston Drive (southbound exit 128). All ramps are free flowing.

Foster Thurston Drive / Ashburn Road

Foster Thurston Drive / Ashburn Road is a four-legged two-way stop controlled intersection located adjacent to the on/off ramps of Foster Thurston Drive and Route 1. All approaches consist of a shared one lane configuration with no separate turn or slip lanes present.

Rothesay Avenue / Retail Drive

Retail Drive / Rothesay Avenue is a three-leg signalized intersection operating under fixed control with an offset of zero seconds. The northbound approach has one separate through lane and one shared through/right turn lane, the southbound approach has one separate through lane and one shared through/left turn lane, and the westbound approach has separate left and right turn lanes.

Rothesay Avenue / Ashburn Lake Road

Rothesay Avenue / Ashburn Lake Road is a three-leg signalized intersection operating under fixed control. The northbound approach has one separate through and one shared through/left turn lane, the southbound approach has one separate through and one shared through/right turn lane, and the westbound approach has a shared left turn/right turn lane. The eastbound leg (Ashburn Lake Road) provides access to/from Route 1. This intersection is coordinated with the Retail Drive / Rothesay Avenue intersection so that motorists receive a green light in progression on Rothesay Avenue. The Rothesay Avenue / Ashburn Lake Road intersection is set at an offset of 45 seconds to the Retail Drive / Rothesay Avenue intersection.

Rothesay Road / Fulton Lane

Rothesay Road and Fulton Lane is a three-legged unsignalized intersection with the stop control located on the westbound approach (exiting Fulton Lane). Each approach is made up of a simple one lane configuration. Fulton Lane consists of a second hand clothing store, a single-detached family home, and a land survey and survey engineering company office building. Existing traffic volumes from Fulton Lane were generated in TripGen using this existing development information.

Ashburn Road / Jones Drive

Ashburn Road / Jones Drive is a three-legged unsignalized intersection with the stop control located on the eastbound approach (exiting Jones Drive). Each of the approaches consists of a shared one lane configuration. Jones Drive is a small residential area with ten single-detached houses present. Existing traffic volumes from Jones Drive were generated in TripGen using this information.

Ashburn Road / Drury Cove Road

Ashburn Road / Drury Cove Road is a three-legged unsignalized intersection with the stop control located on the eastbound approach (exiting Drury Cove Road). Each approach consists of a shared one lane configuration. Drury Cove Road leads to a residential area and connects with smaller, local roads within the area.

Ashburn Road / Rothesay Road

Ashburn Road / Rothesay Road is a three-legged unsignalized intersection with the stop control located on the eastbound approach (exiting Ashburn Road). Each approach consists of a shared one lane configuration.

2.4 Active Transportation Characteristics

The existing Trans Canada Trail that runs through the Study Area is Line 11, which is part of Zone 10 in New Brunswick. This trail currently runs adjacent to Ashburn Road and into Rockwood Park. **Figure 7** shows the Trans Canada Trail Line 11 through the Study Area.

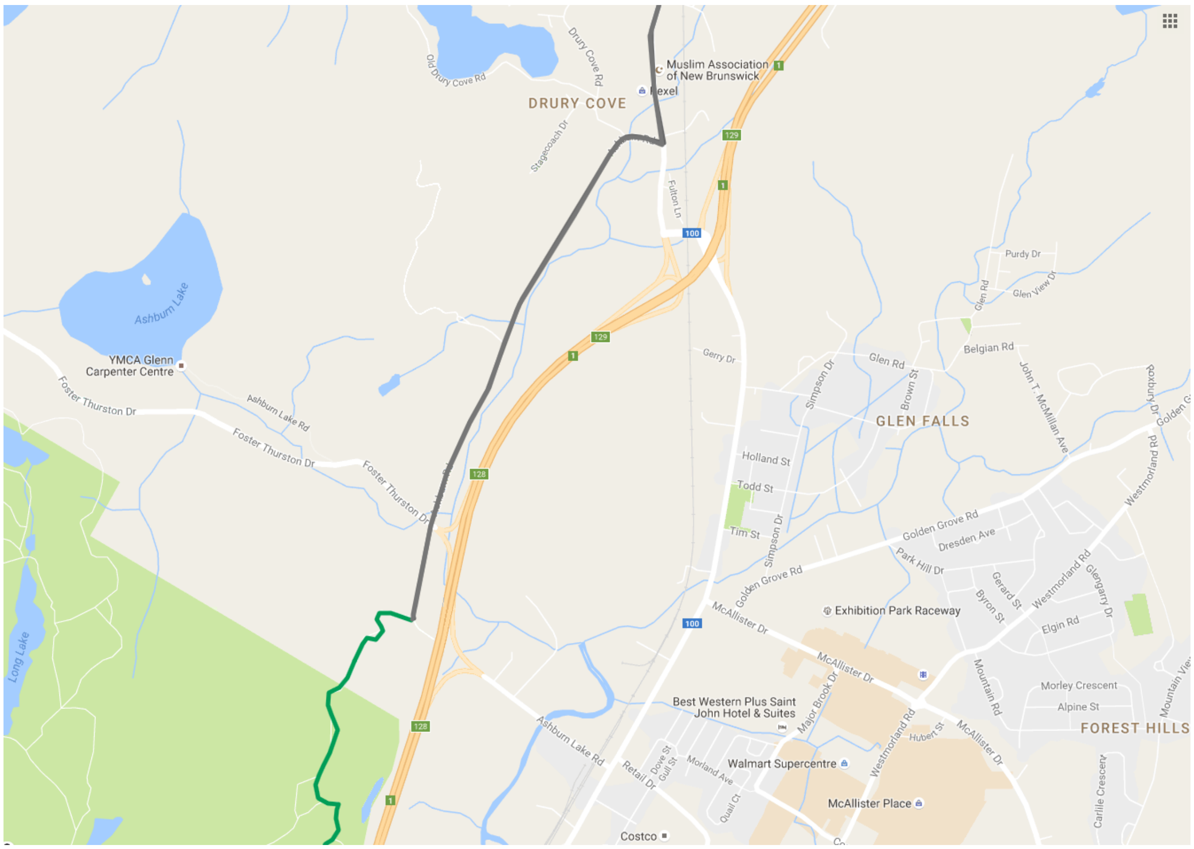

Figure 7 – Existing Trans Canada Trail Through Study Area (Line 11)

2.5 Transit Characteristics

Saint John Transit is Saint John's public transit system that provides bus routes through the Study Area. There are currently two existing routes where a section runs through the Study Area that includes: the main line (blue), and the comex routes (green). These routes are shown in **Figure 8**.

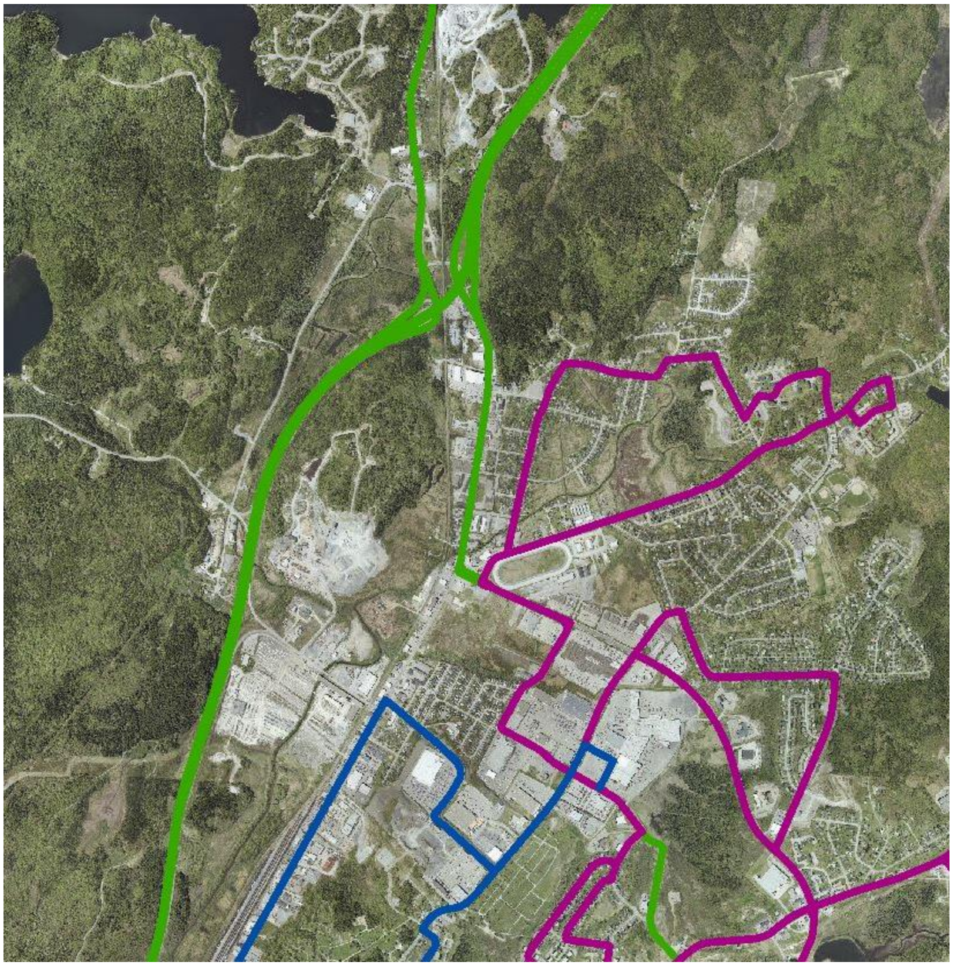

Figure 8 – Existing Transit Routes in Study Area

The section of the main line that runs through the Study Area is the Fairville Boulevard Plaza via Rothesay Avenue, which provides service along Rothesay Avenue and Retail Drive. The bus runs in this area every half hour from 6:10 am to 10:40 pm on weekdays, every half hour from 7:10 am to 10:40 pm on Saturday's, and every hour from 10:40 am to 5:40 pm on Sunday's. A bus stop for this route is located within the Study Area adjacent to the intersection of Rothesay Avenue and Retail Drive.

The section of the comex route that runs through the Study Area is the Kennebecasis Valley Comex, which provides service through the Rothesay Area. The route runs along Route 1 and continues onto Rothesay Road using Exit 129. The bus runs Monday to Friday at 7:05 am, 8:15 am, 4:05 pm, 4:40 pm, 5:15 pm, and 6:25 pm. There are currently no bus stops located within the Study Area for this route.

2.6 Development Characteristics

The proposed development consists of commercial corridor, mid-rise residential, and parkland rezoning. A detailed layout of the developments can be found in **Appendix A**.

The commercial corridor will consist of the following developments:

- Highway Service Stop – 26,000 SF
- Various Fast Food Restaurants – 11,400 SF
- Outdoor Anchor – 36,000 SF
- Entertainment Anchor – 40,000 SF
- Health Club – 40,000 SF
- Two hotels – 125 rooms each
- Six Sit-Down Restaurants – 31,400 SF total
- Garage – 6,300 SF
- Car Wash – 2,400 SF
- Convenience Retail – 24,075 SF
- Tourist Information Centre – 9,000 SF
- Museum – 15,000 SF
- Two banks – 9,300 SF total
- Various Retail Centres – 123,000 SF total
- Entertainment Centre – 40,000 SF
- Entertainment/Recreation Area – 15 acres
- Dealership – 6 acres
- Storage Facility – 4 acres
- Dealership – 3 acres
- Four offices – 18,000 SF/level, 15,000 SF/level, 15,000 SF/level, and 8,300 SF/level
- Gas Station

The residential area will consist of the following developments:

- 12 mid-rise residential buildings – 20 dwelling units each

3 Existing and Future Background Traffic Operations

3.1 Introduction

Existing and horizon year operational conditions were established to determine how the street network within the Study Area is currently functioning and how it will function by the horizon years for Phase 1, 2, and 3 **without the proposed development**. Traffic operations within the Study Area were evaluated using current traffic volumes, road configuration, and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 9, a deterministic model that employs Highway Capacity Manual and procedures are accepted by provincial and municipal agencies throughout North America.

The intersection operations were primarily evaluated in terms of the Level of Service (LOS). Level of Service is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e., less than 10 seconds per vehicle) and LOS F represents very high delay (i.e., greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection). The ramps were analyzed in terms of LOS, which is measured in terms of density, or passenger cars / km / lane (pc/km/ln). Similar to intersections, LOS is expressed on a scale of A to F. The Highway Capacity Manual (HCM) software was used to evaluate the ramp operations.

Usually LOS D or better is considered acceptable in urban areas before improvements are considered, although some communities accept LOS E. The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 1**. A description of traffic performance characteristics is included for each LOS.

Table 1 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (**Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

3.2 Existing and Horizon Year LOS without Development

3.2.1 Foster Thurston Drive / Ashburn Road

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 2** for the Foster Thurston Drive / Ashburn Road intersection. The analysis output can be found in **Appendix B**.

Table 2 – LOS Summary for Foster Thurston Dr/Ashburn Rd without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Forster Thurston			Westbound Foster Thurston			Northbound Ashburn Rd			Southbound Ashburn Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Ashburn Rd @ Foster Thurston	STOP	AM Peak	A 8	shared	B 10 [0.17]	shared	shared	A 7 [0.01]	shared	shared	D 31 [0.09]	shared	shared	D 30 [0.65]	shared
		PM Peak	B 11	shared	A 10 [0.49]	shared	shared	A 7 [0.01]	shared	shared	F 86 [0.31]	shared	shared	C 20 [0.28]	shared
		Sat Peak	A 5	shared	A 8 [0.13]	shared	shared	A 7 [0.00]	shared	shared	B 11 [0.01]	shared	shared	A 9 [0.08]	shared
Projected 2023 Horizon Year without Development Conditions															
Ashburn Rd @ Foster Thurston	STOP	AM Peak	A 10	shared	B 11 [0.19]	shared	shared	A 7 [0.01]	shared	shared	E 41 [0.12]	shared	shared	E 41 [0.76]	shared
		PM Peak	B 13	shared	B 10 [0.53]	shared	shared	A 7 [0.01]	shared	shared	F 117 [0.39]	shared	shared	D 29 [0.40]	shared
		Sat Peak	A 5	shared	A 8 [0.14]	shared	shared	A 7 [0.00]	shared	shared	B 11 [0.02]	shared	shared	A 10 [0.09]	shared
Projected 2028 Horizon Year without Development Conditions															
Ashburn Rd @ Foster Thurston	STOP	AM Peak	B 13	shared	B 11 [0.20]	shared	shared	A 7 [0.01]	shared	shared	F 56 [0.16]	shared	shared	F 55 [0.85]	shared
		PM Peak	B 14	shared	B 11 [0.56]	shared	shared	A 7 [0.01]	shared	shared	F 156 [0.48]	shared	shared	E 39 [0.50]	shared
		Sat Peak	A 5	shared	A 8 [0.15]	shared	shared	A 7 [0.00]	shared	shared	B 11 [0.02]	shared	shared	A 10 [0.10]	shared
Projected 2033 Horizon Year without Development Conditions															
Ashburn Rd @ Foster Thurston	STOP	AM Peak	C 18	shared	B 11 [0.22]	shared	shared	A 7 [0.01]	shared	shared	F 109 [0.28]	shared	shared	F 75 [0.95]	shared
		PM Peak	C 19	shared	B 11 [0.59]	*shared*	shared	A 7 [0.01]	*shared*	shared	F 216 [0.59]	*shared*	shared	F 74 [0.72]	*shared*
		Sat Peak	A 5	shared	A 8 [0.16]	shared	shared	A 7 [0.00]	shared	shared	B 12 [0.02]	shared	shared	A 10 [0.10]	shared

Overall, the **Foster Thurston Drive / Ashburn Road** intersection is currently operating at an excellent LOS A with an intersection delay of 8 seconds/vehicle and 5 seconds/vehicle during the AM and Saturday peak period, respectively and at an overall very good LOS B with an intersection delay of 11 seconds/vehicle during the PM peak period. The eastbound and westbound movements are operating at LOS B or better with average delays of 10 seconds/vehicle or less during the AM, PM, and Saturday peak periods. The northbound approach is operating the lowest in terms of LOS, particularly during the PM peak period. It is operating at satisfactory LOS D (average delay of 31 seconds/vehicle) and LOS B (average delay of 11 seconds/vehicle) during the AM and Saturday peak period, respectively. During the PM peak period the northbound approach operates at an unacceptable LOS F with an average delay of 86 seconds/vehicle. The southbound approach operates at LOS D or better with an average delay of 30 seconds/vehicle or less during the AM, PM, and Saturday peak period. The v/c ratios are all 0.65 or less, indicating that there is sufficient capacity.

By the 2023, 2028, and 2033 horizon years without development, the **Foster Thurston Drive / Ashburn Road** intersection is projected to operate at an overall LOS C or better with an intersection delay of 19 seconds/vehicle or less during the AM, PM, and Saturday peak period. All movements during the Saturday peak period are projected to operate at LOS B or better with an average delay of 12 seconds/vehicle or better for the 2023, 2028, and 2033 horizon years. During the AM peak period, all westbound and eastbound movements are projected to operate at LOS B or better with an average delay of 11 seconds/vehicle or lower by the 2023, 2028, and 2033 horizon years. By 2028 and 2033, the northbound and southbound approaches are projected to operate at LOS F with average delays of 109 seconds/vehicle or less. By 2033 during the PM peak period the northbound and southbound movements are projected to operate at LOS F with average delays of 216 seconds/vehicle or less. The v/c ratios at each movement for all three peak periods do not exceed 0.95.

Operational deficiencies currently exist at the northbound movement of the Foster Thurston Drive / Ashburn Road intersection during the PM peak period, and are projected to occur at the northbound and southbound movements during the AM peak period by 2028 without development as well as in the northbound and southbound movements during the PM peak period by 2033 without development.

3.2.2 **Foster Thurston Drive /NB Route 1 Access Ramps (Exit 128)**

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 3** for the Foster Thurston Drive Access Ramps to Route 1. The analysis output can be found in **Appendix B**

The Foster Thurston Drive off-ramp from Route 1 is currently operating at LOS C, LOS B, and LOS A during the AM, PM, and Saturday peak period, respectively. By the 2023 horizon year without development, the Foster Thurston Drive off-ramp is projected is operating at LOS D (density of 17.6 pc/km/ln) during the AM peak period; minimal changes are projected for the PM and Saturday peak periods. By the 2028 and 2033 horizon years without development, the Foster Thurston Drive off-ramp is projected to continue operating at LOS D, LOS B, and LOS A during the AM, PM, and Saturday peak periods, respectively.

The Foster Thurston Drive on-ramp from Route 1 is currently operating at LOS C, LOS B, and LOS A during the AM, PM, and Saturday peak period, respectively. By the 2023 horizon year without development the on-ramp is projected to operate at LOS D (density of 17.7 pc/km/ln), LOS B (density of 8.4 pc/km/ln), and LOS B (density of 6.0 pc/km/ln) during the AM, PM, and Saturday peak period, respectively. Minimal changes are projected for the Foster Thurston Drive on-ramp from Route 1 by the 2028 and 2033 horizon year without development during all three peak periods.

No operational deficiencies are projected for the Foster Thurston on-ramp or off-ramp for Route 1 during the AM, PM, or Saturday peak period by the 2033 horizon year without the development in place.

Table 3 – LOS Summary for Foster Thurston Dr/Rte 1 Ramps without Development

	AM Peak	PM Peak	SAT Peak
Ramp	**LOS** **Density (pc/km/ln)**	**LOS** **Density (pc/km/ln)**	**LOS** **Density (pc/km/ln)**
Existing (2016) Conditions			
Rte 1 – Foster Thurston Dr off-ramp	C 16.5	B 6.8	A 4.4
Rte 1 EB – Foster Thurston Dr on-ramp	C 16.7	B 8.0	A 5.7
Projected 2023 Horizon Year Conditions without Development			
Rte 1 – Foster Thurston Dr off-ramp	D 17.6	B 7.3	A 4.7
Rte 1 EB – Foster Thurston Dr on-ramp	D 17.7	B 8.4	B 6.0
Projected 2028 Horizon Year Conditions without Development			
Rte 1 – Foster Thurston Dr off-ramp	D 18.5	B 7.7	A 5.0
Rte 1 EB – Foster Thurston Dr on-ramp	D 18.6	B 8.7	B 6.2
Projected 2033 Horizon Year Conditions without Development			
Rte 1 – Foster Thurston Dr off-ramp	D 19.5	B 8.0	A 5.2
Rte 1 EB – Foster Thurston Dr on-ramp	D 19.4	B 9.1	B 6.4

3.2.3 Ashburn Lake Road / NB Route 1 Access Ramps (Exit 128)

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 4** for the Ashburn Lake Road Access Ramps to Route 1. The analysis output can be found in **Appendix B**

The Ashburn Lake Road off-ramp from Route 1 is currently operating at LOS A, LOS C, and LOS A during the AM, PM, and Saturday peak period, respectively. By the 2023 horizon year without development, the Ashburn Lake Road off-ramp is projected is operating at LOS D (density of 18.2 pc/km/ln) during the PM peak period; minimal changes are projected for the AM and Saturday peak periods. By the 2028 and 2033 horizon years without development, the Foster Thurston Drive off-ramp is projected to continue operating at LOS A, LOS D, and LOS A during the AM, PM, and Saturday peak periods, respectively.

The Ashburn Lake Road on-ramp from Route 1 is currently operating at LOS A, LOS D, and LOS B during the AM, PM, and Saturday peak period, respectively. By the 2023 and 2028 horizon years without development the on-ramp is projected to continue operating at LOS A, LOS D, and LOS B during the AM, PM, and Saturday peak period, respectively. By the 2033 horizon year without development, the on-ramp is projected to operate at LOS B (density of 6.1 pc/km/ln), LOS E (density of 22.4 pc/km/ln), and LOS B (density of 7.8 pc/km/ln) during the AM, PM, and Saturday peak period, respectively.

No operational deficiencies are projected for the Ashburn Lake Road on-ramp or off-ramp for Route 1 during the AM, PM, or Saturday peak period by the 2033 horizon year without the development in place.

Table 4 – LOS Summary for Ashburn Lake Rd/Rte 1 Ramps without Development

Ramp	AM Peak LOS Density (pc/km/ln)	PM Peak LOS Density (pc/km/ln)	SAT Peak LOS Density (pc/km/ln)
Existing (2016) Conditions			
Rte 1 – Ashburn Lake Rd off-ramp	A 3.3	C 17.0	A 4.3
Rte 1 EB – Ashburn Lake Rd on-ramp	A 5.4	D 19.1	B 6.8
Projected 2023 Horizon Year Conditions without Development			
Rte 1 – Ashburn Lake Rd off-ramp	A 3.6	D 18.2	A 4.7
Rte 1 EB – Ashburn Lake Rd on-ramp	A 5.6	D 20.4	B 7.2
Projected 2028 Horizon Year Conditions without Development			
Rte 1 – Ashburn Lake Rd off-ramp	A 3.9	D 19.2	A 4.9
Rte 1 EB – Ashburn Lake Rd on-ramp	A 5.8	D 21.3	B 7.5
Projected 2033 Horizon Year Conditions without Development			
Rte 1 – Ashburn Lake Rd off-ramp	A 4.1	D 20.2	A 5.2
Rte 1 EB – Ashburn Lake Rd on-ramp	B 6.1	E 22.4	B 7.8

3.2.4 Rothesay Avenue / Retail Drive

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 5** for the Rothesay Avenue / Retail Drive intersection. The analysis output can be found in **Appendix B**.

Table 5 – LOS Summary for Rothesay Ave/Retail Dr without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [95% Queues (m)]											
				Eastbound			Westbound			Northbound			Southbound		
							Retail Dr			Rothesay Ave			Rothesay Ave		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Ave @ Retail Dr		AM Peak	A 8				D 41 [0.41]		B 11 [0.17]		A 4 [0.20]	shared	shared	A 6 [0.38]	
		PM Peak	C 24				F 132 [1.07]		B 15 [0.50]		A 10 [0.52]	shared	shared	A 9 [0.54]	
		Sat Peak	C 21				F 130 [0.93]		A 8 [0.51]		A 5 [0.38]	shared	shared	A 8 [0.53]	
Projected 2023 Horizon Year without Development Conditions															
Rothesay Ave @ Retail Dr		AM Peak	A 9				D 42 [0.44]		B 10 [0.18]		A 5 [0.21]	shared	shared	A 7 [0.41]	
		PM Peak	D 37				F 147 [1.15]		C 20 [0.56]		C 31 [0.56]	shared	shared	B 10 [0.61]	
		Sat Peak	C 22				F 134 [0.99]		A 8 [0.53]		A 5 [0.40]	shared	shared	A 9 [0.58]	
Projected 2028 Horizon Year without Development Conditions															
Rothesay Ave @ Retail Dr		AM Peak	A 9				D 43 [0.46]		B 10 [0.19]		A 5 [0.22]	shared	shared	A 7 [0.44]	
		PM Peak	D 52				F 168 [0.66]		C 24 [0.61]		D 54 [0.59]	shared	shared	B 12 [0.66]	
		Sat Peak	C 22				F 133 [1.04]		A 9 [0.54]		A 6 [0.42]	shared	shared	B 10 [0.62]	
Projected 2033 Horizon Year without Development Conditions															
Rothesay Ave @ Retail Dr		AM Peak	A 9				D 44 [0.49]		A 10 [0.20]		A 5 [0.23]	shared	shared	A 7 [0.46]	
		PM Peak	E 56				F 191 [1.27]		C 29 [0.66]		D 54 [0.62]	shared	shared	B 17 [0.96]	
		Sat Peak	C 23				F 131 [1.10]		B 12 [0.59]		A 6 [0.45]	shared	shared	B 12 [0.91]	

The **Rothesay Avenue / Retail Drive** intersection is operating at an overall LOS C or better with an intersection delay of 24 seconds/vehicle or less during the AM, PM, and Saturday peak period. The worst movement in terms of LOS is the westbound left-turn movement, which is operating at LOS D (average delay of 41 seconds/vehicle) during the AM peak period and at an unacceptable LOS F with an average delay of 132 seconds/vehicle and 130 seconds/vehicle during the PM and Saturday peak periods, respectively. All other movements are operating at LOS B or better with average delays of 15 seconds/vehicle or less. The 95th percentile queue lengths are the longest at the westbound left turn movement, with lengths of 36 m to 112 m. The v/c ratio at the westbound left turn movement exceeds 1.0 during the PM peak period and is approaching the threshold during the Saturday peak period.

By the 2023, 2028, and 2033 horizon years without development, the **Rothesay Avenue / Retail Drive** intersection is projected to operate at an overall LOS E or better with an intersection delay of 56 seconds/vehicle or less during all three peak periods. All movements are projected to operate at LOS D or better with an average delay of 54 seconds/vehicle or less during the AM, PM, and

Saturday peak periods. The exception is the westbound left turn movement during the PM and Saturday peak period which is projected to operate at LOS F (average delay of 191 seconds/vehicle or less). The 95th percentile queue length at this movement are projected to 137 m during the PM peak period. The v/c ratio at the westbound left turn movement is projected to exceed 1.0 during both the PM and Saturday peak period, indicating that the demand exceeds the capacity. The v/c ratio at the southbound movement is projected to approach 1.0 during the PM and Saturday peak period.

Operational deficiencies currently exist at the westbound left turn movement during the PM and Saturday peak period and are projected to worsen in terms of delay and queuing by the 2033 horizon year without development.

3.2.5 Rothesay Avenue / Ashburn Lake Road

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 6** for the Rothesay Avenue / Ashburn Lake Road intersection. The analysis output can be found in **Appendix B**.

The **Rothesay Avenue / Ashburn Lake Road** intersection is currently operating at LOS B with an intersection delay of 20 seconds/vehicle or less during the AM, PM, and Saturday peak period. All individual movements are operating at LOS C or better with an average delay of 26 seconds/vehicle or less. The v/c ratios are all 0.81 or less, indicating that there is sufficient capacity. The 95th percentile queue lengths are all 76 m or less, with the longest queues projected at the eastbound approach.

By the 2023, 2028, and 2033 horizon year without development, the Rothesay Avenue / Ashburn Lake Road intersection is projected to operate with minimal changes during the AM and Saturday peak period.

By the 2023 horizon year without development during the PM peak period, the Rothesay Avenue / Ashburn Lake Road intersection is projected to operate at an overall LOS C with an intersection delay of 33 seconds/vehicle. All individual movements are projected to operate at LOS D or better with an average delay of 37 seconds/vehicle or less. The v/c ratio at the northbound approach is approaching the threshold.

By the 2028 and 2033 horizon years without development during the PM peak period, the Rothesay Avenue / Ashburn Lake Road intersection is projected to operate at an overall LOS E or better with an intersection delay of 68 seconds/vehicle. The northbound approach is projected to operate at acceptable LOS or better, however, the v/c ratio exceeds the threshold during both horizon years, indicating that the demand exceeds the capacity. The eastbound approach v/c ratio is approaching the threshold during both horizon years.

Operational deficiencies are projected for the Rothesay Avenue / Ashburn Lake Road intersection by 2028 without development at the northbound movement during the PM peak period.

Table 6 – LOS Summary for Rothesay Ave/Ashburn Lake Rd without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [95% Queues (m)]											
				Eastbound			Westbound			Northbound			Southbound		
				Ashburn Lake Rd						Rothesay Ave			Rothesay Ave		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Ave @ Ashburn Lake		AM Peak	B 10	B 13 [0.42]		shared				shared	A 9 [0.28]			A 10 [0.54]	shared
		PM Peak	B 20	C 26 [0.77]		shared				shared	B 19 [0.81]			B 17 [0.56]	shared
		Sat Peak	B 13	B 20 [0.65]		shared				shared	B 10 [0.41]			B 12 [0.45]	shared
Projected 2023 Horizon Year without Development Conditions															
Rothesay Ave @ Ashburn Lake		AM Peak	B 11	B 16 [0.56]		shared				shared	A 9 [0.31]			B 10 [0.58]	shared
		PM Peak	C 33	C 31 [0.83]		shared				shared	C 30 [0.92]			D 37 [0.60]	shared
		Sat Peak	B 15	C 22 [0.70]		shared				shared	B 10 [0.44]			B 15 [0.48]	shared
Projected 2028 Horizon Year Conditions Without Development															
Rothesay Ave @ Ashburn Lake		AM Peak	B 12	B 17 [0.59]		shared				shared	A 10 [0.33]			B 11 [0.61]	shared
		PM Peak	D 53	D 43 [0.87]		shared				shared	D 50 [1.00]			E 61 [0.63]	shared
		Sat Peak	B 18	C 24 [0.74]		shared				shared	B 11 [0.46]			C 22 [0.51]	shared
Projected 2033 Horizon Year Conditions Without Development															
Rothesay Ave @ Ashburn Lake		AM Peak	B 12	B 18 [0.62]		shared				shared	A 10 [0.36]			B 12 [0.64]	shared
		PM Peak	E 68	E 59 [0.91]		shared				shared	E 78 [1.09]			E 61 [0.67]	shared
		Sat Peak	C 25	C 26 [0.77]		shared				shared	B 11 [0.49]			D 36 [0.54]	shared

3.2.6 Rothesay Road / Fulton Lane

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 7** for the Rothesay Road / Fulton Lane intersection. The analysis output can be found in **Appendix B**.

The **Rothesay Road / Fulton Lane** intersection is operating at an overall excellent LOS A and an intersection delay of 0 seconds/vehicle during the AM, PM, and Saturday peak period. The southbound movement is operating at LOS A with an average delay of 10 seconds/vehicle or less during the AM, PM, and Saturday peak period. The westbound movement is operating at a good LOS B with an average delay of 13 seconds/vehicle or less during the AM and Saturday peak periods and at a satisfactory LOS D with an average delay of 26 seconds/vehicle during the PM peak period. The 95th percentile queue lengths are 1 vehicle at all approaches and the v/c ratios are 0.06 or less at all approaches.

Minimal changes are projected at the Rothesay Road / Fulton Lane intersection by the 2023 and 2028 horizon year. By the 2033 horizon year, the westbound movement during the PM peak period is projected to operate at an acceptable LOS E with an average delay of 48 seconds/vehicle and a v/c ratio of 0.12. The 95th percentile queue length at this approach is projected to be 1 vehicle.

No operational deficiencies are projected at the Rothesay Road / Fulton Lane intersection by 2033 without development.

Table 7 – LOS Summary for Rothesay Rd/Fulton Ln without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound Fulton Ln			Northbound Rothesay Rd			Southbound Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Rd @ Fulton Ln	STOP	AM Peak	A 0				B 13 [0.01]		shared		*free flow*	shared	A 8 [0.01]	shared	
		PM Peak	A 0				D 26 [0.06]		shared		*free flow*	shared	A 10 [0.01]	shared	
		Sat Peak	A 0				B 11 [0.01]		shared		*free flow*	shared	A 8 [0.00]	shared	
Projected 2023 Horizon Year without Development Conditions															
Rothesay Rd @ Fulton Ln	STOP	AM Peak	A 0				B 14 [0.01]		shared		*free flow*	shared	A 8 [0.01]	shared	
		PM Peak	A 0				D 30 [0.07]		shared		*free flow*	shared	A 10 [0.01]	shared	
		Sat Peak	A 0				B 11 [0.01]		shared		*free flow*	shared	A 8 [0.00]	shared	
Projected 2028 Horizon Year without Development Conditions															
Rothesay Rd @ Fulton Ln	STOP	AM Peak	A 0				B 14 [0.01]		shared		*free flow*	shared	A 8 [0.01]	shared	
		PM Peak	A 0				D 33 [0.08]		shared		*free flow*	shared	A 10 [0.01]	shared	
		Sat Peak	A 0				B 12 [0.01]		shared		*free flow*	shared	A 8 [0.00]	shared	
Projected 2033 Horizon Year without Development Conditions															
Rothesay Rd @ Fulton Ln	STOP	AM Peak	A 0				B 14 [0.01]		shared		*free flow*	shared	A 8 [0.01]	shared	
		PM Peak	A 0				E 48 [0.12]		shared		*free flow*	shared	A 10 [0.01]	shared	
		Sat Peak	A 0				B 13 [0.01]		shared		*free flow*	shared	A 8 [0.00]	shared	

3.2.7 Ashburn Road / Jones Drive

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 8** for the Ashburn Road / Jones Drive intersection. The analysis output can be found in **Appendix B**.

The **Ashburn Road / Jones Drive** intersection is operating at an overall excellent LOS A with virtually no overall intersection delay during all three peak periods. All individual movements are operating at LOS B or better with average delays of 14 seconds/vehicle or less during the AM, PM, and Saturday peak periods. All v/c ratios are 0.01 or lower.
By the 2033 horizon year, the eastbound movement of the Ashburn Road / Jones Drive intersection is projected to operate at LOS C with an average delay of 16 seconds/vehicle. Minimal queueing is

projected at this approach. No other major changes are projected during the AM, PM, or Saturday peak period.

No operational deficiencies are projected at the Ashburn Road / Jones Drive intersection by 2033 without development.

Table 8 – LOS Summary for Ashburn Rd/Jones Dr without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Jones Dr			Westbound			Northbound Ashburn Rd			Southbound Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Ashburn Rd @ Jones Dr	STOP	AM Peak	A 0	A 10 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		PM Peak	A 0	B 14 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		Sat Peak	A 0	A 10 [0.01]		shared				shared	A 7 [0.00]			*free flow*	shared
Projected 2023 Horizon Year without Development Conditions															
Ashburn Rd @ Jones Dr	STOP	AM Peak	A 0	A 10 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		PM Peak	A 0	B 15 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		Sat Peak	A 0	A 10 [0.01]		shared				shared	A 7 [0.00]			*free flow*	shared
Projected 2028 Horizon Year without Development Conditions															
Ashburn Rd @ Jones Dr	STOP	AM Peak	A 0	A 10 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		PM Peak	A 0	C 15 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		Sat Peak	A 0	A 10 [0.01]		shared				shared	A 7 [0.00]			*free flow*	shared
Projected 2033 Horizon Year without Development Conditions															
Ashburn Rd @ Jones Dr	STOP	AM Peak	A 0	B 10 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		PM Peak	A 0	C 16 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		Sat Peak	A 0	B 10 [0.01]		shared				shared	A 7 [0.00]			*free flow*	shared

3.2.8 Ashburn Road / Drury Cove Road

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 9** for the Ashburn Road / Drury Cove Road intersection. The analysis output can be found in **Appendix B**.

Under existing conditions, the **Ashburn Road / Drury Cove Road** intersection is operating at an overall LOS A with an average intersection delay of 1 seconds/vehicle during both the AM, PM, and Saturday peak period. The eastbound movement is operating at an excellent LOS A with an average delay of 8 seconds/vehicle during the AM and PM peak period; there are no left-turning vehicles at this approach during the Saturday peak period, therefore, this movement experiences free flow. The southbound approach is operating at a very good LOS B with an average delay of 10 seconds/vehicle during the AM and Saturday peak period and at a good LOS C with an average delay of 15 seconds/vehicle during the PM peak period. All 95th percentile queue lengths are 1 vehicle during all three peak periods. Minimal changes are projected by the 2023, 2028, and 2033 horizon years without the development in place.

No operational deficiencies are projected for the Ashburn Road / Drury Cover Road by the 2023, 2028, and 2033 horizon years without the development in place.

Table 9 – LOS Summary for Ashburn Rd/Drury Cover Rd without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Ashburn Rd			Westbound Ashburn Rd			Northbound			Southbound Drury Cove Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Drury Cove Rd @ Ashburn Rd	STOP	AM Peak	A 1	A 8 [0.00]	shared			*free flow*					B 10 [0.02]		shared
		PM Peak	A 1	A 8 [0.00]	shared			*free flow*					C 15 [0.08]		shared
		Sat Peak	A 1	A 0 [0.00]	shared			*free flow*					B 10 [0.02]		shared
Projected 2023 Horizon Year without Development Conditions															
Drury Cove Rd @ Ashburn Rd	STOP	AM Peak	A 1	A 8 [0.00]	shared			*free flow*					B 11 [0.03]		shared
		PM Peak	A 1	A 8 [0.00]	shared			*free flow*					C 16 [0.09]		shared
		Sat Peak	A 1	A 0 [0.00]	shared			*free flow*					B 10 [0.02]		shared
Projected 2028 Horizon Year without Development Conditions															
Drury Cove Rd @ Ashburn Rd	STOP	AM Peak	A 1	A 8 [0.00]	shared			*free flow*					B 11 [0.03]		shared
		PM Peak	A 1	A 8 [0.00]	shared			*free flow*					C 17 [0.09]		shared
		Sat Peak	A 1	A 0 [0.00]	shared			*free flow*					B 10 [0.02]		shared
Projected 2033 Horizon Year without Development Conditions															
Drury Cove Rd @ Ashburn Rd	STOP	AM Peak	A 1	A 8 [0.00]	shared			*free flow*					B 11 [0.03]		shared
		PM Peak	A 1	A 8 [0.00]	shared			*free flow*					C 18 [0.10]		shared
		Sat Peak	A 1	A 0 [0.00]	shared			*free flow*					B 10 [0.02]		shared

3.2.9 Rothesay Avenue / Rothesay Road

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 10** for the Rothesay Road / Rothesay Avenue intersection. The analysis output can be found in **Appendix B**.

Under existing conditions, the **Rothesay Road / Rothesay Avenue** intersection is operating at unacceptable LOS F with intersection delays of 64 seconds/vehicle, 129 seconds/vehicle, and 51 seconds/vehicle during the AM, PM, and Saturday peak period. The westbound approach is experiencing the highest delays, which is operating at LOS F with average delays from 107 seconds/vehicle to 407 seconds/vehicle during the AM, PM, and Saturday peak period. The westbound approach also has v/c ratios that exceed 1.0 during all three peak periods, indicating that the volumes at this approach exceed the capacity. The southbound left-turn movement operates at LOS B or better with average delays of 10 seconds/vehicle or less and v/c ratios of 0.40 or less during all three peak periods.

Table 10 – LOS Summary for Rothesay Rd/Rothesay Ave without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
							Rothesay Ave			Rothesay Rd			Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Rd @ Rothesay Ave	STOP	AM Peak	F 64				F 241 [1.39]		shared		*free flow*	shared	A 8 [0.23]	*free flow*	
		PM Peak	F 129				F 407 [1.80]		shared		*free flow*	shared	B 10 [0.40]	*free flow*	
		Sat Peak	F 51				F 107 [1.10]		shared		*free flow*	shared	A 8 [0.21]	*free flow*	
Projected 2023 Horizon Year without Development Conditions															
Rothesay Rd @ Rothesay Ave	STOP	AM Peak	F 100				F 385 [1.72]		shared		*free flow*	shared	A 8 [0.25]	*free flow*	
		PM Peak	F 226				F 718 [2.49]		shared		*free flow*	shared	B 11 [0.47]	*free flow*	
		Sat Peak	F 57				F 149 [1.22]		shared		*free flow*	shared	A 8 [0.21]	*free flow*	
Projected 2028 Horizon Year without Development Conditions															
Rothesay Rd @ Rothesay Ave	STOP	AM Peak	F 135				F 522 [2.02]		shared		*free flow*	shared	A 8 [0.26]	*free flow*	
		PM Peak	F 310				F 992 [3.09]		shared		*free flow*	shared	B 12 [0.51]	*free flow*	
		Sat Peak	F 85				F 162 [1.25]		shared		*free flow*	shared	A 8 [0.22]	*free flow*	
Projected (YEAR) Horizon Year without Development Conditions															
Rothesay Rd @ Rothesay Ave	STOP	AM Peak	F 178				F 691 [2.39]		shared		*free flow*	shared	A 8 [0.28]	*free flow*	
		PM Peak	F 411				F 1317 [3.79]		shared		*free flow*	shared	B 13 [0.54]	*free flow*	
		Sat Peak	F 151				F 231 [1.42]		shared		*free flow*	shared	A 8 [0.22]	*free flow*	

By the 2023, 2028, and 2033 horizon years the Rothesay Road / Rothesay Avenue intersection is projected to continue to get worse overall in terms of LOS with intersection delays of 226 seconds/vehicle or less by 2023, intersection delays of 310 seconds/vehicle or less by 2028, intersection delays of 411 seconds/vehicle or less by 2028. The southbound approach is projected to have minimal changes by 2033. The westbound approach, however, is projected to continue to get worse in terms of average delays. By 2023 the westbound approach is projected to operate at LOS with an average delay of 718 seconds/vehicle or less, by 2028 the average delay on the westbound approach is projected to be 992 seconds/vehicle or less, and by 2033 the average delay on the westbound approach is projected to be 1317 seconds/vehicle or less.

Operational deficiencies are currently experienced at the Rothesay Road / Rothesay Avenue intersection overall and particularly at the westbound approach. Operational deficiencies are projected to get worse by the 2033 horizon year without the development in place.

3.2.10 Rothesay Road / Ashburn Road

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 11** for the Rothesay Road / Ashburn Road intersection. The analysis output can be found in **Appendix B**.

Under existing conditions, the **Rothesay Road / Ashburn Road** intersection is operating at an overall LOS B or better with an intersection delay of 10 seconds/vehicle or less during the AM, PM, and Saturday peak period. The eastbound left turn and right turn movements are both operating at LOS C or better with average delays of 23 seconds/vehicle or less during all three peak periods. The westbound movement during the PM peak period is operating at LOS C (average delay of 20 seconds/vehicle). The westbound approach (parking lot exit) had no vehicles present during the AM and Saturday peak period. The 95th percentile queue lengths are 6 vehicles or less and at each approach during the AM, PM, and Saturday peak period. The v/c ratios are 0.66 or less indicating there is sufficient capacity.

Table 11 – LOS Summary for Rothesay Rd/Ashburn Rd without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Ashburn Rd			Westbound Ashburn Rd			Northbound Rothesay Rd			Southbound Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Rd @ Ashburn Rd	STOP	AM Peak	A 4	C 16 [0.07]		*B* 12 [0.26]				shared	A 9 [0.10]			*free flow*	shared
		PM Peak	B 10	C 23 [0.36]	shared	*C* 17 [0.66]	shared	C 20 [0.01]	shared	shared	A 8 [0.09]			*free flow*	shared
		Sat Peak	A 4	B 13 [0.10]		B 10 [0.20]				shared	A 8 [0.05]			*free flow*	shared
Projected 2023 Horizon Year without Development Conditions															
Rothesay Rd @ Ashburn Rd	STOP	AM Peak	A 5	C 17 [0.08]		B 13 [0.29]				shared	A 9 [0.11]			*free flow*	shared
		PM Peak	B 12	D 26 [0.43]	shared	C 19 [0.72]	shared	C 24 [0.02]	shared	shared	A 8 [0.10]			*free flow*	shared
		Sat Peak	A 5	B 13 [0.12]		B 10 [0.21]				shared	A 8 [0.05]			*free flow*	shared
Projected 2028 Horizon Year without Development Conditions															
Rothesay Rd @ Ashburn Rd	STOP	AM Peak	A 5	C 17 [0.09]		B 13 [0.31]				shared	A 9 [0.12]			*free flow*	shared
		PM Peak	B 13	D 30 [0.48]	shared	C 11 [0.77]	shared	D 28 [0.02]	shared	shared	A 8 [0.11]			*free flow*	shared
		Sat Peak	A 5	B 14 [0.13]		B 11 [0.23]				shared	A 8 [0.05]			*free flow*	shared
Projected 2033 Horizon Year without Development Conditions															
Rothesay Rd @ Ashburn Rd	STOP	AM Peak	A 5	C 18 [0.10]		B 14 [0.33]				shared	A 9 [0.13]			*free flow*	shared
		PM Peak	C 15	D 35 [0.54]	shared	D 25 [0.82]	shared	E 35 [0.03]	shared	shared	A 8 [0.11]			*free flow*	shared
		Sat Peak	A 5	B 14 [0.14]		B 11 [0.24]				shared	A 8 [0.06]			*free flow*	shared

Minimal changes are projected at the Rothesay Road / Ashburn Road intersection during the AM and Saturday peak period by the 2023, 2028, and 2033 horizon years without the development in place.

By the 2023, 2028, and 2033 horizon years without development during the PM peak period, the Rothesay Road / Ashburn Road intersection is projected to operate at LOS C or better with an intersection delay of 15 seconds/vehicle or less. The eastbound left turn movement is projected to operate at LOS D with an average delay of 35 seconds/vehicle or less. The eastbound right turn movement is projected to operate at LOS D or better with an average delay of 25 seconds/vehicle or less. The westbound movement is projected to operate at LOS E or better with an average delay of 35 seconds/vehicle or less. All v/c ratios are projected to be 0.82 or less, indicating that demand is approaching capacity. The 95th percentile queue lengths are projected to be 10 vehicles or less, with the longest queues projected on the eastbound right turn lane.

No operational deficiencies are projected at the Rothesay Road / Ashburn Road intersection by the 2033 horizon year without development.

3.2.11 Rothesay Avenue / NB Route 1 interchange

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 12** for the Rothesay Avenue / Route 1 off-ramp, **Table 13** for the Rothesay Avenue / Route 1 on-ramp (furthest west), and **Table 14** for the Rothesay Avenue / Route 1 on-ramp (furthest east). The analysis output can be found in **Appendix B**.

3.2.11.1 Rothesay Avenue / Route 1 off-ramp Intersection

Under existing conditions. the **Rothesay Avenue / Route 1 off-ramp** intersection is operating at an unacceptable LOS F with an intersection delay of 52 seconds/vehicle and 92 seconds/vehicle during the AM and Saturday peak periods, respectively. The eastbound and westbound movements are both operating at unacceptable LOS F with an average delay of 248 seconds/vehicle or less during the Am and Saturday peak periods. During the AM and Saturday peak periods, the v/c ratios at these approaches are all approaching or exceeding 1.0, indicating the demand is approaching or exceeding capacity.

During the PM peak period the intersection is operating at good LOS C with an intersection delay of 21 seconds/vehicle. The individual movements are operating at LOS D or better with average delays of 28 seconds/vehicle or less. The v/c ratios are all 0.78 or less, indicating that there is sufficient capacity.

By the 2023, 2028, and 2033 horizon years during the AM and Saturday peak period, the **Rothesay Avenue / Route 1 off-ramp** is projected to operate at LOS F with an intersection delay of 214 seconds/vehicle or less. The individual movements are all projected to operate at LOS F with average delays of 529 seconds/vehicle or less during the AM and Saturday peak period. The v/c ratios are all projected to exceed 1.0, indicating that the demand exceeds the capacity.

During the PM peak period, the **Rothesay Avenue / Route 1 off-ramp** intersection is projected to operate at an overall LOS D with an intersection delay of 34 seconds/vehicle or less by the 2023 and 2028 horizon year. The eastbound and westbound approaches are projected to operate at LOS E or better with an average delay of 39 seconds/vehicle or less and LOS E with an average delay of 46 seconds/vehicle or less, respectively. By the 2033 horizon year, the intersection is projected to operate at an acceptable LOS E with an average delay of 44 seconds/vehicle during the PM peak period. The eastbound and westbound approaches are projected to operate at LOS F with average delays of 109 seconds/vehicle or less. The v/c ratios at the eastbound and westbound approaches are approaching 1.0, indicating that the demand is approaching the capacity of these approaches.

Table 12 – LOS Summary for Rothesay Ave/Rte 1 off-ramp without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Rothesay Ave (towards on-ramp)			Rothesay Ave						Rte 1 off-ramp		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave	STOP	AM Peak	F 52		F 134 [1.17]	shared		F 80 [0.96]						*free flow*	
		PM Peak	C 21		C 25 [0.77]	shared		D 28 [0.78]						*free flow*	
		Sat Peak	F 92		F 92 [1.04]	shared		F 248 [1.45]						*free flow*	
Projected 2023 Horizon Year without Development Conditions															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave	STOP	AM Peak	F 81		F 206 [1.35]	shared		F 128 [1.12]						*free flow*	
		PM Peak	D 27		D 31 [0.84]	shared		E 36 [0.86]						*free flow*	
		Sat Peak	F 132		F 150 [1.21]	shared		F 345 [1.67]						*free flow*	
Projected 2028 Horizon Year without Development Conditions															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave	STOP	AM Peak	F 109		F 275 [1.51]	shared		F 177 [1.25]						*free flow*	
		PM Peak	D 34		E 39 [0.90]	shared		E 46 [0.92]						*free flow*	
		Sat Peak	F 151		F 204 [1.34]	shared		F 430 [1.86]						*free flow*	
Projected 2033 Horizon Year without Development Conditions															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave	STOP	AM Peak	F 143		F 353 [1.69]	shared		F 240 [1.40]						*free flow*	
		PM Peak	E 44		F 107 [0.96]	shared		F 109 [0.99]						*free flow*	
		Sat Peak	F 214		F 269 [1.49]	shared		F 529 [2.08]						*free flow*	

Operational deficiencies are currently experienced at the Rothesay Avenue / Route 1 off-ramp during the AM and Saturday peak period at both the eastbound and westbound approaches and are projected to be experienced during the PM peak period at the eastbound and westbound approaches by the 2033 horizon year without the development in place.

3.2.11.2 Rothesay Avenue / Route 1 on-ramp Intersections

Both of the **Rothesay Avenue / Route 1 on-ramp** (eastbound street) intersections are operating at LOS A with an intersection delay of 5 seconds/vehicle or better during the AM, PM, and Saturday peak period. Each individual movement (northbound and eastbound) is operating at LOS C or better at both intersections with average delays of 19 seconds/vehicle or less during both the AM, PM, and Saturday peak periods. All the v/c ratios are 0.46 or less, indicating there is sufficient capacity.

By the 2023, 2028, and 2033 horizon years without development, both the **Rothesay Avenue / Route 1 on-ramp** intersections are projected to operate at an overall LOS A with intersection delays of 8 seconds/vehicle or less during all peak periods. Individual movements at both intersections are projected to operate at LOS D or better with an average delay of 26 seconds/vehicle or less during all peak periods. The v/c ratios are all projected to be 0.62 or less, indicating that there is sufficient capacity.

No operational deficiencies are projected at the Rothesay Avenue / Route 1 on-ramp intersections by the 2033 horizon year without the development in place.

Table 13 – LOS Summary for Rothesay Ave/Rte 1 on-ramp (furthest west) without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Rothesay Ave (to Rte 1 on-ramp)			Westbound			Northbound Rothesay Ave			Southbound		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	AM Peak	A 2		B 12 [0.12]						*free flow*				
		PM Peak	A 6		C 19 [0.46]						*free flow*				
		Sat Peak	A 2		B 14 [0.16]						*free flow*				
Projected 2023 Horizon Year without Development Conditions															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	AM Peak	A 2		B 12 [0.13]						*free flow*				
		PM Peak	A 7		C 21 [0.52]						*free flow*				
		Sat Peak	A 2		B 14 [0.18]						*free flow*				
Projected 2028 Horizon Year without Development Conditions															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	AM Peak	A 2		B 12 [0.14]						*free flow*				
		PM Peak	A 7		C 23 [0.57]						*free flow*				
		Sat Peak	A 2		B 15 [0.20]						*free flow*				
Projected 2033 Horizon Year without Development Conditions															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	AM Peak	A 2		B 13 [0.15]						*free flow*				
		PM Peak	A 8		D 26 [0.62]						*free flow*				
		Sat Peak	A 2		C 15 [0.21]						*free flow*				

Table 14 – LOS Summary for Rothesay Ave/Rte 1 on-ramp (furthest east) without Development

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Rothesay Ave (to Rte 1 on-ramp)						Rte 1 On-Ramp					
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Rothesay Ave on-ramp to Rte 1	STOP	AM Peak	A 3	A 10 [0.09]							*free flow*				
		PM Peak	A 5	C 18 [0.44]							*free flow*				
		Sat Peak	A 2	C 17 [0.21]							free flow				
Projected 2023 Horizon Year without Development Conditions															
Rothesay Ave on-ramp to Rte 1	STOP	AM Peak	A 3	A 10 [0.09]							*free flow*				
		PM Peak	A 6	C 20 [0.46]							*free flow*				
		Sat Peak	A 2	C 18 [0.24]							*free flow*				
Projected 2028 Horizon Year without Development Conditions															
Rothesay Ave on-ramp to Rte 1	STOP	AM Peak	A 3	A 10 [0.10]							*free flow*				
		PM Peak	A 6	C 22 [0.55]							free flow				
		Sat Peak	A 2	C 20 [0.26]							free flow				
Projected 2033 Horizon Year without Development Conditions															
Rothesay Ave on-ramp to Rte 1	STOP	AM Peak	A 3	B 10 [0.11]							*free flow*				
		PM Peak	A 7	D 25 [0.60]							free flow				
		Sat Peak	A 2	C 21 [0.29]							free flow				

3.2.12 NB Route 1 Access with Rothesay Road / Rothesay Avenue

The LOS for existing and projected horizon years 2023, 2028, and 2033 traffic volumes for AM, PM, and Saturday peak hours without development are presented in **Table 15** for the Rothesay Road Access Ramps to Route 1 and **Table 16** for the Rothesay Avenue Access Ramps to Route 1. The analysis output can be found in **Appendix B.**

During the AM peak period, the **Rothesay Road / Route 1** off-ramp is operating at LOS A (0.5 pc/km/ln density) and is projected to continue to operate at LOS A by the 2033 horizon year without development. The Rothesay Road on-ramp is operating at LOS D with a density of 18.3 pc/km/ln during the AM peak period. The on-ramp is projected to continue to operate at LOS D (density of 20.7 pc/km/ln or less) during the 2023 and 2028 horizon years without development. By the 2033 horizon year, the on-ramp is projected to operate at an unacceptable LOS F (21.7 pc/km/ln density) during the AM peak period.

During the PM peak period, the **Rothesay Road / Route 1** off-ramp is currently operating at LOS C and is projected to continue operating at LOS C with an average density of 16.1 pc/km/ln or lower by the 2033 horizon year without the development in place. The Rothesay Road / Route 1 on-ramp is currently operating at LOS B and is projected to continue operating at LOS B with an average density of 7.4 pc/km/ln or lower by the 2033 horizon year without the development in place during the PM peak period.

The **Rothesay Road / Route 1** on and off-ramps are currently operating at LOS A and are projected to continue operating at LOS A with an average density of 5.0 pc/km/ln by the 2033 horizon year during the Saturday peak period without the development in place.

Operational deficiencies are projected at the Rothesay Road / Route 1 on-ramp during the AM peak period by 2033 horizon year without the development in place. No operational deficiencies are projected during the PM or Saturday peak periods.

Table 15 – LOS Summary for Rothesay Rd/Rt 1 Ramps without Development

	AM Peak	PM Peak	SAT Peak
Ramp	**LOS Density (pc/km/ln)**	**LOS Density (pc/km/ln)**	**LOS Density (pc/km/ln)**
Existing (2016) Conditions			
Rte 1 – Rothesay Rd off-ramp	A 0.5	C 13.1	A 2.9
Rte 1 – Rothesay Rd on-ramp	D 18.3	B 6.2	A 4.2
Projected 2023 Horizon Year Conditions without Development			
Rte 1 – Rothesay Rd off-ramp	A 0.7	C 14.3	A 3.2
Rte 1 – Rothesay Rd on-ramp	D 19.6	B 6.7	A 4.5
Projected 2028 Horizon Year Conditions without Development			
Rte 1 – Rothesay Rd off-ramp	A 0.9	C 15.1	A 3.5
Rte 1 – Rothesay Rd on-ramp	D 20.7	B 7.0	A 4.8
Projected 2033 Horizon Year Conditions without Development			
Rte 1 – Rothesay Rd off-ramp	A 1.1	C 16.1	A 3.7
Rte 1 – Rothesay Rd on-ramp	F 21.7	B 7.4	A 5.1

The **Rothesay Avenue / Route 1** off-ramp is currently operating at LOS C during the AM peak period and LOS A during both the PM and Saturday peak period. By the 2023, 2028, and 2033 horizon years without the development in place, the off-ramp is projected to operate at LOS D or better with an average density of 18.1 pc/km/ln or lower during the AM peak period and is continue to operate at LOS A (density of 1.6 pc/km/ln or lower) during both the PM and Saturday peak periods.

The **Rothesay Avenue / Route 1** on-ramp operating at LOS A (density of 5.6 pc/km/ln), LOS D (density of 19.6 pc/km/ln), and LOS B (density of 9.3 pc/km/ln) during the AM, PM, and Saturday peak periods, respectively. By the 2023, 2028, and 2033 horizon years without the development in place, the on-ramp is projected to operate at LOS B or better (density of 6.4 pc/km/ln or lower) during the AM peak, LOS E or better (density of 22.9 pc/km/ln or lower) during the PM peak period, and continue to operate at LOS B (density of 10.8 pc/km/ln or lower) during the Saturday peak period.

No operational deficiencies are projected at the Rothesay Avenue / Route 1 access ramps by the 2033 horizon year without the development in place.

Table 16 – LOS Summary for Rothesay Ave/Rte 1 Ramps without Development

	AM Peak	PM Peak	SAT Peak
Ramp	**LOS Density (pc/km/ln)**	**LOS Density (pc/km/ln)**	**LOS Density (pc/km/ln)**
Existing (2016) Conditions			
Rte 1 – Rothesay Ave off-ramp	C 15.0	A 3.7	A 1.2
Rte 1 – Rothesay Ave on-ramp	A 5.6	D 19.6	B 9.4
Projected 2023 Horizon Year Conditions without Development			
Rte 1 – Rothesay Ave off-ramp	C 16.2	A 4.1	A 1.4
Rte 1 – Rothesay Ave on-ramp	A 5.9	D 20.9	B 10.0
Projected 2028 Horizon Year Conditions without Development			
Rte 1 – Rothesay Ave off-ramp	D 17.1	A 4.4	A 1.5
Rte 1 – Rothesay Ave on-ramp	B 6.1	D 21.9	B 10.4
Projected 2033 Horizon Year Conditions without Development			
Rte 1 – Rothesay Ave off-ramp	D 18.1	A 4.7	A 1.7
Rte 1 – Rothesay Ave on-ramp	B 6.4	E 22.9	B 10.9

4 Trip Generation and Assignment

4.1 Trip Generation

In order to estimate the amount of traffic that will be generated at the new development site, trip generation rates were utilized for the proposed retail development. These rates are documented in the TripGen 2014 software and are based on the 9th edition of the Trip General Manual, published by the Institute of Transportation Engineers (ITE).

Table 17 shows the estimated traffic generation during of the development. The Table is sectioned based on which developments will be completed by the Phase 1, Phase 2, and Phase 3 horizon years. The AM, PM, and Saturday peak hours for the following components of the development are shown. **Figure 10** shows a visual on the site plan of the anticipated phasing used in this study.

The proposed development is projected to generate significantly more traffic during the PM and Saturday peak periods. For this reason, only the PM and Saturday peak hours will be evaluated with respect to the traffic impacts associated with the proposed development, with the exception of the Route 1 ramps, which will be evaluated using the critical peak period based on the directional split for Route 1.

Table 17 – Trip Generation for Development

Development	Size (m^2)	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
Phase 1 (completed by 2023)										
Highway Service Stop ITE Land Use #950	2,415	110	102	212	184	170	354	184	170	354
FF-1 (fast food & drive thru) x3 ITE Land Use #934	1,059	264	254	518	193	179	372	343	330	673
Outdoor Anchor ITE Land Use #861	3,345	7	2	9	32	34	66	70	68	138
Restaurant ITE Land Use #932	520	34	27	61	21	10	31	42	37	79
Garage ITE Land Use #943	585	5	1	6	12	16	28	19	23	42
Car Wash ITE Land Use #947	223	4	1	5	17	17	34	17	17	34
Convenience Retail ITE Land Use #852	1059	177	177	354	193	201	394	193	201	394
Museum/Tourist Centre ITE Land Use #580	2230	6	1	7	1	3	4	11	5	16

Bank ITE Land Use #911	427	7	3	10	25	31	56	0	0	0
Small Retail ITE Land Use #826	2,267	16	5	21	29	37	66	29	37	66
Restaurant E ITE Land Use #932	465	30	24	54	29	20	49	37	33	70
Retail E ITE Land Use #826	2,155	15	5	20	28	35	63	28	35	63
Restaurant F ITE Land Use #932	465	30	24	54	29	20	49	37	33	70
Retail F ITE Land Use #826	418	4	1	5	5	7	12	5	7	12
Dealership ITE Land Use #841	2,264	35	12	47	26	38	64	49	49	98
Storage Facility ITE Land Use #151	3,250	3	2	5	5	4	9	7	7	14
Phase 1 Total		**748**	**641**	**1,389**	**841**	**834**	**1,675**	**1,071**	**1,052**	**2,123**
Phase 2 (completed by 2028)										
Restaurant H ITE Land Use #932	465	30	24	54	29	20	49	37	33	70
Retail H ITE Land Use #826	2,861	18	6	24	37	46	83	37	46	83
Restaurant I ITE Land Use #932	465	30	24	54	29	20	49	37	33	70
Retail I ITE Land Use #826	418	4	1	5	5	7	12	5	7	12
Entertainment Anchor ITE Land Use #435	3,716	20	5	25	79	64	143	79	64	143
Health Club ITE Land Use #492	3,716	28	28	56	80	61	141	50	61	111
Hotel 1 + 2 ITE Land Use #310	250 rooms	78	55	133	77	73	150	101	79	180
Small Retail	2,564	18	6	24	33	42	75	33	42	75
Entertainment Centre ITE Land Use #444	3716	0	0	0	0	0	0	614	482	1096

Bank ITE Land Use #911	437	7	3	10	25	32	57	0	0	0
Restaurant ITE Land Use #932	539	35	28	63	22	11	33	43	39	82
Dealership ITE Land Use #810	1,650	0	0	0	12	13	25	27	29	56
Phase 2 Total		**268**	**180**	**448**	**428**	**389**	**817**	**1,063**	**915**	**1,978**
Phase 3 (completed by 2033)										
Entertainment / Recreation Area ITE Land Use #481	15 acres	6	0	6	60	37	97	164	119	283
General Office (x4) ITE Land Use #710	10,461	154	22	176	29	140	169	26	22	48
Residential Area (12 mid-rise apartments) ITE Land Use #223	20 units each	24	48	72	60	36	96	30	36	66
Gas Station ITE Land Use #944	8 fueling stations	49	48	97	56	55	111	56	55	111
Convenience Retail ITE Land Use #826	1,177	6	3	9	15	19	34	15	19	34
Phase 3 Total		**239**	**121**	**360**	**220**	**287**	**507**	**291**	**251**	**542**
TOTAL		**1,255**	**942**	**2,197**	**1,489**	**1,510**	**2,999**	**2,425**	**2,218**	**4,643**

Figure 10 – Proposed Development Phasing

4.2 Trip Assignment

New developments generate new traffic, the total traffic generated is comprised of new trips, diverted trips, and pass-by trips. New traffic is generated by a new development being constructed and in operation. This is traffic that would not have been on the street network without the new development, and needs to be added to the adjacent street and intersection approaches. Diverted traffic is traffic that has been diverted from other nearby areas as a result of the development and also increases the traffic on adjacent streets and intersection approaches. Pass-by traffic is traffic that is already on the adjacent street and intersection approaches and makes an intermediate trip to the development. This traffic is not new to the adjacent street network. The percentage of pass-by trips varies between different types of developments.

For the purpose of this study, a 25% pass-by trip percentage is assumed. It should be noted that the generated traffic volumes (**Table 17**) were reduced by 20% when they were assigned to the network to reflect an internal synergy component.

The generated trips have been assigned to the Study Area streets and intersections based on existing traffic distribution within the Study Area during the peak periods.

The following summarizes the assumptions utilized for assigning new traffic to the development for the PM and Saturday peak hours:

Traffic generated from the north (Foster Thurston Drive): 10% (PM) and 5% (Saturday);

Traffic generated from the south (Rothesay Avenue): 30% (PM) and 40% (Saturday);

Traffic generated from the east (Route 1): 15% (PM) and 25% (Saturday);

Traffic generated from the east (Rothesay Road): 5% (PM) and 5% (Saturday), and;

Traffic generated from the west (Route 1): 40% (PM) and 25% (Saturday).

It is assumed that traffic generated from the east on Rothesay Road will access the development using the Rothesay Road / Ashburn Road intersection. It was assumed that 80% of traffic generated from the east and west on Route 1 will access the development using the Rothesay Road / Rothesay Avenue intersection, while 20% will access the development using the Rothesay Road / Ashburn Road intersection. Traffic generated from the south was assumed to access the development using the Rothesay Road / Rothesay Avenue intersection. Traffic generated from the north was assumed to access the development using the Foster Thurston / Ashburn Road intersection.

Figures 11, 12 and 13 show the traffic assignment for Phase 1 (2023 Horizon Year).

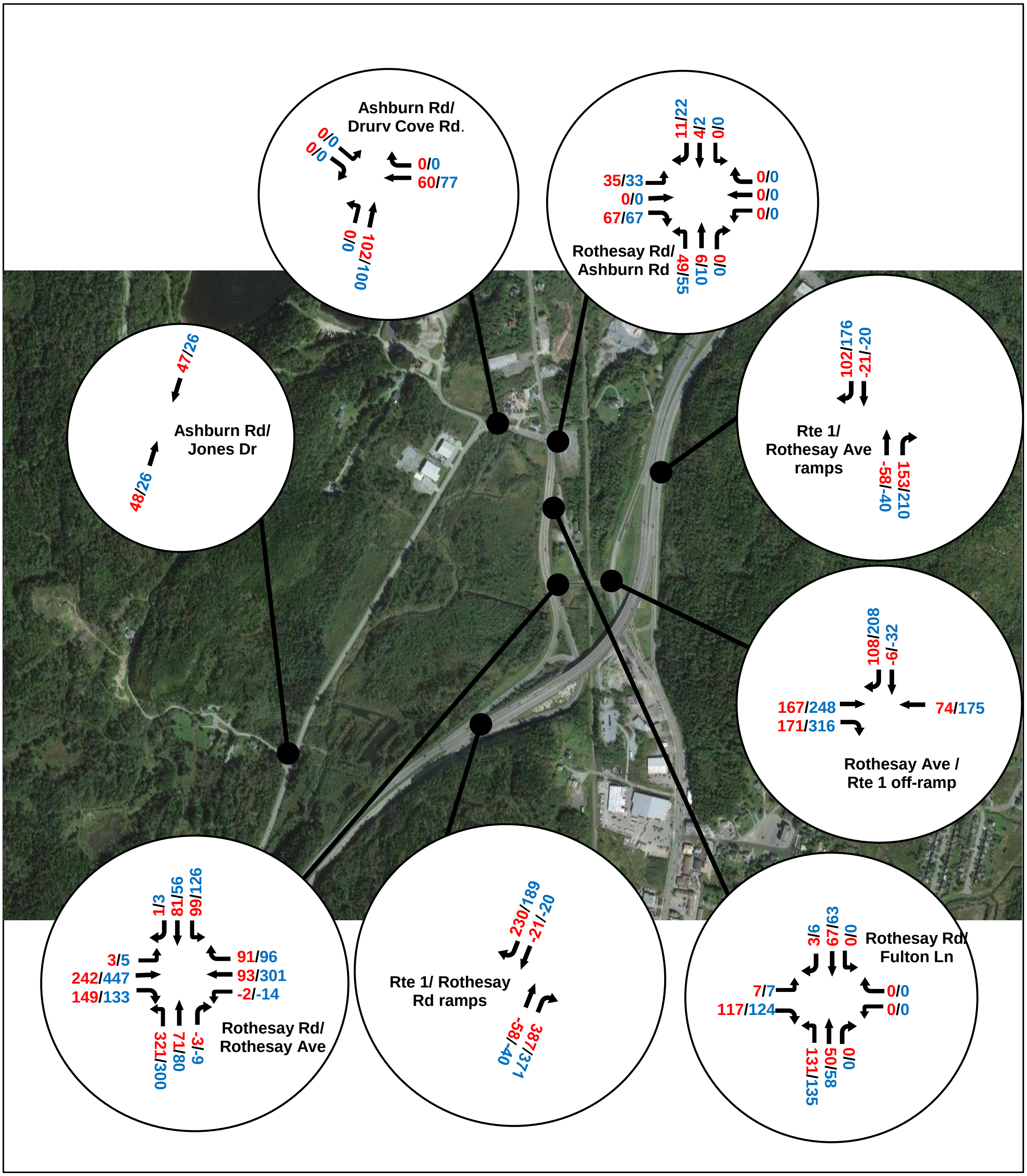

Figure 11 – Trip Assignment – Development Phase 1 (2023 Horizon Year) (1 of 3)

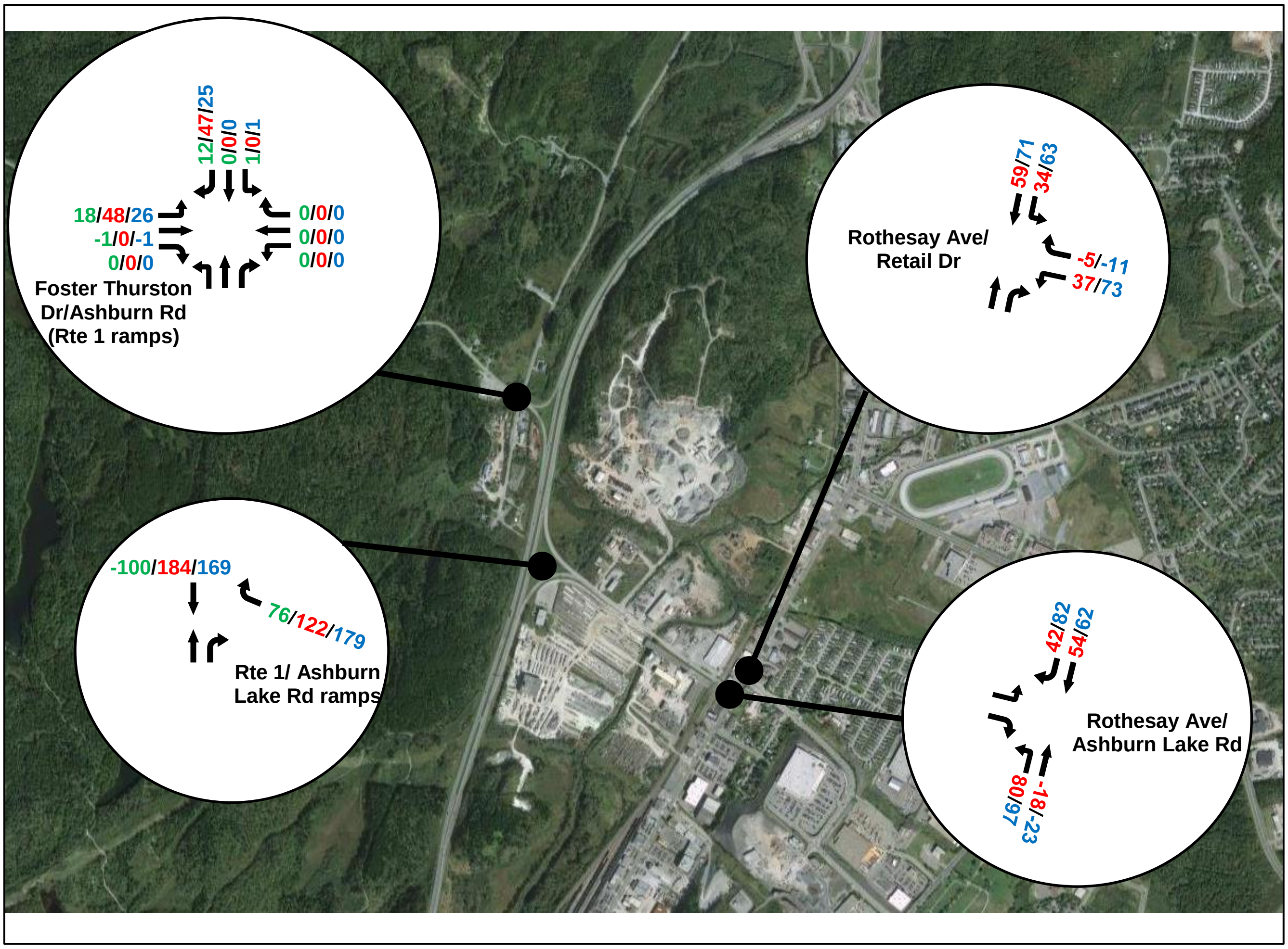

Figure 12 – Trip Assignment – Development Phase 1 (2023 Horizon Year) (2 of 3)

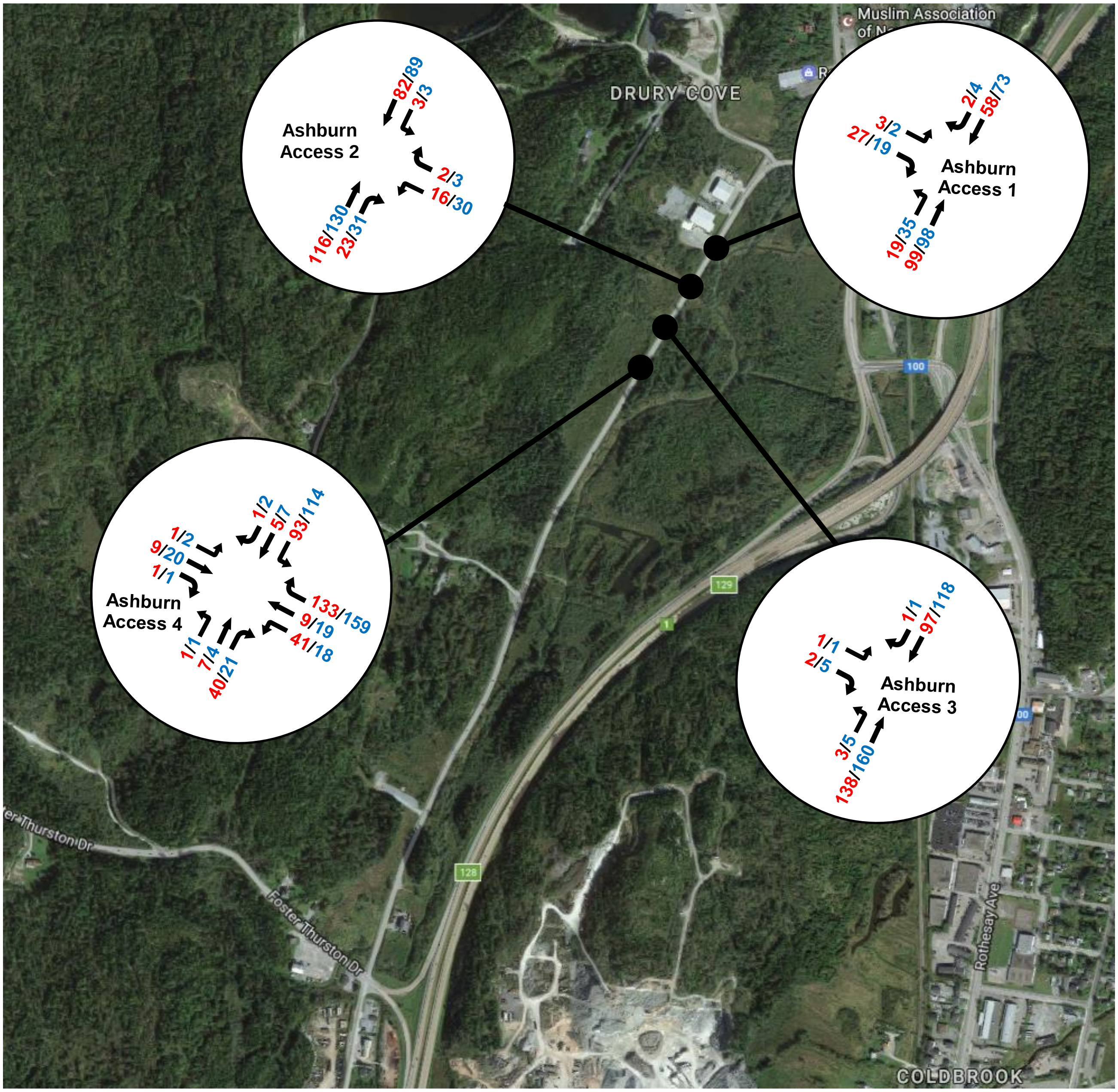

Figure 13 – Trip Assignment – Development Phase 1 (2023 Horizon Year) (3 of 3)

5 Future Traffic Operations – Phase 1

5.1 2023 Horizon Year Levels of Service (Phase 1)

Given a) the existing operational issues within the study area, and b) that full buildout of the Crossing is expected to generate significant traffic volumes; a decision was made to initially focus the traffic study on Phase 1 of the development. **Consequently, this section focuses on the 2023 horizon year future traffic operations with Phase 1 of the development in place.** The Synchro model was updated to reflect changes in traffic volumes and lane configurations associated with the developments for Phase 1 and then re-run to obtain LOS with Phase 1 development.

5.1.1 Foster Thurston Drive / Ashburn Road

The Foster Thurston Drive / Ashburn Road intersection is one of the access points to the proposed development. For Phase 1 of the development it was assumed that this access would be utilized by traffic generated from the north. The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with Phase 1 of the development under existing conditions as well as with recommended options are presented in **Table 18** for the Foster Thurston Drive / Ashburn Road intersection. The analysis output can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 of the development in place, the **Ashburn Road / Foster Thurston** intersection is projected to operate at an overall LOS C or better with an intersection delay of 15 seconds/vehicle or less during the PM and Saturday peak period. All individual movements are projected to operate at acceptable LOS E or better with average delays of 35 seconds/vehicle or less for the PM and Saturday peak period. The lone exception is the northbound movement during the PM peak period, which is projected to operate at an unacceptable LOS F (average delay of 168 seconds/vehicle). The lowest movements in terms of LOS are the northbound and southbound approaches, which currently operate under stop control conditions. All v/c ratios are below 0.57 or lower, indicating that there is sufficient capacity.

It is important to note that operational deficiencies are projected at the northbound movement during the PM peak period by the 2023 horizon year without development as well as at the southbound movement during the PM peak period by the 2033 horizon year without development.

The movements experiencing operational deficiencies (northbound and southbound through movements) have very low volumes and operate under stop control conditions. There are limited options to improve these approaches other than a change in traffic control or restricting turn movements. It is notable that trips generated as a result of Phase 1 of the development are not projected to worsen operating conditions significantly.

It is recommended to add a separate channelized right turn slip lane on the southbound approach. This is recommended because of the increase in southbound (Ashburn Road) right turning traffic volume as a result of vehicles exiting the development towards the north. These right turn movements would not be delayed by the through and left turn movements.

Synchro was updated to reflect the recommended change in lane geometry and rerun using 2023 traffic volumes with development. Results are summarized in **Table 18**. The northbound approach is still projected to operate at LOS F, however, this approach has very low volumes with a v/c ratio well below capacity. It is important to note that delays experienced by the through and left turn movements at the southbound approach and the delays at the northbound approach are not a result of traffic associated with Phase 1 of the development.

Table 18 – LOS Summary for Foster Thurston Dr/Ashburn Rd with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Forster Thurston			Foster Thurston			Ashburn Rd			Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Ashburn Rd @ Foster Thurston	STOP	PM Peak	C 15	shared	B 11 [0.56]	shared	shared	A 7 [0.01]	shared	shared	F 168 [0.50]	shared	shared	C 35 [0.57]	shared
		Sat Peak	A 6	shared	A 8 [0.16]	shared	shared	A 7 [0.00]	shared	shared	B 12 [0.02]	shared	shared	A 10 [0.13]	shared
Projected 2023 Horizon Year with Development Conditions and Recommended Option (separate RT lane)															
Ashburn Rd @ Foster Thurston	STOP	PM Peak	B 13	shared	B 11 [0.56]	shared	shared	A 7 [0.01]	shared	shared	F 168 [0.50]	shared	shared	C 22 [0.41]	shared
		Sat Peak	A 6	shared	A 8 [0.16]	shared	shared	A 7 [0.00]	shared	shared	B 12 [0.02]	shared	shared	A 10 [0.12]	shared

5.1.2 Foster Thurston Drive / NB Route 1 Access Ramps

The AM peak period was analyzed for the Foster Thurston Drive / Route 1 on-ramp and off-ramp because the directional split on Route 1 westbound is significantly higher during this period, therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the AM peak period.

The results of the LOS analysis under projected 2023 traffic volumes with Phase 1 of the development are presented in Table 19 for the Foster Thurston Drive / NB Route 1 Access Ramps. The detailed analysis output can be found in Appendix C.

By 2023 with Phase 1 of the development in place, the **Foster Thurston Drive / Route 1 off-ramp** is projected to operate at LOS D with an average density of 17.6 pc/km/ln during the AM peak period. The **Foster Thurston Drive / Route 1 on-ramp** is projected to operate at LOS D with an average density of 17.7 pc/km/ln during the AM peak period.

No operational deficiencies are projected at the Foster Thurston Drive / Route 1 Access Ramps by 2023 with Phase 1 of the development in place.

Table 19 – LOS Summary for Foster Thurston Dr/Rte 1 Ramps with Development (Ph 1)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Foster Thurston Dr off-ramp (AM Peak)	D 17.6
Rte 1 – Foster Thurston Dr on-ramp (AM Peak)	D 17.7

5.1.3 Ashburn Lake Road / NB Route 1 Access Ramps

The PM peak period was analyzed for the Ashburn Lake Road / Route 1 on-ramp and off-ramp because the directional split on Route 1 eastbound is significantly higher during this period, therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the PM peak period.
The results of the LOS analysis under projected 2023 traffic volumes with Phase 1 of the development are presented in **Table 20** for the Ashburn Lake Road / NB Route 1 Access Ramps. The detailed analysis output can be found in **Appendix C**.

By 2023 with Phase 1 of the development in place, the **Ashburn Lake Road / Route 1 off-ramp** is projected to operate at LOS D with an average density of 19.6 pc/km/ln during the PM peak period. The **Ashburn Lake Road / Route 1 on-ramp** is projected to operate at LOS E with an average density of 22.2 pc/km/ln during the PM peak period.

The Ashburn Lake Road / Route 1 on-ramp will begin to experience some congestion by the 2023 horizon year with Phase 1 of the development in place. This is a result of no direct connection to Foster Thurston Drive.

Table 20 – LOS Summary for Ashburn Lake Rd/Rte 1 Ramps with Development (Ph 1)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Ashburn Lake Rd off-ramp (PM Peak)	D 19.6
Rte 1 – Ashburn Lake Rd on-ramp (PM Peak)	E 22.2

5.1.4 Rothesay Avenue / Retail Drive / Ashburn Lake Road

The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development under existing conditions as well as with recommended options are presented in **Table 21** for the Rothesay Avenue / Retail Drive and Rothesay Avenue / Ashburn Lake Road intersections. The analysis output can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 of the development in place, the **Rothesay Avenue / Retail Drive** intersection is projected to operate at an overall acceptable LOS E or better with an intersection delay of 57 seconds/vehicle or less during the PM and Saturday peak period. The westbound left turn movement is operating at an unacceptable LOS F with an average delay of 203 seconds/vehicle or less during both the PM and Saturday peak period. The v/c ratio at the westbound left turn movement exceeds 1.0 during both the PM and Saturday peak period, indicating that the demand exceeds the capacity. All other movements are projected to operate at LOS D or better with average delays of 54 seconds/vehicle or less and v/c ratios of 0.92 or less. The 95th percentile queues are projected to reach 139 m to 141 m on the westbound left turn movement during the PM and Saturday peak period.

By the 2023 horizon year with Phase 1 of the development in place, the **Rothesay Avenue / Ashburn Lake Road** intersection is projected to operate at an overall LOS D with an intersection delay of 38 seconds/vehicle during the Saturday peak period and at an unacceptable LOS F with an intersection delay of 82 seconds/vehicle during the PM peak period. All individual movements are projected to operate at acceptable LOS E or better with an average delay of 61 seconds/vehicle or less during both the PM and Saturday peak period. The exception is the northbound movement during the PM peak period which is projected to operate at LOS F with an average delay of 124 seconds/vehicle. The v/c ratio at the northbound approach during the PM peak period is projected to exceed the 1.0 threshold indicating that the demand exceeds the capacity. The 95th percentile queue lengths are projected to be 84 m on the eastbound approach and 98 m on the northbound approach during the PM peak period. High projected delays at the northbound approach of Rothesay Avenue / Ashburn Lake Road is a result of the assumption that traffic generated from the south (south of Retail Drive) would access the development using the Ashburn Lake Road ramps.

It is important to note that operational deficiencies are already projected by the 2023 horizon year at the westbound left turn movement of Rothesay Avenue / Retail Drive without the development in place. Additional operational deficiencies as a result of the traffic generated by the development is projected at the northbound movement of the Rothesay Avenue / Ashburn Lake Road intersection during the PM peak period by the 2023 horizon year.

The Rothesay Avenue / Retail Drive and Rothesay Avenue / Ashburn Lake Road off-set intersections cannot function properly because of the short distance between them and the high traffic volumes.

It is recommended to realign the existing Rothesay Avenue / Retail Drive and Rothesay Avenue / Ashburn Lake Road into a 4-leg signalized intersection. Although it was not within the scope of this study to do a detailed design of the potential future realignment at this location, a possible re-alignment lane configuration was completed in Synchro to determine the potential impact. The distribution of traffic by the 2023 horizon year with Phase 1 of the development at the realigned intersection is shown in **Figure 14** for the PM and Saturday peak periods.

The northbound and southbound approaches each have one separate left turn lane, one separate through lane, and one shared through/right turn lane. The right turn lane at the northbound approach is channelized with free flow conditions. The eastbound and westbound approaches each have a separate left turn lane and a shared through/right turn lane. The intersection was assumed to operate under full detection. There are 8 phases, which include a protected left turn phase at each of the approaches. The realigned intersection was modelled in Synchro; results are shown in **Table 21**.

With the realignment by the 2023 horizon year with Phase 1 of the development in place, the **Rothesay Avenue / Retail Drive / Ashburn Lake Road** intersection is projected to operate at an overall LOS C with an intersection delay of 27 seconds/vehicle and 22 seconds/vehicle during the PM and Saturday peak period, respectively. All individual movements are projected to operate at satisfactory LOS D or better with an average delay of 44 seconds/vehicle or less and v/c ratios of 0.89 or less during both peak periods. The 95th percentile queue lengths are projected to be the longest at the northbound approach during the PM peak period, at a length of 97 m.

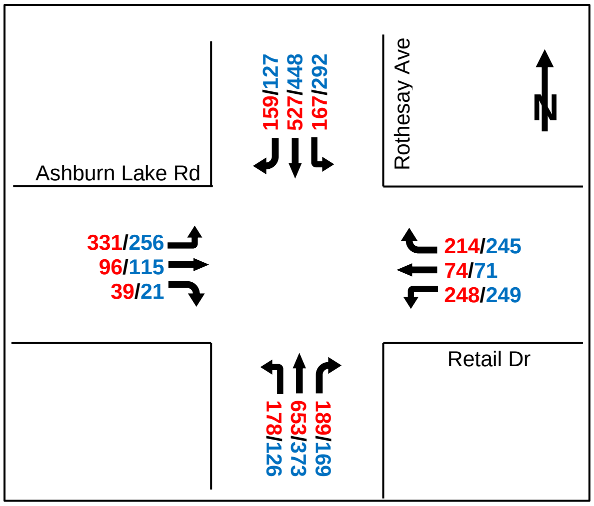

Figure 14 – Projected Volumes for Realigned Rothesay Ave / Retail Dr (2023 w/ Development) – PM/SAT

Table 21 – LOS Summary for Rothesay Ave/Retail Dr with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [95% Queues (m)]											
				Eastbound			Westbound			Northbound			Southbound		
				Ashburn Lake Rd			Retail Dr			Rothesay Ave			Rothesay Ave		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions (Rothesay Ave / Retail Dr)															
Rothesay Ave @ Retail Dr / Ashburn Lake Rd		PM Peak	E 57				F 203 [1.30]		B 19 [0.55]		D 54 [0.56]	shared	shared	B 17 [0.89]	
		Sat Peak	C 35				F 199 [1.29]		A 8 [0.51]		A 6 [0.40]	shared	shared	B 12 [0.92]	
Projected 2023 Horizon Year with Development Conditions (Rothesay Ave / Ashburn Lake Rd)															
Rothesay Ave @ Retail Dr / Ashburn Lake Rd		PM Peak	F 82	C 33 [0.83]		shared				shared	F 124 [1.29]			E 61 [0.67]	shared
		Sat Peak	D 38	C 22 [0.70]		shared				shared	B 16 [0.72]			E 61 [0.58]	shared
Projected 2023 Horizon Year with Development Conditions and Recommendations (Rothesay Ave / Retail Dr / Ashburn Lake Rd realignment)															
Rothesay Ave @ Retail Dr / Ashburn Lake Rd		PM Peak	C 27	D 44 [0.89]	C 24 [0.38]	shared	C 22 [0.58]	C 24 [0.73]	shared	C 20 [0.59]	C 30 [0.82]	shared	C 21 [0.60]	C 24 [0.67]	shared
		Sat Peak	C 22	C 28 [0.73]	C 25 [0.42]	shared	B 19 [0.55]	B 18 [0.70]	shared	B 13 [0.34]	C 22 [0.67]	shared	C 28 [0.78]	C 20 [0.56]	shared

5.1.5 Rothesay Road / Fulton Lane

The Rothesay Road / Fulton Lane intersection is proposed to be slightly offset from an access point to the development on Rothesay Road (just east of Fulton Lane). The intersection was analyzed assuming it is a four-leg intersection. The majority of the traffic using this access to the development would be volumes generated from the proposed truck stop.

The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development under existing conditions as well as with recommended options are presented in **Table**

22 for the Rothesay Road / Fulton Lane / Access intersection. The analysis output can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 of the development in place, the **Rothesay Road / Fulton Lane / Access** intersection is projected to operate at an overall LOS A during the PM and Saturday peak period. During the PM peak period, the eastbound and westbound movements are projected to operate at unacceptable LOS F with average delays of 52 seconds/vehicle and 190 seconds/vehicle, respectively. There are very small volumes associated with the westbound right and left turn movement and the eastbound left turn movement, therefore, the v/c ratios at these approaches are still well below the threshold despite the higher delays. All other movements are projected to operate at LOS B with average delays of 11 seconds/vehicle or less. During the Saturday peak period all movements are projected to operate at LOS C or better with an average delay of 22 seconds/vehicle or less. The v/c ratios are projected to be 0.66 or less during both the PM and Saturday peak period.

Operational deficiencies are projected at the Rothesay Road / Fulton Lane / Access intersection during the PM peak period at the eastbound and westbound approaches by the 2023 horizon year with Phase 1 of the development in place.

It is recommended this proposed development access be aligned with the existing Fulton Lane at Rothesay Avenue. It is also recommended to make this access a right-in/right-out only with the primary access off Ashburn Road. As this access is projected to primarily be utilized by trucks, it is recommended that during the detailed design of this access that the approach be checked to ensure the turning movements can be accommodated by the design vehicle (i.e. the largest truck that would utilize this access).

The Synchro model was updated to reflect the recommended right-in/right-out only access. Results are shown in **Table 22**. By the 2023 horizon year with Phase 1 of the development in place and after making the access to the development right-in/right out only, the **Rothesay Road / Fulton Lane / Access** intersection is projected to operate at an overall LOS A with an intersection delay of 2 seconds/vehicle during both the PM and Saturday peak period. The westbound movement during the PM peak period is still projected to operate at LOS F with an average delay of 98 seconds/vehicle. This movement, however, has a very low volume and a v/c ratio that is well below the threshold; delays are unavoidable under two-way stop controlled conditions. All other movements are projected to operate at LOS C or better with average delays of 21 seconds/vehicle or less. All v/c ratios are 0.36 or less, indicating that there is sufficient capacity.

Table 22 – LOS Summary for Rothesay Rd/Fulton Ln/Access with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Access			Fulton Ln			Rothesay Rd			Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Rothesay Rd @ Fulton Ln / Access	STOP	PM Peak	A 5	shared	F 52 [0.66]	shared	shared	F 190 [0.38]	shared	shared	B 11 [0.18]	shared	shared	B 10 [0.01]	shared
		Sat Peak	A 3	shared	B 14 [0.26]	shared	shared	C 22 [0.02]	shared	shared	A 9 [0.13]	shared	shared	A 8 [0.00]	shared
Projected 2023 Horizon Year with Development Conditions and Recommended Option															
Rothesay Rd @ Fulton Ln / Access	STOP	PM Peak	A 2		C 21 [0.36]	shared	shared	F 98 [0.22]	shared		*free flow*		shared	B 11 [0.01]	shared
		Sat Peak	A 2		B 12 [0.21]	shared	shared	C 19 [0.04]	shared		*free flow*		shared	A 8 [0.00]	shared

5.1.6 Ashburn Road / Jones Drive

The Ashburn Road / Jones Drive intersection is to be utilized in the future as an access to the development to the south of Ashburn Road. It was assumed, however, that this access would not be utilized by development traffic by the 2023 horizon year with Phase 1 of the development in place.

The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development under existing conditions are presented in **Table 23** for the Ashburn Road / Jones Drive intersection. The analysis output can be found in **Appendix C**.

Minimal changes are projected at the **Ashburn Road / Jones Drive** intersection by the 2023 horizon year with Phase 1 of the development in place. All movements are projected to operate at LOS C or better with average delays of 16 seconds/vehicle or less during both the PM and Saturday peak period.

No operational deficiencies are projected at the Ashburn Road / Jones Drive intersection by the 2023 horizon year with Phase 1 of the development in place.
The Ashburn Road / Jones Drive intersection will be an access point to the development after full build out. It is recommended to implement separate left turn lanes at all approaches of this intersection to accommodate future internal traffic demand.

Table 23 – LOS Summary for Ashburn Rd/Jones Dr/Access with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Jones Dr						Ashburn Rd			Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Ashburn Rd @ Jones Dr	STOP	PM Peak	A 0	C 16 [0.01]		shared				shared	A 8 [0.00]			*free flow*	shared
		Sat Peak	A 0	B 10 [0.01]		shared				shared	A 7 [0.00]			*free flow*	shared

5.1.7 Ashburn Road / Drury Cove Road

The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development are presented in **Table 24** for the Ashburn Road / Drury Cove Road intersection. The analysis output can be found in **Appendix C**.

Minimal changes are projected at the **Ashburn Road / Drury Cove Road** intersection by the 2023 horizon year with Phase 1 in place. All movements are projected to operate at LOS C or better with average delays of 20 seconds/vehicle or less during both the PM and Saturday peak periods.

No operational deficiencies are projected at the Ashburn Road / Drury Cove Road intersection by the 2023 horizon year with Phase 1 of the development in place. No recommended changes are needed at the Ashburn Road / Drury Cove Road intersection by the 2023 horizon year with Phase 1 of the development in place.

Table 24 – LOS Summary for Ashburn Rd/Drury Cove Rd with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Ashburn Rd			Westbound Ashburn Rd			Northbound			Southbound Drury Cove Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Drury Cove @ Ashburn Rd	STOP	PM Peak	A 1	A 8 [0.00]	shared			*free flow*					C 20 [0.11]		shared
		Sat Peak	A 0	A 0 [0.00]	shared			*free flow*					B 11 [0.03]		shared

5.1.8 Rothesay Avenue / Rothesay Road

The Rothesay Road / Rothesay Avenue intersection is to be the main access to the proposed development. The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development are presented in **Table 25** for the Rothesay Road / Rothesay Avenue intersection. The analysis output can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 of the development in place the **Rothesay Road / Rothesay Avenue** intersection is projected to operate at an overall LOS F with significant queuing and delays projected at the eastbound and westbound approaches during both the PM and Saturday peak period. All other movements are projected to operate at LOS B or better with average delays of 14 seconds/vehicle or less during both the PM and Saturday peak period.

Significant operational deficiencies are projected at the Rothesay Road / Rothesay Avenue intersection on the eastbound and westbound approaches by the 2023 horizon year with development in place. It is important to note that operational deficiencies are already experienced on the westbound approach under existing conditions.

Two different options were analyzed as potential improvements for the Rothesay Road / Rothesay Avenue intersection. These options included a roundabout (single lane, two multi lane, and full double lane options) as well as a traffic signal and changes in lane geometry. Roundabout configurations for the four different options can be found in the detailed analysis outputs in **Appendix C**.

Roundabout Improvement Option

The option for a roundabout at the **Rothesay Road / Rothesay Avenue** intersection was analyzed using Sidra software. Two options were analyzed including a single lane and a double lane scenario. It is important to note that for the double lane scenario, it was assumed that the second lane at each approach were each 60 metres in length. Results are summarized in **Table 25**. Detailed reports of the analyses can be found in **Appendix C**.

The first option analyzed was a single lane roundabout implemented at the **Rothesay Road / Rothesay Avenue** intersection. By the 2023 horizon year with the development in place and a single lane roundabout, the intersection is projected to operate at an overall LOS F during both the PM and Saturday peak periods. During the PM peak period, the northbound and eastbound movements are projected to operate at LOS with average delays of 141 seconds/vehicle or greater. The westbound and southbound movements are projected to operate at LOS D with an average delay of 47 seconds/vehicle or less. During the Saturday peak period all individual movements are projected to operate at LOS F with average delays of 128 seconds/vehicle or less. All v/c ratios exceed the threshold of 1.0 during both peak periods, indicating that the demand exceeds the capacity.

The second option analyzed was a multi lane roundabout implemented at the **Rothesay Road / Rothesay Avenue** intersection that included two lanes at the northbound and southbound (Rothesay Road) approaches, and single lanes with separate right turn by-pass lanes at the eastbound and westbound (Rothesay Avenue) approaches. By the 2023 horizon year with development in place and a multi lane roundabout, the intersection is projected to operate at an overall LOS C or better with an intersection delay of 28 seconds/vehicle or less during the PM and Saturday peak period. During the PM peak period the northbound movements are projected to operate the lowest in terms of LOS at LOS E or better with average delays of 67 seconds/vehicle or less. The v/c ratio on the northbound left turn movement is projected to be 1.02, indicating the demand exceeds capacity. All other movements are operating at LOS C or better with an average delay of 21 seconds/vehicle or less and a v/c ratio of 0.74 or lower. During the Saturday peak period all individual movements are projected to operate at LOS D or better with average delays of 38 seconds/vehicle or less.

The third option analyzed was a multi lane roundabout described above with the addition of a right turn by-pass lane at the northbound approach. The addition of the northbound right turn by-pass lane is projected to improve conditions at the northbound approach of the **Rothesay Road / Rothesay Avenue** intersection. During the PM peak period the northbound through and left turn lanes are projected to operate at LOS D with average delays of 48 seconds/vehicle or less and v/c ratios of 0.94 or better, indicating that there is sufficient capacity. The right turn slip lane is projected to operate at LOS B with an average delay of 12 seconds/vehicle. During the Saturday peak period the northbound through and left turn lanes are projected to operate at LOS C or better with an average delay of 25 seconds/vehicle or less and v/c ratios of 0.60 or lower. The right turn slip lane is projected to operate at LOS B with an average delay of 13 seconds/vehicle.

The final option analyzed was a full double lane roundabout. By the 2023 horizon year with development in place and a double lane roundabout implemented at the **Rothesay Road / Rothesay Avenue** intersection, the intersection is projected to operate at an overall LOS C or better with an intersection delay of 23 seconds/vehicle or less during both the PM and Saturday peak period. All individual movements are projected to operate at LOS D or better with average delays of 40 seconds/vehicle or less during both peak periods. The v/c ratios for each movement are projected to be below the threshold, indicating that there is sufficient capacity. The 95th percentile queue lengths are all projected to be below 116 metres with the longest queues projected on the northbound approach during the PM peak period.

No operational deficiencies are projected for the multi or double lane roundabout at the Rothesay Road / Rothesay Avenue intersection by the 2023 horizon year with Phase 1 of the development in place.

5.1.8.1 *Traffic Signal Improvement Option*

The second improvement option involves implementing traffic signals at the Rothesay Road / Rothesay Avenue intersection. Rothesay Avenue was assumed to be a 3-lane cross section with two lanes eastbound and one lane westbound. The lane geometry used in the analysis included a separate left turn pocket and a shared through and channelized right turn lane with yield conditions on the northbound approach; a separate left turn pocket, a through lane, and a separate channelized right turn pocket (extending back as far as the bridge structure) with free flow conditions on the westbound (Rothesay Avenue) approach; a separate left turn pocket and a shared through/channelized right turn lane with free flow conditions on the southbound approach and; a separate left turn lane, a through lane, and a separate channelized right turn lane with yield control on the eastbound (development access) approach.

The signal at the Rothesay Road / Rothesay Avenue intersection was analyzed assuming full detection. If the traffic signal option is implemented it is recommended to coordinate all three recommended traffic signals along Rothesay Avenue and Rothesay Road (for the Rothesay Road / Ashburn Road, Rothesay Road / Rothesay Avenue, and Rothesay Avenue / Route 1 off-ramp intersections). The analysis was performed assuming this coordination existed amongst the three intersections. The Synchro model was updated to reflect these changes. Results are summarized in **Table 25**. Detailed reports of the analyses can be found in **Appendix C**.

By the 2023 horizon year with the development in place and coordinated traffic signals implemented at the three intersections on Rothesay Road and Rothesay Avenue, the **Rothesay Road / Rothesay Avenue** intersection is projected to operate at an overall LOS D or better with an intersection delay of 42 seconds/vehicle or less during the PM and Saturday peak period. The eastbound and northbound through movements are projected to operate the lowest in terms of LOS, at LOS E or better with an average delay of 72 seconds/vehicle or less during both the PM and Saturday peak period. All other movements and the southbound and westbound left turn movements are projected to operate at LOS E with an average delay of 80 seconds/vehicle or less. The v/c ratio at the northbound through and southbound left turn movement are either at capacity.

No operational deficiencies are projected by 2023 with Phase 1 of the development at the Rothesay Road / Rothesay Avenue intersection with actuated-coordinated signals and recommended geometry. The southbound left turn and northbound through movements have reached capacity.

Given the relatively high cost for the required roundabout solution, and the potential for overbuilt infrastructure if construction of the Ashburn underpass were to proceed, as well as from the operational findings for both options, **it is recommended that traffic signals be the preferred solution at the Rothesay Ave / Rothesay Rd intersection** to accommodate Phase 1 of the development.

Table 25 – LOS Summary for Rothesay Rd/Rothesay Ave with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Rothesay Ave			Westbound Rothesay Ave			Northbound Rothesay Rd			Southbound Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year Conditions with Existing Configuration															
Rothesay Rd @ Rothesay Ave	STOP	PM Peak	F	shared	F >300 [>2.00]	shared	shared	F >300 [>2.00]	shared	A 9 [0.27]	*free flow*	shared	shared	B 14 [0.61]	shared
		Sat Peak	F	shared	F >300 [>2.00]	shared	shared	F >300 [>2.00]	shared	A 8 [0.22]	*free flow*	shared	shared	A 9 [0.32]	shared
Projected 2023 Horizon Year with Development Conditions with Recommendation (single lane roundabout) (option 1)															
Rothesay Rd @ Rothesay Ave		PM Peak	F	shared	F 141 [1.22]	shared	shared	D 42 [1.01]	shared	shared	F >300 [>2.00]	shared	shared	D 47 [1.02]	shared
		Sat Peak	F	shared	F 123 [1.21]	shared	shared	F 113 [1.20]	shared	shared	F 109 [1.15]	shared	shared	F 128 [1.20]	shared
Projected 2023 Horizon Year with Development Conditions with Recommendation (multi lane roundabout) (option 2)															
Rothesay Rd @ Rothesay Ave		PM Peak	C 28	A 10 [0.46]	shared	A 5 [0.18]	B 10 [0.35]	shared	B 10 [0.71]	E 67 [1.02]	shared	D 45 [0.93]	C 21 [0.74]	shared	B 12 [0.43]
		Sat Peak	B 19	B 16 [0.79]	shared	A 6 [0.16]	B 12 [0.74]	shared	A 5 [0.28]	C 25 [0.60]	shared	B 20 [0.54]	D 38 [0.83]	shared	C 21 [0.42]
Projected 2023 Horizon Year with Development Conditions with Recommendation (multi lane roundabout) (option 3)															
Rothesay Rd @ Rothesay Ave		PM Peak	C 22	A 10 [0.46]	shared	A 5 [0.18]	B 10 [0.35]	shared	B 10 [0.71]	D 48 [0.94]	D 35 [0.85]	B 12 [0.15]	C 21 [0.75]	shared	B 13 [0.43]
		Sat Peak	B 18	B 16 [0.79]	shared	A 6 [0.16]	B 12 [0.73]	shared	A 5 [0.28]	C 25 [0.60]	B 18 [0.39]	B 13 [0.18]	D 37 [0.83]	shared	C 21 [0.42]
Projected 2023 Horizon Year with Development Conditions with Recommendation (double lane roundabout) (option 4)															
Rothesay Rd @ Rothesay Ave		PM Peak	C 23	A 9 [0.42]	shared	A 8 [0.31]	B 14 [0.48]	shared	B 15 [0.84]	D 40 [0.92]	shared	D 35 [0.91]	C 21 [0.79]	shared	B 12 [0.40]
		Sat Peak	B 16	B 12 [0.71]	shared	B 11 [0.36]	B 11 [0.68]	shared	A 7 [0.43]	C 21 [0.55]	shared	B 15 [0.47]	C 32 [0.79]	shared	B 18 [0.40]
Projected 2023 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Rd @ Rothesay Ave		PM Peak	D 42	C 27 [0.01]	E 80 [0.93]	A 10 [0.43]	E 28 [0.65]	D 42 [0.27]	A 1 [0.33]	B 11 [0.53]	E 72 [1.03]	shared	E 62 [1.00]	B 14 [0.27]	shared
		Sat Peak	C 30	C 22 [0.02]	D 51 [0.89]	A 7 [0.26]	D 48 [0.91]	B 11 [0.43]	A 0 [0.19]	C 21 [0.57]	C 34 [0.58]	shared	D 42 [0.90]	C 28 [0.26]	shared

5.1.9 Rothesay Road / Ashburn Road

The Rothesay Road / Ashburn Road intersection is a secondary access off Rothesay Road to the proposed development. The LOS for the projected 2023 horizon year volumes for PM and Saturday peak hours with development are presented in **Table 26** for the Rothesay Road / Ashburn Road intersection. The analysis output can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 in place, the **Rothesay Road / Ashburn Road** intersection is projected to operate at an overall LOS C with an intersection delay of 17 seconds/vehicle during the PM peak period and at an overall LOS A with an intersection delay of 5 seconds/vehicle during the Saturday peak period. During the PM peak period, the eastbound left turn movement is projected to operate at an unacceptable LOS F with an average delay of 51 seconds/vehicle, the v/c ratio, however, is below the 1.0 threshold indicating that there is sufficient capacity. The westbound movement is projected to operate at LOS E with an average delay of 38 seconds/vehicle. It is important to note that this movement is associated with extremely low volumes and the v/c ratio is 0.03, indicating there is sufficient capacity. During the Saturday peak period all individual movements are operating at LOS C or better with average delays of 19 seconds/vehicle or less.

Operational deficiencies are projected at the eastbound approach of the Rothesay Road / Ashburn Road intersection on the eastbound approach during the PM peak period by the 2023 horizon year with Phase 1 of the development in place.

It is recommended to implement traffic signals at the Rothesay Road / Ashburn Road intersection. The traffic signals should be fully actuated and coordinated with the Rothesay Road / Rothesay Avenue intersection traffic signals. A separate left turn lane is recommended for the northbound approach.

The Synchro model was updated with the actuated-coordinated traffic signal and recommended changes to lane geometry at the Rothesay Road / Ashburn Road intersection. Note that the traffic volumes were also updated to reflect the right-in/right-only recommendation at the Rothesay Road / Fulton Lane development access; it was assumed that left turning vehicles to and from the truck stop would utilize the Rothesay Road / Ashburn Road intersection.

By the 2023 horizon year with Phase 1 of the development in place and an actuated-coordinated traffic signal and northbound left turn lane implemented, the **Rothesay Road / Ashburn Road** intersection is projected to operate at an overall LOS A with an intersection delay of 9 seconds/vehicle or less during both the PM and Saturday peak period. All individual movements are projected to operate at LOS D or better with an average delay of 38 seconds/vehicle or less during both the PM and Saturday peak period. All v/c ratios are projected to be 0.78 or less, indicating that there is sufficient capacity.

No operational deficiencies are projected at the Rothesay Road / Ashburn Road intersection with actuated-coordinated traffic signal and an added left turn lane at the northbound approach by the 2023 horizon year with Phase 1 of the development in place.

Table 26 – LOS Summary for Rothesay Rd/Ashburn Rd with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Ashburn Rd			Westbound Parking Lot			Northbound Rothesay Rd			Southbound Rothesay Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Rothesay Rd @ Ashburn Rd	STOP	PM Peak	C 17	F 51 [0.70]	D 25 [0.82]	shared	shared	E 38 [0.03]	shared	shared	A 8 [0.14]	shared	shared	A 0 [0.0]	shared
		Sat Peak	A 5	C 19 [0.27]	B 10 [0.17]	shared	shared	A 0 [0.00]	shared	shared	A 8 [0.10]	shared	shared	A 0 [0.00]	shared
Projected 2023 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Rd @ Ashburn Rd		PM Peak	A 9	D 36 [0.54]	A 9 [0.78]	shared	shared	A 0 [0.01]	shared	A 4 [0.52]	A 3 [0.48]	shared	shared	C 22 [0.29]	shared
		Sat Peak	A 7	C 22 [0.42]	A 0 [0.16]	shared	shared	A 0 [0.00]	shared	A 3 [0.30]	A 2 [0.14]	shared	shared	B 12 [0.34]	shared

5.1.10 Rothesay Avenue / NB Route 1 Interchange

The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development are presented in **Table 27** for the Rothesay Avenue / Route 1 off-ramp intersection, and **Table 28** for the Rothesay Avenue / Route 1 on-ramp intersections (west and east). The analysis outputs can be found in **Appendix C**.

Rothesay Avenue / Route 1 off-ramp Intersection

By the 2023 horizon year with Phase 1 of the development in place, the **Rothesay Avenue / Route 1 off-ramp** intersection is projected to operate at an overall LOS F during the PM and Saturday peak period. The eastbound and westbound approaches are projected to operate at LOS F during both the PM and Saturday peak period. The highest delays are projected during the Saturday peak period, with delays exceeding 300 seconds/vehicle. The eastbound and westbound approaches are projected to experience significant delays and v/c ratios are either approaching or exceeding the threshold, indicating that there is not enough capacity for the demand. Significant queueing is projected at these approaches.

Significant operational deficiencies are projected by the 2023 horizon year with Phase 1 of the development in place at the eastbound and westbound approaches of the Rothesay Avenue / Route 1 off-ramp intersection during the PM and Saturday peak period. It is notable that operational deficiencies are projected at this intersection by the 2023 horizon year without the development in place, however, delays and queueing are expected to get worse with the addition of traffic to the development from both the south as well as from Route 1 westbound traffic.

It is recommended to implement traffic signals at the Rothesay Avenue / Route 1 off-ramp intersection as well as a through pocket on the eastbound approach. The signals should be fully actuated and coordinated with traffic signals at the Rothesay Road / Rothesay Avenue intersection.

The Synchro model was updated to reflect an actuated-coordinated traffic signal and change in geometry at the Rothesay Avenue / Route 1 off-ramp intersection. Results are shown in **Table 27**.

By the 2023 horizon year with Phase 1 of the development in place as well as actuated-coordinated traffic signals and recommended change in geometry, the **Rothesay Avenue / Route 1 off-ramp** intersection is projected to operate at an overall LOS A (intersection delay of 8 seconds/vehicle) and LOS C (intersection delay of 23 seconds/vehicle) during the PM and Saturday peak period, respectively. All individual movements are projected to operate at satisfactory LOS D or better with an average delay of 40 seconds/vehicle or less during both peak periods. All v/c ratios are projected to be 0.92 or less. The 95th percentile queue length at the southbound approach is not projected to exceed 170 m, which is well below the length of the off-ramp.

No operational deficiencies are projected at the Rothesay Avenue / Route 1 off-ramp intersection by the 2023 horizon year with Phase 1 of the development in place after an actuated-coordinated traffic signal and eastbound through pocket are implemented along with required infrastructure changes upstream at the Rothesay Road / Rothesay Avenue / Access intersection.

Table 27 – LOS Summary for Rothesay Ave/Rte1 off-ramp with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Rothesay Ave			Rothesay Ave						Rte 1 off-ramp		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave	STOP	PM Peak	F		F 193 [1.37]	shared		E 57 [0.98]						*free flow*	
		Sat Peak	F		F >300 [>2.00]	shared		F >300 [>2.00]						*free flow*	
Projected 2023 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave		PM Peak	A 8		A 9 [0.40]	A 0 [0.33]		A 10 [0.58]						C 22 [0.63]	A 5 [0.26]
		Sat Peak	C 23		B 14 [0.43]	A 1 [0.43]		C 34 [0.84]						D 41 [0.93]	A 8 [0.30]

Rothesay Avenue / Route 1 on-ramp Intersections

By the 2023 horizon year with Phase 1 of the development in place, both the **Rothesay Avenue / Route 1 on-ramp** intersections (east and west) are projected to operate at an overall satisfactory LOS D or better with an intersection delay of 33 seconds/vehicle or less. The eastbound movements are projected to operate at LOS F during both peak periods for the intersection furthest west and during the Saturday peak period for the intersection furthest east. The 95th percentile queue lengths indicate that vehicles at the intersection furthest east may spill back to the intersection furthest to the west, as the projected lengths exceed the short distance between the two intersections.

Operational deficiencies are projected by the 2023 with Phase 1 of the development in place at the Rothesay Avenue / Route 1 on-ramp intersection (west) at the eastbound approach during the PM and Saturday peak periods and at the Rothesay Avenue / Route 1 on-ramp intersection (east) at the eastbound approach during the Saturday peak period.

There are limited options with respect to changes to infrastructure geometry to improve traffic conditions at the Rothesay Avenue / Route 1 on-ramp intersections because of the overpass structure just west of this location.

Table 28 – LOS Summary for Rothesay Ave/Rte 1 on-ramp intersections with Development (Ph 1)

Intersection: North South Street @ East West Street	Traffic Control	Time Period	Overall LOS & Delay (sec/veh)	Eastbound Rothesay Ave L	Eastbound Rothesay Ave T	Eastbound Rothesay Ave R	Westbound L	Westbound T	Westbound R	Northbound Rothesay Ave L	Northbound Rothesay Ave T	Northbound Rothesay Ave R	Southbound L	Southbound T	Southbound R
Projected 2023 Horizon Year with Development Conditions (furthest west)															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	PM Peak	D 33		F 82 [1.02]						*free flow*				
		Sat Peak	C 25		F 74 [0.97]						*free flow*				
Projected 2023 Horizon Year with Development Conditions (furthest east)															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	PM Peak	C 19	E 56 [0.87]							*free flow*				
		Sat Peak	C 21	F 66 [0.94]							*free flow*				

Turning Movements LOS: Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]

5.1.11 NB Route 1 Access with Rothesay Road / Rothesay Avenue

The AM peak period was analyzed for the Rothesay Road / Route 1 on-ramp because the directional split on Route 1 westbound is significantly higher during the AM period. The PM peak period was analyzed for the Rothesay Road / Route 1 off-ramp because the directional split on Route 1 eastbound is significantly higher during the PM peak period. Therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the AM peak period for the on-ramp and during the PM peak period for the off-ramp.

The LOS results for the Rothesay Road / Route 1 Access ramps during the critical peak period are summarized in **Table 29**. The results for the Rothesay Avenue / Route 1 Access ramps during the critical peak period are summarized in **Table 30**. Detailed results can be found in **Appendix C**.

By the 2023 horizon year with Phase 1 of the development in place the **Rothesay Road / Route 1 on-ramp** is projected to operate at LOS C with an average density of 13.9 pc/km/ln during the PM peak period. The **Rothesay Road / Route 1 off-ramp** is projected to operate at LOS D with an average density of 19.6 pc/km/ln during the Saturday peak period.

No operational deficiencies are projected at the Rothesay Road / Route 1 Access Ramps by the 2023 horizon year with Phase 1 of the development in place.

Table 29 – LOS Analysis for Rothesay Rd/Rte 1 Access Ramps

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Rothesay Rd off-ramp (PM Peak)	C 13.9
Rte 1 – Rothesay Rd on-ramp (AM Peak)	D 19.6

By the 2023 horizon year with Phase 1 of the development in place the **Rothesay Avenue / Route 1 on-ramp** is projected to operate at LOS C with an average density of 15.8 pc/km/ln during the PM peak period. The **Rothesay Avenue / Route 1 off-ramp** is projected to operate at LOS D with an average density of 21.3 pc/km/ln during the Saturday peak period.

No operational deficiencies are projected at the Rothesay Avenue / Route 1 Access Ramps by the 2023 horizon year with Phase 1 of the development in place.

Table 30 – LOS Summary for Rothesay Ave/Rte 1 Access Ramps (Ph 1)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Rothesay Ave off-ramp (AM Peak)	C 15.8
Rte 1 – Rothesay Ave on-ramp (PM Peak)	D 21.3

5.1.12 Ashburn Road Site Access Intersections (1-5)

There are 9 proposed access locations to the development located on Ashburn Road (in addition to the Ashburn Road / Jones Drive access). For the 2023 horizon year with Phase 1 of the development in place, it was assumed that the first 5 access points beginning closest to Rothesay Road / Ashburn Road would be in operation. The LOS for the projected 2023 horizon year traffic volumes for PM and Saturday peak hours with development are presented in **Table 31** for the 5 accesses on Ashburn Road. Note that the accesses have been analyzed assuming the recommended geometry described below. The analysis output can be found in **Appendix C**.

It is recommended to implement separate left turn lanes at all access points on all approaches to accommodate future traffic demand at the development. It is also recommended to implement a traffic signal at the main Ashburn Road access to the development (access 5 in this analysis). The traffic signals should have full detection on all approaches.

By 2023 with Phase 1 of the development in place, the first access off of Rothesay Road on Ashburn Road (primarily access to the truck stop, assuming Rothesay Road / Fulton Lane access is right-in/right-out only) is projected to operate at an overall LOS A with an intersection delay of 4 seconds/vehicle or less during both the PM and Saturday peak period. All individual movements are projected to operate at LOS A with average delays of 9 seconds/vehicle or less and v/c ratios of 0.10 or less during both the PM and Saturday peak period.

By 2023 with Phase 1 of the development in place, the second access along Ashburn Road (just south of Drury Cove Road, primarily access to Kenworth Dealership) is projected to operate at an overall LOS A with an intersection delay of 1 second/vehicle during both the PM and Saturday peak period. During the PM peak period, the eastbound left turn movement is projected to operate at LOS C (average delay of 21 seconds/vehicle). During the Saturday peak period the eastbound left turn movement is projected to operate at LOS B (average delay of 12 seconds/vehicle). All other movements during both the PM and Saturday peak period are projected to operate at LOS A with an average delay of 9 seconds/vehicle or less.

By 2023 with Phase 1 of the development in place, the third access along Ashburn Road (primarily access to a restaurant) is projected to operate at LOS A during both the PM and Saturday peak period. The westbound left turn and right turn movements are projected to operate at LOS C with an average delay of 22 seconds/vehicle or less during the PM peak period and at LOS B with an average delay of 13 seconds/vehicle or less. The southbound left turn movement is projected to operate at LOS A with an average delay of 10 seconds/vehicle or less during both peak periods.

By 2023 with Phase 1 of the development in place, the fourth access along Ashburn Road (primarily access to the UHaul Storage Facility) is projected to operate at an overall LOS A with minimal intersection delay during both the PM and Saturday peak period. During the PM peak period, the eastbound left turn movement is projected to operate at LOS C (average delay of 21 seconds/vehicle). During the Saturday peak period the eastbound left turn movement is projected to operate at LOS B (average delay of 13 seconds/vehicle). All other movements during both the PM and Saturday peak period are projected to operate at LOS A with an average delay of 10 seconds/vehicle or less.

The main Ashburn Road access from Rothesay Avenue is projected to operate at an overall LOS A with an intersection delay of 7 seconds/vehicle or less during the PM and Saturday peak period by 2023 with Phase 1 of the development in place. All individual movements are projected to operate at LOS B with an average delay of 18 seconds/vehicle or less during both peak periods. The exception is the westbound left turn movement during the PM peak period, which is projected to operate at LOS C with an average delay of 32 seconds/vehicle. The v/c ratios for each of the individual movements is 0.48 or less.

No operational deficiencies are projected at the Ashburn Road access intersections under recommended geometry and traffic control conditions by 2023 with Phase 1 of the development in place.

Table 31 – LOS Summary for Ashburn Road Access Points with Development (Ph 1)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Access			Access			Ashburn Rd			Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions Access 1 (truck stop)															
Ashburn Rd @ Access 1	STOP	PM Peak	A 4		*free flow*		A 8 [0.10]	*free flow*		A 0 [0.00]		A 9 [0.01]			
		Sat Peak	A 3		*free flow*		A 8 [0.10]	*free flow*		A 0 [0.00]		A 9 [0.01]			
Projected 2023 Horizon Year with Development Conditions Access 2 (south of Drury Cove Rd)															
Ashburn Rd @ Access 2	STOP	PM Peak	A 1	C 21 [0.01]		A 9 [0.04]				A 8 [0.02]	*free flow*			*free flow*	
		Sat Peak	A 1	B 12 [0.00]		A 9 [0.02]				A 8 [0.03]	*free flow*			*free flow*	
Projected 2023 Horizon Year with Development Conditions Access 3															
Ashburn Rd @ Access 3	STOP	PM Peak	A 0				C 22 [0.08]		C 16 [0.01]		*free flow*		A 10 [0.00]	*free flow*	
		Sat Peak	A 1				B 13 [0.07]		B 10 [0.01]		*free flow*		A 8 [0.00]	*free flow*	
Projected 2023 Horizon Year with Development Conditions Access 4															
Ashburn Rd @ Access 4	STOP	PM Peak	A 0	C 21 [0.01]		A 10 [0.00]				A 8 [0.00]	*free flow*			*free flow*	
		Sat Peak	A 0	B 13 [0.00]		A 9 [0.01]				A 8 [0.00]	*free flow*			*free flow*	
Projected 2023 Horizon Year with Development Conditions Access 5 (main Rothesay Avenue access)															
Ashburn Rd @ Access 5 (main)		PM Peak	A 7	B 17 [0.01]	B 18 [0.05]	shared	C 32 [0.23]	B 11 [0.48]	shared	A 2 [0.00]	A 6 [0.58]	shared	A 5 [0.25]	A 3 [0.10]	shared
		Sat Peak	A 6	A 10 [0.01]	B 11 [0.06]	shared	B 11 [0.07]	A 6 [0.42]	shared	A 5 [0.00]	A 5 [0.21]	shared	A 6 [0.17]	A 5 [0.08]	shared

6 Impact of Ashburn Underpass

Following the analysis for Phase 1, it was determined that additional traffic generated by Phase 2 and 3 of the development could not be adequately accommodated without major modifications to the existing road network such as:

1. Major upgrades to the Route 100 interchange area to increase capacity; *or*
2. Construction of a new underpass near Ashburn Lake Road and Foster Thurston Road.

The NB Department of Transportation & Infrastructure has been assessing the long-term need for a new underpass connection in the vicinity of the Ashburn Lake Road and Foster Thurston Drive ramps. If/when a new underpass is built, a significant amount of existing traffic is expected to divert away from the Route 100 Interchange, thus alleviating some of the existing operational issues at this location. While a significant portion of newly generated traffic from the development would also use the new Ashburn Lake Road underpass, its construction has merit regardless of whether the development proceeds.

6.1 Redistribution of Existing Traffic

Once the new underpass structure is built, there will be an immediate redistribution of traffic. For the purposes of this study, it was assumed the following redistribution will occur:

1. 30% of existing WB off-ramp traffic at Route 100 interchange will divert to the WB off ramp at the Ashburn underpass;
2. 80% of the existing left turn movement from Foster Thurston onto Ashburn Road will divert to the new EB on-ramp at Ashburn underpass;
3. Existing traffic from Rothesay Road to Rothesay Avenue (towards Route 1 EB and Rothesay Avenue south) will also decrease by 80% (as a consequence of traffic being redistributed in *Assumption #2*);
4. 30% of existing through traffic from Rothesay Road (east) to Rothesay Avenue will divert to the new Ashburn underpass, 50% of existing traffic from Rothesay Road (from Ashburn Road) to Rothesay Avenue will also divert to the new Ashburn underpass from Foster Thurston Drive / Ashburn Road.
5. Existing traffic from Rothesay Avenue to Route 1 WB will decrease by 75%
6. Traffic from Ashburn Lake Road to Route 1 WB will increase by the inverse of the current AM/PM peak hour volumes at the EB off-ramp at Ashburn Lake Road and by the estimated westbound traffic onto Ashburn Lake Road for the Saturday peak hour.

The net redistribution of existing traffic based on the above assumptions is depicted graphically in **Figure 15** and applied to the intersections within the Study Area. The anticipated redistribution of existing traffic on the entire road network within the Study Area is shown in **Figure 16** and **Figure 17**.

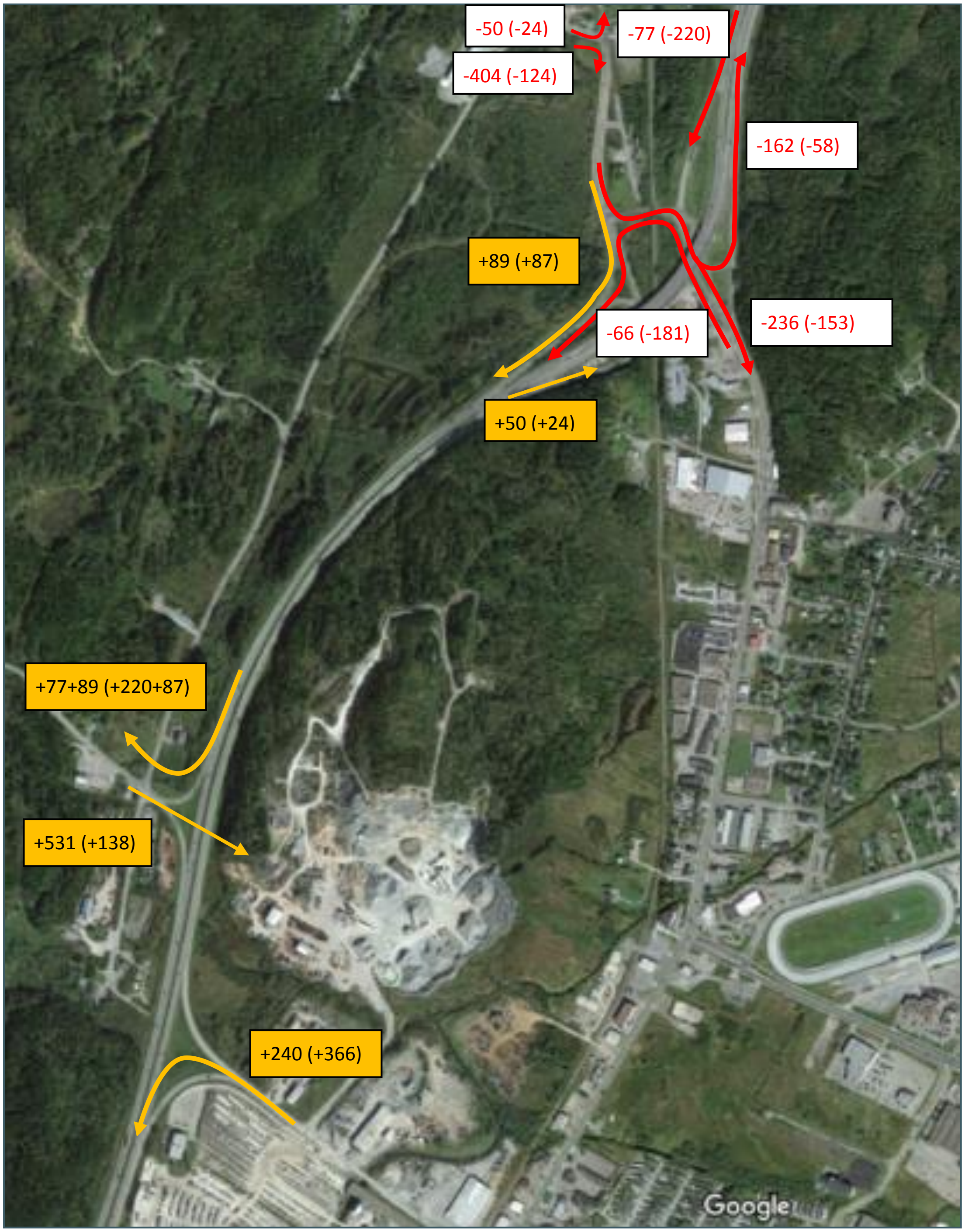

Figure 15 – Anticipated Traffic Redistribution attributed to new Ashburn Underpass

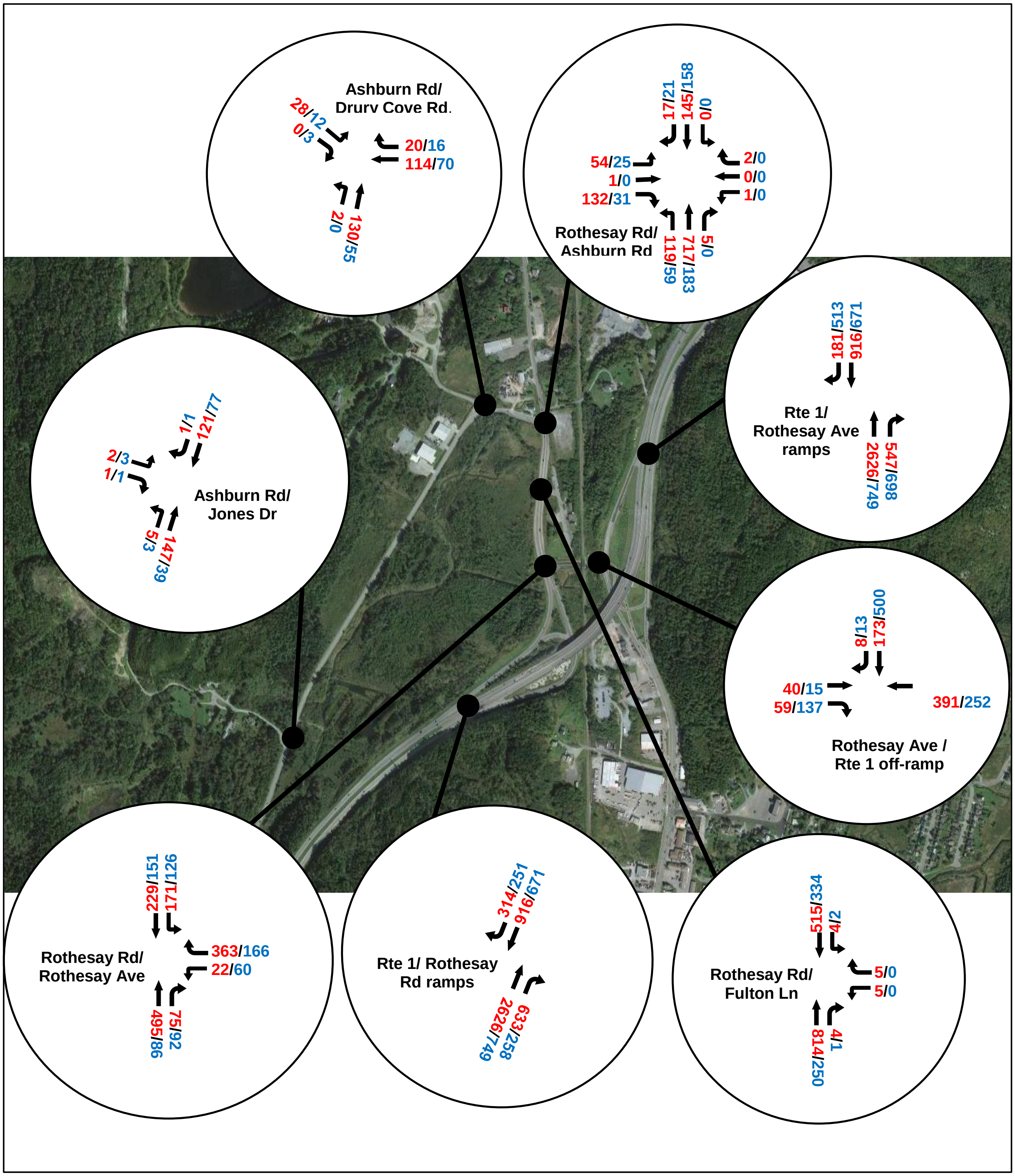

Figure 16 – Redistributed Existing (2016) Traffic with Ashburn Underpass (1 of 2) – PM/SAT

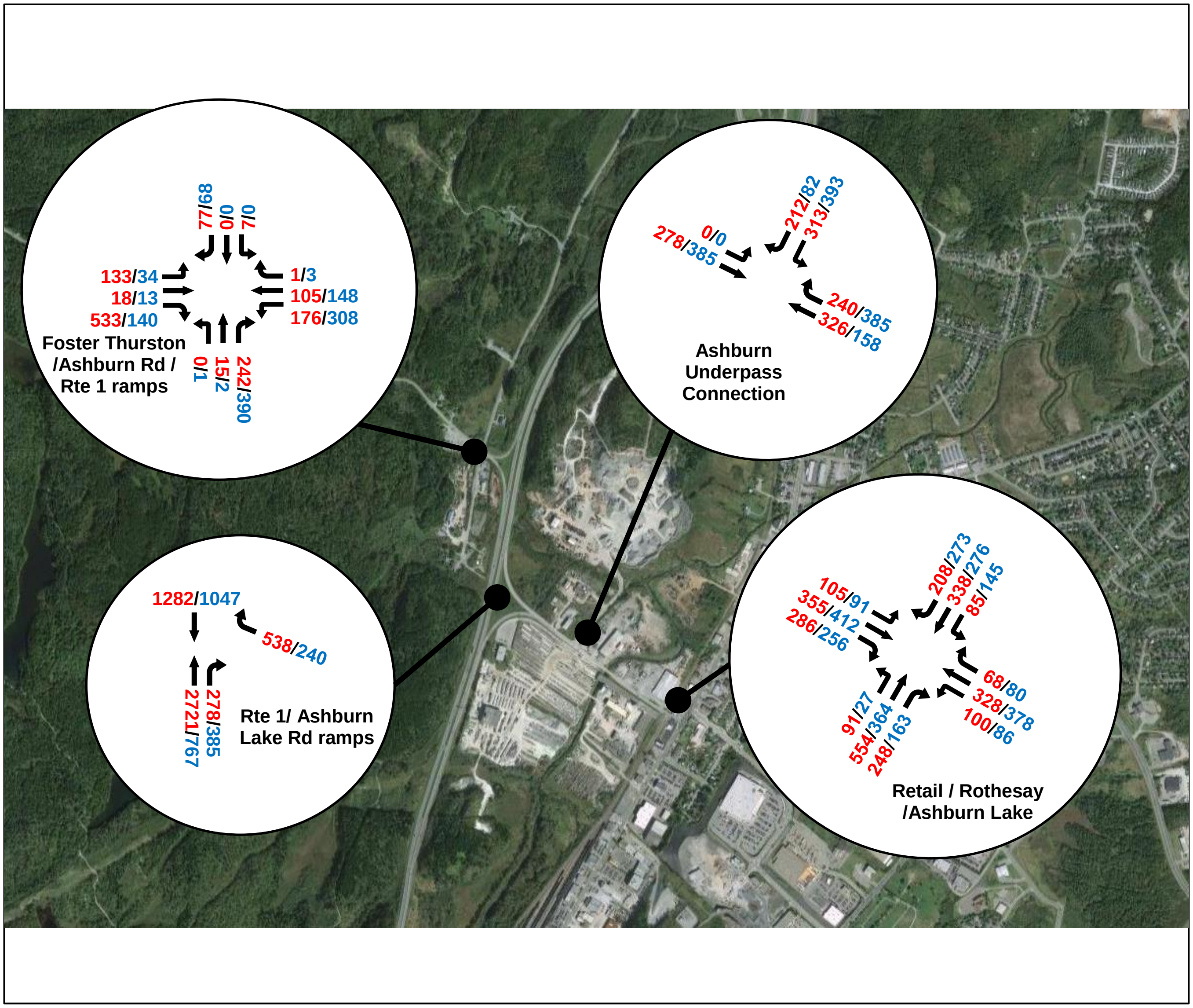

Figure 17 – Redistributed Existing (2016) Traffic with Ashburn Underpass (2 of 2) – PM/SAT

6.2 Revised Trip Assignment

The generated traffic was re-assigned to the Study Area assuming the Ashburn underpass is in place. Trips were assigned to the access points based on origin of the generated traffic as well as anticipated signing for the development as it is expected that Route 1 traffic will be encouraged to use the Ashburn underpass. The assumptions utilized for assigning the generated traffic to the development access points are as follows:

- Traffic from East (Rothesay Road) – 100% use Rothesay Road / Ashburn Road access;
- Traffic from East (Route 1) – 20% use Foster Thurston / Ashburn Road access, 65% use Rothesay Road / Rothesay Avenue access, and 15% use Rothesay Road / Ashburn Road access;
- Traffic from West (Route 1) – 30% use Foster Thurston / Ashburn Road access (Ashburn underpass), 60% use Rothesay Road / Rothesay Avenue access, and 10% use Rothesay Road / Ashburn Road access;
- Traffic from South – 50% use Rothesay Avenue / Rothesay Road access from Rothesay Avenue, 10% use Rothesay Road / Rothesay Avenue access from Ashburn Lake Road on-ramps to Route 1, and 40% use Foster Thurston / Ashburn Road access from Ashburn underpass, and;
- Traffic from North – 100% use Foster Thurston / Ashburn Road access.

Figure 18, **Figure 19**, and **Figure 20** shows the traffic assignment for Phase 1, 2, and 3 (2033 Full Build Out Horizon Year).

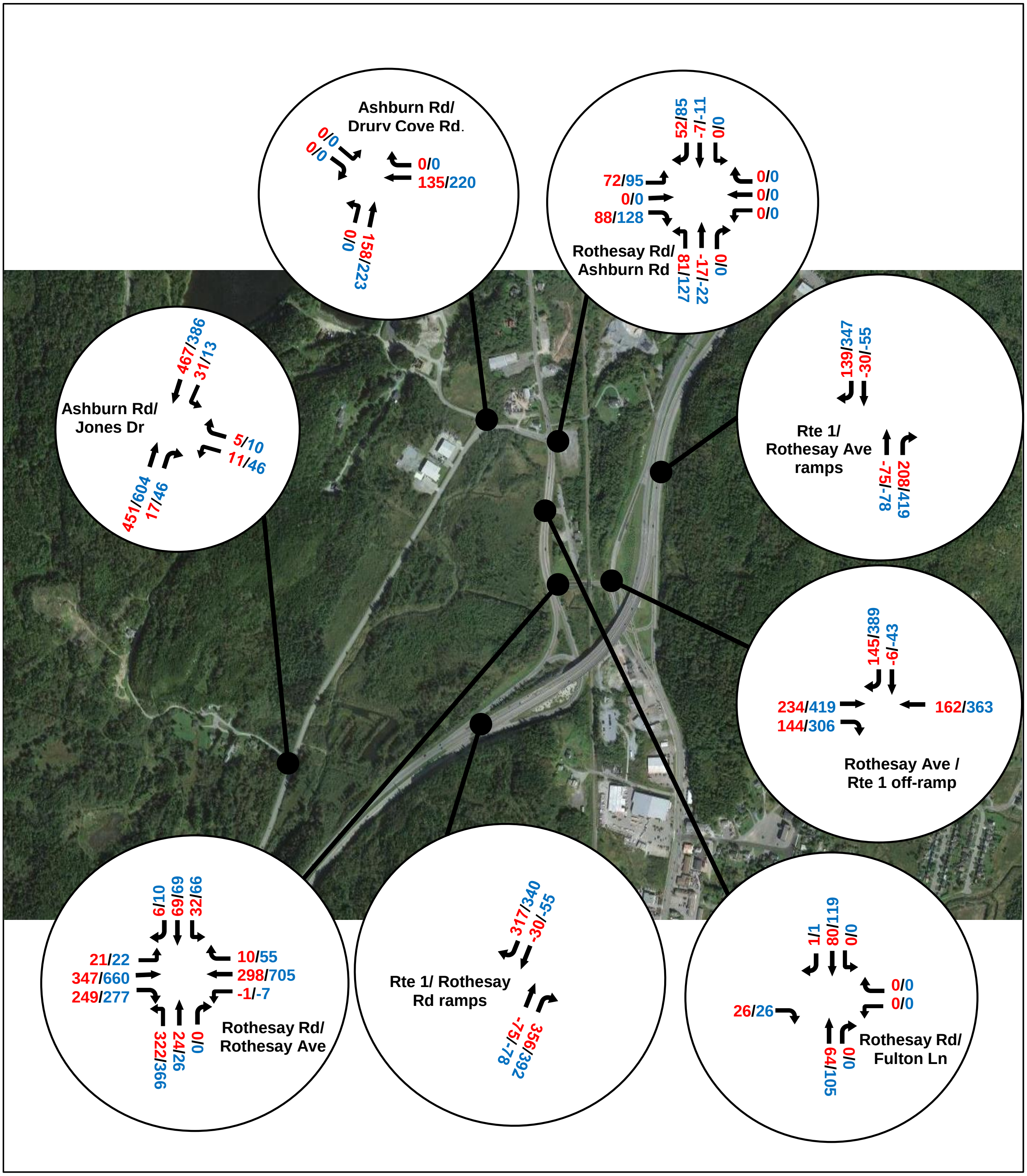

Figure 18 – Revised Trip Assignment Full Build Out with Ashburn Underpass (1 of 3) – PM/SAT

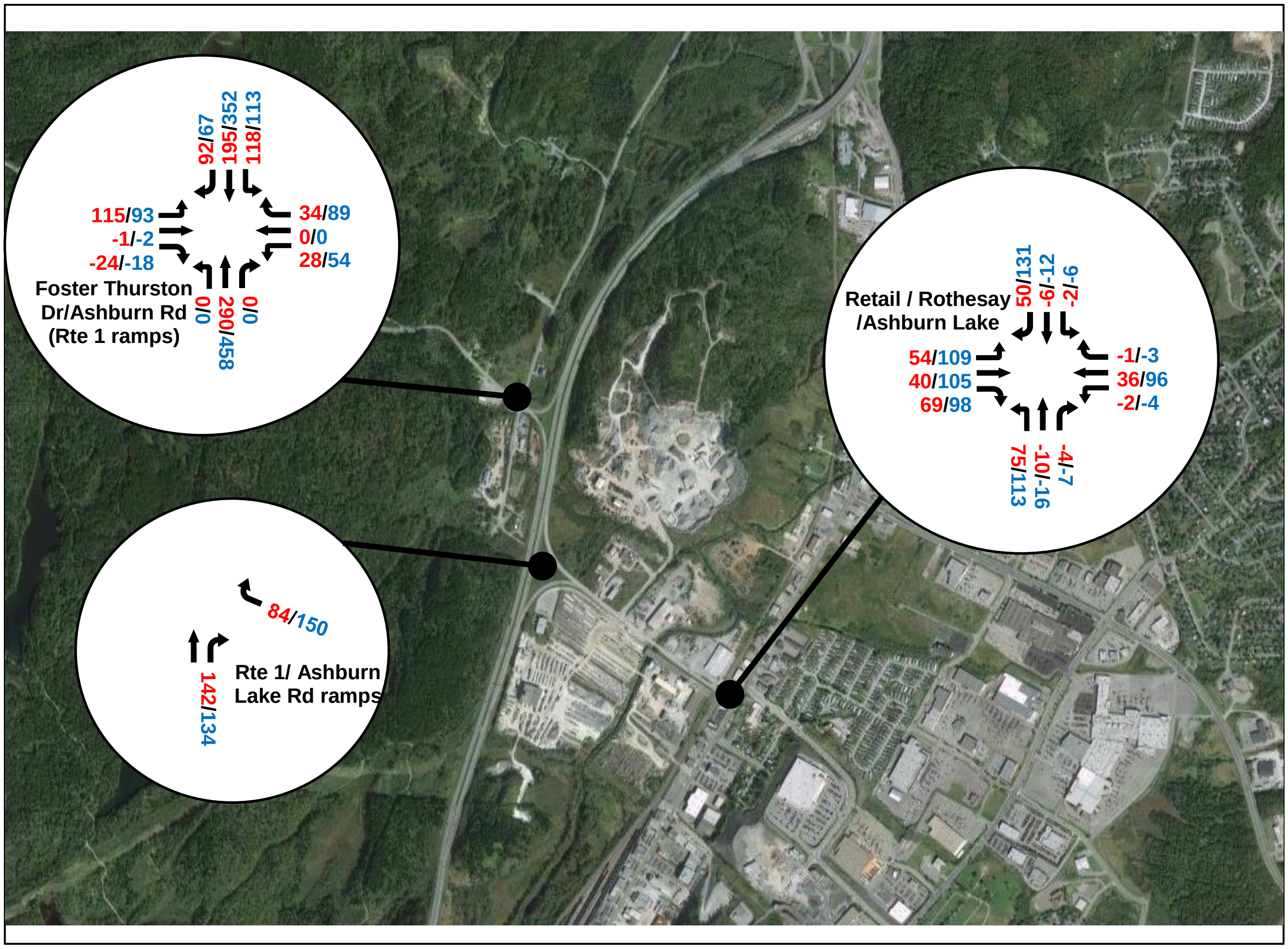

Figure 19 – Revised Trip Assignment Full Build Out with Ashburn Underpass (2 of 3) – PM/SAT

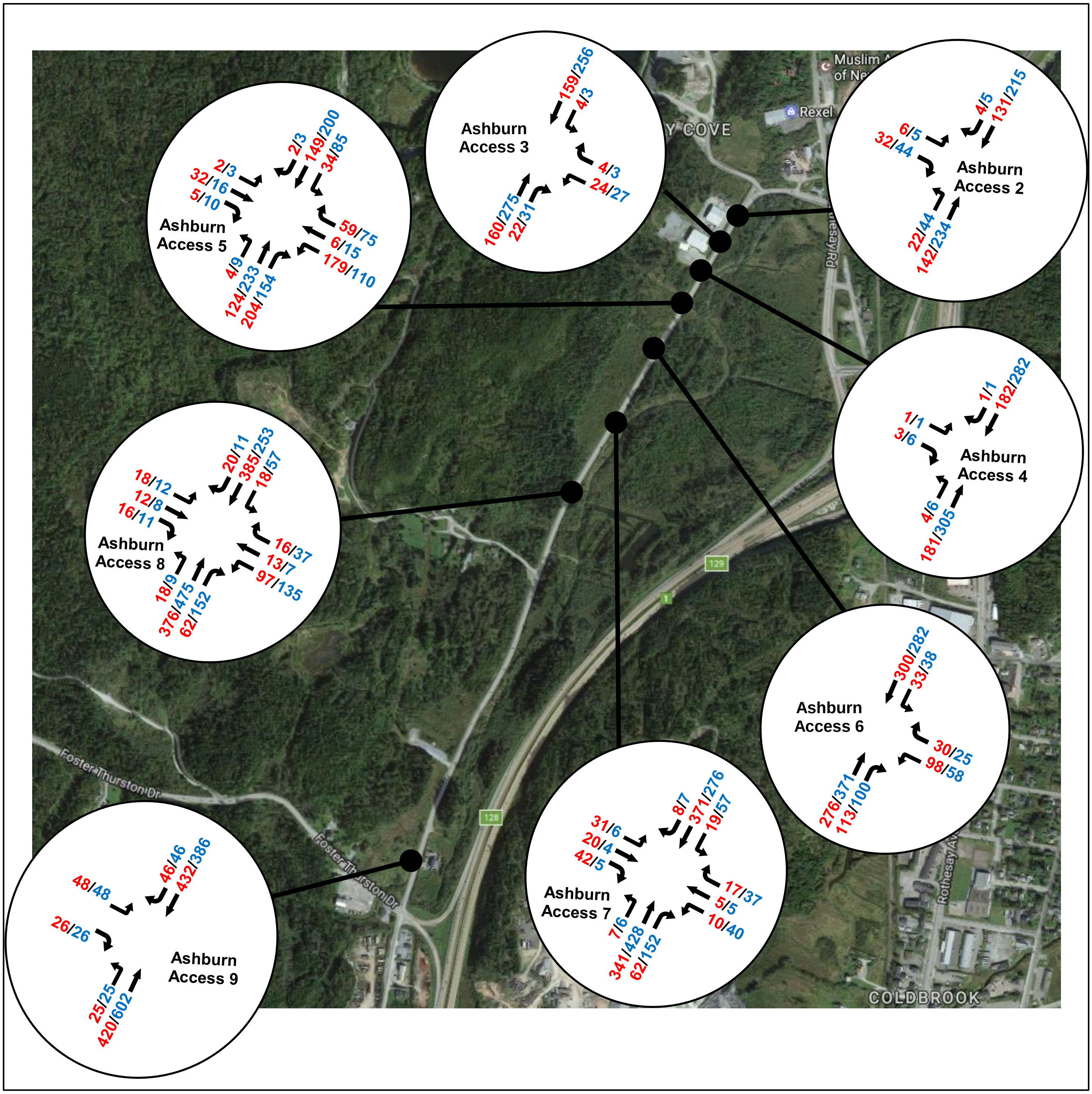

Figure 20 – Revised Trip Assignment Full Build Out with Ashburn Underpass (3 of 3) – PM/SAT

7 Future Traffic Operations – Phase 2 and 3

7.1 2033 Horizon Year Levels of Service (Full Build Out)

The 2033 horizon year operational conditions were established to determine how the street network within the Study Area is projected to function with the full development and the Ashburn underpass in place. Traffic operations within the Study Area were evaluated using projected 2033 traffic volumes with the Ashburn underpass and development, as well as with recommended improvements to accommodate Phase 1 of the development.

It is important to note that the concept of the Ashburn underpass is in the preliminary phase and the exact configuration has not been determined. Results are based on the preliminary configuration described in the Route 1 corridor study performed by exp in 2016. Results for the development access points will not be affected, however, intersections west of the development may change as more details for the Ashburn underpass become available.

7.1.1 Foster Thurston Drive / Ashburn Road

The Foster Thurston Drive / Ashburn Road intersection is one of the access points to the proposed development. It is also one of the ramp terminals (northern end) of the potential Ashburn underpass.

At a minimum, it is recommended to implement fully-actuated signals at the Foster Thurston Drive / Ashburn Road ramp terminal intersection as well as implement separate left turn lanes at all four approaches and separate right turn lanes at the northbound and southbound (Ashburn Road) approaches to accommodate the increase in traffic that will be diverted as a result of the Ashburn underpass. All approaches should have channelization and the turning bays long enough that the 95th percentile queues do not block any lanes. Note that the Ashburn underpass concept has not been finalized and the required ramp terminal configuration may change as a result.

The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with the Ashburn underpass and full development in place as well as the above recommended road geometry and traffic control are presented in **Table 32** for the Foster Thurston Drive / Ashburn Road ramp terminal intersection. The analysis output can be found in **Appendix D**.

By 2033 with the Ashburn underpass and full development in place and the recommended intersection geometry and traffic control, the **Foster Thurston Drive / Ashburn Road** ramp terminal intersection is projected to operate at an overall LOS B with an intersection delay of 19 seconds/vehicle or less during both the PM and Saturday peak periods. All individual movements are projected to operate at LOS C or better with average delays of 33 seconds/vehicle or less. All movements have a v/c ratio of 0.87 or less. The 95th queue lengths at the westbound approach (i.e. the Route 1 off ramp) are not projected to exceed 75 m, which is well below the length of the ramp.

No operational deficiencies are projected for the Foster Thurston Drive / Ashburn Road ramp terminal intersection by 2033 with the Ashburn underpass and full development in place with the recommended intersection geometry and traffic control.

Table 32 – LOS Summary for Foster Thurston Dr/Ashburn Rd with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
North South Street @ East West Street	Traffic Control	Time Period		Forster Thurston			Foster Thurston			Ashburn Rd			Ashburn Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Development Conditions															
Ashburn Rd @ Foster Thurston		PM Peak	B 19	B 13 [0.48]	C 21 [0.87]	shared	C 31 [0.76]	C 22 [0.43]	shared	B 12 [0.01]	C 30 [0.69]	A 6 [0.49]	B 17 [0.41]	B 18 [0.34]	A 4 [0.29]
		Sat Peak	B 18	C 20 [0.46]	B 16 [0.57]	shared	C 33 [0.83]	C 28 [0.65]	shared	A 8 [0.01]	C 24 [0.71]	A 5 [0.57]	B 11 [0.35]	B 14 [0.46]	A 1 [0.19]

7.1.2 **Foster Thurston Drive / NB Route 1 Access Ramps**

The AM peak period was analyzed for the Foster Thurston Drive / Route 1 on-ramp and off-ramp because the directional split on Route 1 westbound is significantly higher during this period, therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the AM peak period.

The results of the LOS analysis under projected 2033 traffic volumes with the Ashburn underpass and the full development are presented in **Table 33** for the Foster Thurston Drive / NB Route 1 Access Ramps. The detailed analysis output can be found in **Appendix D**.

By 2033 with the Ashburn underpass and the full development in place, the **Foster Thurston Drive / Route 1 off-ramp** is projected to operate at LOS D with an average density of 18.1 pc/km/ln during the AM peak period. The **Foster Thurston Drive / Route 1 on-ramp** is projected to operate at LOS D with an average density of 20.0 pc/km/ln during the AM peak period.

No operational deficiencies are projected at the Foster Thurston Drive / Route 1 Access Ramps by 2033 with the Ashburn underpass and full development in place.

It is recommended to extend the acceleration lane from the Route 100 WB on-ramp to the start of the deceleration lane for the Foster Thurston WB off-ramp, introducing a weaving area. This recommendation was first made in the Route 1 Corridor Study performed by **exp** in 2016.

Table 33 – LOS Summary for Foster Thurston Dr/Rte 1 Access Ramps with Development (Full Build Out)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Foster Thurston Dr off-ramp (AM Peak)	D 18.1
Rte 1 – Foster Thurston Dr on-ramp (AM Peak)	D 20.0

7.1.3 **Ashburn Lake Road / NB Route 1 Access Ramps**

The PM peak period was analyzed for the Ashburn Lake Road / Route 1 on-ramp and off-ramp because the directional split on Route 1 eastbound is significantly higher during this period, therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the PM peak period.

The results of the LOS analysis under projected 2033 traffic volumes with the Ashburn underpass and the full development are presented in **Table 34** for the Ashburn Lake Road / NB Route 1 Access Ramps. The detailed analysis output can be found in **Appendix D**.

By 2033 with the Ashburn underpass and the development in place, the **Ashburn Lake Road / Route 1 off-ramp** is projected to operate at LOS D with an average density of 20.6 pc/km/ln during the PM peak period. The **Ashburn Lake Road / Route 1 on-ramp** is projected to operate at an unacceptable LOS F with an average density of 26.9 pc/km/ln during the PM peak period. This is primarily a result of the increase in traffic from the north using the Ashburn underpass to access Route 1 eastbound.

No operational deficiencies are projected at the Ashburn Lake Road / Route 1 off-ramp by the 2033 horizon year with the Ashburn underpass and full development in place. The Ashburn Lake Road / Route 1 on-ramp is projected to have operational deficiencies by the 2033 horizon year with the Ashburn underpass and the full development in place.

It is recommended to extend the acceleration lane from the Ashburn Lake Road EB on-ramp to the start of the deceleration lane for the Route 100 EB off-ramp, introducing a weaving area. This will reduce congestion for the EB on-ramp at Ashburn Lake Road and reduce the flow interruptions on the EB lanes. This recommendation was first made in the Route 1 Corridor Study performed by **exp** in 2016.

Table 34 – LOS Summary for Ashburn Lake Rd/Rte 1 Access Ramps (Full Build Out)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Ashburn Lake Rd off-ramp (PM Peak)	D 20.6
Rte 1 – Ashburn Lake Rd on-ramp (PM Peak)	F 26.9

7.1.4 Rothesay Avenue / Retail Drive / Ashburn Lake Road

The results of the LOS analysis under projected 2033 traffic volumes with the Ashburn underpass and full development are presented in **Table 35** for the Rothesay Avenue / Retail Drive / Ashburn Lake Road intersection. The detailed analysis output can be found in **Appendix D**.

Although it was not within the scope of this study to do a detailed design of the potential future realignment at this location, a possible re-alignment lane configuration was completed in Synchro to determine the potential impact. In addition to Phase 1 recommendations, an additional separate right turn slip lane is recommended at the eastbound (Ashburn Lake Road) approach to accommodate the increase in traffic that will be diverted to this intersection as a result of the Ashburn underpass. This geometry may change depending on the final configuration of Ashburn Lake Road (i.e. whether it is a 2, 3, or 4 lane cross section).

By 2033 with the Ashburn underpass and full development in place as well as the additional eastbound right turn slip lane pocket, the **Rothesay Avenue / Retail Drive / Ashburn Lake Road** intersection is projected to operate at an overall LOS C with an intersection delay of 34 seconds/vehicle or less during both the PM and Saturday peak period. The lowest movements in terms of LOS are the eastbound and northbound left turn movements during the Saturday peak period, which are projected to operate at LOS E with average delays of 61 seconds/vehicle or less. All other movements are projected to operate at satisfactory LOS D or better with average delays of 53 seconds/vehicle or less during both the PM and Saturday peak periods. The v/c ratio at the westbound approach is approaching capacity at 0.95 during both peak periods.

No operational deficiencies are projected at the Rothesay Avenue / Retail Drive / Ashburn Lake Road intersection by 2033 with the Ashburn underpass and full development in place with the preliminary recommended intersection geometry.

Table 35 – LOS Summary for Rothesay Ave/Retail Dr/Ashburn Lake Rd with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [95% Queues (m)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Ashburn Lake Rd			Westbound Retail Dr			Northbound Rothesay Ave			Southbound Rothesay Ave		
				L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Development Conditions															
Rothesay Ave @ Retail Dr / Ashburn Lake Rd		PM Peak	C 29	D 51 [0.85]	C 30 [0.74]	A 9 [0.57]	B 18 [0.41]	D 53 [0.95]	shared	C 32 [0.73]	C 27 [0.81]	shared	C 26 [0.55]	B 18 [0.65]	shared
		Sat Peak	C 34	E 55 [0.90]	C 26 [0.72]	A 5 [0.45]	B 16 [0.41]	D 52 [0.95]	shared	E 61 [0.84]	C 32 [0.71]	shared	D 54 [0.83]	C 28 [0.80]	shared

7.1.5 **Rothesay Road / Fulton Lane**

The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with the Ashburn underpass and development are presented in **Table 36** for the Rothesay Road / Fulton Lane / Access intersection. The analysis output can be found in **Appendix D**.

By the 2033 horizon year with the Ashburn underpass and the full development in place, the **Rothesay Road / Fulton Lane / Access** intersection is projected to operate at an overall LOS A during the PM and Saturday peak period. During the PM peak period, the westbound movement is projected to operate at an unacceptable LOS F with average delays of 78 seconds/vehicle. There are very small volumes associated with the westbound right and left turn movement and the v/c ratios at this approach is still well below the threshold despite the higher delays. All other movements are projected to operate at LOS C or better with average delays of 18 seconds/vehicle or less. During the Saturday peak period all movements are projected to operate at LOS C or better with an average delay of 16 seconds/vehicle or less. The v/c ratios are projected to be 0.31 or less during both the PM and Saturday peak period.

Operational deficiencies are projected at the Rothesay Road / Fulton Lane / Access intersection during the PM peak period at the westbound approach by the 2033 horizon year with the Ashburn underpass and the full development in place. This movement is associated with a very small volume and the v/c ratio is well below the threshold of 1.0.

Table 36 – LOS Summary for Rothesay Rd/Fulton Ln/Access with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Access			Fulton Ln			Rothesay Rd			Rothesay Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Rothesay Rd @ Fulton Ln / Access	STOP	PM Peak	A 2		C 18 [0.31]	shared	shared	F 78 [0.18]	shared		*free flow*		shared	B 11 [0.01]	shared
		Sat Peak	A 1		B 11 [0.05]	shared	shared	C 16 [0.03]	shared		*free flow*		shared	A 8 [0.00]	shared

7.1.6 Ashburn Road / Jones Drive

The Ashburn Road / Jones Drive intersection is to be utilized by the 2033 horizon year as an access to the development from Ashburn Road.

The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with the Ashburn underpass and full development in place are presented in **Table 37** for the Ashburn Road / Jones Drive intersection. The analysis output can be found in **Appendix D**.

By the 2033 horizon year with the Ashburn underpass and full development in place, the **Ashburn Road / Jones Drive** intersection is projected to operate at an overall LOS A during the PM and Saturday peak periods. The eastbound and westbound left turn movements are projected to operate the lowest in terms of LOS at LOS E or better with an average delay of 50 seconds/vehicle or less during both peak periods. These movements were analyzed assuming stop control conditions and are associated with small volumes. All other movements are projected to operate at LOS B or better with average delays of 14 seconds/vehicle or less during both peak periods.

No operational deficiencies are projected at the Ashburn Road / Jones Drive intersection by the 2033 horizon year with the Ashburn underpass and the full development in place. This access should be re-evaluated in the future as more details with respect to the development become available to determine if signals are warranted.

Table 37 – LOS Summary for Ashburn Rd/Jones Dr/Access with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Jones Dr						Ashburn Rd			Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Ashburn Rd @ Jones Dr	STOP	PM Peak	A 1	E 39 [0.02]	B 13 [0.00]	shared	E 42 [0.11]	B 13 [0.01]	shared	A 9 [0.01]	*free flow*	*shared*	A 9 [0.04]	*free flow*	shared
		Sat Peak	A 2	D 34 [0.02]	B 11 [0.00]	shared	E 50 [0.39]	B 14 [0.03]	shared	A 9 [0.00]	*free flow*	shared	A 9 [0.02]	*free flow*	shared

7.1.7 **Ashburn Road / Drury Cove Road**

The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with the Ashburn underpass and the full development in place are presented in **Table 38** for the Ashburn Road / Drury Cove Road intersection. The analysis output can be found in **Appendix D**.

By the 2033 horizon year with the Ashburn underpass and the full development in place, the **Ashburn Road / Drury Cove Road** is projected to operate at an overall LOS A during both the PM and Saturday peak period. All individual movements are projected to operate at LOS B or better with average delays of 14 seconds/vehicle or less.

No operational deficiencies are projected at the Ashburn Road / Drury Cove Road intersection by the 2033 horizon year with the Ashburn underpass and the full development in place. No recommended changes are needed at the Ashburn Road / Drury Cove Road intersection.

Table 38 – LOS Summary for Ashburn Rd/Drury Cove Rd with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Ashburn Rd			Ashburn Rd						Drury Cove Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Drury Cove @ Ashburn Rd	STOP	PM Peak	A 1	A 8 [0.00]	shared			*free flow*					B 14 [0.07]		shared
		Sat Peak	A 0	A 0 [0.00]	shared			*free flow*					B 13 [0.04]		shared

7.1.8 **Rothesay Avenue / Rothesay Road**

The Rothesay Road / Rothesay Avenue intersection will be the main access to the proposed development. The LOS for the projected 2033 horizon year traffic volumes with the Ashburn underpass and the full development in place for PM and Saturday peak hours with development are presented in **Table 39** for the Rothesay Road / Rothesay Avenue intersection. The analysis output can be found in **Appendix D**.

By the 2033 horizon year with the Ashburn underpass and the full development in place the **Rothesay Road / Rothesay Avenue** intersection is projected to operate at an overall LOS C with an intersection delay of 26 seconds/vehicle during the PM peak period and LOS D with an intersection delay of 39 seconds/vehicle during the Saturday peak period. The worst movement in terms of LOS is the northbound left turn movement during the Saturday peak period, which is projected to operate at an acceptable LOS E with an average delay of 68 seconds/vehicle and the eastbound through movement during the PM peak period, which is projected to operate at LOS E with an average delay of 58 seconds/vehicle. The v/c ratios at these movements are approaching capacity. All other movements are projected to operate at LOS D or better with average delays of 52 seconds/vehicle or less during both peak periods. The 95th percentile queues are projected to be 166 m or less at the northbound approach, 204 m or less on the westbound through approach, 194 m or less on the eastbound approach, and 77 m or less on the southbound approach during both the PM and Saturday peak period.

No operational deficiencies are projected by the 2033 horizon year with the Ashburn underpass and the full development in place at the Rothesay Road / Rothesay Avenue intersection with fully-actuated, coordinated signals implemented.

Table 39 – LOS Summary for Rothesay Rd/Rothesay Ave with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Rothesay Ave			Westbound Rothesay Ave			Northbound Rothesay Rd			Southbound Rothesay Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Existing (2016) Conditions															
Projected 2033 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Rd @ Rothesay Ave	Signal	PM Peak	C 26	C 26 [0.12]	E 58 [0.90]	A 7 [0.48]	C 26 [0.11]	D 41 [0.78]	A 0 [0.30]	B 14 [0.59]	C 27 [0.87]	shared	C 31 [0.75]	B 19 [0.43]	shared
		Sat Peak	D 39	B 20 [0.17]	D 52 [0.95]	A 8 [0.39]	C 25 [0.38]	D 49 [0.91]	A 0 [0.17]	E 68 [0.99]	C 27 [0.51]	shared	C 23 [0.57]	D 42 [0.71]	shared

7.1.9 Rothesay Road / Ashburn Road

The Rothesay Road / Ashburn Road intersection is a secondary access off Rothesay Road to the proposed development. The LOS for the projected 2033 horizon year volumes for PM and Saturday peak hours with the Ashburn underpass and full development in place are presented in **Table 40** for the Rothesay Road / Ashburn Road intersection. The analysis output can be found in **Appendix D**.

By the 2033 horizon year with the Ashburn underpass and the full development in place, the **Rothesay Road / Ashburn Road** intersection is projected to operate at an overall LOS A during the PM and Saturday peak periods The worst movement in terms of LOS is the eastbound left turn movement (from the development), which is projected to operate at LOS D with an average delay of 42 seconds/vehicle during the PM peak period and 40 seconds/vehicle during the Saturday peak period. The 95th percentile queue length on this approach is projected to be 37 m or less during both peak periods. All other movements are projected to operate at LOS A with average delays of 9 seconds/vehicle or less. The v/c ratios are all 0.69 or less.

No operational deficiencies are projected at the Rothesay Road / Ashburn Road intersection by the 2033 horizon year with the Ashburn underpass and the full development in place.

Table 40 – LOS Summary for Rothesay Rd/Ashburn Rd with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
North South Street @ East West Street	Traffic Control	Time Period		Eastbound Ashburn Rd			Westbound Parking Lot			Northbound Rothesay Rd			Southbound Rothesay Rd		
				L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Rd @ Ashburn Rd	Signal	PM Peak	A 9	D 42 [0.62]	A 9 [0.55]	shared	shared	A 0 [0.01]	shared	A 2 [0.29]	A 5 [0.67]	shared	shared	A 9 [0.25]	shared
		Sat Peak	A 8	D 40 [0.69]	A 1 [0.24]	shared	shared	A 0 [0.00]	shared	A 2 [0.25]	A 1 [0.15]	shared	shared	A 6 [0.29]	shared

7.1.10 **Rothesay Avenue / NB Route 1 Interchange**

The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with the Ashburn underpass and the full development in place are presented in **Table 41** for the Rothesay Avenue / Route 1 off-ramp intersection, and **Table 42** for the Rothesay Avenue / Route 1 on-ramp intersections (west and east). The analysis outputs can be found in **Appendix D**.

Rothesay Avenue / Route 1 off-ramp Intersection

For analysis purposes, it is assumed that the recommendations made for **Rothesay Avenue / Route 1 off-ramp** intersection in the Phase 1 TIS will be in place by the 2033 horizon year (Phase 3 of the development). This includes implementing actuated coordinated signals as well as an eastbound through lane pocket to allow for a free-flowing independent right turn lane.

By the 2033 horizon year with the Ashburn underpass and the full development in place as well as coordinated traffic signals and an eastbound through lane pocket implemented, the **Rothesay Avenue / Route 1 off-ramp** intersection is projected to operate at an overall LOS A with an intersection delay of 8 seconds/vehicle during the PM peak period and at an overall LOS B with an intersection delay of 19 seconds/vehicle during the Saturday peak period. All individual movements are projected to operate at LOS C or better with an average delay of 21 seconds/vehicle or less and v/c ratios of 0.57 or less during the PM peak period. During the Saturday peak period the southbound through movement is projected to operate at LOS D with an average delay of 38 seconds/vehicle. All other individual movements are projected to operate at LOS C or better with an average delay of 25 seconds/vehicle or less. The v/c ratio for each movement is 0.84 or less during both the PM and Saturday peak period. The 95th percentile queue length at the southbound approach is not projected to exceed 131 m, which is still less than the length of the off-ramp.

No operational deficiencies are projected by 2033 with the Ashburn underpass and the full development in place at the Rothesay Avenue / Route 1 off-ramp intersection with coordinated signals and an eastbound through movement pocket implemented.

Table 41 – LOS Summary for Rothesay Ave/Rte1 off-ramp with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Rothesay Ave			Rothesay Ave						Rte 1 off-ramp		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2023 Horizon Year with Development Conditions															
Projected 2023 Horizon Year with Development Conditions and Recommended Option (Actuated Coordinated Signal)															
Rothesay Ave/Rte 1 Off-ramp @ Rothesay Ave		PM Peak	A 8		A 6 [0.25]	A 0 [0.15]		A 8 [0.55]						C 21 [0.57]	A 6 [0.37]
		Sat Peak	B 19		A 8 [0.48]	A 0 [0.32]		C 25 [0.73]						D 38 [0.84]	B 18 [0.64]

Rothesay Avenue / Route 1 on-ramp Intersections

By the 2033 horizon year with the full development in place, both the **Rothesay Avenue / Route 1 on-ramp** intersections (east and west) are projected to operate at an overall LOS F during the Saturday peak period. The eastbound movements are projected to operate at LOS F at both the intersections during the Saturday peak period, these movements currently operate under stop control conditions. The intersections are projected to operate sufficiently during the PM peak period. The 95th percentile queue lengths indicate that vehicles at the intersection furthest east may spill back to the intersection furthest to the west, as the projected lengths exceed the short distance between the two intersections.

Operational deficiencies are projected by the 2033 with the Ashburn underpass as well as the full development in place at the Rothesay Avenue / Route 1 on-ramp intersections (east and west) at the eastbound approach during the Saturday peak periods. It is notable that operational deficiencies were identified at these locations in the TIS for Phase 1 of the development.

There are limited options with respect to changes to infrastructure geometry to improve traffic conditions at the Rothesay Avenue / Route 1 on-ramp intersections because of the overpass structure just west of this location. This location should be re-evaluated in the future when more details with respect to the development become available to determine if signals are warranted.

Table 42 – LOS Summary for Rothesay Ave/Rte 1 on-ramp with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound			Westbound			Northbound			Southbound		
				Rothesay Ave						Rothesay Ave					
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Ashburn Underpass and Development Conditions (furthest west)															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	PM Peak	B 14		D 34 [0.73]						*free flow*				
		Sat Peak	F		F 142 [1.20]						*free flow*				
Projected 2033 Horizon Year with Ashburn Underpass and Development Conditions (furthest east)															
Rothesay Ave @ Rothesay Ave to Rte 1 on-ramp	STOP	PM Peak	A 9	D 29 [0.68]							*free flow*				
		Sat Peak	F	F 203 [1.34]							*free flow*				

7.1.11 NB Route 1 Access with Rothesay Road / Rothesay Avenue

The AM peak period was analyzed for the Rothesay Road / Route 1 on-ramp because the directional split on Route 1 westbound is significantly higher during the AM period. The PM peak period was analyzed for the Rothesay Road / Route 1 off-ramp because the directional split on Route 1 eastbound is significantly higher during the PM peak period. Therefore, the critical operational deficiencies occurring at these access ramps as a result of the development would occur during the AM peak period for the on-ramp and during the PM peak period for the off-ramp.

The LOS results for the 2033 horizon year with the Ashburn underpass and full development for the Rothesay Road / Route 1 Access ramps during the critical peak period are summarized in **Table 43**. The results for the Rothesay Avenue / Route 1 Access ramps during the critical peak period are summarized in **Table 15**. Detailed results can be found in **Appendix D**.

Rothesay Road / Route 1 Access Ramps

By the 2033 horizon year with the Ashburn underpass and the full development in place the **Rothesay Road / Route 1 on-ramp** is projected to operate at LOS D with an average density of 17.5

pc/km/ln during the PM peak period. The **Rothesay Road / Route 1 off-ramp** is projected to operate at an unacceptable LOS F with an average density of 23.2 pc/km/ln during the Saturday peak period.

No operational deficiencies are projected at the Rothesay Road / Route 1 off-ramp by the 2033 horizon year with the Ashburn underpass and full development in place. Operational deficiencies are projected at the Rothesay Road / Route 1 Access Ramp on-ramp by the 2033 horizon year with the Ashburn underpass and the full Phase 1 of the development in place.

It is recommended to extend the acceleration lane from the Route 100 WB on-ramp to the start of the deceleration lane for the Foster Thurston WB off-ramp, introducing a weaving area. It is also recommended to extend the acceleration lane from the Ashburn Lake Road EB on-ramp to the start of the deceleration lane for the Route 100 EB off-ramp, introducing a weaving area. This will reduce congestion for the EB on-ramp at Ashburn Lake Road and WB on-ramp at Rothesay Road and reduce the flow interruptions on the EB and WB lanes. These recommendations were first made in the Route 1 Corridor Study performed by **exp** in 2016.

Table 43 – LOS Summary for Rothesay Rd/Rte 1 Access Ramps (Full Build Out)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Rothesay Rd off-ramp (PM Peak)	D 17.5
Rte 1 – Rothesay Rd on-ramp (AM Peak)	F 23.2

Rothesay Avenue / Route 1 Access Ramps

By the 2033 horizon year with the Ashburn underpass and the full development in place the **Rothesay Avenue / Route 1 on-ramp** is projected to operate at LOS D with an average density of 17.5 pc/km/ln during the PM peak. The **Rothesay Avenue / Route 1 off-ramp** is projected to operate at an unacceptable LOS F with an average density of 23.2 pc/km/ln during the Saturday peak period. It is notable that the Rothesay Avenue / Route 1 on-ramp just reaches unacceptable LOS at the 2033 horizon year, which is primarily due to the anticipated increase in Route 1 background traffic.

No operational deficiencies are projected at the Rothesay Avenue / Route 1 off-ramp by the 2033 horizon year the Ashburn underpass and the full development in place. Operational deficiencies are projected at the Rothesay Avenue / Route 1 on-ramp by the 2033 horizon year with the Ashburn underpass and the full development in place. This ramp should be monitored and re-evaluated as more details about the development are finalized.

Table 44 – LOS Summary for Rothesay Ave/Rte 1 Access Ramps (Full Build Out)

Ramp	LOS Density (pc/km/ln)
Projected 2023 Horizon Year Conditions with Development	
Rte 1 – Rothesay Ave off-ramp (AM Peak)	D 19.2
Rte 1 – Rothesay Ave on-ramp (PM Peak)	F 22.2

7.1.12 **Ashburn Road Site Access Intersections (1-9)**

There are 9 proposed access locations to the development located on Ashburn Road (in addition to the Ashburn Road / Jones Drive access). The LOS for the projected 2033 horizon year traffic volumes for PM and Saturday peak hours with development and the Ashburn underpass in place are presented in **Table 45** for the 9 accesses on Ashburn Road. Note that the accesses have been analyzed assuming the recommended geometry described below. The analysis output can be found in **Appendix B**.

It is recommended to implement separate left turn lanes at all access points on all approaches to accommodate future traffic demand at the development. It is also recommended to implement a traffic signal at the main Ashburn Road access to the development (access 5 in this analysis). The traffic signals should have full detection on all approaches. In addition, access 8 in this analysis (directly east of Jones Drive) should have full-actuated signals implemented to accommodate the additional left turning traffic onto Ashburn Road towards Foster Thurston Drive as a result of the Ashburn underpass.

By 2033 the Ashburn underpass and full development in place, the first access off of Rothesay Road on Ashburn Road (primarily access to the truck stop, assuming Rothesay Road / Fulton Lane access is right-in/right-out only) is projected to operate at an overall LOS A during both the PM and Saturday peak period. All individual movements are projected to operate at LOS B or better with average delays of 10 seconds/vehicle or less during both the PM and Saturday peak period.

By 2033 with the Ashburn underpass and the full development in place, the second access on Ashburn Road (just south of Drury Cove Road, primarily access to the proposed Kenworth Dealership) is projected to operate at an overall LOS A during both the PM and Saturday peak period. The eastbound left turn movement is projected to operate at LOS C with an average delay of 16 seconds/vehicle during both the PM and Saturday peak period. All other movements during both the PM and Saturday peak period are projected to operate at LOS B or better with an average delay of 10 seconds/vehicle or less.

By 2033 with the Ashburn underpass and the full development in place, the third access on Ashburn Road (primarily access to a proposed restaurant) is projected to operate at LOS A during both the PM and Saturday peak period. The westbound left turn movement is projected to operate at LOS C with an average delay of 17 seconds/vehicle or less during the PM and Saturday peak period. All other movements are projected to operate at LOS B or better with an average delay of 12 seconds/vehicle or less during both peak periods.

By 2033 with the Ashburn underpass and the full development in place, the fourth access on Ashburn Road (primarily access to the proposed UHaul Storage Facility) is projected to operate at an overall LOS A with minimal intersection delay during both the PM and Saturday peak period. The eastbound left turn movement is projected to operate at LOS C with an average delay of 17 seconds/vehicle or less during both peak periods. All other movements during both the PM and Saturday peak period are projected to operate at LOS B or better with an average delay of 11 seconds/vehicle or less.

The main Ashburn Road access from Rothesay Avenue (access 5 of this analysis) is projected to operate at an overall LOS B with an intersection delay of 12 seconds/vehicle during the PM peak period and at an overall LOS A with an intersection delay of 8 seconds/vehicle during the Saturday peak period by 2033 with the Ashburn underpass and the full development in place. All individual movements are projected to operate at LOS B with an average delay of 15 seconds/vehicle or less during both peak periods. The exception is the westbound left turn movement during the PM peak period, which is projected to operate at LOS C with an average delay of 29 seconds/vehicle. The v/c ratios for each of the individual movements is 0.63 or less.

By 2033 with the Ashburn underpass and the full development in place, the fifth access on Ashburn Road (primarily access to the proposed major retail area) is projected to operate at an overall LOS A during both peak periods. All individual movements are projected to operate at LOS B or better with average delays of 14 seconds/vehicle or less. The exception is the westbound left turn movement, which is projected to operate at LOS D with an average delay of 34 seconds/vehicle during the PM peak and at LOS C with an average delay of 24 seconds/vehicle during the Saturday peak period.

The seventh access along Ashburn Road is primarily an access to the office area. By 2033 with the Ashburn underpass and full development in place, it is projected to operate at an overall LOS A during both peak periods. During the PM peak period, both the eastbound and westbound left turn movements (which operate under stop control conditions) are projected to operate at LOS E with average delays of 49 seconds/vehicle or less. During the Saturday peak period, the eastbound and westbound left turn movements are projected to operate at LOS E or better with average delays of 36 seconds/vehicle or less. The through/right turn movement is projected to operate at LOS C with an average delay of 22 seconds/vehicle or less during both peak periods. All other movements are projected to operate at LOS A during both peak periods. This access may require signalization in the future and should be re-evaluated when more details about the development are known.

The eighth access on Ashburn Road is expected to be the second main access on Ashburn Road in this analysis and primarily provides access to the residential area as well as the main retail area (to the south of Ashburn Road). Under signalized conditions, this access is projected to operate at an overall LOS A during both peak periods by 2033 with the Ashburn underpass and full development in place. The westbound left turn movement is projected to operate at LOS C with an average delay of 25 seconds/vehicle or less during both peak periods. All other movements are projected to operate at LOS B or better with an average delay of 17 seconds/vehicle or less during both peak periods. All movements have a v/c ratio of 0.55 or less.

The final access on Ashburn Road is primarily an access to the gas station and convenience retail adjacent to Foster Thurston Drive. By 2033 with the Ashburn underpass and full development in place, this access is projected to operate at LOS A during the PM and Saturday peak periods. The eastbound left turn movement is projected to operate at LOS E with an average delay of 49 seconds/vehicle or less during both peak periods. All other movements are projected to operate at LOS B or better with average delays of 13 seconds/vehicle or less.

No operational deficiencies are projected at the Ashburn Road access intersections under recommended geometry and traffic control conditions by 2033 with the Ashburn underpass and full development in place. Results for the accesses are for proof of concept only. Additional accesses may require traffic signals and/or changes to geometry and should be re-evaluated as more details about the development are finalized.

Table 45 – LOS Summary for Ashburn Road Access Points with Development (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)]											
				Eastbound Access			Westbound Access			Northbound Ashburn Rd			Southbound Ashburn Rd		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Development Conditions Access 1 (truck stop)															
Ashburn Rd @ Access 1	STOP	PM Peak	A 0		*free flow*		A 8 [0.01]	*free flow*		A 0 [0.00]		B 10 [0.00]			
		Sat Peak	A 0		*free flow*		A 8 [0.01]	*free flow*		A 0 [0.00]		B 10 [0.00]			
Projected 2033 Horizon Year with Development Conditions Access 2 (south of Drury Cove Rd)															
Ashburn Rd @ Access 2	STOP	PM Peak	A 1	C 16 [0.02]		B 10 [0.05]				A 8 [0.02]	*free flow*			*free flow*	
		Sat Peak	A 1	C 16 [0.02]		B 10 [0.07]				A 8 [0.04]	*free flow*			*free flow*	
Projected 2033 Horizon Year with Development Conditions Access 3															
Ashburn Rd @ Access 3	STOP	PM Peak	A 1				C 17 [0.08]		B 12 [0.01]		*free flow*		A 9 [0.00]	*free flow*	
		Sat Peak	A 1				C 16 [0.08]		B 11 [0.01]		*free flow*		A 8 [0.00]	*free flow*	
Projected 2033 Horizon Year with Development Conditions Access 4															
Ashburn Rd @ Access 4	STOP	PM Peak	A 0	C 17 [0.00]		B 10 [0.00]				A 8 [0.00]	*free flow*			*free flow*	
		Sat Peak	A 0	C 15 [0.00]		B 11 [0.01]				A 8 [0.01]	*free flow*			*free flow*	
Projected 2033 Horizon Year with Development Conditions Access 5 (main Rothesay Avenue access)															
Ashburn Rd @ Access 5 (main)		PM Peak	B 12	B 15 [0.01]	B 15 [0.09]	shared	C 29 [0.63]	A 7 [0.17]	shared	A 6 [0.01]	A 10 [0.61]	shared	A 7 [0.11]	A 7 [0.27]	shared
		Sat Peak	A 8	A 10 [0.01]	A 8 [0.07]	shared	B 15 [0.38]	A 6 [0.23]	shared	A 5 [0.02]	A 7 [0.44]	shared	A 7 [0.18]	A 6 [0.26]	shared
Projected 2033 Horizon Year with Development Conditions Access 6															
Ashburn Rd @ Access 6	STOP	PM Peak	A 2				D 34 [0.34]		B 14 [0.06]		*free flow*		A 9 [0.04]	*free flow*	
		Sat Peak	A 2				C 24 [0.25]		B 12 [0.05]		*free flow*		A 9 [0.04]	*free flow*	
Projected 2033 Horizon Year with Development Conditions Access 7															
Ashburn Rd @ Access 7	STOP	PM Peak	A 3	E 49 [0.30]	C 22 [0.24]	shared	E 48 [0.11]	C 18 [0.08]	shared	A 9 [0.01]	*free flow*	shared	A 9 [0.02]	*free flow*	shared
		Sat Peak	A 3	D 31 [0.05]	C 18 [0.04]	shared	E 36 [0.27]	C 15 [0.11]	shared	A 8 [0.01]	*free flow*	shared	A 9 [0.07]	*free flow*	shared
Projected 2033 Horizon Year with Development Conditions Access 8															
Ashburn Rd @ Access 8		PM Peak	A 9	B 17 [0.07]	B 12 [0.09]	shared	C 21 [0.35]	B 12 [0.09]	shared	A 4 [0.04]	A 8 [0.60]	shared	A 5 [0.06]	A 7 [0.46]	shared
		Sat Peak	A 8	B 16 [0.05]	B 15 [0.09]	shared	C 25 [0.55]	B 11 [0.19]	shared	A 5 [0.01]	A 9 [0.59]	shared	A 7 [0.18]	A 5 [0.28]	shared
Projected 2033 Horizon Year with Development Conditions Access 9															
Ashburn Rd @ Access 9	STOP	PM Peak	A 2	E 49 [0.40]		B 13 [0.06]				A 9 [0.03]	*free flow*			*free flow*	
		Sat Peak	A 2	E 36 [0.31]		B 12 [0.05]				A 9 [0.03]	*free flow*			*free flow*	

7.1.13 **Ashburn Underpass Ramps Terminals**

The Ashburn underpass ramp terminals include the Foster Thurston Drive / Ashburn Road intersection (analyzed previously) as well as the Ashburn underpass / Ashburn Lake Road intersection. The LOS analysis for the Ashburn underpass / Ashburn Lake Road ramp terminal with the Ashburn underpass and full development in place are shown in **Table 46**. Detailed analysis can be found in **Appendix D**.

Although it was not within the scope of this study to do a detailed design of the potential future ramp terminal at this location, a possible configuration was completed in Synchro to determine the potential impact. The configuration included fully actuated traffic signals and separate left turn and right turn pockets at all approaches.

Under this configuration, the **Ashburn underpass / Ashburn Lake Road ramp terminal** is projected to operate at an overall LOS B with an intersection delay of 19 seconds/vehicle or less during both peak periods. All individual movements are projected to operate at LOS C or better with average delays of 30 seconds/vehicle or less during both the PM and Saturday peak period. All movements have a v/c ratio of 0.87 or less.

No operational deficiencies are projected at the Ashburn underpass / Ashburn Lake Road ramp terminal under the above described intersection geometry by 2033 with the Ashburn underpass and full development in place. Results are for proof of concept only and should be re-evaluated when the Ashburn underpass concept is finalized. The geometry for this intersection is also dependent on the final cross-section of Ashburn Lake Road.

Table 46 – LOS Summary for Ashburn underpass/Ashburn Lake Rd Ramp Terminal (Full Build Out)

Intersection			Overall LOS & Delay (sec/veh)	Turning Movements LOS Average Delay (seconds per vehicle) [95% Queues (m)]											
				Eastbound			Westbound			Northbound			Southbound		
				Ashburn Lake Rd			Retail Dr			Rothesay Ave			Rothesay Ave		
North South Street @ East West Street	Traffic Control	Time Period		L	T	R	L	T	R	L	T	R	L	T	R
Projected 2033 Horizon Year with Development Conditions															
Underpass ramp terminal / Ashburn Lake Rd		PM Peak	B 13	C 25 [0.61]	B 13 [0.48]			B 16 [0.64]	A 3 [0.47]				C 20 [0.74]		A 6 [0.43]
		Sat Peak	B 19	B 17 [0.39]	C 23 [0.69]			C 25 [0.50]	A 8 [0.77]				C 30 [0.87]		A 3 [0.16]

8 Conclusions

Projected traffic generated by Phase 1 of The Crossing can be adequately accommodated with relatively minor improvements to the existing road network (e.g. changes to traffic control, additional turn lanes, intersection realignment, etc).

Projected traffic generated by Phases 2 and 3 of the development will require major modifications to the existing road network such as:

1. Major upgrades to the Route 100 interchange area to increase capacity; or
2. Construction of a new underpass near Ashburn Lake Road and Foster Thurston Road.

Final details regarding recommended improvements will need to be tweaked as details of the development and the Ashburn underpass are finalized.

Appendix A – Site Plan

Figure 1 - Revised Conceptual Rendering of the Developed Site Plan

Appendix B –
LOS Results without Development

Intersection	
Int Delay, s/veh	7.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	2	6	4	3	2	226	127	19	2	12	714	6
Future Vol, veh/h	2	6	4	3	2	226	127	19	2	12	714	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	7	4	3	2	246	138	21	2	13	776	7

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1227	1107	22	1108	1104	779	783	0	0	23	0	0
Stage 1	298	298	-	805	805	-	-	-	-	-	-	-
Stage 2	929	809	-	303	299	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	155	210	1055	187	211	396	835	-	-	1592	-	-
Stage 1	711	667	-	376	395	-	-	-	-	-	-	-
Stage 2	321	394	-	706	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	172	1055	156	173	396	835	-	-	1592	-	-
Mov Cap-2 Maneuver	50	172	-	156	173	-	-	-	-	-	-	-
Stage 1	592	556	-	313	389	-	-	-	-	-	-	-
Stage 2	119	388	-	579	555	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	30.7	30.4	8.7	0.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	153	1592	-	-	835	-	-	384
HCM Lane V/C Ratio	0.085	0.008	-	-	0.165	-	-	0.654
HCM Control Delay (s)	30.7	7.3	0	-	10.2	0	-	30.4
HCM Lane LOS	D	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.6	-	-	4.5

Intersection	
Int Delay, s/veh	10

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	2	6	4	3	2	242	136	20	2	12	766	7
Future Vol, veh/h	2	6	4	3	2	242	136	20	2	12	766	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	7	4	3	2	263	148	22	2	13	833	8

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1313	1184	23	1187	1183	836	840	0	0	24	0	0
Stage 1	318	318	-	863	863	-	-	-	-	-	-	-
Stage 2	995	866	-	324	320	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	135	189	1054	165	189	367	795	-	-	1591	-	-
Stage 1	693	654	-	349	372	-	-	-	-	-	-	-
Stage 2	295	370	-	688	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	151	1054	134	151	367	795	-	-	1591	-	-
Mov Cap-2 Maneuver	32	151	-	134	151	-	-	-	-	-	-	-
Stage 1	562	530	-	283	366	-	-	-	-	-	-	-
Stage 2	82	364	-	549	529	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	41	40.7	9.1	0.1
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	113	1591	-	-	795	-	-	355
HCM Lane V/C Ratio	0.115	0.008	-	-	0.186	-	-	0.756
HCM Control Delay (s)	41	7.3	0	-	10.6	0	-	40.7
HCM Lane LOS	E	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	0.4	0	-	-	0.7	-	-	6

Intersection	
Int Delay, s/veh	13.1

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	2	6	4	4	2	254	143	21	2	12	805	7
Future Vol, veh/h	2	6	4	4	2	254	143	21	2	12	805	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	7	4	4	2	276	155	23	2	13	875	8

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1379	1244	24	1245	1241	879	883	0	0	25	0	0
Stage 1	335	335	-	905	905	-	-	-	-	-	-	-
Stage 2	1044	909	-	340	336	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	122	174	1052	151	175	347	766	-	-	1589	-	-
Stage 1	679	643	-	331	355	-	-	-	-	-	-	-
Stage 2	277	354	-	675	642	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	21	136	1052	121	137	347	766	-	-	1589	-	-
Mov Cap-2 Maneuver	21	136	-	121	137	-	-	-	-	-	-	-
Stage 1	540	511	-	263	349	-	-	-	-	-	-	-
Stage 2	55	348	-	528	510	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	55.6	54.5	9.4	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	84	1589	-	-	766	-	-	333
HCM Lane V/C Ratio	0.155	0.008	-	-	0.203	-	-	0.849
HCM Control Delay (s)	55.6	7.3	0	-	10.9	0	-	54.5
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	0.5	0	-	-	0.8	-	-	7.6

Intersection	
Int Delay, s/veh	17.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	2	6	4	4	2	267	150	22	2	12	846	7
Future Vol, veh/h	2	6	4	4	2	267	150	22	2	12	846	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	7	4	4	2	290	163	24	2	13	920	8

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1447	1304	25	1306	1301	923	927	0	0	26	0	0
Stage 1	351	351	-	949	949	-	-	-	-	-	-	-
Stage 2	1096	953	-	357	352	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	109	160	1051	137	161	327	737	-	-	1588	-	-
Stage 1	666	632	-	313	339	-	-	-	-	-	-	-
Stage 2	259	338	-	661	632	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	10	122	1051	107	123	327	737	-	-	1588	-	-
Mov Cap-2 Maneuver	10	122	-	107	123	-	-	-	-	-	-	-
Stage 1	517	490	-	243	333	-	-	-	-	-	-	-
Stage 2	28	332	-	504	490	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	108.8	75	9.7	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	47	1588	-	-	737	-	-	314
HCM Lane V/C Ratio	0.278	0.008	-	-	0.221	-	-	0.945
HCM Control Delay (s)	108.8	7.3	0	-	11.3	0	-	75
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	0.9	0	-	-	0.8	-	-	9.5

Intersection	
Int Delay, s/veh	10.9

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	15	3	7	0	77	664	18	2	10	105	1
Future Vol, veh/h	0	15	3	7	0	77	664	18	2	10	105	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	8	0	84	722	20	2	11	114	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1642	1601	21	1610	1601	115	115	0	0	22	0	0
Stage 1	1464	1464	-	136	136	-	-	-	-	-	-	-
Stage 2	178	137	-	1474	1465	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	80	106	1056	84	106	937	1474	-	-	1593	-	-
Stage 1	160	193	-	867	784	-	-	-	-	-	-	-
Stage 2	824	783	-	158	193	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	44	53	1056	40	53	937	1474	-	-	1593	-	-
Mov Cap-2 Maneuver	44	53	-	40	53	-	-	-	-	-	-	-
Stage 1	81	97	-	437	779	-	-	-	-	-	-	-
Stage 2	745	778	-	66	97	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	86	20.2	9.5	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	63	1593	-	-	1474	-	-	327
HCM Lane V/C Ratio	0.311	0.007	-	-	0.49	-	-	0.279
HCM Control Delay (s)	86	7.3	0	-	9.8	0	-	20.2
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.1	0	-	-	2.8	-	-	1.1

Intersection	
Int Delay, s/veh	12.5

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	15	3	8	0	82	711	19	2	10	113	1
Future Vol, veh/h	0	15	3	8	0	82	711	19	2	10	113	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	9	0	89	773	21	2	11	123	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1757	1713	22	1722	1713	123	124	0	0	23	0	0
Stage 1	1567	1567	-	145	145	-	-	-	-	-	-	-
Stage 2	190	146	-	1577	1568	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	66	90	1055	70	90	928	1463	-	-	1592	-	-
Stage 1	139	172	-	858	777	-	-	-	-	-	-	-
Stage 2	812	776	-	137	171	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	34	42	1055	29	42	928	1463	-	-	1592	-	-
Mov Cap-2 Maneuver	34	42	-	29	42	-	-	-	-	-	-	-
Stage 1	65	80	-	399	772	-	-	-	-	-	-	-
Stage 2	729	771	-	51	80	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	117.3	28.8	9.9	0.6
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	50	1592	-	-	1463	-	-	247
HCM Lane V/C Ratio	0.391	0.007	-	-	0.528	-	-	0.396
HCM Control Delay (s)	117.3	7.3	0	-	10.2	0	-	28.8
HCM Lane LOS	F	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	1.4	0	-	-	3.2	-	-	1.8

Intersection	
Int Delay, s/veh	14.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	15	3	8	0	86	748	20	2	10	118	1
Future Vol, veh/h	0	15	3	8	0	86	748	20	2	10	118	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	9	0	93	813	22	2	11	128	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1846	1800	23	1810	1801	129	129	0	0	24	0	0
Stage 1	1649	1649	-	151	151	-	-	-	-	-	-	-
Stage 2	197	151	-	1659	1650	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	57	80	1054	61	80	921	1457	-	-	1591	-	-
Stage 1	125	156	-	851	772	-	-	-	-	-	-	-
Stage 2	805	772	-	123	156	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	28	34	1054	22	34	921	1457	-	-	1591	-	-
Mov Cap-2 Maneuver	28	34	-	22	34	-	-	-	-	-	-	-
Stage 1	54	68	-	369	767	-	-	-	-	-	-	-
Stage 2	718	767	-	40	68	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	156	38.5	10.2	0.6
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	41	1591	-	-	1457	-	-	206
HCM Lane V/C Ratio	0.477	0.007	-	-	0.558	-	-	0.496
HCM Control Delay (s)	156	7.3	0	-	10.5	0	-	38.5
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1.7	0	-	-	3.6	-	-	2.5

Intersection	
Int Delay, s/veh	18.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	15	3	9	0	91	786	21	2	10	124	1
Future Vol, veh/h	0	15	3	9	0	91	786	21	2	10	124	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	10	0	99	854	23	2	11	135	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1940	1891	24	1899	1891	135	136	0	0	25	0	0
Stage 1	1733	1733	-	157	157	-	-	-	-	-	-	-
Stage 2	207	158	-	1742	1734	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	49	70	1052	53	70	914	1448	-	-	1589	-	-
Stage 1	112	142	-	845	768	-	-	-	-	-	-	-
Stage 2	795	767	-	110	142	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	23	28	1052	16	28	914	1448	-	-	1589	-	-
Mov Cap-2 Maneuver	23	28	-	16	28	-	-	-	-	-	-	-
Stage 1	45	57	-	340	763	-	-	-	-	-	-	-
Stage 2	704	762	-	31	57	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	216.1	74	10.7	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	33	1589	-	-	1448	-	-	151
HCM Lane V/C Ratio	0.593	0.007	-	-	0.59	-	-	0.72
HCM Control Delay (s)	216.1	7.3	0	-	11	0	-	74
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	2	0	-	-	4.1	-	-	4.3

Intersection	
Int Delay, s/veh	5

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	1	2	5	0	0	68	172	13	2	1	148	3
Future Vol, veh/h	1	2	5	0	0	68	172	13	2	1	148	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	0	0	74	187	14	2	1	161	3

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	591	555	15	558	555	162	164	0	0	16	0	0
Stage 1	389	389	-	165	165	-	-	-	-	-	-	-
Stage 2	202	166	-	393	390	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	419	440	1065	440	440	883	1414	-	-	1602	-	-
Stage 1	635	608	-	837	762	-	-	-	-	-	-	-
Stage 2	800	761	-	632	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	345	381	1065	391	381	883	1414	-	-	1602	-	-
Mov Cap-2 Maneuver	345	381	-	391	381	-	-	-	-	-	-	-
Stage 1	551	527	-	726	761	-	-	-	-	-	-	-
Stage 2	732	760	-	543	527	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	10.9	9.4	7.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	623	1602	-	-	1414	-	-	883
HCM Lane V/C Ratio	0.014	0.001	-	-	0.132	-	-	0.084
HCM Control Delay (s)	10.9	7.2	0	-	7.9	0	-	9.4
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.5	-	-	0.3

Intersection	
Int Delay, s/veh	5.1

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	1	2	5	0	0	73	184	14	2	1	159	3
Future Vol, veh/h	1	2	5	0	0	73	184	14	2	1	159	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	0	0	79	200	15	2	1	173	3

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	632	594	16	597	594	174	176	0	0	17	0	0
Stage 1	416	416	-	177	177	-	-	-	-	-	-	-
Stage 2	216	178	-	420	417	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	393	418	1063	415	418	869	1400	-	-	1600	-	-
Stage 1	614	592	-	825	753	-	-	-	-	-	-	-
Stage 2	786	752	-	611	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	317	357	1063	365	357	869	1400	-	-	1600	-	-
Mov Cap-2 Maneuver	317	357	-	365	357	-	-	-	-	-	-	-
Stage 1	526	507	-	706	752	-	-	-	-	-	-	-
Stage 2	714	751	-	518	506	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	11.2	9.6	7.4	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	594	1600	-	-	1400	-	-	869
HCM Lane V/C Ratio	0.015	0.001	-	-	0.143	-	-	0.091
HCM Control Delay (s)	11.2	7.3	0	-	8	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.5	-	-	0.3

Intersection	
Int Delay, s/veh	5.1

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	1	2	5	0	0	77	194	15	2	1	167	3
Future Vol, veh/h	1	2	5	0	0	77	194	15	2	1	167	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	0	0	84	211	16	2	1	182	3

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	666	626	17	628	625	183	185	0	0	18	0	0
Stage 1	439	439	-	185	185	-	-	-	-	-	-	-
Stage 2	227	187	-	443	440	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	373	401	1062	395	401	859	1390	-	-	1599	-	-
Stage 1	597	578	-	817	747	-	-	-	-	-	-	-
Stage 2	776	745	-	594	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	297	339	1062	345	339	859	1390	-	-	1599	-	-
Mov Cap-2 Maneuver	297	339	-	345	339	-	-	-	-	-	-	-
Stage 1	506	490	-	692	746	-	-	-	-	-	-	-
Stage 2	700	744	-	498	490	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	11.4	9.6	7.4	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	572	1599	-	-	1390	-	-	859
HCM Lane V/C Ratio	0.015	0.001	-	-	0.152	-	-	0.097
HCM Control Delay (s)	11.4	7.3	0	-	8.1	0	-	9.6
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.5	-	-	0.3

Intersection	
Int Delay, s/veh	5.2

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	1	2	5	0	0	81	204	15	2	1	175	4
Future Vol, veh/h	1	2	5	0	0	81	204	15	2	1	175	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	0	0	88	222	16	2	1	190	4

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	700	658	17	660	657	192	195	0	0	18	0	0
Stage 1	461	461	-	195	195	-	-	-	-	-	-	-
Stage 2	239	197	-	465	462	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	354	384	1062	376	385	850	1378	-	-	1599	-	-
Stage 1	581	565	-	807	739	-	-	-	-	-	-	-
Stage 2	764	738	-	578	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	277	321	1062	325	322	850	1378	-	-	1599	-	-
Mov Cap-2 Maneuver	277	321	-	325	322	-	-	-	-	-	-	-
Stage 1	486	473	-	675	738	-	-	-	-	-	-	-
Stage 2	684	737	-	479	473	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	11.7	9.7	7.5	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	550	1599	-	-	1378	-	-	850
HCM Lane V/C Ratio	0.016	0.001	-	-	0.161	-	-	0.104
HCM Control Delay (s)	11.7	7.3	0	-	8.1	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.6	-	-	0.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2501	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	732	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2501		732			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	695		203			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3057	821	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3057 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3057	4600	No
v_{12}	3057	4400	No
$v_{FO} = v_F - v_R$	2236	4600	No
v_R	821	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 16.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.477	
Space mean speed in ramp influence area,	S_R = 84.3	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.3	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 2/14/2017
Analysis time period: AM Peak
Freeway/Dir of Travel: Westbound
Junction: Foster Thurston Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2681	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	785	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2681		785			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	745		218			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3277	881	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3277 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3277	4600	No
v_{12}	3277	4400	No
$v_{FO} = v_F - v_R$	2396	4600	No
v_R	881	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 17.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.482	
Space mean speed in ramp influence area,	S_R = 84.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.1	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2820	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	824	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2820		824			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	783		229			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3447	925	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3447 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3447	4600	No
v_{12}	3447	4400	No
$v_{FO} = v_F - v_R$	2522	4600	No
v_R	925	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 18.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.486		
Space mean speed in ramp influence area,	S_R = 84.0	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 84.0	km/h	

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2965	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	865	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2965		865			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	824		240			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3624	971	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3624 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3624	4600	No
v_{12}	3624	4400	No
$v_{FO} = v_F - v_R$	2653	4600	No
v_R	971	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 19.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.490	
Space mean speed in ramp influence area,	S_R = 83.8	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 83.8	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2501	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	26	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2501		26			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	695		7			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3057	29	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3057 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3086	4600	No
v_{R12}	3086	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 16.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.378

Space mean speed in ramp influence area, S_R = 87.5 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 87.5 km/h

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```
Phone:                                     Fax:
E-mail:

_________________________________Merge Analysis________________________________

Analyst:                 Katie Hazzard
Agency/Co.:              exp
Date performed:          2/14/2017
Analysis time period:    AM Peak
Freeway/Dir of Travel:   Westbond
Junction:                Foster Thurston On Ramp
Jurisdiction:            Provincial
Analysis Year:           2023
Description:  The Crossing TIS

__________________________________Freeway Data_________________________________

Type of analysis                            Merge
Number of lanes in freeway                  2
Free-flow speed on freeway                  100.0         km/h
Volume on freeway                           2681          vph

__________________________________On Ramp Data_________________________________

Side of freeway                             Right
Number of lanes in ramp                     1
Free-flow speed on ramp                     60.0          km/h
Volume on ramp                              27            vph
Length of first accel/decel lane            120           m
Length of second accel/decel lane                         m

_________________________Adjacent Ramp Data (if one exists)____________________

Does adjacent ramp exist?                   No
Volume on adjacent Ramp                                   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp                                 m

____________________Conversion to pc/h Under Base Conditions___________________

Junction Components                    Freeway     Ramp        Adjacent
                                                               Ramp
Volume, V (vph)                        2681        27                    vph
Peak-hour factor, PHF                  0.90        0.90
Peak 15-min volume, v15                745         8                     v
Trucks and buses                       6           2                     %
Recreational vehicles                  1           0                     %
Terrain type:                          Rolling     Level
     Grade                                    %           %           %
     Length                                  km          km          km
Trucks and buses PCE, ET               2.5         1.5
Recreational vehicle PCE, ER           2.0         1.2
```

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3277	30	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3277 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3307	4600	No
v_{R12}	3307	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 17.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.399

Space mean speed in ramp influence area, S_R = 86.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 86.8 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2820	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	29	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2820		29			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	783		8			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3447        33                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3447   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3480          4600            No
      FO
     v                     3480          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   18.6    pc/km/ln
          R                   R           12             A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.419
                                              S
Space mean speed in ramp influence area,     S  = 86.2    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 86.2    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2965	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	30	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2965	30		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	824	8		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3624	34	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3624 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3658	4600	No
v_{R12}	3658	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 19.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.443	
Space mean speed in ramp influence area,	S_R = 85.4	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 85.4	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1014	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	116	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1014		116			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	282		32			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1239        130                  pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =               (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  1239   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                1239          4600            No
      Fi   F
     v                     1239          4400            No
      12
     v  = v - v            1109          4600            No
      FO   F   R
     v                     130           2000            No
      R

_________________Level of Service Determination (if not F)______________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   6.8     pc/km/ln
                          R                  12           D
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                D  = 0.415
                                             S
Space mean speed in ramp influence area,    S  = 86.3    km/h
                                             R
Space mean speed in outer lanes,            S  =  N/A    km/h
                                             0
Space mean speed for all vehicles,          S  = 86.3    km/h
________________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Don Good
Agency/Co.: exp
Date performed: 2/14/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Westbound
Junction: Foster Thurston Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1087	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	124	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1087		124			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	302		34			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1329	139	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1329 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1329	4600	No
v_{12}	1329	4400	No
$v_{FO} = v_F - v_R$	1190	4600	No
v_R	139	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 7.3 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.416	
Space mean speed in ramp influence area,	S_R = 86.3	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 86.3	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Westbound
Junction: Foster Thurston Off Ramp
Jurisdiction: Provincial
Analysis Year: 2028
Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1144	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	129	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1144		129			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	318		36			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1398        145                    pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L   =               (Equation 25-8 or 25-9)
                   EQ
                  P   =    1.000      Using Equation  0
                   FD
                  v   = v   + (v - v ) P   =  1398   pcph
                   12   R      F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v   = v               1398          4600            No
      Fi    F
     v                     1398          4400            No
      12
     v   = v - v           1253          4600            No
      FO    F   R
     v                     145           2000            No
      R

_________________Level of Service Determination (if not F)_____________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   7.7     pc/km/ln
                          R                  12           D
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                D  = 0.416
                                             S
Space mean speed in ramp influence area,    S  = 86.3    km/h
                                             R
Space mean speed in outer lanes,            S  =  N/A    km/h
                                             0
Space mean speed for all vehicles,          S  = 86.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1202	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	135	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1202		135			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	334		38			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1469	152	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1469 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1469	4600	No
v_{12}	1469	4400	No
$v_{FO} = v_F - v_R$	1317	4600	No
v_R	152	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 8.0 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.417	
Space mean speed in ramp influence area,	S_R = 86.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 86.2	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 2/14/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Westbond
Junction: Foster Thurston On Ramp
Jurisdiction: Provincial
Analysis Year: 2016
Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1014	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	28	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1014	28		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	282	8		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1239	31	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1239 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1270	4600	No
v_{R12}	1270	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 8.0 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.306	
Space mean speed in ramp influence area,	S_R = 89.9	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 89.9	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1087	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	30	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1087	30		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	302	8		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1329	34	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1329 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1363	4600	No
v_{R12}	1363	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 8.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.307

Space mean speed in ramp influence area, S_R = 89.9 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 89.9 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1144	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	31	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1144	31		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	318	9		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1398        35                       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1398   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1433          4600            No
      FO
     v                     1433          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   8.7     pc/km/ln
          R                   R           12             A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                   M  = 0.309
                                                S
Space mean speed in ramp influence area,       S  = 89.8    km/h
                                                R
Space mean speed in outer lanes,               S  =  N/A    km/h
                                                0
Space mean speed for all vehicles,             S  = 89.8    km/h
_______________________________________________________________________________
```

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Westbond
Junction: Foster Thurston On Ramp
Jurisdiction: Provincial
Analysis Year: 2033
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	1202	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	32	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1202	32		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	334	9		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1469	36	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1469 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1505	4600	No
v_{R12}	1505	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 9.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.310	
Space mean speed in ramp influence area,	S_R = 89.8	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 89.8	km/h

```
Phone:                                    Fax:
E-mail:

_________________________________Diverge Analysis______________________________

Analyst:                 Katie Hazzard
Agency/Co.:              exp
Date performed:          1/23/2017
Analysis time period:    Sat Peak
Freeway/Dir of Travel:   Westbound
Junction:                Foster Thurston Off Ramp
Jurisdiction:            Provincial
Analysis Year:           2016
Description:  The Crossing

__________________________________Freeway Data__________________________________

Type of analysis                             Diverge
Number of lanes in freeway                   2
Free-flow speed on freeway                   100.0          km/h
Volume on freeway                            644            vph

_________________________________Off Ramp Data__________________________________

Side of freeway                              Right
Number of lanes in ramp                      1
Free-Flow speed on ramp                      60.0           km/h
Volume on ramp                               152            vph
Length of first accel/decel lane             130            m
Length of second accel/decel lane                           m

_________________________Adjacent Ramp Data (if one exists)____________________

Does adjacent ramp exist?                    No
Volume on adjacent ramp                                     vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp                                   m

____________________Conversion to pc/h Under Base Conditions___________________

Junction Components                     Freeway     Ramp        Adjacent
                                                                Ramp
Volume, V (vph)                         644         152                  vph
Peak-hour factor, PHF                   0.90        0.90
Peak 15-min volume, v15                 179         42                   v
Trucks and buses                        6           2                    %
Recreational vehicles                   1           0                    %
Terrain type:                           Rolling     Level
     Grade                              0.00    %   0.00    %          %
     Length                             0.00    km  0.00    km         km
Trucks and buses PCE, ET                2.5         1.5
Recreational vehicle PCE, ER            2.0         1.2
```

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	787	171	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 787 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	787	4600	No
v_{12}	787	4400	No
$v_{FO} = v_F - v_R$	616	4600	No
v_R	171	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 4.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.418		
Space mean speed in ramp influence area,	S_R = 86.2	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 86.2	km/h	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	163	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	690		163			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	192		45			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	843	183	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 843 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	843	4600	No
v_{12}	843	4400	No
$v_{FO} = v_F - v_R$	660	4600	No
v_R	183	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.419	
Space mean speed in ramp influence area,	S_R = 86.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 86.2	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Westbound
Junction: Foster Thurston Off Ramp
Jurisdiction: Provincial
Analysis Year: 2028
Description: The Crossing TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	725	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	180	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	725		180			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	201		50			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	886	202	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 886 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	886	4600	No
v_{12}	886	4400	No
$v_{FO} = v_F - v_R$	684	4600	No
v_R	202	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 5.0 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.421

Space mean speed in ramp influence area, S_R = 86.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 86.1 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	763	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	180	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	763		180			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	212		50			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	933	202	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 933 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	933	4600	No
v_{12}	933	4400	No
$v_{FO} = v_F - v_R$	731	4600	No
v_R	202	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 5.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.421	
Space mean speed in ramp influence area,	S_R = 86.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 86.1	km/h

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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	644	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	18	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	644		18			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	179		5			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	787	20	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 787 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	807	4600	No
v_{R12}	807	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 5.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.301	
Space mean speed in ramp influence area,	S_R = 90.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 90.1	km/h

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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	690	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	19	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	690	19		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	192	5		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	843	21	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 843 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	864	4600	No
v_{R12}	864	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 6.0+ pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.301

Space mean speed in ramp influence area, S_R = 90.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 90.1 km/h

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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	725	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	20	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	725	20		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	201	6		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          886         22                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  886    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     908           4600            No
      FO
     v                     908           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   6.2     pc/km/ln
          R                    R           12             A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.302
                                              S
Space mean speed in ramp influence area,     S  = 90.0    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.0    km/h
_______________________________________________________________________________
```

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Phone: Fax:
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Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: Sat Peak
Freeway/Dir of Travel: Westbond
Junction: Foster Thurston On Ramp
Jurisdiction: Provincial
Analysis Year: 2033
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	763	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	20	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	763	20		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	212	6		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	933	22	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 933 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	955	4600	No
v_{R12}	955	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 6.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.302		
Space mean speed in ramp influence area,	S_R = 90.0	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 90.0	km/h	

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Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	3/20/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	618	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	240	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	618		240			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	172		67			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	755	269	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 755 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	755	4500	No
v_{12}	755	4400	No
$v_{FO} = v_F - v_R$	486	4500	No
v_R	269	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 3.3 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.427

Space mean speed in ramp influence area, S_R = 80.2 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 80.2 km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	662	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	257	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	662		257			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	184		71			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	809	288	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 809 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	809	4500	No
v_{12}	809	4400	No
$v_{FO} = v_F - v_R$	521	4500	No
v_R	288	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 3.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.429		
Space mean speed in ramp influence area,	S_R = 80.1	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 80.1	km/h	

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E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	696	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	271	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	696		271			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	193		75			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	851	304	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 851 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	851	4500	No
v_{12}	851	4400	No
$v_{FO} = v_F - v_R$	547	4500	No
v_R	304	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 3.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.430	
Space mean speed in ramp influence area,	S_R = 80.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 80.1	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	732	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	281	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	732		281			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	203		78			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	895	315	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 895 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	895	4500	No
v_{12}	895	4400	No
$v_{FO} = v_F - v_R$	580	4500	No
v_R	315	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.431	
Space mean speed in ramp influence area,	S_R = 80.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 80.1	km/h

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	618	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	47	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	618	47		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	172	13		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           755         53                          pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L   =               (Equation 25-2 or 25-3)
                   EQ
                  P   =    1.000      Using Equation  0
                   FM
                  v   = v  (P  ) =  755    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     808           4600            No
      FO
     v                     808           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   5.4     pc/km/ln
          R                   R           12             A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.294
                                              S
Space mean speed in ramp influence area,     S  = 90.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: AM Peak
Freeway/Dir of Travel: Eastbond
Junction: Ashburn On Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	662	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	51	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	662	51		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	184	14		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	809	57	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 809 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	866	4600	No
v_{R12}	866	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 5.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 90.3	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 90.3	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	696	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	53	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	696	53		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	193	15		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           851         59                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =              (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  851    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     910           4600            No
      FO
     v                     910           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   5.8     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.295
                                              S
Space mean speed in ramp influence area,     S  = 90.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.3    km/h
_______________________________________________________________________________
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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	732	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	56	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	732	56		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	203	16		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	895	63	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 895 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	958	4600	No
v_{R12}	958	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 6.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.295	
Space mean speed in ramp influence area,	S_R = 90.3	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 90.3	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/207
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	2721	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	278	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2721		278			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	756		77			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3326        312                    pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =               (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3326   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                             Actual        Maximum         LOS F?
     v  = v                  3326          4500            No
      Fi   F
     v                       3326          4400            No
      12
     v  = v - v              3014          4500            No
      FO   F   R
     v                       312           2000            No
      R

_________________Level of Service Determination (if not F)______________________

Density,                D = 2.642 + 0.0053 v  - 0.0183  L   =   17.0-   pc/km/ln
                         R                  12           D
Level of service for ramp-freeway junction areas of influence  C

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.431
                                              S
Space mean speed in ramp influence area,     S  = 80.1    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 80.1    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Eastbound
Junction: Ashburn Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	2918	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	298	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2918		298			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	811		83			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           3566        334                  pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =              (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000     Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3566   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3566          4500            No
      Fi   F
     v                     3566          4400            No
      12
     v  = v - v            3232          4500            No
      FO   F   R
     v                     334           2000            No
      R

_________________Level of Service Determination (if not F)_____________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   18.2    pc/km/ln
                          R                  12           D
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                D  = 0.433
                                             S
Space mean speed in ramp influence area,    S  = 80.0    km/h
                                             R
Space mean speed in outer lanes,            S  =  N/A    km/h
                                             0
Space mean speed for all vehicles,          S  = 80.0    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	3066	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	314	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3066		314			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	852		87			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3747	352	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3747 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3747	4500	No
v_{12}	3747	4400	No
$v_{FO} = v_F - v_R$	3395	4500	No
v_R	352	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 19.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S =	0.435	
Space mean speed in ramp influence area,	S_R =	80.0	km/h
Space mean speed in outer lanes,	S_0 =	N/A	km/h
Space mean speed for all vehicles,	S =	80.0	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	3224	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	330	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3224		330			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	896		92			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3940	370	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3940 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3940	4500	No
v_{12}	3940	4400	No
$v_{FO} = v_F - v_R$	3570	4500	No
v_R	370	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 20.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.436		
Space mean speed in ramp influence area,	S_R = 80.0	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 80.0	km/h	

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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2/14/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2721	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	326	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2721	326		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	756	91		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3326	366	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3326 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3692	4600	No
v_{R12}	3692	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 19.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.441	
Space mean speed in ramp influence area,	S_R = 85.4	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 85.4	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2918	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	349	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2918	349		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	811	97		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3566        392                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3566   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3958          4600            No
      FO
     v                     3958          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   20.4    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.489
                                              S
Space mean speed in ramp influence area,     S  = 83.9    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 83.9    km/h
_______________________________________________________________________________
```

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Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM Peak
Freeway/Dir of Travel: Eastbond
Junction: Ashburn On Ramp
Jurisdiction: Provincial
Analysis Year: 2028
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3066	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	367	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3066	367		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	852	102		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3747	412	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3747 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4159	4600	No
v_{R12}	4159	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 21.3 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.535	
Space mean speed in ramp influence area,	S_R = 82.4	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 82.4	km/h

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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3224	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	385	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3224	385		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	896	107		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3940	432	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3940 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4372	4600	No
v_{R12}	4372	4600	No

Level of Service Determination (if not F)

Density, $D = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 22.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S	= 0.594	
Space mean speed in ramp influence area,	S_R	= 80.4	km/h
Space mean speed in outer lanes,	S_0	= N/A	km/h
Space mean speed for all vehicles,	S	= 80.4	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: Sat Peak
Freeway/Dir of Travel: Eastbound
Junction: Ashburn Off Ramp
Jurisdiction: Provincial
Analysis Year: 2016
Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	767	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	385	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	767		385			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	213		107			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	937	432	pcph

Estimation of V12 Diverge Areas

$L_{EQ} =$ (Equation 25-8 or 25-9)

$P_{FD} = 1.000$ Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 937$ pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	937	4500	No
v_{12}	937	4400	No
$v_{FO} = v_F - v_R$	505	4500	No
v_R	432	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D = 4.3$ pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	$D_S = 0.442$	
Space mean speed in ramp influence area,	$S_R = 79.8$	km/h
Space mean speed in outer lanes,	$S_0 =$ N/A	km/h
Space mean speed for all vehicles,	$S = 79.8$	km/h

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Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023
Description:	The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	823	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	413	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	823		413			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	229		115			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1006	463	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1006 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1006	4500	No
v_{12}	1006	4400	No
$v_{FO} = v_F - v_R$	543	4500	No
v_R	463	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.445	
Space mean speed in ramp influence area,	S_R = 79.8	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 79.8	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	856	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	456	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	856		456			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	238		127			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1046	512	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1046 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1046	4500	No
v_{12}	1046	4400	No
$v_{FO} = v_F - v_R$	534	4500	No
v_R	512	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 4.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.449	
Space mean speed in ramp influence area,	S_R = 79.7	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 79.7	km/h

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Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	899	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	479	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	899		479			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	250		133			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1099	538	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1099 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1099	4500	No
v_{12}	1099	4400	No
$v_{FO} = v_F - v_R$	561	4500	No
v_R	538	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 5.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.451	
Space mean speed in ramp influence area,	S_R = 79.6	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 79.6	km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	767	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	158	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	767	158		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	213	44		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	937	177	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 937 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1114	4600	No
v_{R12}	1114	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 6.8 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 90.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 90.2	km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	823	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	169	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	823	169		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	229	47		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1006	190	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1006 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1196	4600	No
v_{R12}	1196	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 7.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.298

Space mean speed in ramp influence area, S_R = 90.2 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 90.2 km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	856	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	187	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	856		187			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	238		52			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1046	210	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1046 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1256	4600	No
v_{R12}	1256	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 7.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.299

Space mean speed in ramp influence area, S_R = 90.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 90.1 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	899	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	197	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	899	197		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	250	55		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV             0.909       0.990
Driver population factor, fP              1.00        1.00
Flow rate, vp                             1099        221                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1099   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1320          4600            No
      FO
     v                     1320          4600            No
      R12

_________________Level of Service Determination (if not F)______________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   7.8     pc/km/ln
          R                   R           12              A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.300
                                              S
Space mean speed in ramp influence area,     S  = 90.1    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.1    km/h
_______________________________________________________________________________
```

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	377	75	49	741	102	56
Future Volume (vph)	377	75	49	741	102	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)		0.0	0.0		0.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.975					0.850
Flt Protected				0.997	0.950	
Satd. Flow (prot)	3489	0	0	3568	1789	1601
Flt Permitted				0.888	0.757	
Satd. Flow (perm)	3489	0	0	3178	1426	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	58					61
Link Speed (k/h)	48			48	48	
Link Distance (m)	53.7			221.5	497.7	
Travel Time (s)	4.0			16.6	37.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	410	82	53	805	111	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	492	0	0	858	111	61
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			2		
Permitted Phases			2		4	4
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.20			0.38	0.41	0.17
Control Delay	3.4			6.3	40.9	10.5
Queue Delay	0.6			0.0	0.0	0.0
Total Delay	4.0			6.4	40.9	10.5
LOS	A			A	D	B
Approach Delay	4.0			6.4	30.1	
Approach LOS	A			A	C	
Queue Length 50th (m)	7.2			30.1	19.1	0.0
Queue Length 95th (m)	10.4			39.1	35.6	10.4
Internal Link Dist (m)	29.7			197.5	473.7	

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Turn Bay Length (m)						
Base Capacity (vph)	2494			2256	270	353
Starvation Cap Reductn	1576			0	0	0
Spillback Cap Reductn	0			218	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.54			0.42	0.41	0.17

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	404	80	53	794	109	60
Future Volume (vph)	404	80	53	794	109	60
Satd. Flow (prot)	3489	0	0	3568	1789	1601
Flt Permitted				0.880	0.757	
Satd. Flow (perm)	3489	0	0	3149	1426	1601
Satd. Flow (RTOR)	57					65
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	526	0	0	921	118	65
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.21			0.41	0.44	0.18
Control Delay	4.1			6.6	41.7	10.2
Queue Delay	0.7			0.1	0.0	0.0
Total Delay	4.8			6.7	41.7	10.2
LOS	A			A	D	B
Approach Delay	4.8			6.7	30.5	
Approach LOS	A			A	C	
Queue Length 50th (m)	9.8			33.3	20.4	0.0
Queue Length 95th (m)	13.6			43.1	37.5	10.9
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2493			2235	270	356
Starvation Cap Reductn	1572			0	0	0
Spillback Cap Reductn	0			306	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.57			0.48	0.44	0.18

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 86.1%	ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	425	85	55	835	115	63
Future Volume (vph)	425	85	55	835	115	63
Satd. Flow (prot)	3489	0	0	3568	1789	1601
Flt Permitted				0.876	0.757	
Satd. Flow (perm)	3489	0	0	3135	1426	1601
Satd. Flow (RTOR)	57					68
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	554	0	0	968	125	68
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.22			0.44	0.46	0.19
Control Delay	4.2			6.8	42.4	10.0
Queue Delay	0.7			0.1	0.2	0.0
Total Delay	4.9			6.9	42.6	10.0
LOS	A			A	D	B
Approach Delay	4.9			6.9	31.1	
Approach LOS	A			A	C	
Queue Length 50th (m)	10.5			35.8	21.7	0.0
Queue Length 95th (m)	14.1			46.3	39.5	10.9
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2493			2225	270	359
Starvation Cap Reductn	1545			0	0	0
Spillback Cap Reductn	0			360	10	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.58			0.52	0.48	0.19

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 88.7%	ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	446	89	58	878	121	66
Future Volume (vph)	446	89	58	878	121	66
Satd. Flow (prot)	3489	0	0	3568	1789	1601
Flt Permitted				0.870	0.757	
Satd. Flow (perm)	3489	0	0	3113	1426	1601
Satd. Flow (RTOR)	58					72
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	582	0	0	1017	132	72
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.23			0.46	0.49	0.20
Control Delay	4.2			7.1	43.2	9.9
Queue Delay	0.8			0.2	0.6	0.0
Total Delay	4.9			7.2	43.7	9.9
LOS	A			A	D	A
Approach Delay	4.9			7.2	31.8	
Approach LOS	A			A	C	
Queue Length 50th (m)	11.1			38.5	23.0	0.0
Queue Length 95th (m)	14.2			49.8	41.4	11.3
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2494			2210	270	362
Starvation Cap Reductn	1519			0	0	0
Spillback Cap Reductn	0			412	22	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.60			0.57	0.53	0.20

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 92.1%	ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	924	266	124	585	266	204
Future Volume (vph)	924	266	124	585	266	204
Satd. Flow (prot)	3457	0	0	3546	1789	1601
Flt Permitted				0.558	0.757	
Satd. Flow (perm)	3457	0	0	1997	1426	1601
Satd. Flow (RTOR)	92					170
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1293	0	0	771	289	222
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.52			0.54	1.07	0.50
Control Delay	4.7			8.6	115.0	14.5
Queue Delay	5.1			0.2	17.0	0.0
Total Delay	9.8			8.8	132.0	14.5
LOS	A			A	F	B
Approach Delay	9.8			8.8	81.0	
Approach LOS	A			A	F	
Queue Length 50th (m)	22.0			32.1	~62.3	8.5
Queue Length 95th (m)	26.8			45.5	#111.8	29.6
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2481			1417	270	441
Starvation Cap Reductn	1108			0	0	0
Spillback Cap Reductn	0			146	96	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.94			0.61	1.66	0.50

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 23.6	Intersection LOS: C
Intersection Capacity Utilization 127.9%	ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	991	285	133	627	285	219
Future Volume (vph)	991	285	133	627	285	219
Satd. Flow (prot)	3457	0	0	3546	1789	1601
Flt Permitted				0.535	0.757	
Satd. Flow (perm)	3457	0	0	1915	1426	1601
Satd. Flow (RTOR)	92					148
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1387	0	0	827	310	238
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.56			0.61	1.15	0.56
Control Delay	4.9			9.8	139.1	20.1
Queue Delay	26.5			0.6	7.8	0.0
Total Delay	31.4			10.4	146.8	20.1
LOS	C			B	F	C
Approach Delay	31.4			10.4	91.8	
Approach LOS	C			B	F	
Queue Length 50th (m)	23.8			37.2	~70.8	15.1
Queue Length 95th (m)	m28.0			53.4	#121.9	38.8
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2481			1359	270	424
Starvation Cap Reductn	1152			0	0	0
Spillback Cap Reductn	0			221	108	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	1.04			0.73	1.91	0.56

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 135.4%	ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1041	300	140	659	300	230
Future Volume (vph)	1041	300	140	659	300	230
Satd. Flow (prot)	3457	0	0	3546	1789	1601
Flt Permitted				0.521	0.757	
Satd. Flow (perm)	3457	0	0	1864	1426	1601
Satd. Flow (RTOR)	92					133
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1458	0	0	868	326	250
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.59			0.66	1.21	0.61
Control Delay	5.0			10.8	159.7	24.2
Queue Delay	48.9			1.5	8.7	0.0
Total Delay	53.8			12.3	168.3	24.2
LOS	D			B	F	C
Approach Delay	53.8			12.3	105.8	
Approach LOS	D			B	F	
Queue Length 50th (m)	26.1			41.6	~77.3	20.0
Queue Length 95th (m)	m27.6			60.6	#129.2	45.5
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2481			1323	270	411
Starvation Cap Reductn	1181			0	0	0
Spillback Cap Reductn	0			263	116	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	1.12			0.82	2.12	0.61

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 51.7	Intersection LOS: D
Intersection Capacity Utilization 142.1%	ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1094	315	147	693	315	242
Future Volume (vph)	1094	315	147	693	315	242
Satd. Flow (prot)	3457	0	0	3546	1789	1601
Flt Permitted				0.507	0.757	
Satd. Flow (perm)	3457	0	0	1814	1426	1601
Satd. Flow (RTOR)	91					119
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1531	0	0	913	342	263
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.62			0.96dl	1.27	0.66
Control Delay	4.9			12.3	181.6	28.9
Queue Delay	48.9			4.8	9.5	0.0
Total Delay	53.8			17.2	191.2	28.9
LOS	D			B	F	C
Approach Delay	53.8			17.2	120.6	
Approach LOS	D			B	F	
Queue Length 50th (m)	27.7			46.8	~83.8	25.5
Queue Length 95th (m)	m27.1			69.9	#136.9	52.5
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2480			1287	270	400
Starvation Cap Reductn	1210			0	0	0
Spillback Cap Reductn	0			301	123	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	1.21			0.93	2.33	0.66

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.27	
Intersection Signal Delay: 56.1	Intersection LOS: E
Intersection Capacity Utilization 148.3%	ICU Level of Service H

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	593	265	214	470	230	239
Future Volume (vph)	593	265	214	470	230	239
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)		0.0	0.0		0.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.954					0.850
Flt Protected				0.985	0.950	
Satd. Flow (prot)	3414	0	0	3525	1789	1601
Flt Permitted				0.556	0.757	
Satd. Flow (perm)	3414	0	0	1990	1426	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	176					260
Link Speed (k/h)	48			48	48	
Link Distance (m)	53.7			221.5	497.7	
Travel Time (s)	4.0			16.6	37.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	645	288	233	511	250	260
Shared Lane Traffic (%)						
Lane Group Flow (vph)	933	0	0	744	250	260
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			2		
Permitted Phases			2		4	4
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.38			0.53	0.93	0.51
Control Delay	4.6			8.4	80.2	8.3
Queue Delay	0.6			0.1	49.4	0.0
Total Delay	5.1			8.4	129.6	8.3
LOS	A			A	F	A
Approach Delay	5.1			8.4	67.8	
Approach LOS	A			A	E	
Queue Length 50th (m)	16.6			30.4	48.0	0.0
Queue Length 95th (m)	20.4			43.1	#93.1	20.0
Internal Link Dist (m)	29.7			197.5	473.7	

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Turn Bay Length (m)						
Base Capacity (vph)	2474			1412	270	514
Starvation Cap Reductn	1040			0	0	0
Spillback Cap Reductn	0			70	78	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.65			0.55	1.30	0.51

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	636	284	229	504	247	256
Future Volume (vph)	636	284	229	504	247	256
Satd. Flow (prot)	3414	0	0	3525	1789	1601
Flt Permitted				0.544	0.757	
Satd. Flow (perm)	3414	0	0	1947	1426	1601
Satd. Flow (RTOR)	177					278
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1000	0	0	797	268	278
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.40			0.58	0.99	0.53
Control Delay	4.8			9.2	95.2	8.3
Queue Delay	0.6			0.2	38.3	0.0
Total Delay	5.3			9.3	133.5	8.3
LOS	A			A	F	A
Approach Delay	5.3			9.3	69.8	
Approach LOS	A			A	E	
Queue Length 50th (m)	18.2			34.5	52.3	0.0
Queue Length 95th (m)	22.5			49.3	#102.0	20.8
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2475			1382	270	529
Starvation Cap Reductn	975			0	0	0
Spillback Cap Reductn	0			97	84	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.67			0.62	1.44	0.53

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 146.7%	ICU Level of Service H

Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	668	299	241	530	259	269
Future Volume (vph)	668	299	241	530	259	269
Satd. Flow (prot)	3414	0	0	3525	1789	1601
Flt Permitted				0.535	0.757	
Satd. Flow (perm)	3414	0	0	1915	1426	1601
Satd. Flow (RTOR)	177					289
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1051	0	0	838	282	292
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.42			0.62	1.04	0.54
Control Delay	4.9			9.9	107.9	8.7
Queue Delay	0.6			0.3	25.0	0.0
Total Delay	5.5			10.2	132.9	8.7
LOS	A			B	F	A
Approach Delay	5.5			10.2	69.7	
Approach LOS	A			B	E	
Queue Length 50th (m)	19.4			38.1	~59.4	0.5
Queue Length 95th (m)	23.6			54.9	#108.5	22.0
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2475			1359	270	538
Starvation Cap Reductn	926			0	0	0
Spillback Cap Reductn	0			132	91	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.68			0.68	1.58	0.54

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 146.7%	ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9:

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	702	314	253	557	272	283
Future Volume (vph)	702	314	253	557	272	283
Satd. Flow (prot)	3414	0	0	3525	1789	1601
Flt Permitted				0.527	0.757	
Satd. Flow (perm)	3414	0	0	1886	1426	1601
Satd. Flow (RTOR)	176					269
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1104	0	0	880	296	308
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Total Split (s)	76.0		76.0	76.0	24.0	24.0
Total Lost Time (s)	5.0			5.0	5.0	5.0
Act Effct Green (s)	71.0			71.0	19.0	19.0
Actuated g/C Ratio	0.71			0.71	0.19	0.19
v/c Ratio	0.45			0.91dl	1.10	0.59
Control Delay	5.0			10.8	122.6	12.1
Queue Delay	0.6			0.7	8.3	0.0
Total Delay	5.6			11.5	130.8	12.1
LOS	A			B	F	B
Approach Delay	5.6			11.5	70.3	
Approach LOS	A			B	E	
Queue Length 50th (m)	20.7			42.2	~65.1	6.3
Queue Length 95th (m)	24.9			61.4	#115.0	30.9
Internal Link Dist (m)	29.7			197.5	470.0	
Turn Bay Length (m)						
Base Capacity (vph)	2474			1339	270	522
Starvation Cap Reductn	873			0	0	0
Spillback Cap Reductn	0			178	100	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.69			0.76	1.74	0.59

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 22.7	Intersection LOS: C
Intersection Capacity Utilization 146.7%	ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

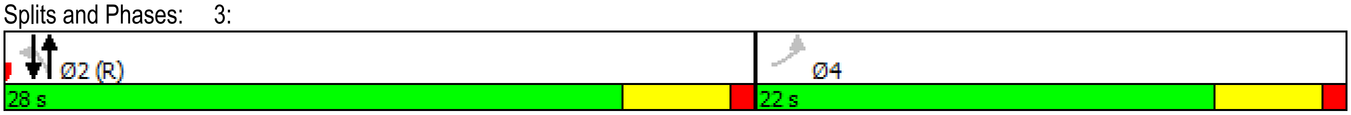
Splits and Phases: 9:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	169	73	44	298	747	63
Future Volume (vph)	169	73	44	298	747	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.959				0.988	
Flt Protected	0.966			0.994		
Satd. Flow (prot)	1745	0	0	3557	3536	0
Flt Permitted	0.966			0.801		
Satd. Flow (perm)	1745	0	0	2866	3536	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	47				23	
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.8			306.1	53.7	
Travel Time (s)	19.1			22.0	3.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	184	79	48	324	812	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	263	0	0	372	880	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	2	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.42			0.28	0.54	
Control Delay	12.9			9.1	8.3	
Queue Delay	0.0			0.0	1.4	
Total Delay	12.9			9.1	9.7	
LOS	B			A	A	
Approach Delay	12.9			9.1	9.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	14.1			10.0	22.3	
Queue Length 95th (m)	29.2			16.8	30.7	
Internal Link Dist (m)	240.8			282.1	29.7	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Bay Length (m)						
Base Capacity (vph)	624			1318	1638	
Starvation Cap Reductn	0			0	521	
Spillback Cap Reductn	0			17	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.42			0.29	0.79	

Intersection Summary	
Area Type: Other	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBSB, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 58.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3:

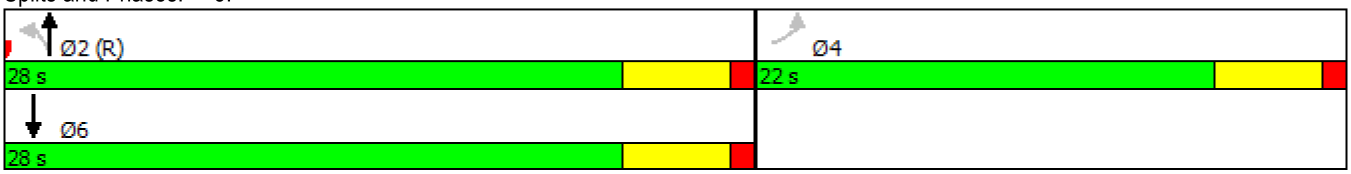


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	235	85	47	319	801	68
Future Volume (vph)	235	85	47	319	801	68
Satd. Flow (prot)	1752	0	0	3557	3536	0
Flt Permitted	0.965			0.788		
Satd. Flow (perm)	1752	0	0	2820	3536	0
Satd. Flow (RTOR)	39				23	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	347	0	0	398	945	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.56			0.31	0.58	
Control Delay	16.0			9.3	8.9	
Queue Delay	0.0			0.0	1.5	
Total Delay	16.0			9.3	10.4	
LOS	B			A	B	
Approach Delay	16.0			9.3	10.4	
Approach LOS	B			A	B	
Queue Length 50th (m)	21.3			10.8	24.5	
Queue Length 95th (m)	41.3			18.1	38.2	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	621			1297	1638	
Starvation Cap Reductn	0			0	473	
Spillback Cap Reductn	0			26	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.56			0.31	0.81	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 71.9%	ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3:

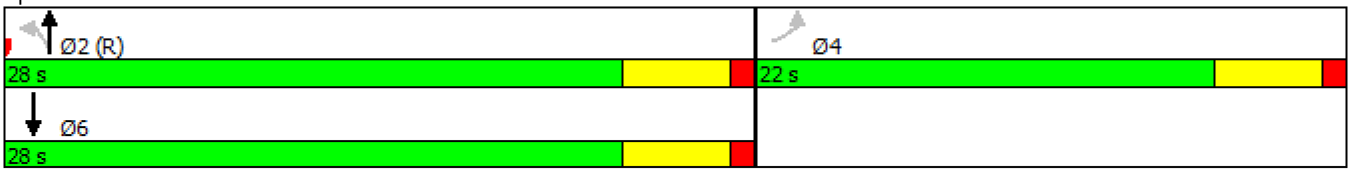


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	247	89	50	336	842	71
Future Volume (vph)	247	89	50	336	842	71
Satd. Flow (prot)	1752	0	0	3557	3536	0
Flt Permitted	0.965			0.777		
Satd. Flow (perm)	1752	0	0	2781	3536	0
Satd. Flow (RTOR)	39				23	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	365	0	0	419	992	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.59			0.33	0.61	
Control Delay	16.7			9.5	9.4	
Queue Delay	0.0			0.0	1.6	
Total Delay	16.7			9.5	10.9	
LOS	B			A	B	
Approach Delay	16.7			9.5	10.9	
Approach LOS	B			A	B	
Queue Length 50th (m)	22.8			11.5	26.2	
Queue Length 95th (m)	44.1			19.2	43.7	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	621			1279	1638	
Starvation Cap Reductn	0			0	437	
Spillback Cap Reductn	0			27	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.59			0.33	0.83	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 75.6%	ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3:



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	259	94	52	353	885	75
Future Volume (vph)	259	94	52	353	885	75
Satd. Flow (prot)	1752	0	0	3557	3536	0
Flt Permitted	0.965			0.754		
Satd. Flow (perm)	1752	0	0	2698	3536	0
Satd. Flow (RTOR)	39				23	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	384	0	0	441	1044	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.62			0.36	0.64	
Control Delay	17.5			9.8	10.0	
Queue Delay	0.0			0.0	1.7	
Total Delay	17.5			9.8	11.6	
LOS	B			A	B	
Approach Delay	17.5			9.8	11.6	
Approach LOS	B			A	B	
Queue Length 50th (m)	24.6			12.2	28.0	
Queue Length 95th (m)	47.0			20.4	49.7	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	621			1241	1638	
Starvation Cap Reductn	0			0	398	
Spillback Cap Reductn	0			53	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.62			0.37	0.84	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 78.6%	ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	398	36	91	802	673	178
Future Volume (vph)	398	36	91	802	673	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.989				0.969	
Flt Protected	0.956			0.995		
Satd. Flow (prot)	1781	0	0	3561	3468	0
Flt Permitted	0.956			0.729		
Satd. Flow (perm)	1781	0	0	2609	3468	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	10				88	
Link Speed (k/h)	48			48	48	
Link Distance (m)	264.8			306.1	53.7	
Travel Time (s)	19.9			23.0	4.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	433	39	99	872	732	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	472	0	0	971	925	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	2	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.77			0.81	0.56	
Control Delay	25.7			18.9	9.5	
Queue Delay	0.4			0.2	7.1	
Total Delay	26.1			19.1	16.5	
LOS	C			B	B	
Approach Delay	26.1			19.1	16.5	
Approach LOS	C			B	B	
Queue Length 50th (m)	35.7			36.2	31.4	
Queue Length 95th (m)	#76.2			#68.0	m38.7	
Internal Link Dist (m)	240.8			282.1	29.7	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Bay Length (m)						
Base Capacity (vph)	612			1200	1642	
Starvation Cap Reductn	0			0	665	
Spillback Cap Reductn	15			19	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.79			0.82	0.95	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 45 (90%), Referenced to phase 2:NBSB, Start of 1st Green

Control Type: Pretimed

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 19.5 Intersection LOS: B

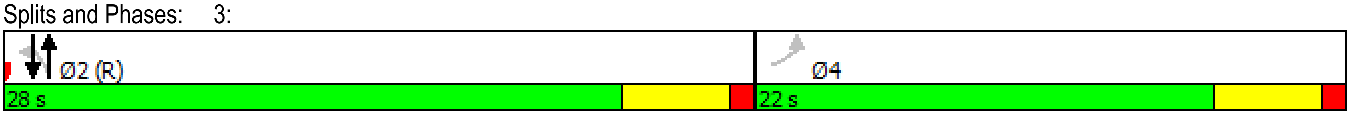
Intersection Capacity Utilization 85.8% ICU Level of Service E

Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	427	39	98	860	722	191
Future Volume (vph)	427	39	98	860	722	191
Satd. Flow (prot)	1781	0	0	3561	3468	0
Flt Permitted	0.956			0.692		
Satd. Flow (perm)	1781	0	0	2476	3468	0
Satd. Flow (RTOR)	10				88	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	506	0	0	1042	993	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.83			0.92	0.60	
Control Delay	29.6			28.0	10.2	
Queue Delay	1.0			1.6	26.6	
Total Delay	30.7			29.6	36.9	
LOS	C			C	D	
Approach Delay	30.7			29.6	36.9	
Approach LOS	C			C	D	
Queue Length 50th (m)	39.3			42.1	36.2	
Queue Length 95th (m)	#84.3			#79.2	m40.6	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	612			1138	1642	
Starvation Cap Reductn	0			0	686	
Spillback Cap Reductn	21			29	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.86			0.94	1.04	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 32.7	Intersection LOS: C
Intersection Capacity Utilization 91.2%	ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	448	41	103	904	758	201
Future Volume (vph)	448	41	103	904	758	201
Satd. Flow (prot)	1781	0	0	3561	3468	0
Flt Permitted	0.956			0.668		
Satd. Flow (perm)	1781	0	0	2390	3468	0
Satd. Flow (RTOR)	10				88	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	532	0	0	1095	1042	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.87			1.00	0.63	
Control Delay	33.9			43.4	10.7	
Queue Delay	8.6			7.0	50.0	
Total Delay	42.5			50.4	60.7	
LOS	D			D	E	
Approach Delay	42.5			50.4	60.7	
Approach LOS	D			D	E	
Queue Length 50th (m)	42.3			47.2	39.3	
Queue Length 95th (m)	#90.6			#87.1	m42.1	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	612			1099	1642	
Starvation Cap Reductn	0			0	699	
Spillback Cap Reductn	60			28	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.96			1.02	1.10	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 52.8	Intersection LOS: D
Intersection Capacity Utilization 95.2%	ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	471	43	108	950	797	211
Future Volume (vph)	471	43	108	950	797	211
Satd. Flow (prot)	1781	0	0	3561	3468	0
Flt Permitted	0.956			0.643		
Satd. Flow (perm)	1781	0	0	2301	3468	0
Satd. Flow (RTOR)	10				88	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	559	0	0	1150	1095	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.91			1.09	0.67	
Control Delay	39.7			72.3	11.0	
Queue Delay	19.0			5.5	50.0	
Total Delay	58.8			77.8	61.1	
LOS	E			E	E	
Approach Delay	58.8			77.8	61.1	
Approach LOS	E			E	E	
Queue Length 50th (m)	45.5			~63.5	41.3	
Queue Length 95th (m)	#96.9			#95.3	m43.5	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	612			1058	1642	
Starvation Cap Reductn	0			0	711	
Spillback Cap Reductn	65			27	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	1.02			1.12	1.18	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 67.5	Intersection LOS: E
Intersection Capacity Utilization 99.4%	ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

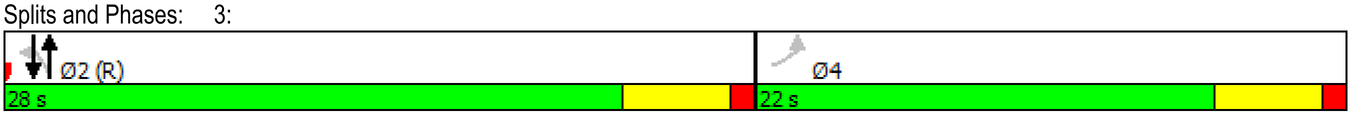
Splits and Phases: 3:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	346	20	27	527	574	108
Future Volume (vph)	346	20	27	527	574	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.993				0.976	
Flt Protected	0.955			0.998		
Satd. Flow (prot)	1786	0	0	3571	3493	0
Flt Permitted	0.955			0.902		
Satd. Flow (perm)	1786	0	0	3228	3493	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6				57	
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.8			306.1	53.7	
Travel Time (s)	19.1			22.0	3.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	376	22	29	573	624	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	0	0	602	741	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	2	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.65			0.41	0.45	
Control Delay	19.9			10.0	8.9	
Queue Delay	0.0			0.1	3.1	
Total Delay	19.9			10.1	12.0	
LOS	B			B	B	
Approach Delay	19.9			10.1	12.0	
Approach LOS	B			B	B	
Queue Length 50th (m)	28.7			17.3	26.9	
Queue Length 95th (m)	52.0			26.9	m32.2	
Internal Link Dist (m)	240.8			282.1	29.7	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Bay Length (m)						
Base Capacity (vph)	611			1484	1637	
Starvation Cap Reductn	0			0	765	
Spillback Cap Reductn	0			112	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.65			0.44	0.85	

Intersection Summary	
Area Type: Other	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBSB, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3:



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	371	21	29	565	615	116
Future Volume (vph)	371	21	29	565	615	116
Satd. Flow (prot)	1786	0	0	3571	3493	0
Flt Permitted	0.955			0.894		
Satd. Flow (perm)	1786	0	0	3199	3493	0
Satd. Flow (RTOR)	6				58	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	426	0	0	646	794	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.70			0.44	0.48	
Control Delay	21.9			10.3	9.5	
Queue Delay	0.0			0.1	5.8	
Total Delay	21.9			10.4	15.2	
LOS	C			B	B	
Approach Delay	21.9			10.4	15.2	
Approach LOS	C			B	B	
Queue Length 50th (m)	31.4			18.8	27.4	
Queue Length 95th (m)	#65.5			29.2	m34.3	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	611			1471	1638	
Starvation Cap Reductn	0			0	774	
Spillback Cap Reductn	0			128	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.70			0.48	0.92	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 67.3%	ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	390	23	30	594	647	122
Future Volume (vph)	390	23	30	594	647	122
Satd. Flow (prot)	1784	0	0	3571	3493	0
Flt Permitted	0.955			0.891		
Satd. Flow (perm)	1784	0	0	3188	3493	0
Satd. Flow (RTOR)	6				58	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	449	0	0	679	836	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.74			0.46	0.51	
Control Delay	23.9			10.6	9.8	
Queue Delay	0.1			0.0	11.7	
Total Delay	24.0			10.6	21.5	
LOS	C			B	C	
Approach Delay	24.0			10.6	21.5	
Approach LOS	C			B	C	
Queue Length 50th (m)	33.7			20.2	29.3	
Queue Length 95th (m)	#71.2			31.0	m36.6	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	610			1466	1638	
Starvation Cap Reductn	0			0	781	
Spillback Cap Reductn	4			13	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.74			0.47	0.98	

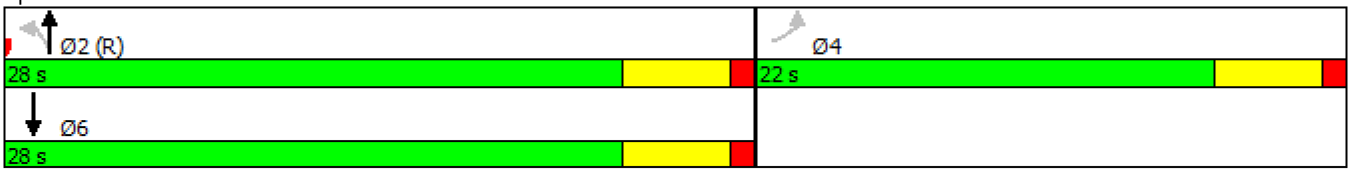
Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 70.0%	ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	410	24	32	624	680	128
Future Volume (vph)	410	24	32	624	680	128
Satd. Flow (prot)	1786	0	0	3571	3493	0
Flt Permitted	0.955			0.885		
Satd. Flow (perm)	1786	0	0	3167	3493	0
Satd. Flow (RTOR)	6				57	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	472	0	0	713	878	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	22.0		28.0	28.0	28.0	
Total Lost Time (s)	5.0			5.0	5.0	
Act Effct Green (s)	17.0			23.0	23.0	
Actuated g/C Ratio	0.34			0.46	0.46	
v/c Ratio	0.77			0.49	0.54	
Control Delay	25.9			10.9	10.2	
Queue Delay	0.2			0.0	25.7	
Total Delay	26.1			10.9	35.9	
LOS	C			B	D	
Approach Delay	26.1			10.9	35.9	
Approach LOS	C			B	D	
Queue Length 50th (m)	36.1			21.5	32.2	
Queue Length 95th (m)	#76.6			33.0	m38.9	
Internal Link Dist (m)	240.8			282.1	29.7	
Turn Bay Length (m)						
Base Capacity (vph)	611			1456	1637	
Starvation Cap Reductn	0			0	787	
Spillback Cap Reductn	8			21	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.78			0.50	1.03	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 45 (90%), Referenced to phase 2:NBTL, Start of 1st Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 25.0	Intersection LOS: C
Intersection Capacity Utilization 73.5%	ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3:

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	178	2	6	463
Future Vol, veh/h	3	1	178	2	6	463
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	193	2	7	503

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	711	195	0	0	196	0
Stage 1	195	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	400	846	-	-	1377	-
Stage 1	838	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	397	846	-	-	1377	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	838	-	-	-	-	-
Stage 2	595	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	458	1377	-
HCM Lane V/C Ratio	-	-	0.009	0.005	-
HCM Control Delay (s)	-	-	12.9	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	191	2	6	496
Future Vol, veh/h	3	1	191	2	6	496
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	208	2	7	539

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	761	209	0	0	210	0
Stage 1	209	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	373	831	-	-	1361	-
Stage 1	826	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	370	831	-	-	1361	-
Mov Cap-2 Maneuver	370	-	-	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	573	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	430	1361	-
HCM Lane V/C Ratio	-	-	0.01	0.005	-
HCM Control Delay (s)	-	-	13.5	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	201	2	6	522
Future Vol, veh/h	3	1	201	2	6	522
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	218	2	7	567

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	800	220	0	0	221	0
Stage 1	220	-	-	-	-	-
Stage 2	580	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	354	820	-	-	1348	-
Stage 1	817	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	351	820	-	-	1348	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	556	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	410	1348	-
HCM Lane V/C Ratio	-	-	0.011	0.005	-
HCM Control Delay (s)	-	-	13.9	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	211	2	6	548
Future Vol, veh/h	3	1	211	2	6	548
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	229	2	7	596

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	839	230	0	0	232	0
Stage 1	230	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	336	809	-	-	1336	-
Stage 1	808	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	333	809	-	-	1336	-
Mov Cap-2 Maneuver	333	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	390	1336	-
HCM Lane V/C Ratio	-	-	0.011	0.005	-
HCM Control Delay (s)	-	-	14.3	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	764	4	4	677
Future Vol, veh/h	5	5	764	4	4	677
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	830	4	4	736

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1578	833	0	0	835	0
Stage 1	833	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	120	369	-	-	798	-
Stage 1	427	-	-	-	-	-
Stage 2	469	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	369	-	-	798	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	465	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.3	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	180	798	-
HCM Lane V/C Ratio	-	-	0.06	0.005	-
HCM Control Delay (s)	-	-	26.3	9.5	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	819	4	4	726
Future Vol, veh/h	5	5	819	4	4	726
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	890	4	4	789

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1690	892	0	0	895	0
Stage 1	892	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	103	341	-	-	758	-
Stage 1	400	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	102	341	-	-	758	-
Mov Cap-2 Maneuver	102	-	-	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	439	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.6	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	157	758	-
HCM Lane V/C Ratio	-	-	0.069	0.006	-
HCM Control Delay (s)	-	-	29.6	9.8	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	861	4	4	763
Future Vol, veh/h	5	5	861	4	4	763
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	936	4	4	829

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1776	938	0	0	940	0
Stage 1	938	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	91	321	-	-	729	-
Stage 1	381	-	-	-	-	-
Stage 2	424	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	90	321	-	-	729	-
Mov Cap-2 Maneuver	90	-	-	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.7	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	141	729	-
HCM Lane V/C Ratio	-	-	0.077	0.006	-
HCM Control Delay (s)	-	-	32.7	10	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	905	4	4	802
Future Vol, veh/h	5	5	905	4	4	802
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	984	4	4	872

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1866	986	0	0	988	0
Stage 1	986	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Critical Hdwy	7.12	6.22	-	-	4.12	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	56	301	-	-	699	-
Stage 1	298	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	301	-	-	699	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	298	-	-	-	-	-
Stage 2	338	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	48.2	0	0.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	94	699	-
HCM Lane V/C Ratio	-	-	0.116	0.006	-
HCM Control Delay (s)	-	-	48.2	10.2	0
HCM Lane LOS	-	-	E	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	226	1	2	313
Future Vol, veh/h	2	2	226	1	2	313
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	246	1	2	340

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	591	246	0	0	247	0
Stage 1	246	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	470	793	-	-	1319	-
Stage 1	795	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	469	793	-	-	1319	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	589	1319	-
HCM Lane V/C Ratio	-	-	0.007	0.002	-
HCM Control Delay (s)	-	-	11.2	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	242	1	2	336
Future Vol, veh/h	2	2	242	1	2	336
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	263	1	2	365

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	634	264	0	0	264	0
Stage 1	264	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	443	775	-	-	1300	-
Stage 1	780	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	442	775	-	-	1300	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	563	1300	-
HCM Lane V/C Ratio	-	-	0.008	0.002	-
HCM Control Delay (s)	-	-	11.4	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	255	1	2	353
Future Vol, veh/h	2	2	255	1	2	353
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	277	1	2	384

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	666	278	0	0	278	0
Stage 1	278	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	425	761	-	-	1285	-
Stage 1	769	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	424	761	-	-	1285	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	545	1285	-
HCM Lane V/C Ratio	-	-	0.008	0.002	-
HCM Control Delay (s)	-	-	11.7	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	268	1	2	371
Future Vol, veh/h	2	2	268	1	2	371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	291	1	2	403

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	700	292	0	0	292	0
Stage 1	292	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	7.12	6.22	-	-	4.12	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	354	747	-	-	1270	-
Stage 1	716	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	353	747	-	-	1270	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	619	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	479	1270	-
HCM Lane V/C Ratio	-	-	0.009	0.002	-
HCM Control Delay (s)	-	-	12.6	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	1	132	130	1	3	2
Future Vol, veh/h	1	132	130	1	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	143	141	1	3	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	288	142
Stage 1	-	-	-	-	142	-
Stage 2	-	-	-	-	146	-
Critical Hdwy	4.12	-	-	-	7.12	6.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1441	-	-	-	664	906
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	857	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1441	-	-	-	663	906
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	856	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1441	-	743	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.5	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	1	142	139	1	3	2
Future Vol, veh/h	1	142	139	1	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	154	151	1	3	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	152	0	-	0	309	152
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1429	-	-	-	683	894
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1429	-	-	-	682	894
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	870	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1429	-	753	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.5	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	1	149	146	1	3	2
Future Vol, veh/h	1	149	146	1	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	162	159	1	3	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	160	0	-	0	323	159
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	164	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1419	-	-	-	671	886
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	670	886
Mov Cap-2 Maneuver	-	-	-	-	670	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	864	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1419	-	742	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.5	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	1	156	154	1	3	2
Future Vol, veh/h	1	156	154	1	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	170	167	1	3	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	168	0	-	0	340	168
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	172	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1410	-	-	-	656	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	858	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1410	-	-	-	655	876
Mov Cap-2 Maneuver	-	-	-	-	655	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	857	-

Approach	NB	SB	SE
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1410	-	729	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.6	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	5	643	113	1	3	1
Future Vol, veh/h	5	643	113	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	699	123	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	124	0	-	0	833	123
Stage 1	-	-	-	-	123	-
Stage 2	-	-	-	-	710	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1463	-	-	-	339	928
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1463	-	-	-	337	928
Mov Cap-2 Maneuver	-	-	-	-	337	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	484	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1463	-	401	-	-
HCM Lane V/C Ratio	0.004	-	0.011	-	-
HCM Control Delay (s)	7.5	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	5	689	121	1	3	1
Future Vol, veh/h	5	689	121	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	749	132	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	133	0	-	0	892	132
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	760	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1452	-	-	-	312	917
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	462	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1452	-	-	-	310	917
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	459	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1452	-	371	-	-
HCM Lane V/C Ratio	0.004	-	0.012	-	-
HCM Control Delay (s)	7.5	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	5	725	127	1	3	1
Future Vol, veh/h	5	725	127	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	788	138	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	139	0	-	0	938	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	799	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1445	-	-	-	293	909
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	443	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	291	909
Mov Cap-2 Maneuver	-	-	-	-	291	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	440	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1445	-	351	-	-
HCM Lane V/C Ratio	0.004	-	0.012	-	-
HCM Control Delay (s)	7.5	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	5	762	134	1	3	1
Future Vol, veh/h	5	762	134	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	828	146	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	147	0	-	0	985	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	839	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1435	-	-	-	275	901
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	424	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1435	-	-	-	273	901
Mov Cap-2 Maneuver	-	-	-	-	273	-
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	421	-

Approach	NB	SB	SE
HCM Control Delay, s	0	0	16
HCM LOS			C

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1435	-	331	-	-
HCM Lane V/C Ratio	0.004	-	0.013	-	-
HCM Control Delay (s)	7.5	0	16	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	3	179	72	1	3	1
Future Vol, veh/h	3	179	72	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	195	78	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	79	0	-	0	280	79
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	201	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1519	-	-	-	710	981
Stage 1	-	-	-	-	944	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1519	-	-	-	709	981
Mov Cap-2 Maneuver	-	-	-	-	709	-
Stage 1	-	-	-	-	944	-
Stage 2	-	-	-	-	831	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1519	-	762	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.4	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	3	192	77	1	3	1
Future Vol, veh/h	3	192	77	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	209	84	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	85	0	-	0	299	84
Stage 1	-	-	-	-	84	-
Stage 2	-	-	-	-	215	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1512	-	-	-	692	975
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	821	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1512	-	-	-	691	975
Mov Cap-2 Maneuver	-	-	-	-	691	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	819	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1512	-	745	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.4	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	3	202	81	1	3	1
Future Vol, veh/h	3	202	81	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	220	88	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	89	0	-	0	315	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1506	-	-	-	678	969
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1506	-	-	-	677	969
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	810	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1506	-	732	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.4	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	3	212	85	1	3	1
Future Vol, veh/h	3	212	85	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	230	92	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	93	0	-	0	330	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	4.12	-	-	-	7.12	6.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1501	-	-	-	623	964
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1501	-	-	-	622	964
Mov Cap-2 Maneuver	-	-	-	-	622	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	764	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1501	-	683	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.4	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	161	128	32	14	3
Future Vol, veh/h	2	161	128	32	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	175	139	35	15	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	174	0	-	0	336	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	179	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1403	-	-	-	659	889
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1403	-	-	-	658	889
Mov Cap-2 Maneuver	-	-	-	-	658	-
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1403	-	-	-	690
HCM Lane V/C Ratio	0.002	-	-	-	0.027
HCM Control Delay (s)	7.6	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	173	137	32	14	3
Future Vol, veh/h	2	173	137	32	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	188	149	35	15	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	358	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	192	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	640	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	639	878
Mov Cap-2 Maneuver	-	-	-	-	639	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	839	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1391	-	-	-	671
HCM Lane V/C Ratio	0.002	-	-	-	0.028
HCM Control Delay (s)	7.6	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	181	144	32	14	3
Future Vol, veh/h	2	181	144	32	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	197	157	35	15	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	191	0	-	0	375	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	201	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1383	-	-	-	626	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1383	-	-	-	625	869
Mov Cap-2 Maneuver	-	-	-	-	625	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	831	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1383	-	-	-	658
HCM Lane V/C Ratio	0.002	-	-	-	0.028
HCM Control Delay (s)	7.6	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	191	152	32	14	3
Future Vol, veh/h	2	191	152	32	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	208	165	35	15	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	200	0	-	0	395	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	212	-
Critical Hdwy	4.12	-	-	-	7.12	6.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1372	-	-	-	565	859
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1372	-	-	-	564	859
Mov Cap-2 Maneuver	-	-	-	-	564	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	788	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1372	-	-	-	600
HCM Lane V/C Ratio	0.002	-	-	-	0.031
HCM Control Delay (s)	7.6	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	558	114	20	28	0
Future Vol, veh/h	2	558	114	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	607	124	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	146	0	-	0	746	135
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	611	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1436	-	-	-	381	914
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1436	-	-	-	380	914
Mov Cap-2 Maneuver	-	-	-	-	380	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1436	-	-	-	380
HCM Lane V/C Ratio	0.002	-	-	-	0.08
HCM Control Delay (s)	7.5	0	-	-	15.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	598	122	20	28	0
Future Vol, veh/h	2	598	122	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	650	133	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	154	0	-	0	797	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	654	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1426	-	-	-	356	905
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1426	-	-	-	355	905
Mov Cap-2 Maneuver	-	-	-	-	355	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	516	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1426	-	-	-	355
HCM Lane V/C Ratio	0.002	-	-	-	0.086
HCM Control Delay (s)	7.5	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	629	128	20	28	0
Future Vol, veh/h	2	629	128	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	684	139	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	161	0	-	0	838	150
Stage 1	-	-	-	-	150	-
Stage 2	-	-	-	-	688	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1418	-	-	-	336	896
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1418	-	-	-	335	896
Mov Cap-2 Maneuver	-	-	-	-	335	-
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1418	-	-	-	335
HCM Lane V/C Ratio	0.002	-	-	-	0.091
HCM Control Delay (s)	7.5	0	-	-	16.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	661	135	20	28	0
Future Vol, veh/h	2	661	135	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	718	147	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	168	0	-	0	881	158
Stage 1	-	-	-	-	158	-
Stage 2	-	-	-	-	723	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1410	-	-	-	317	887
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1410	-	-	-	316	887
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	480	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1410	-	-	-	316
HCM Lane V/C Ratio	0.002	-	-	-	0.096
HCM Control Delay (s)	7.6	0	-	-	17.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	179	70	16	12	3
Future Vol, veh/h	0	179	70	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	195	76	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	93	0	-	0	280	85
Stage 1	-	-	-	-	85	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1501	-	-	-	710	974
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1501	-	-	-	710	974
Mov Cap-2 Maneuver	-	-	-	-	710	-
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1501	-	-	-	751
HCM Lane V/C Ratio	-	-	-	-	0.022
HCM Control Delay (s)	0	-	-	-	9.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	192	75	16	12	3
Future Vol, veh/h	0	192	75	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	209	82	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	99	0	-	0	299	90
Stage 1	-	-	-	-	90	-
Stage 2	-	-	-	-	209	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1494	-	-	-	692	968
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	826	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1494	-	-	-	692	968
Mov Cap-2 Maneuver	-	-	-	-	692	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	826	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1494	-	-	-	734
HCM Lane V/C Ratio	-	-	-	-	0.022
HCM Control Delay (s)	0	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	202	79	16	12	3
Future Vol, veh/h	0	202	79	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	220	86	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	315	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1489	-	-	-	678	962
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	817	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1489	-	-	-	678	962
Mov Cap-2 Maneuver	-	-	-	-	678	-
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	817	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	721
HCM Lane V/C Ratio	-	-	-	-	0.023
HCM Control Delay (s)	0	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	212	83	16	12	3
Future Vol, veh/h	0	212	83	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	230	90	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	108	0	-	0	329	99
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	230	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1483	-	-	-	665	957
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	808	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1483	-	-	-	665	957
Mov Cap-2 Maneuver	-	-	-	-	665	-
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1483	-	-	-	708
HCM Lane V/C Ratio	-	-	-	-	0.023
HCM Control Delay (s)	0	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	63.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	164	126	63	64	329	458
Future Vol, veh/h	164	126	63	64	329	458
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	178	137	68	70	358	498

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1281	68	0	-	68	0
Stage 1	68	-	-	-	-	-
Stage 2	1213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	183	995	-	0	1533	-
Stage 1	955	-	-	0	-	-
Stage 2	281	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 140	995	-	-	1533	-
Mov Cap-2 Maneuver	~ 140	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	215	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	240.8	0	3.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	227	1533	-
HCM Lane V/C Ratio	-	1.389	0.233	-
HCM Control Delay (s)	-	240.8	8.1	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	17.7	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	100.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	176	135	68	69	352	491
Future Vol, veh/h	176	135	68	69	352	491
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	191	147	74	75	383	534

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1373	74	0	-	74	0
Stage 1	74	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 161	988	-	0	1526	-
Stage 1	949	-	-	0	-	-
Stage 2	256	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 121	988	-	-	1526	-
Mov Cap-2 Maneuver	~ 121	-	-	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	192	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 384.5	0	3.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	197	1526	-
HCM Lane V/C Ratio	-	1.716	0.251	-
HCM Control Delay (s)	-	$ 384.5	8.1	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	23.1	1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	135.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	185	142	71	72	370	516
Future Vol, veh/h	185	142	71	72	370	516
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	201	154	77	78	402	561

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1442	77	0	-	77	0
Stage 1	77	-	-	-	-	-
Stage 2	1365	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 146	984	-	0	1522	-
Stage 1	946	-	-	0	-	-
Stage 2	237	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 107	984	-	-	1522	-
Mov Cap-2 Maneuver	~ 107	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	~ 174	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 521.7	0	3.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	176	1522	-
HCM Lane V/C Ratio	-	2.02	0.264	-
HCM Control Delay (s)	-	$ 521.7	8.2	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	27.3	1.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	178.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	194	149	75	76	389	542
Future Vol, veh/h	194	149	75	76	389	542
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	211	162	82	83	423	589

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1517	82	0	-	82	0
Stage 1	82	-	-	-	-	-
Stage 2	1435	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 131	978	-	0	1515	-
Stage 1	941	-	-	0	-	-
Stage 2	219	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 94	978	-	-	1515	-
Mov Cap-2 Maneuver	~ 94	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	~ 158	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 691	0	3.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	156	1515	-
HCM Lane V/C Ratio	-	2.39	0.279	-
HCM Control Delay (s)	-	$ 691	8.3	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	31.5	1.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	129

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	363	445	75	422	140
Future Vol, veh/h	88	363	445	75	422	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	395	484	82	459	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1554	484	0	-	484	0
Stage 1	484	-	-	-	-	-
Stage 2	1070	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	125	583	-	0	1079	-
Stage 1	620	-	-	0	-	-
Stage 2	329	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 72	583	-	-	1079	-
Mov Cap-2 Maneuver	~ 72	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	189	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 406.9	0	8.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	272	1079	-
HCM Lane V/C Ratio	-	1.802	0.425	-
HCM Control Delay (s)	-	$ 406.9	10.8	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	32.9	2.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	225.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	95	390	477	80	453	150
Future Vol, veh/h	95	390	477	80	453	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	424	518	87	492	163

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1666	518	0	-	518	0
Stage 1	518	-	-	-	-	-
Stage 2	1148	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	106	558	-	0	1048	-
Stage 1	598	-	-	0	-	-
Stage 2	302	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 56	558	-	-	1048	-
Mov Cap-2 Maneuver	~ 56	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	160	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 718.3	0	8.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	212	1048	-
HCM Lane V/C Ratio	-	2.487	0.47	-
HCM Control Delay (s)	-	$ 718.3	11.4	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	43.9	2.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	310.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	99	409	502	84	476	157
Future Vol, veh/h	99	409	502	84	476	157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	108	445	546	91	517	171

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1751	546	0	-	546	0
Stage 1	546	-	-	-	-	-
Stage 2	1205	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 94	538	-	0	1023	-
Stage 1	580	-	-	0	-	-
Stage 2	284	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 46	538	-	-	1023	-
Mov Cap-2 Maneuver	~ 46	-	-	-	-	-
Stage 1	580	-	-	-	-	-
Stage 2	140	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 992.1	0	9.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	179	1023	-
HCM Lane V/C Ratio	-	3.085	0.506	-
HCM Control Delay (s)	-	$ 992.1	12.1	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	50.7	2.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	411.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	430	527	88	500	165
Future Vol, veh/h	104	430	527	88	500	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	467	573	96	543	179

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1839	573	0	-	573	0
Stage 1	573	-	-	-	-	-
Stage 2	1266	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 83	519	-	0	1000	-
Stage 1	564	-	-	0	-	-
Stage 2	265	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 38	519	-	-	1000	-
Mov Cap-2 Maneuver	~ 38	-	-	-	-	-
Stage 1	564	-	-	-	-	-
Stage 2	121	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 1316.9	0	9.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	153	1000	-
HCM Lane V/C Ratio	-	3.794	0.543	-
HCM Control Delay (s)	-	$ 1316.9	12.8	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	57.2	3.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	51.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	241	166	62	92	271	64
Future Vol, veh/h	241	166	62	92	271	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	262	180	67	100	295	70

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	776	117	0	0	167	0
Stage 1	117	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	366	935	-	-	1411	-
Stage 1	908	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	289	935	-	-	1411	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	407	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	106.9	0	6.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	402	1411	-
HCM Lane V/C Ratio	-	-	1.1	0.209	-
HCM Control Delay (s)	-	-	106.9	8.2	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	15.7	0.8	-

Intersection	
Int Delay, s/veh	77.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	258	178	66	99	291	69
Future Vol, veh/h	258	178	66	99	291	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	280	193	72	108	316	75

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	780	72	0	-	72	0
Stage 1	72	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Critical Hdwy	7.12	6.22	-	-	4.12	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	313	990	-	0	1528	-
Stage 1	938	-	-	0	-	-
Stage 2	426	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 263	990	-	-	1528	-
Mov Cap-2 Maneuver	~ 263	-	-	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	338	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	148.6	0	6.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	390	1528	-
HCM Lane V/C Ratio	-	1.215	0.207	-
HCM Control Delay (s)	-	148.6	8	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	19.6	0.8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	85					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	272	187	70	104	305	72
Future Vol, veh/h	272	187	70	104	305	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	296	203	76	113	332	78

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	817	76	0	-	76	0
Stage 1	76	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	346	985	-	0	1523	-
Stage 1	947	-	-	0	-	-
Stage 2	471	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 271	985	-	-	1523	-
Mov Cap-2 Maneuver	~ 271	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	162.5	0	6.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	398	1523	-
HCM Lane V/C Ratio	-	1.254	0.218	-
HCM Control Delay (s)	-	162.5	8	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	21.4	0.8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	119.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	285	197	73	109	321	76
Future Vol, veh/h	285	197	73	109	321	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	0	-	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	310	214	79	118	349	83

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	859	79	0	-	79	0
Stage 1	79	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	327	981	-	0	1519	-
Stage 1	944	-	-	0	-	-
Stage 2	452	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 252	981	-	-	1519	-
Mov Cap-2 Maneuver	~ 252	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	348	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	230.6	0	6.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	370	1519	-
HCM Lane V/C Ratio	-	1.416	0.23	-
HCM Control Delay (s)	-	230.6	8.1	-
HCM Lane LOS	-	F	A	-
HCM 95th %tile Q(veh)	-	26.6	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	161	108	80	308	60
Future Vol, veh/h	22	161	108	80	308	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	175	117	87	335	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	689	367	400	0	-	0
Stage 1	367	-	-	-	-	-
Stage 2	322	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	412	678	1159	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	368	678	1159	-	-	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	657	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	4.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1159	-	368	678	-	-
HCM Lane V/C Ratio	0.101	-	0.065	0.258	-	-
HCM Control Delay (s)	8.5	0	15.5	12.1	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	1	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	173	116	86	330	64
Future Vol, veh/h	24	173	116	86	330	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	188	126	93	359	70

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	739	393	428	0	-	0
Stage 1	393	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	385	656	1131	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	340	656	1131	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	632	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	4.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1131	-	340	656	-	-
HCM Lane V/C Ratio	0.111	-	0.077	0.287	-	-
HCM Control Delay (s)	8.6	0	16.5	12.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.2	1.2	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	191	128	95	365	71
Future Vol, veh/h	26	191	128	95	365	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	208	139	103	397	77

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	817	435	474	0	-	0
Stage 1	435	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	346	621	1088	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	299	621	1088	-	-	-
Mov Cap-2 Maneuver	299	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	596	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1088	-	299	621	-	-
HCM Lane V/C Ratio	0.128	-	0.095	0.334	-	-
HCM Control Delay (s)	8.8	0	18.3	13.7	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.3	1.5	-	-

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	104	1	536	1	0	2	119	262	5	0	145	17
Future Vol, veh/h	104	1	536	1	0	2	119	262	5	0	145	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	113	1	583	1	0	2	129	285	5	0	158	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	714	716	167	713	722	288	176	0	0	290	0	0
Stage 1	167	167	-	546	546	-	-	-	-	-	-	-
Stage 2	547	549	-	167	176	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	346	356	877	347	353	751	1400	-	-	1272	-	-
Stage 1	835	760	-	522	518	-	-	-	-	-	-	-
Stage 2	521	516	-	835	753	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	316	317	877	106	314	751	1400	-	-	1272	-	-
Mov Cap-2 Maneuver	316	317	-	106	314	-	-	-	-	-	-	-
Stage 1	743	760	-	465	461	-	-	-	-	-	-	-
Stage 2	462	459	-	280	753	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	19.7	2.4	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1400	-	-	316	877	248	1272	-	-
HCM Lane V/C Ratio	0.092	-	-	0.361	0.664	0.013	-	-	-
HCM Control Delay (s)	7.8	0	-	22.7	16.8	19.7	0	-	-
HCM Lane LOS	A	A	-	C	C	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.6	5.2	0	0	-	-

Intersection	
Int Delay, s/veh	11.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	1	575	1	0	2	128	281	5	0	155	18
Future Vol, veh/h	112	1	575	1	0	2	128	281	5	0	155	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	122	1	625	1	0	2	139	305	5	0	168	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	766	767	178	765	774	308	188	0	0	311	0	0
Stage 1	178	178	-	586	586	-	-	-	-	-	-	-
Stage 2	588	589	-	179	188	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	320	332	865	320	329	732	1386	-	-	1249	-	-
Stage 1	824	752	-	496	497	-	-	-	-	-	-	-
Stage 2	495	495	-	823	745	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	289	292	865	80	289	732	1386	-	-	1249	-	-
Mov Cap-2 Maneuver	289	292	-	80	289	-	-	-	-	-	-	-
Stage 1	724	752	-	436	437	-	-	-	-	-	-	-
Stage 2	434	435	-	228	745	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.4	23.6	2.4	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1386	-	-	289	865	197	1249	-	-
HCM Lane V/C Ratio	0.1	-	-	0.425	0.723	0.017	-	-	-
HCM Control Delay (s)	7.9	0	-	26.4	19.2	23.6	0	-	-
HCM Lane LOS	A	A	-	D	C	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2	6.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	117	1	604	1	0	2	134	295	5	0	163	19
Future Vol, veh/h	117	1	604	1	0	2	134	295	5	0	163	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	127	1	657	1	0	2	146	321	5	0	177	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	804	805	188	803	813	323	198	0	0	326	0	0
Stage 1	188	188	-	615	615	-	-	-	-	-	-	-
Stage 2	616	617	-	188	198	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	301	316	854	302	313	718	1375	-	-	1234	-	-
Stage 1	814	745	-	479	482	-	-	-	-	-	-	-
Stage 2	478	481	-	814	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	270	275	854	63	272	718	1375	-	-	1234	-	-
Mov Cap-2 Maneuver	270	275	-	63	272	-	-	-	-	-	-	-
Stage 1	708	745	-	417	419	-	-	-	-	-	-	-
Stage 2	415	418	-	188	737	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23	27.8	2.4	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1375	-	-	270	854	161	1234	-	-
HCM Lane V/C Ratio	0.106	-	-	0.475	0.769	0.02	-	-	-
HCM Control Delay (s)	7.9	0	-	29.8	21.7	27.8	0	-	-
HCM Lane LOS	A	A	-	D	C	D	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.4	7.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	15.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	123	1	635	1	0	2	141	310	5	0	172	20
Future Vol, veh/h	123	1	635	1	0	2	141	310	5	0	172	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	134	1	690	1	0	2	153	337	5	0	187	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	845	847	198	844	855	340	209	0	0	342	0	0
Stage 1	198	198	-	646	646	-	-	-	-	-	-	-
Stage 2	647	649	-	198	209	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	283	299	843	283	296	702	1362	-	-	1217	-	-
Stage 1	804	737	-	460	467	-	-	-	-	-	-	-
Stage 2	460	466	-	804	729	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	252	257	843	46	255	702	1362	-	-	1217	-	-
Mov Cap-2 Maneuver	252	257	-	46	255	-	-	-	-	-	-	-
Stage 1	692	737	-	396	402	-	-	-	-	-	-	-
Stage 2	395	401	-	145	729	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.9	35.3	2.5	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1362	-	-	252	843	122	1217	-	-
HCM Lane V/C Ratio	0.113	-	-	0.535	0.819	0.027	-	-	-
HCM Control Delay (s)	8	0	-	34.6	25.4	35.3	0	-	-
HCM Lane LOS	A	A	-	D	D	E	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.9	9.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	155	59	159	158	21
Future Vol, veh/h	49	155	59	159	158	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	168	64	173	172	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	484	183	195	0	-	0
Stage 1	183	-	-	-	-	-
Stage 2	301	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	859	1378	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	514	859	1378	-	-	-
Mov Cap-2 Maneuver	514	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Approach	**EB**		**NB**		**SB**	
HCM Control Delay, s	10.8		2.1		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1378	-	514	859	-	-
HCM Lane V/C Ratio	0.047	-	0.104	0.196	-	-
HCM Control Delay (s)	7.7	0	12.8	10.2	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.7	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	166	63	170	169	23
Future Vol, veh/h	53	166	63	170	169	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	180	68	185	184	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	518	196	209	0	-	0
Stage 1	196	-	-	-	-	-
Stage 2	322	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	518	845	1362	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	489	845	1362	-	-	-
Mov Cap-2 Maneuver	489	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	2.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1362	-	489	845	-	-
HCM Lane V/C Ratio	0.05	-	0.118	0.214	-	-
HCM Control Delay (s)	7.8	0	13.3	10.4	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.8	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	175	66	179	178	24
Future Vol, veh/h	55	175	66	179	178	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	190	72	195	193	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	545	207	220	0	-	0
Stage 1	207	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	499	833	1349	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	469	833	1349	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	2.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1349	-	469	833	-	-
HCM Lane V/C Ratio	0.053	-	0.127	0.228	-	-
HCM Control Delay (s)	7.8	0	13.8	10.6	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.9	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	58	184	70	188	187	25
Future Vol, veh/h	58	184	70	188	187	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	800	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	200	76	204	203	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	574	217	230	0	-	0
Stage 1	217	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	480	823	1338	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	449	823	1338	-	-	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	663	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	2.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1338	-	449	823	-	-
HCM Lane V/C Ratio	0.057	-	0.14	0.243	-	-
HCM Control Delay (s)	7.9	0	14.3	10.8	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	66	327	0	278	0	0	0	0	0	747	22
Future Volume (Veh/h)	0	66	327	0	278	0	0	0	0	0	747	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	72	355	0	302	0	0	0	0	0	812	24
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	963	812	812	848	812	0	812			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	963	812	812	848	812	0	812			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	77	6	100	4	100	100			100		
cM capacity (veh/h)	29	313	379	15	313	1085	814			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	427	302	812	24
Volume Left	0	0	0	0
Volume Right	355	0	0	24
cSH	366	313	1700	1700
Volume to Capacity	1.17	0.96	0.48	0.01
Queue Length 95th (m)	129.4	75.8	0.0	0.0
Control Delay (s)	133.5	79.6	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	133.5	79.6	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	51.8		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	71	350	0	298	0	0	0	0	0	800	24
Future Volume (Veh/h)	0	71	350	0	298	0	0	0	0	0	800	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	77	380	0	324	0	0	0	0	0	870	26
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	1032	870	870	908	870	0	870			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1032	870	870	908	870	0	870			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	73	0	0	0	100	100			100		
cM capacity (veh/h)	0	290	351	0	290	1085	775			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	457	324	870	26
Volume Left	0	0	0	0
Volume Right	380	0	0	26
cSH	339	290	1700	1700
Volume to Capacity	1.35	1.12	0.51	0.02
Queue Length 95th (m)	170.4	101.6	0.0	0.0
Control Delay (s)	206.4	127.5	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	206.4	127.5	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	80.9		
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	75	368	0	314	0	0	0	0	0	841	25
Future Volume (Veh/h)	0	75	368	0	314	0	0	0	0	0	841	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	82	400	0	341	0	0	0	0	0	914	27
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	1084	914	914	955	914	0	914			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1084	914	914	955	914	0	914			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	70	0	0	0	100	100			100		
cM capacity (veh/h)	0	273	331	0	273	1085	746			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	482	341	914	27
Volume Left	0	0	0	0
Volume Right	400	0	0	27
cSH	319	273	1700	1700
Volume to Capacity	1.51	1.25	0.54	0.02
Queue Length 95th (m)	205.3	124.1	0.0	0.0
Control Delay (s)	274.9	176.9	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	274.9	176.9	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	109.3		
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	78	387	0	330	0	0	0	0	0	884	26
Future Volume (Veh/h)	0	78	387	0	330	0	0	0	0	0	884	26
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	421	0	359	0	0	0	0	0	961	28
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	1140	961	961	1004	961	0	961			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1140	961	961	1004	961	0	961			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	67	0	0	0	100	100			100		
cM capacity (veh/h)	0	256	311	0	256	1085	716			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	506	359	961	28
Volume Left	0	0	0	0
Volume Right	421	0	0	28
cSH	300	256	1700	1700
Volume to Capacity	1.69	1.40	0.57	0.02
Queue Length 95th (m)	241.1	149.6	0.0	0.0
Control Delay (s)	352.8	239.6	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	352.8	239.6	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	142.7		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	202	295	0	457	0	0	0	0	0	250	8
Future Volume (Veh/h)	0	202	295	0	457	0	0	0	0	0	250	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	220	321	0	497	0	0	0	0	0	272	9
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	520	272	272	382	272	0	272			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	520	272	272	382	272	0	272			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	65	58	100	22	100	100			100		
cM capacity (veh/h)	165	635	767	245	635	1085	1291			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	541	497	272	9
Volume Left	0	0	0	0
Volume Right	321	0	0	9
cSH	707	635	1700	1700
Volume to Capacity	0.77	0.78	0.16	0.01
Queue Length 95th (m)	55.1	57.2	0.0	0.0
Control Delay (s)	24.7	28.0	0.0	0.0
Lane LOS	C	D		
Approach Delay (s)	24.7	28.0	0.0	
Approach LOS	C	D		

Intersection Summary			
Average Delay	20.7		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	216	316	0	490	0	0	0	0	0	268	9
Future Volume (Veh/h)	0	216	316	0	490	0	0	0	0	0	268	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	235	343	0	533	0	0	0	0	0	291	10
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	558	291	291	408	291	0	291			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	558	291	291	408	291	0	291			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	62	54	100	14	100	100			100		
cM capacity (veh/h)	119	619	748	211	619	1085	1271			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	578	533	291	10
Volume Left	0	0	0	0
Volume Right	343	0	0	10
cSH	690	619	1700	1700
Volume to Capacity	0.84	0.86	0.17	0.01
Queue Length 95th (m)	70.7	74.0	0.0	0.0
Control Delay (s)	31.2	36.3	0.0	0.0
Lane LOS	D	E		
Approach Delay (s)	31.2	36.3	0.0	
Approach LOS	D	E		

Intersection Summary			
Average Delay	26.5		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	227	332	0	515	0	0	0	0	0	282	9
Future Volume (Veh/h)	0	227	332	0	515	0	0	0	0	0	282	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	247	361	0	560	0	0	0	0	0	307	10
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	587	307	307	430	307	0	307			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	587	307	307	430	307	0	307			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	59	51	100	8	100	100			100		
cM capacity (veh/h)	81	607	733	185	607	1085	1254			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	608	560	307	10
Volume Left	0	0	0	0
Volume Right	361	0	0	10
cSH	676	607	1700	1700
Volume to Capacity	0.90	0.92	0.18	0.01
Queue Length 95th (m)	87.0	90.1	0.0	0.0
Control Delay (s)	39.4	46.1	0.0	0.0
Lane LOS	E	E		
Approach Delay (s)	39.4	46.1	0.0	
Approach LOS	E	E		

Intersection Summary			
Average Delay	33.5		
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	239	349	0	541	0	0	0	0	0	296	10
Future Volume (Veh/h)	0	239	349	0	541	0	0	0	0	0	296	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	260	379	0	588	0	0	0	0	0	322	11
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	616	322	322	452	322	0	322			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	616	322	322	452	322	0	322			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	56	47	100	1	100	100			100		
cM capacity (veh/h)	28	595	719	161	595	1085	1238			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	639	588	322	11
Volume Left	0	0	0	0
Volume Right	379	0	0	11
cSH	663	595	1700	1700
Volume to Capacity	0.96	0.99	0.19	0.01
Queue Length 95th (m)	106.8	109.4	0.0	0.0
Control Delay (s)	51.5	60.2	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	51.5	60.2	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	43.8		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	73	290	0	433	0	0	0	0	0	720	13
Future Volume (Veh/h)	0	73	290	0	433	0	0	0	0	0	720	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	79	315	0	471	0	0	0	0	0	783	14
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	1018	783	783	822	783	0	783			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	783	783	822	783	0	783			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	76	20	100	0	100	100			100		
cM capacity (veh/h)	0	325	394	48	325	1085	835			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	394	471	783	14
Volume Left	0	0	0	0
Volume Right	315	0	0	14
cSH	378	325	1700	1700
Volume to Capacity	1.04	1.45	0.46	0.01
Queue Length 95th (m)	100.4	191.6	0.0	0.0
Control Delay (s)	91.7	248.4	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	91.7	248.4	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	92.1		
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	78	311	0	464	0	0	0	0	0	772	14
Future Volume (Veh/h)	0	78	311	0	464	0	0	0	0	0	772	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	338	0	504	0	0	0	0	0	839	15
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	1091	839	839	882	839	0	839			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1091	839	839	882	839	0	839			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	72	8	100	0	100	100			100		
cM capacity (veh/h)	0	302	366	16	302	1085	796			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	423	504	839	15
Volume Left	0	0	0	0
Volume Right	338	0	0	15
cSH	351	302	1700	1700
Volume to Capacity	1.21	1.67	0.49	0.01
Queue Length 95th (m)	136.0	237.8	0.0	0.0
Control Delay (s)	149.5	345.3	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	149.5	345.3	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	133.2		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
50: Rothesay Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	82	327	0	488	0	0	0	0	0	811	15
Future Volume (Veh/h)	0	82	327	0	488	0	0	0	0	0	811	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	89	355	0	530	0	0	0	0	0	882	16
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	1147	882	882	926	882	0	882			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1147	882	882	926	882	0	882			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	69	0	0	0	100	100			100		
cM capacity (veh/h)	0	285	345	0	285	1085	767			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	444	530	882	16
Volume Left	0	0	0	0
Volume Right	355	0	0	16
cSH	331	285	1700	1700
Volume to Capacity	1.34	1.86	0.52	0.01
Queue Length 95th (m)	165.3	274.5	0.0	0.0
Control Delay (s)	203.8	430.0	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	203.8	430.0	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	170.1		
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	86	343	0	513	0	0	0	0	0	853	15
Future Volume (Veh/h)	0	86	343	0	513	0	0	0	0	0	853	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	93	373	0	558	0	0	0	0	0	927	16
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	1206	927	927	974	927	0	927			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1206	927	927	974	927	0	927			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	65	0	0	0	100	100			100		
cM capacity (veh/h)	0	268	325	0	268	1085	737			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	466	558	927	16
Volume Left	0	0	0	0
Volume Right	373	0	0	16
cSH	312	268	1700	1700
Volume to Capacity	1.49	2.08	0.55	0.01
Queue Length 95th (m)	197.4	313.7	0.0	0.0
Control Delay (s)	269.2	528.9	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	269.2	528.9	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	213.8		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	66	0	0	0	0	0	278	0	0	0	0
Future Volume (Veh/h)	0	66	0	0	0	0	0	278	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	72	0	0	0	0	0	302	0	0	0	0
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	302	302	0	338	302	302	0			302		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302	302	0	338	302	302	0			302		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	88	100	100	100	100	100			100		
cM capacity (veh/h)	650	611	1085	560	611	738	1623			1259		

Direction, Lane #	EB 1	NB 1
Volume Total	72	302
Volume Left	0	0
Volume Right	0	0
cSH	611	1700
Volume to Capacity	0.12	0.18
Queue Length 95th (m)	3.0	0.0
Control Delay (s)	11.7	0.0
Lane LOS	B	
Approach Delay (s)	11.7	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	71	0	0	0	0	0	298	0	0	0	0
Future Volume (Veh/h)	0	71	0	0	0	0	0	298	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	77	0	0	0	0	0	324	0	0	0	0
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	324	324	0	362	324	324	0			324		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324	324	0	362	324	324	0			324		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	87	100	100	100	100	100			100		
cM capacity (veh/h)	629	594	1085	534	594	717	1623			1236		

Direction, Lane #	EB 1	NB 1
Volume Total	77	324
Volume Left	0	0
Volume Right	0	0
cSH	594	1700
Volume to Capacity	0.13	0.19
Queue Length 95th (m)	3.4	0.0
Control Delay (s)	12.0	0.0
Lane LOS	B	
Approach Delay (s)	12.0	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	75	0	0	0	0	0	314	0	0	0	0
Future Volume (Veh/h)	0	75	0	0	0	0	0	314	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	82	0	0	0	0	0	341	0	0	0	0
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	341	341	0	382	341	341	0			341		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341	341	0	382	341	341	0			341		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	86	100	100	100	100	100			100		
cM capacity (veh/h)	613	581	1085	514	581	701	1623			1218		

Direction, Lane #	EB 1	NB 1
Volume Total	82	341
Volume Left	0	0
Volume Right	0	0
cSH	581	1700
Volume to Capacity	0.14	0.20
Queue Length 95th (m)	3.7	0.0
Control Delay (s)	12.2	0.0
Lane LOS	B	
Approach Delay (s)	12.2	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	202	0	0	0	0	0	457	0	0	0	0
Future Volume (Veh/h)	0	202	0	0	0	0	0	457	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	220	0	0	0	0	0	497	0	0	0	0
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	497	497	0	607	497	497	0			497		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497	497	0	607	497	497	0			497		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	54	100	100	100	100	100			100		
cM capacity (veh/h)	483	475	1085	260	475	573	1623			1067		

Direction, Lane #	EB 1	NB 1
Volume Total	220	497
Volume Left	0	0
Volume Right	0	0
cSH	475	1700
Volume to Capacity	0.46	0.29
Queue Length 95th (m)	18.3	0.0
Control Delay (s)	19.0	0.0
Lane LOS	C	
Approach Delay (s)	19.0	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	216	0	0	0	0	0	490	0	0	0	0
Future Volume (Veh/h)	0	216	0	0	0	0	0	490	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	235	0	0	0	0	0	533	0	0	0	0
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	533	533	0	650	533	533	0			533		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533	533	0	650	533	533	0			533		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	48	100	100	100	100	100			100		
cM capacity (veh/h)	458	453	1085	226	453	547	1623			1035		

Direction, Lane #	EB 1	NB 1
Volume Total	235	533
Volume Left	0	0
Volume Right	0	0
cSH	453	1700
Volume to Capacity	0.52	0.31
Queue Length 95th (m)	22.2	0.0
Control Delay (s)	21.2	0.0
Lane LOS	C	
Approach Delay (s)	21.2	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	227	0	0	0	0	0	515	0	0	0	0
Future Volume (Veh/h)	0	227	0	0	0	0	0	515	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	247	0	0	0	0	0	560	0	0	0	0
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	560	560	0	684	560	560	0			560		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	560	560	0	684	560	560	0			560		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	43	100	100	100	100	100			100		
cM capacity (veh/h)	439	437	1085	200	437	528	1623			1011		

Direction, Lane #	EB 1	NB 1
Volume Total	247	560
Volume Left	0	0
Volume Right	0	0
cSH	437	1700
Volume to Capacity	0.57	0.33
Queue Length 95th (m)	25.9	0.0
Control Delay (s)	23.4	0.0
Lane LOS	C	
Approach Delay (s)	23.4	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	239	0	0	0	0	0	541	0	0	0	0
Future Volume (Veh/h)	0	239	0	0	0	0	0	541	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	260	0	0	0	0	0	588	0	0	0	0
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	588	588	0	718	588	588	0			588		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	588	588	0	718	588	588	0			588		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	38	100	100	100	100	100			100		
cM capacity (veh/h)	421	421	1085	174	421	509	1623			987		

Direction, Lane #	EB 1	NB 1
Volume Total	260	588
Volume Left	0	0
Volume Right	0	0
cSH	421	1700
Volume to Capacity	0.62	0.35
Queue Length 95th (m)	30.6	0.0
Control Delay (s)	26.4	0.0
Lane LOS	D	
Approach Delay (s)	26.4	0.0
Approach LOS	D	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	73	0	0	0	0	0	433	0	0	0	0
Future Volume (Veh/h)	0	73	0	0	0	0	0	433	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	79	0	0	0	0	0	471	0	0	0	0
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	471	471	0	510	471	471	0			471		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	471	471	0	510	471	471	0			471		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	84	100	100	100	100	100			100		
cM capacity (veh/h)	503	491	1085	415	491	593	1623			1091		

Direction, Lane #	EB 1	NB 1
Volume Total	79	471
Volume Left	0	0
Volume Right	0	0
cSH	491	1700
Volume to Capacity	0.16	0.28
Queue Length 95th (m)	4.3	0.0
Control Delay (s)	13.7	0.0
Lane LOS	B	
Approach Delay (s)	13.7	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	78	0	0	0	0	0	464	0	0	0	0
Future Volume (Veh/h)	0	78	0	0	0	0	0	464	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	0	0	0	0	0	504	0	0	0	0
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	504	504	0	546	504	504	0			504		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	504	504	0	546	504	504	0			504		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	82	100	100	100	100	100			100		
cM capacity (veh/h)	478	470	1085	386	470	568	1623			1061		

Direction, Lane #	EB 1	NB 1
Volume Total	85	504
Volume Left	0	0
Volume Right	0	0
cSH	470	1700
Volume to Capacity	0.18	0.30
Queue Length 95th (m)	5.0	0.0
Control Delay (s)	14.3	0.0
Lane LOS	B	
Approach Delay (s)	14.3	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	82	0	0	0	0	0	488	0	0	0	0
Future Volume (Veh/h)	0	82	0	0	0	0	0	488	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	89	0	0	0	0	0	530	0	0	0	0
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	530	530	0	574	530	530	0			530		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530	530	0	574	530	530	0			530		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	80	100	100	100	100	100			100		
cM capacity (veh/h)	460	455	1085	365	455	549	1623			1037		

Direction, Lane #	EB 1	NB 1
Volume Total	89	530
Volume Left	0	0
Volume Right	0	0
cSH	455	1700
Volume to Capacity	0.20	0.31
Queue Length 95th (m)	5.5	0.0
Control Delay (s)	14.8	0.0
Lane LOS	B	
Approach Delay (s)	14.8	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	86	0	0	0	0	0	513	0	0	0	0
Future Volume (Veh/h)	0	86	0	0	0	0	0	513	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	93	0	0	0	0	0	558	0	0	0	0
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	558	558	0	604	558	558	0			558		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	558	558	0	604	558	558	0			558		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	79	100	100	100	100	100			100		
cM capacity (veh/h)	440	438	1085	343	438	529	1623			1013		

Direction, Lane #	EB 1	NB 1
Volume Total	93	558
Volume Left	0	0
Volume Right	0	0
cSH	438	1700
Volume to Capacity	0.21	0.33
Queue Length 95th (m)	6.0	0.0
Control Delay (s)	15.4	0.0
Lane LOS	C	
Approach Delay (s)	15.4	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	78	0	0	0	0	0	330	0	0	0	0
Future Volume (Veh/h)	0	78	0	0	0	0	0	330	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	0	0	0	0	0	359	0	0	0	0
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	359	359	0	402	359	359	0			359		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359	359	0	402	359	359	0			359		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	85	100	100	100	100	100			100		
cM capacity (veh/h)	596	568	1085	495	568	685	1623			1200		

Direction, Lane #	EB 1	NB 1
Volume Total	85	359
Volume Left	0	0
Volume Right	0	0
cSH	568	1700
Volume to Capacity	0.15	0.21
Queue Length 95th (m)	4.0	0.0
Control Delay (s)	12.5	0.0
Lane LOS	B	
Approach Delay (s)	12.5	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	66	0	0	151	0	0
Future Volume (Veh/h)	66	0	0	151	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	0	0	164	0	0
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	164	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	164	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	100	100			
cM capacity (veh/h)	827	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	72	164
Volume Left	72	0
Volume Right	0	0
cSH	827	1700
Volume to Capacity	0.09	0.10
Queue Length 95th (m)	2.2	0.0
Control Delay (s)	9.8	0.0
Lane LOS	A	
Approach Delay (s)	9.8	0.0
Approach LOS	A	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	71	0	0	162	0	0
Future Volume (Veh/h)	71	0	0	162	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	0	0	176	0	0
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	176	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	100	100			
cM capacity (veh/h)	814	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	77	176
Volume Left	77	0
Volume Right	0	0
cSH	814	1700
Volume to Capacity	0.09	0.10
Queue Length 95th (m)	2.4	0.0
Control Delay (s)	9.9	0.0
Lane LOS	A	
Approach Delay (s)	9.9	0.0
Approach LOS	A	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	0	0	170	0	0
Future Volume (Veh/h)	75	0	0	170	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	0	0	185	0	0
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	185	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	100	100			
cM capacity (veh/h)	804	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	82	185
Volume Left	82	0
Volume Right	0	0
cSH	804	1700
Volume to Capacity	0.10	0.11
Queue Length 95th (m)	2.6	0.0
Control Delay (s)	10.0	0.0
Lane LOS	A	
Approach Delay (s)	10.0	0.0
Approach LOS	A	

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	78	0	0	179	0	0
Future Volume (Veh/h)	78	0	0	179	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	0	0	195	0	0
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	195	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	195	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	794	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	85	195
Volume Left	85	0
Volume Right	0	0
cSH	794	1700
Volume to Capacity	0.11	0.11
Queue Length 95th (m)	2.7	0.0
Control Delay (s)	10.1	0.0
Lane LOS	B	
Approach Delay (s)	10.1	0.0
Approach LOS	B	

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	202	0	0	507	0	0
Future Volume (Veh/h)	202	0	0	507	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	220	0	0	551	0	0
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	551	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	56	100	100			
cM capacity (veh/h)	495	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	220	551
Volume Left	220	0
Volume Right	0	0
cSH	495	1700
Volume to Capacity	0.44	0.32
Queue Length 95th (m)	17.1	0.0
Control Delay (s)	17.9	0.0
Lane LOS	C	
Approach Delay (s)	17.9	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	216	0	0	544	0	0
Future Volume (Veh/h)	216	0	0	544	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	235	0	0	591	0	0
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	591	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	591	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	100	100			
cM capacity (veh/h)	470	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	235	591
Volume Left	235	0
Volume Right	0	0
cSH	470	1700
Volume to Capacity	0.50	0.35
Queue Length 95th (m)	20.9	0.0
Control Delay (s)	20.1	0.0
Lane LOS	C	
Approach Delay (s)	20.1	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	227	0	0	571	0	0
Future Volume (Veh/h)	227	0	0	571	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	247	0	0	621	0	0
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	621	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	621	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	100	100			
cM capacity (veh/h)	451	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	247	621
Volume Left	247	0
Volume Right	0	0
cSH	451	1700
Volume to Capacity	0.55	0.37
Queue Length 95th (m)	24.5	0.0
Control Delay (s)	22.2	0.0
Lane LOS	C	
Approach Delay (s)	22.2	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	239	0	0	601	0	0
Future Volume (Veh/h)	239	0	0	601	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	260	0	0	653	0	0
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	653	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	40	100	100			
cM capacity (veh/h)	432	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	260	653
Volume Left	260	0
Volume Right	0	0
cSH	432	1700
Volume to Capacity	0.60	0.38
Queue Length 95th (m)	29.2	0.0
Control Delay (s)	25.2	0.0
Lane LOS	D	
Approach Delay (s)	25.2	0.0
Approach LOS	D	

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	1.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	0	0	683	0	0
Future Vol, veh/h	73	0	0	683	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	0	0	742	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	742	-	-	0
Stage 1	0	-	-	-
Stage 2	742	-	-	-
Critical Hdwy	6.42	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-
Follow-up Hdwy	3.518	-	-	-
Pot Cap-1 Maneuver	383	0	0	-
Stage 1	-	0	0	-
Stage 2	471	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	383	-	-	-
Mov Cap-2 Maneuver	383	-	-	-
Stage 1	-	-	-	-
Stage 2	471	-	-	-

Approach	EB	NB
HCM Control Delay, s	16.8	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	383
HCM Lane V/C Ratio	-	0.207
HCM Control Delay (s)	-	16.8
HCM Lane LOS	-	C
HCM 95th %tile Q(veh)	-	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	78	0	0	732	0	0
Future Volume (Veh/h)	78	0	0	732	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	0	0	796	0	0
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	796	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	100	100			
cM capacity (veh/h)	356	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	85	796
Volume Left	85	0
Volume Right	0	0
cSH	356	1700
Volume to Capacity	0.24	0.47
Queue Length 95th (m)	7.0	0.0
Control Delay (s)	18.3	0.0
Lane LOS	C	
Approach Delay (s)	18.3	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	82	0	0	770	0	0
Future Volume (Veh/h)	82	0	0	770	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	0	0	837	0	0
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	837	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	837	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	100	100			
cM capacity (veh/h)	337	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	89	837
Volume Left	89	0
Volume Right	0	0
cSH	337	1700
Volume to Capacity	0.26	0.49
Queue Length 95th (m)	7.9	0.0
Control Delay (s)	19.5	0.0
Lane LOS	C	
Approach Delay (s)	19.5	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	0	0	809	0	0
Future Volume (Veh/h)	86	0	0	809	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	93	0	0	879	0	0
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	879	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	879	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	100	100			
cM capacity (veh/h)	318	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	93	879
Volume Left	93	0
Volume Right	0	0
cSH	318	1700
Volume to Capacity	0.29	0.52
Queue Length 95th (m)	9.0	0.0
Control Delay (s)	20.9	0.0
Lane LOS	C	
Approach Delay (s)	20.9	0.0
Approach LOS	C	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: Morning Peak
Freeway/Dir of Travel: EB
Junction: Rothesay Rd Off Ramp
Jurisdiction: Provincial
Analysis Year: 2016
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	514	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	151	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	514		151			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	143		42			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          628         169                     pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =               (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  628    pcph
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                           Actual        Maximum          LOS F?
     v  = v                628           4600             No
      Fi   F
     v                     628           4400             No
      12
     v  = v - v            459           4600             No
      FO   F   R
     v                     169           2000             No
      R

_________________Level of Service Determination (if not F)______________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   0.5     pc/km/ln
                          R                   12          D
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                   D  = 0.418
                                                S
Space mean speed in ramp influence area,       S  = 86.2    km/h
                                                R
Space mean speed in outer lanes,               S  =  N/A    km/h
                                                0
Space mean speed for all vehicles,             S  = 86.2    km/h
________________________________________________________________________________
```

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	551	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	162	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	551		162			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	153		45			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	673	182	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 673 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	673	4600	No
v_{12}	673	4400	No
$v_{FO} = v_F - v_R$	491	4600	No
v_R	182	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 0.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.419	
Space mean speed in ramp influence area,	S_R = 86.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 86.2	km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028
Description: The Crossing	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	579	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	170	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	579		170			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	161		47			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	708	191	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 708 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	708	4600	No
v_{12}	708	4400	No
$v_{FO} = v_F - v_R$	517	4600	No
v_R	191	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 0.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.420

Space mean speed in ramp influence area, S_R = 86.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 86.1 km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	609	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	179	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	609		179			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	169		50			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	744	201	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 744 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	744	4600	No
v_{12}	744	4400	No
$v_{FO} = v_F - v_R$	543	4600	No
v_R	201	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 1.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.421

Space mean speed in ramp influence area, S_R = 86.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 86.1 km/h

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 2017
Analysis time period: AM Peak
Freeway/Dir of Travel: Eastbond
Junction: Rte 100 On Ramp
Jurisdiction: Provincial
Analysis Year: 2016
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2587	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	646	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2587	646		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	719	179		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3162	725	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3162 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3887	4600	No
v_{R12}	3887	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 18.3 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.444	
Space mean speed in ramp influence area,	S_R = 85.3	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 85.3	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2774	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	692	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2774	692		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	771	192		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           3390        777                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =              (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3390   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4167          4600            No
      FO
     v                     4167          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   19.6    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.505
                                              S
Space mean speed in ramp influence area,     S  = 83.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 83.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2916	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	728	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2916	728		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	810	202		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3564	817	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3564 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4381	4600	No
v_{R12}	4381	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\, v_R + 0.0048\, v_{12} - 0.01278\, L_A$ = 20.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.565		
Space mean speed in ramp influence area,	S_R = 81.3	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 81.3	km/h	

```
                 HCS2000: Ramps and Ramp Junctions Release 4.1f




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E-mail:

_________________________________Merge Analysis_________________________________

Analyst:                Katie Hazzard
Agency/Co.:             exp
Date performed:         1/23/2017
Analysis time period:   AM Peak
Freeway/Dir of Travel:  WB
Junction:               Rte 100 On Ramp
Jurisdiction:           Provincial
Analysis Year:          2033
Description:  The Crossing

__________________________________Freeway Data__________________________________

Type of analysis                            Merge
Number of lanes in freeway                  2
Free-flow speed on freeway                  100.0         km/h
Volume on freeway                           3498          vph

__________________________________On Ramp Data__________________________________

Side of freeway                             Right
Number of lanes in ramp                     1
Free-flow speed on ramp                     60.0          km/h
Volume on ramp                              782           vph
Length of first accel/decel lane            280           m
Length of second accel/decel lane                         m

_________________________Adjacent Ramp Data (if one exists)____________________

Does adjacent ramp exist?                   No
Volume on adjacent Ramp                                   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp                                 m

____________________Conversion to pc/h Under Base Conditions___________________

Junction Components                    Freeway     Ramp        Adjacent
                                                               Ramp
Volume, V (vph)                        3498        782                  vph
Peak-hour factor, PHF                  0.90        0.90
Peak 15-min volume, v15                972         217                  v
Trucks and buses                       6           2                    %
Recreational vehicles                  1           0                    %
Terrain type:                          Rolling     Level
     Grade                                    %           %           %
     Length                                   km          km          km
Trucks and buses PCE, ET               2.5         1.5
Recreational vehicle PCE, ER           2.0         1.2
```

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          4275        878                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  4275   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     5153          4600            Yes
      FO
     v                     5153          4600            Yes
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   24.3    pc/km/ln
          R                   R           12             A
Level of service for ramp-freeway junction areas of influence  F

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.928
                                              S
Space mean speed in ramp influence area,     S  = 69.4    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 69.4    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2464	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	583	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2464		583			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	684		162			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3012	654	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3012 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3012	4600	No
v_{12}	3012	4400	No
$v_{FO} = v_F - v_R$	2358	4600	No
v_R	654	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 13.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.462	
Space mean speed in ramp influence area,	S_R = 84.8	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.8	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2642	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	625	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2642		625			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	734		174			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3229	701	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3229 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3229	4600	No
v_{12}	3229	4400	No
$v_{FO} = v_F - v_R$	2528	4600	No
v_R	701	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 14.3 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.466	
Space mean speed in ramp influence area,	S_R = 84.6	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.6	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2776	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	657	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2776		657			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	771		183			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3393	737	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3393 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3393	4600	No
v_{12}	3393	4400	No
$v_{FO} = v_F - v_R$	2656	4600	No
v_R	737	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 15.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.469

Space mean speed in ramp influence area, S_R = 84.5 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 84.5 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM
Freeway/Dir of Travel: EB
Junction: Rothesay Rd Off Ramp
Jurisdiction: Provincial
Analysis Year: 2033
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2919	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	690	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2919		690			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	811		192			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3568	774	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3568 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3568	4600	No
v_{12}	3568	4400	No
$v_{FO} = v_F - v_R$	2794	4600	No
v_R	774	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 16.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.473	
Space mean speed in ramp influence area,	S_R = 84.4	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.4	km/h

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Phone: Fax:
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Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	EB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	839	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	291	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	839	291		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	233	81		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1025        327                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1025   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1352          4600            No
      FO
     v                     1352          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   6.2     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.269
                                              S
Space mean speed in ramp influence area,     S  = 91.1    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.1    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	899	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	312	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	899	312		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	250	87		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           1099        350                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1099   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1449          4600            No
      FO
     v                     1449          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   6.7     pc/km/ln
          R                   R           12             A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.270
                                              S
Space mean speed in ramp influence area,     S  = 91.1    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.1    km/h
_______________________________________________________________________________
```

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E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	945	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	328	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	945	328		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	263	91		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV            0.909       0.990
Driver population factor, fP             1.00        1.00
Flow rate, vp                            1155        368                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1155   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1523          4600            No
      FO
     v                     1523          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   7.0     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.272
                                              S
Space mean speed in ramp influence area,     S  = 91.0    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.0    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	993	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	344	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	993	344		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	276	96		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1214        386                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1214   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1600          4600            No
      FO
     v                     1600          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   7.4     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.273
                                              S
Space mean speed in ramp influence area,     S  = 91.0    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.0    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	691	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	234	vph
Length of first accel/decel lane	230	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	691		234			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	192		65			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	845	263	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 845 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	845	4600	No
v_{12}	845	4400	No
$v_{FO} = v_F - v_R$	582	4600	No
v_R	263	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 2.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.427		
Space mean speed in ramp influence area,	S_R = 85.9	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 85.9	km/h	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	741	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	251	vph
Length of first accel/decel lane	230	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	741		251			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	206		70			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	906	282	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 906 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	906	4600	No
v_{12}	906	4400	No
$v_{FO} = v_F - v_R$	624	4600	No
v_R	282	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053 v_{12} - 0.0183 L_D$ = 3.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.428

Space mean speed in ramp influence area, S_R = 85.9 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 85.9 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: Sat
Freeway/Dir of Travel: EB
Junction: Rothesay Rd Off Ramp
Jurisdiction: Provincial
Analysis Year: 2028
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	779	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	264	vph
Length of first accel/decel lane	230	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	779		264			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	216		73			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          952         296                     pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =               (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  952    pcph
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                           Actual        Maximum         LOS F?
     v  = v                952           4600            No
      Fi   F
     v                     952           4400            No
      12
     v  = v - v            656           4600            No
      FO   F   R
     v                     296           2000            No
      R

_________________Level of Service Determination (if not F)______________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   3.5     pc/km/ln
                          R                   12          D
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.430
                                              S
Space mean speed in ramp influence area,     S  = 85.8    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 85.8    km/h
________________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	819	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	277	vph
Length of first accel/decel lane	230	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	819		277			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	228		77			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1001	311	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1001 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1001	4600	No
v_{12}	1001	4400	No
$v_{FO} = v_F - v_R$	690	4600	No
v_R	311	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 3.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.431

Space mean speed in ramp influence area, S_R = 85.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 85.8 km/h

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	451	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	345	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	451	345		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	125	96		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           551         387                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  551    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     938           4600            No
      FO
     v                     938           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   4.2     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.264
                                              S
Space mean speed in ramp influence area,     S  = 91.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.3    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	483	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	370	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	483		370			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	134		103			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           590         415                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  590    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1005          4600            No
      FO
     v                     1005          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   4.5     pc/km/ln
          R                   R            12            A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.264
                                              S
Space mean speed in ramp influence area,     S  = 91.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	508	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	389	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	508	389		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	141	108		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	621	437	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 621 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1058	4600	No
v_{R12}	1058	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 4.8 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.265		
Space mean speed in ramp influence area,	S_R = 91.3	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 91.3	km/h	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Sat
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	534	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	409	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	534	409		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	148	114		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909        0.990
Driver population factor, fP           1.00         1.00
Flow rate, vp                          653          459                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  653    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1112          4600            No
      FO
     v                     1112          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   5.1     pc/km/ln
          R                   R            12             A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.266
                                              S
Space mean speed in ramp influence area,     S  = 91.2    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 91.2    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	1/17/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2587	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	769	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2587		769			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	719		214			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3162	863	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3162 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3162	4600	No
v_{12}	3162	4400	No
$v_{FO} = v_F - v_R$	2299	4600	No
v_R	863	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 15.0 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.481	
Space mean speed in ramp influence area,	S_R = 84.1	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.1	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KEH
Agency/Co.: exp
Date performed: 1/17/2017
Analysis time period: Morning Peak
Freeway/Dir of Travel: Westbound
Junction: Route 100 Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2774	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	824	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2774		824			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	771		229			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3390	925	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3390 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3390	4600	No
v_{12}	3390	4400	No
$v_{FO} = v_F - v_R$	2465	4600	No
v_R	925	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 16.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 84.0	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 84.0	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	1/17/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2916	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	866	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2916		866			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	810		241			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3564        972                     pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =                (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3564   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                             Actual        Maximum         LOS F?
     v  = v                  3564          4600            No
      Fi   F
     v                       3564          4400            No
      12
     v  = v - v              2592          4600            No
      FO   F   R
     v                       972           2000            No
      R

_________________Level of Service Determination (if not F)_____________________

Density,                D = 2.642 + 0.0053 v  - 0.0183  L   =   17.1    pc/km/ln
                         R                  12           D
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.490
                                              S
Space mean speed in ramp influence area,     S  = 83.8    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 83.8    km/h
________________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	1/17/2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3065	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	910	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3065		910			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	851		253			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3746	1021	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3746 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3746	4600	No
v_{12}	3746	4400	No
$v_{FO} = v_F - v_R$	2725	4600	No
v_R	1021	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 18.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.495		
Space mean speed in ramp influence area,	S_R = 83.7	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 83.7	km/h	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	1/17/2017
Analysis time period:	AM
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	514	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	217	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	514	217		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	143	60		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          628         244                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  628    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     872           4600            No
      FO
     v                     872           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   5.6     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.294
                                              S
Space mean speed in ramp influence area,     S  = 90.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	1/17/2017
Analysis time period:	AM
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	551	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	233	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	551	233		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	153	65		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          673         261                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  673    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     934           4600            No
      FO
     v                     934           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   5.9     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  A

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.295
                                              S
Space mean speed in ramp influence area,     S  = 90.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.3    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	AM
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	579	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	245	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	579	245		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	161	68		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          708         275                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  708    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     983           4600            No
      FO
     v                     983           4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   6.1     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.295
                                              S
Space mean speed in ramp influence area,     S  = 90.3    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.3    km/h
_______________________________________________________________________________
```

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Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	AM
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	609	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	257	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	609	257		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	169	71		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           744         288                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  744    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1032          4600            No
      FO
     v                     1032          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   6.4     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.296
                                              S
Space mean speed in ramp influence area,     S  = 90.2    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 90.2    km/h
_______________________________________________________________________________
```

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	839	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	258	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	839		258			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	233		72			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1025	290	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1025 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1025	4600	No
v_{12}	1025	4400	No
$v_{FO} = v_F - v_R$	735	4600	No
v_R	290	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 3.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.429

Space mean speed in ramp influence area, S_R = 85.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 85.8 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KEH
Agency/Co.: exp
Date performed: 2017
Analysis time period: Morning Peak
Freeway/Dir of Travel: Westbound
Junction: Route 100 Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	899	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	277	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	899		277			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	250		77			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1099	311	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1099 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1099	4600	No
v_{12}	1099	4400	No
$v_{FO} = v_F - v_R$	788	4600	No
v_R	311	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.431

Space mean speed in ramp influence area, S_R = 85.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 85.8 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	945	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	291	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	945		291			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	263		81			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1155	327	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1155 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1155	4600	No
v_{12}	1155	4400	No
$v_{FO} = v_F - v_R$	828	4600	No
v_R	327	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.4 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.432

Space mean speed in ramp influence area, S_R = 85.7 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 85.7 km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	993	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	306	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	993		306			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	276		85			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1214	343	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1214 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1214	4600	No
v_{12}	1214	4400	No
$v_{FO} = v_F - v_R$	871	4600	No
v_R	343	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 4.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.434	
Space mean speed in ramp influence area,	S_R = 85.7	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 85.7	km/h

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Phone: Fax:
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Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2464	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	709	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2464	709		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	684	197		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3012	796	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3012 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3808	4600	No
v_{R12}	3808	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 19.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.461		
Space mean speed in ramp influence area,	S_R = 84.8	km/h	
Space mean speed in outer lanes,	S_0 = N/A	km/h	
Space mean speed for all vehicles,	S = 84.8	km/h	

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Phone: Fax:
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Merge Analysis

Analyst: KEH
Agency/Co.: exp
Date performed: 2017
Analysis time period: Evening Peak
Freeway/Dir of Travel: EB
Junction: Route 100 On Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2642	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	760	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2642		760			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	734		211			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3229        853                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3229   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4082          4600            No
      FO
     v                     4082          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   20.9    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.516
                                              S
Space mean speed in ramp influence area,     S  = 83.0    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 83.0    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2776	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	799	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2776	799		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	771	222		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3393        897                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3393   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4290          4600            No
      FO
     v                     4290          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   21.9    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.570
                                              S
Space mean speed in ramp influence area,     S  = 81.2    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 81.2    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	Westbond
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2919	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	839	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2919		839			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	811		233			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade		%		%		%
Length		km		km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3568        942                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3568   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4510          4600            No
      FO
     v                     4510          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   22.9    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  E

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.640
                                              S
Space mean speed in ramp influence area,     S  = 78.9    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 78.9    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	451	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	733	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	451		733			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	125		204			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	551	823	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 551 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	551	4600	No
v_{12}	551	4400	No
$v_{FO} = v_F - v_R$	-272	4600	No
v_R	823	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 1.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.477

Space mean speed in ramp influence area, S_R = 84.3 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 84.3 km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	483	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	786	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	483		786			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	134		218			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	590	882	pcph

Estimation of V12 Diverge Areas

$L_{EQ} =$ (Equation 25-8 or 25-9)

$P_{FD} = 1.000$ Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD} = 590$ pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	590	4600	No
v_{12}	590	4400	No
$v_{FO} = v_F - v_R$	-292	4600	No
v_R	882	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D = 1.4$ pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	$D_S = 0.482$	
Space mean speed in ramp influence area,	$S_R = 84.1$	km/h
Space mean speed in outer lanes,	$S_0 =$ N/A	km/h
Space mean speed for all vehicles,	$S = 84.1$	km/h

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2028
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	508	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	826	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	508		826			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	141		229			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	621	927	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 621 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	621	4600	No
v_{12}	621	4400	No
$v_{FO} = v_F - v_R$	-306	4600	No
v_R	927	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\, v_{12} - 0.0183\, L_D$ = 1.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 83.9	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 83.9	km/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	534	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	868	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	534		868			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	148		241			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	653	974	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 653 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	653	4600	No
v_{12}	653	4400	No
$v_{FO} = v_F - v_R$	-321	4600	No
v_R	974	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053 v_{12} - 0.0183 L_D$ = 1.7 pc/km/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.491

Space mean speed in ramp influence area, S_R = 83.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 83.8 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	K Hazzard
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	691	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	756	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	691	756		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	192	210		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          845         848                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                 (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  845    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1693          4600            No
      FO
     v                     1693          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   9.4     pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.306
                                              S
Space mean speed in ramp influence area,     S  = 89.9    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 89.9    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	741	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	811	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	741	811		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	206	225		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          906         910                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  906    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1816          4600            No
      FO
     v                     1816          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   10.0    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.309
                                              S
Space mean speed in ramp influence area,     S  = 89.8    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 89.8    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	Westbond
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2028
Description:	The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	779	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	852	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	779	852		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	216	237		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          952         956                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L   =                 (Equation 25-2 or 25-3)
                   EQ
                  P   =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  952    pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     1908          4600            No
      FO
     v                     1908          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   10.4    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.311
                                              S
Space mean speed in ramp influence area,     S  = 89.7    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 89.7    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Sat
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	819	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	895	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	819	895		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	228	249		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          1001        1004                 pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  1001   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     2005          4600            No
      FO
     v                     2005          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   10.9    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  B

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.314
                                              S
Space mean speed in ramp influence area,     S  = 89.6    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 89.6    km/h
_______________________________________________________________________________
```

Appendix C – LOS Results with Phase 1 (2023) of Development

Intersection	
Int Delay, s/veh	15.1

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	15	3	8	0	129	759	19	2	10	113	1
Future Vol, veh/h	0	15	3	8	0	129	759	19	2	10	113	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	9	0	140	825	21	2	11	123	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1887	1818	22	1827	1818	123	124	0	0	23	0	0
Stage 1	1672	1672	-	145	145	-	-	-	-	-	-	-
Stage 2	215	146	-	1682	1673	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	54	78	1055	59	78	928	1463	-	-	1592	-	-
Stage 1	121	152	-	858	777	-	-	-	-	-	-	-
Stage 2	787	776	-	119	152	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	25	33	1055	21	33	928	1463	-	-	1592	-	-
Mov Cap-2 Maneuver	25	33	-	21	33	-	-	-	-	-	-	-
Stage 1	52	65	-	368	772	-	-	-	-	-	-	-
Stage 2	663	771	-	38	65	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	168	35.2	10.3	0.6
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	39	1592	-	-	1463	-	-	263
HCM Lane V/C Ratio	0.502	0.007	-	-	0.564	-	-	0.566
HCM Control Delay (s)	168	7.3	0	-	10.6	0	-	35.2
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1.8	0	-	-	3.7	-	-	3.2

Intersection	
Int Delay, s/veh	5.6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	2	5	1	0	98	210	13	2	1	159	3
Future Vol, veh/h	1	2	5	1	0	98	210	13	2	1	159	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	1	0	107	228	14	2	1	173	3

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	702	650	15	653	650	174	176	0	0	16	0	0
Stage 1	472	472	-	177	177	-	-	-	-	-	-	-
Stage 2	230	178	-	476	473	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	353	388	1065	380	388	869	1400	-	-	1602	-	-
Stage 1	573	559	-	825	753	-	-	-	-	-	-	-
Stage 2	773	752	-	570	558	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	271	324	1065	329	324	869	1400	-	-	1602	-	-
Mov Cap-2 Maneuver	271	324	-	329	324	-	-	-	-	-	-	-
Stage 1	479	467	-	690	752	-	-	-	-	-	-	-
Stage 2	678	751	-	472	466	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	11.7	9.8	7.5	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1
Capacity (veh/h)	550	1602	-	-	1400	-	-	855
HCM Lane V/C Ratio	0.016	0.001	-	-	0.163	-	-	0.126
HCM Control Delay (s)	11.7	7.2	0	-	8.1	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.6	-	-	0.4

Intersection	
Int Delay, s/veh	13.7

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	15	3	8	0	129	759	19	2	10	113	1
Future Vol, veh/h	0	15	3	8	0	129	759	19	2	10	113	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	750	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	3	9	0	140	825	21	2	11	123	1

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	1817	1818	22	1827	1818	123	124	0	0	23	0	0
Stage 1	1672	1672	-	145	145	-	-	-	-	-	-	-
Stage 2	145	146	-	1682	1673	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	60	78	1055	59	78	928	1463	-	-	1592	-	-
Stage 1	121	152	-	858	777	-	-	-	-	-	-	-
Stage 2	858	776	-	119	152	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	28	33	1055	21	33	928	1463	-	-	1592	-	-
Mov Cap-2 Maneuver	28	33	-	21	33	-	-	-	-	-	-	-
Stage 1	52	65	-	368	772	-	-	-	-	-	-	-
Stage 2	723	771	-	38	65	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	168	24.6	10.3	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1	SBLn2
Capacity (veh/h)	39	1592	-	-	1463	-	-	21	928
HCM Lane V/C Ratio	0.502	0.007	-	-	0.564	-	-	0.414	0.151
HCM Control Delay (s)	168	7.3	0	-	10.6	0	-	266.7	9.6
HCM Lane LOS	F	A	A	-	B	A	-	F	A
HCM 95th %tile Q(veh)	1.8	0	-	-	3.7	-	-	1.2	0.5

Intersection	
Int Delay, s/veh	5.6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	1	2	5	1	0	98	210	13	2	1	159	3
Future Vol, veh/h	1	2	5	1	0	98	210	13	2	1	159	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	750	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	5	1	0	107	228	14	2	1	173	3

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	649	650	15	653	650	174	176	0	0	16	0	0
Stage 1	472	472	-	177	177	-	-	-	-	-	-	-
Stage 2	177	178	-	476	473	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	383	388	1065	380	388	869	1400	-	-	1602	-	-
Stage 1	573	559	-	825	753	-	-	-	-	-	-	-
Stage 2	825	752	-	570	558	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	294	324	1065	329	324	869	1400	-	-	1602	-	-
Mov Cap-2 Maneuver	294	324	-	329	324	-	-	-	-	-	-	-
Stage 1	479	467	-	690	752	-	-	-	-	-	-	-
Stage 2	723	751	-	472	466	-	-	-	-	-	-	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	11.5	9.8	7.5	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SBLn1	SBLn2
Capacity (veh/h)	561	1602	-	-	1400	-	-	329	869
HCM Lane V/C Ratio	0.016	0.001	-	-	0.163	-	-	0.003	0.123
HCM Control Delay (s)	11.5	7.2	0	-	8.1	0	-	16	9.7
HCM Lane LOS	B	A	A	-	A	A	-	C	A
HCM 95th %tile Q(veh)	0	0	-	-	0.6	-	-	0	0.4

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2672	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	785	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2672		785			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	742		218			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3266        881                     pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =                (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3266   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                             Actual        Maximum         LOS F?
     v  = v                  3266          4600            No
      Fi   F
     v                       3266          4400            No
      12
     v  = v - v              2385          4600            No
      FO   F   R
     v                       881           2000            No
      R

_________________Level of Service Determination (if not F)______________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   17.6    pc/km/ln
                          R                  12           D
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                D  = 0.482
                                             S
Space mean speed in ramp influence area,    S  = 84.1    km/h
                                             R
Space mean speed in outer lanes,            S  =  N/A    km/h
                                             0
Space mean speed for all vehicles,          S  = 84.1    km/h
________________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2672	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	27	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2672	27		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	742	8		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           3266        30                    pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3266   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3296          4600            No
      FO
     v                     3296          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   17.7    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.398
                                              S
Space mean speed in ramp influence area,     S  = 86.9    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 86.9    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	3124	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	298	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3124		298			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	868		83			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3818	334	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3818 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3818	4500	No
v_{12}	3818	4400	No
$v_{FO} = v_F - v_R$	3484	4500	No
v_R	334	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 19.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.433

Space mean speed in ramp influence area, S_R = 80.0 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 80.0 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3124	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	471	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3124	471		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	868	131		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3818        529                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3818   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4347          4600            No
      FO
     v                     4347          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   22.2    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  E

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.586
                                              S
Space mean speed in ramp influence area,     S  = 80.7    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 80.7    km/h
_______________________________________________________________________________
```

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	117	5	0	5	131	869	4	4	793	3
Future Vol, veh/h	7	0	117	5	0	5	131	869	4	4	793	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	127	5	0	5	142	945	4	4	862	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2106	2106	864	2168	2106	947	865	0	0	949	0	0
Stage 1	872	872	-	1232	1232	-	-	-	-	-	-	-
Stage 2	1234	1234	-	936	874	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	37	51	354	34	51	317	778	-	-	724	-	-
Stage 1	345	368	-	217	249	-	-	-	-	-	-	-
Stage 2	216	249	-	318	367	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	25	31	354	15	31	317	778	-	-	724	-	-
Mov Cap-2 Maneuver	25	31	-	15	31	-	-	-	-	-	-	-
Stage 1	212	364	-	133	153	-	-	-	-	-	-	-
Stage 2	130	153	-	202	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.1	190.3	1.4	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	778	-	-	203	29	724	-	-
HCM Lane V/C Ratio	0.183	-	-	0.664	0.375	0.006	-	-
HCM Control Delay (s)	10.7	0	-	52.1	190.3	10	0	-
HCM Lane LOS	B	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.7	-	-	4	1.2	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	124	2	0	2	135	300	1	2	399	6
Future Vol, veh/h	7	0	124	2	0	2	135	300	1	2	399	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	135	2	0	2	147	326	1	2	434	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1062	1062	437	1129	1065	327	440	0	0	327	0	0
Stage 1	441	441	-	620	620	-	-	-	-	-	-	-
Stage 2	621	621	-	509	445	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	201	223	620	181	223	714	1120	-	-	1233	-	-
Stage 1	595	577	-	476	480	-	-	-	-	-	-	-
Stage 2	475	479	-	547	575	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	176	187	620	124	187	714	1120	-	-	1233	-	-
Mov Cap-2 Maneuver	176	187	-	124	187	-	-	-	-	-	-	-
Stage 1	500	576	-	400	403	-	-	-	-	-	-	-
Stage 2	398	402	-	427	574	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.9	22.4	2.7	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1120	-	-	546	211	1233	-	-
HCM Lane V/C Ratio	0.131	-	-	0.261	0.021	0.002	-	-
HCM Control Delay (s)	8.7	0	-	13.9	22.4	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	1	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	117	5	0	5	0	1000	4	4	793	3
Future Vol, veh/h	0	0	117	5	0	5	0	1000	4	4	793	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	127	5	0	5	0	1087	4	4	862	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	1963	864	2025	1963	1089	-	0	0	1091	0	0
Stage 1	-	872	-	1089	1089	-	-	-	-	-	-	-
Stage 2	-	1091	-	936	874	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	63	354	43	63	262	0	-	-	640	-	-
Stage 1	0	368	-	261	291	-	0	-	-	-	-	-
Stage 2	0	291	-	318	367	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	62	354	27	62	262	-	-	-	640	-	-
Mov Cap-2 Maneuver	-	62	-	27	62	-	-	-	-	-	-	-
Stage 1	-	364	-	261	291	-	-	-	-	-	-	-
Stage 2	-	291	-	201	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	98.3	0	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	354	49	640	-	-
HCM Lane V/C Ratio	-	-	0.359	0.222	0.007	-	-
HCM Control Delay (s)	-	-	20.8	98.3	10.7	0	-
HCM Lane LOS	-	-	C	F	B	A	-
HCM 95th %tile Q(veh)	-	-	1.6	0.7	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	124	5	0	5	0	435	1	2	399	6
Future Vol, veh/h	0	0	124	5	0	5	0	435	1	2	399	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	135	5	0	5	0	473	1	2	434	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	915	437	982	918	473	-	0	0	474	0	0
Stage 1	-	441	-	473	473	-	-	-	-	-	-	-
Stage 2	-	474	-	509	445	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	273	620	228	272	591	0	-	-	1088	-	-
Stage 1	0	577	-	572	558	-	0	-	-	-	-	-
Stage 2	0	558	-	547	575	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	272	620	178	271	591	-	-	-	1088	-	-
Mov Cap-2 Maneuver	-	272	-	178	271	-	-	-	-	-	-	-
Stage 1	-	576	-	572	558	-	-	-	-	-	-	-
Stage 2	-	558	-	427	574	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	18.7	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	620	274	1088	-	-
HCM Lane V/C Ratio	-	-	0.217	0.04	0.002	-	-
HCM Control Delay (s)	-	-	12.4	18.7	8.3	0	-
HCM Lane LOS	-	-	B	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	5	737	168	1	3	1
Future Vol, veh/h	5	737	168	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	801	183	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	995	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	812	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1391	-	-	-	271	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	437	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1391	-	-	-	269	859
Mov Cap-2 Maneuver	-	-	-	-	269	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	434	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1391	-	325	-	-
HCM Lane V/C Ratio	0.004	-	0.013	-	-
HCM Control Delay (s)	7.6	0	16.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	3	218	103	1	3	1
Future Vol, veh/h	3	218	103	1	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	237	112	1	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	113	0	-	0	355	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	243	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1476	-	-	-	643	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1476	-	-	-	642	941
Mov Cap-2 Maneuver	-	-	-	-	642	-
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	795	-

Approach	NB	SB	SE
HCM Control Delay, s	0.1	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SBT	SBR
Capacity (veh/h)	1476	-	697	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.4	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	700	182	20	28	0
Future Vol, veh/h	2	700	182	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	761	198	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	220	0	-	0	974	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	765	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1349	-	-	-	279	831
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1349	-	-	-	278	831
Mov Cap-2 Maneuver	-	-	-	-	278	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	458	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1349	-	-	-	278
HCM Lane V/C Ratio	0.002	-	-	-	0.109
HCM Control Delay (s)	7.7	0	-	-	19.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	292	152	16	12	3
Future Vol, veh/h	0	292	152	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	317	165	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	183	0	-	0	491	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1392	-	-	-	537	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1392	-	-	-	537	869
Mov Cap-2 Maneuver	-	-	-	-	537	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	738	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1392	-	-	-	581
HCM Lane V/C Ratio	-	-	-	-	0.028
HCM Control Delay (s)	0	-	-	-	11.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	242	149	93	188	481	321	548	77	552	231	1
Future Vol, veh/h	3	242	149	93	188	481	321	548	77	552	231	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	500	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	263	162	101	204	523	349	596	84	600	251	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2848	2745	252	2957	2745	596	252	0	-	596	0	0
Stage 1	1452	1452	-	1293	1293	-	-	-	-	-	-	-
Stage 2	1396	1293	-	1664	1452	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	11	~ 20	787	~ 9	~ 20	~ 504	1313	-	0	980	-	-
Stage 1	162	~ 195	-	200	233	-	-	-	0	-	-	-
Stage 2	175	~ 233	-	122	~ 195	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	~ 5	787	-	~ 5	~ 504	1313	-	-	980	-	-
Mov Cap-2 Maneuver	-	~ 5	-	-	~ 5	-	-	-	-	-	-	-
Stage 1	98	~ 76	-	121	~ 140	-	-	-	-	-	-	-
Stage 2	~ 2	~ 140	-	-	~ 76	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			3.2	10.1
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1313	-	-	-	980	-	-
HCM Lane V/C Ratio	0.266	-	-	-	0.612	-	-
HCM Control Delay (s)	8.7	0	-	-	14.3	-	-
HCM Lane LOS	A	A	-	-	B	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-	4.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	447	133	244	301	274	300	146	90	417	125	3
Future Vol, veh/h	5	447	133	244	301	274	300	146	90	417	125	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	500	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	486	145	265	327	298	326	159	98	453	136	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2018	1855	138	2170	1857	159	139	0	-	159	0	0
Stage 1	1044	1044	-	811	811	-	-	-	-	-	-	-
Stage 2	974	811	-	1359	1046	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	43	~ 74	910	~ 34	~ 74	886	1445	-	0	1420	-	-
Stage 1	277	~ 306	-	373	393	-	-	-	0	-	-	-
Stage 2	303	~ 393	-	~ 183	~ 305	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	~ 38	910	-	~ 38	886	1445	-	-	1420	-	-
Mov Cap-2 Maneuver	-	~ 38	-	-	~ 38	-	-	-	-	-	-	-
Stage 1	209	~ 208	-	281	~ 296	-	-	-	-	-	-	-
Stage 2	-	~ 296	-	-	~ 208	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			5.5	6.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	-	1420	-	-
HCM Lane V/C Ratio	0.226	-	-	-	0.319	-	-
HCM Control Delay (s)	8.2	0	-	-	8.7	-	-
HCM Lane LOS	A	A	-	-	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	-	1.4	-	-

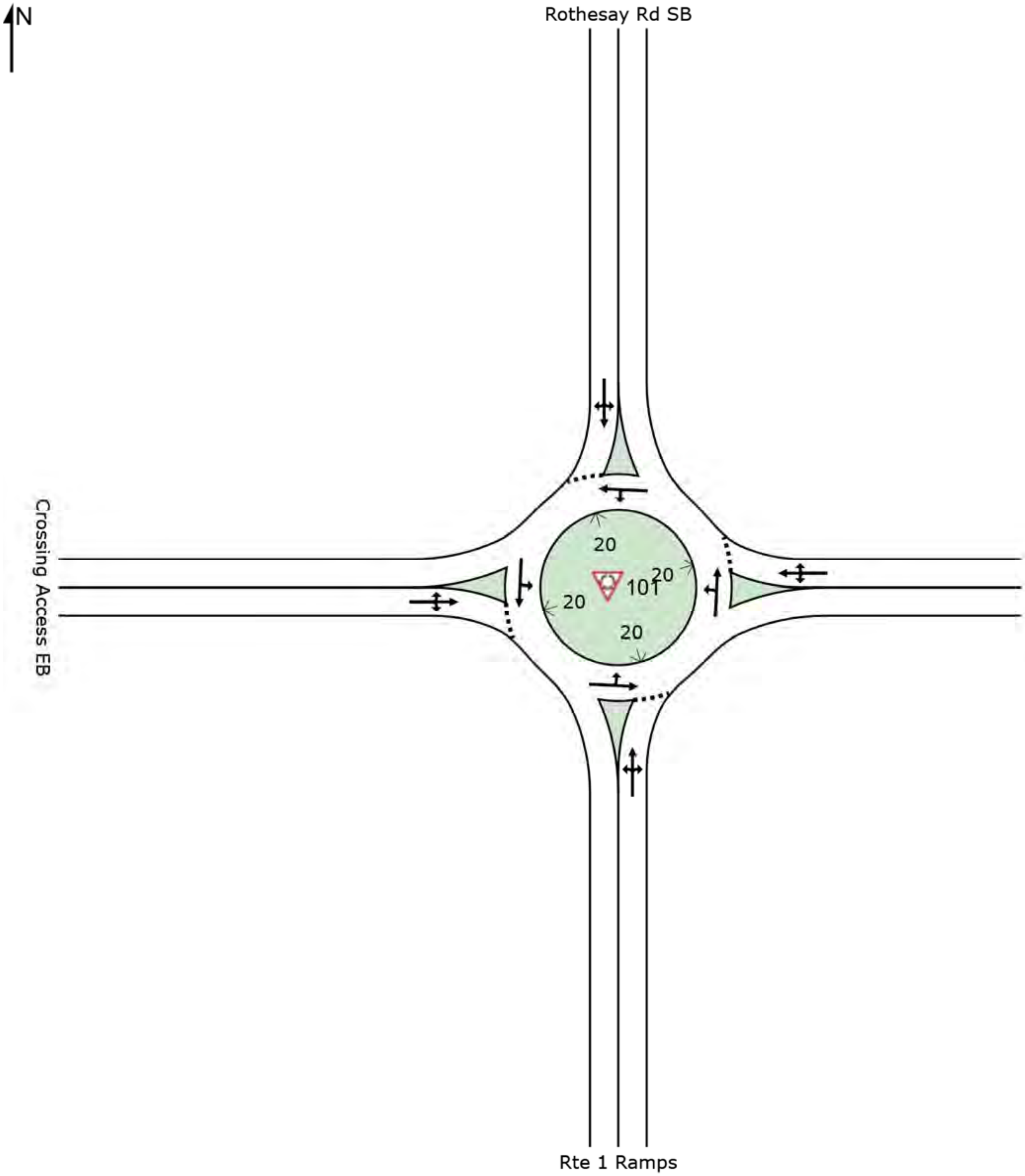
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

SITE LAYOUT

Site: 101 [Crossing 2023 PM (Single Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Single Lane Option
Roundabout



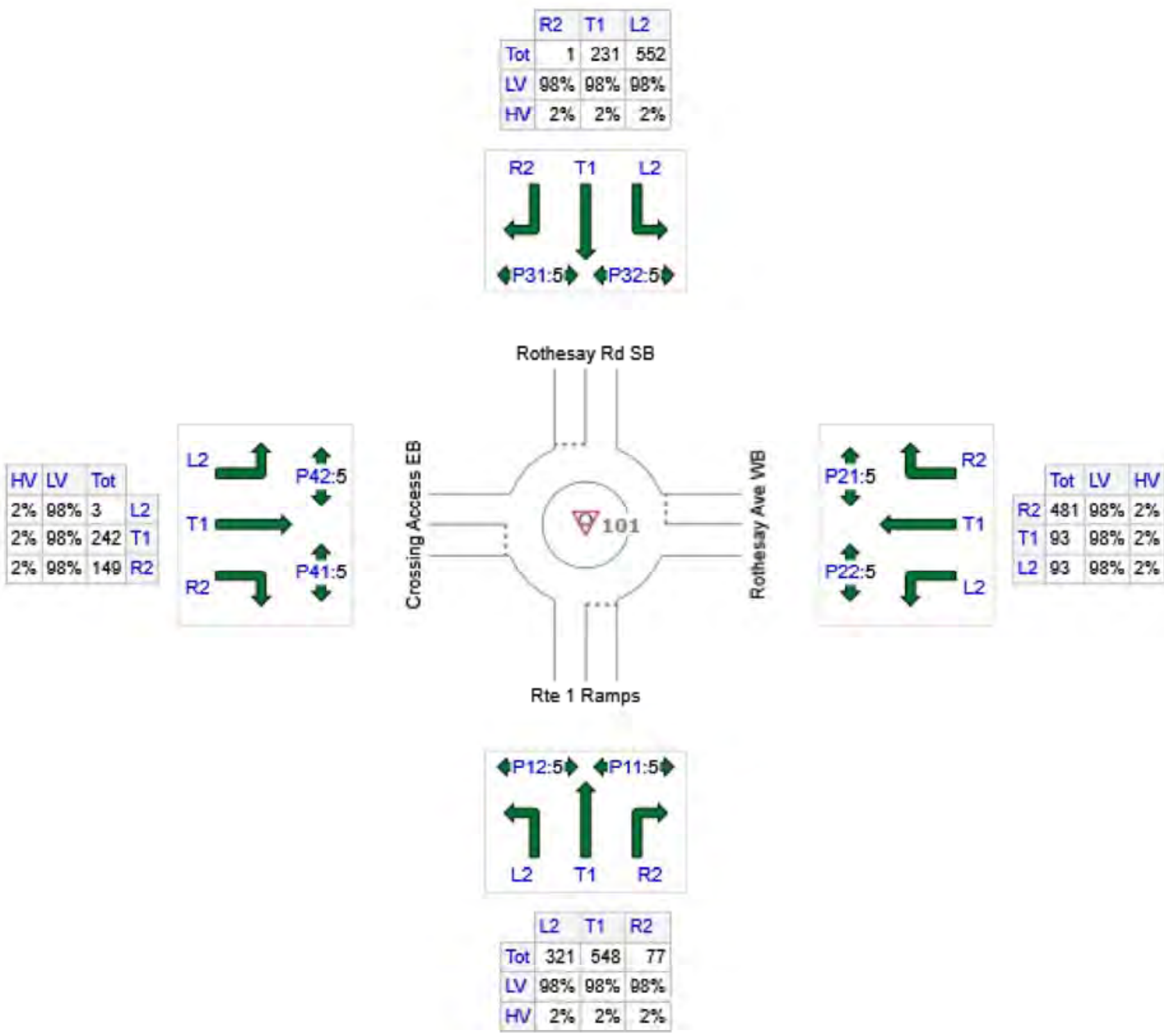
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 PM (Single Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Single Lane Option
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	946	927	19
E: Rothesay Ave WB	667	654	13
N: Rothesay Rd SB	784	768	16
W: Crossing Access EB	394	386	8
Total	2791	2735	56

Organisation: GRIFFIN TRANSPORTATION GROUP | Created: February 3, 2017 9:55:16 AM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis
\Crossing_2023wDevelopment.sip7

LANE SUMMARY

Site: 101 [Crossing 2023 PM (Single Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Single Lane Option
Roundabout

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	996	2.0	443	2.247	100	585.6	LOS F	193.8	1379.9	Full	500	0.0	67.7
Approach	996	2.0		2.247		585.6	LOS F	193.8	1379.9				
East: Rothesay Ave WB													
Lane 1[d]	702	2.0	699	1.005	100	42.0	LOS D	29.6	210.8	Full	500	0.0	0.0
Approach	702	2.0		1.005		42.0	LOS D	29.6	210.8				
North: Rothesay Rd SB													
Lane 1[d]	825	2.0	810	1.018	100	47.4	LOS D	35.4	252.0	Full	500	0.0	0.0
Approach	825	2.0		1.018		47.4	LOS D	35.4	252.0				
West: Crossing Access EB													
Lane 1[d]	415	2.0	340	1.221	100	140.9	LOS F	38.4	273.2	Full	500	0.0	0.0
Approach	415	2.0		1.221		140.9	LOS F	38.4	273.2				
Intersection	2938	2.0		2.247		241.7	LOS F	193.8	1379.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

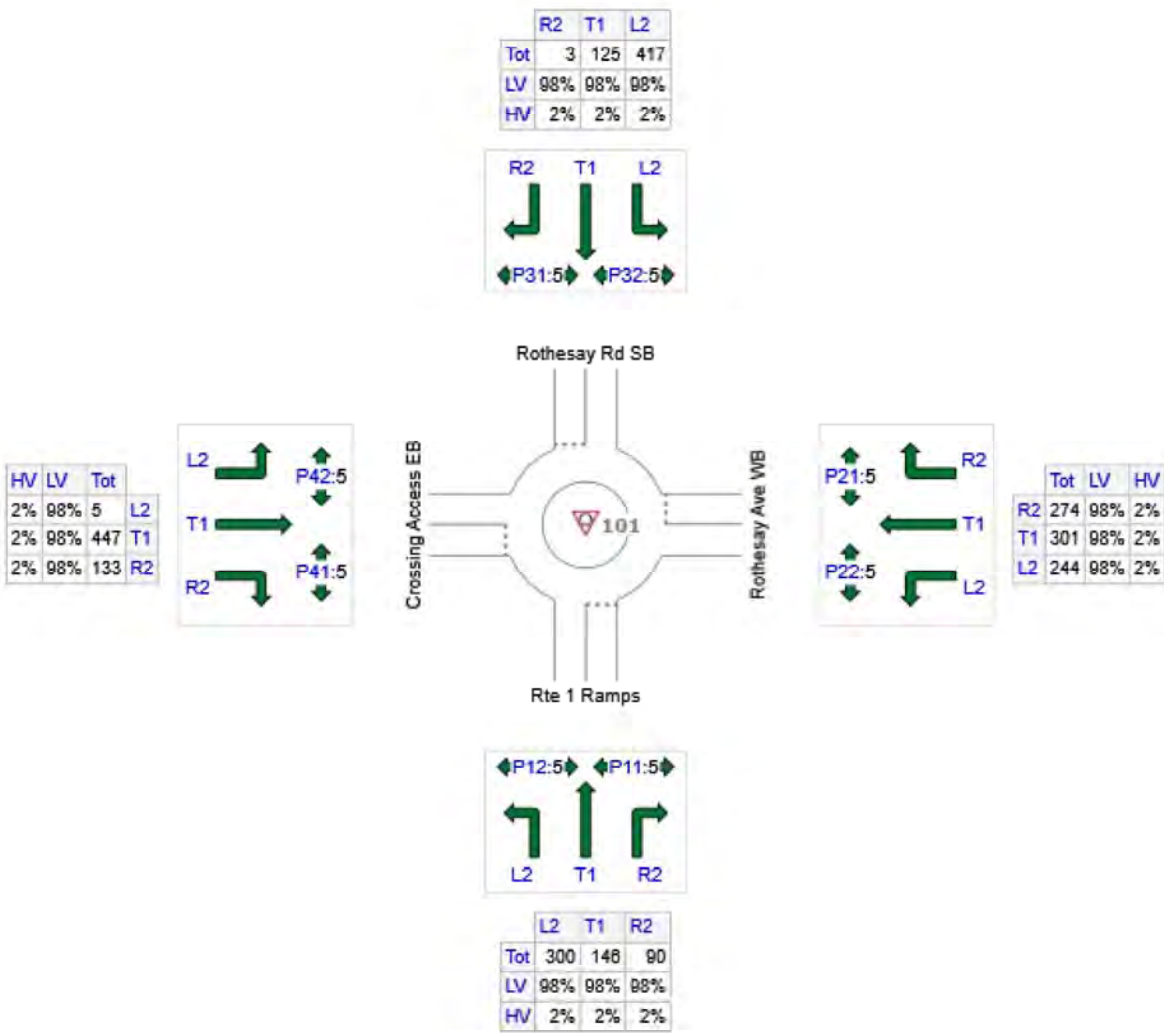
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 Sat (Single Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Single Lane Option
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	536	525	11
E: Rothesay Ave WB	819	803	16
N: Rothesay Rd SB	545	534	11
W: Crossing Access EB	585	573	12
Total	2485	2435	50

LANE SUMMARY

Site: 101 [Crossing 2023 Sat (Single Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Single Lane Option
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	564	2.0	491	1.149	100	108.8	LOS F	41.0	292.2	Full	500	0.0	0.0
Approach	564	2.0		1.149		108.8	LOS F	41.0	292.2				
East: Rothesay Ave WB													
Lane 1[d]	862	2.0	717	1.202	100	113.1	LOS F	67.5	480.5	Full	500	0.0	3.8
Approach	862	2.0		1.202		113.1	LOS F	67.5	480.5				
North: Rothesay Rd SB													
Lane 1[d]	574	2.0	479	1.197	100	127.8	LOS F	46.8	333.5	Full	500	0.0	0.0
Approach	574	2.0		1.197		127.8	LOS F	46.8	333.5				
West: Crossing Access EB													
Lane 1[d]	616	2.0	511	1.205	100	123.0	LOS F	50.5	359.9	Full	500	0.0	0.0
Approach	616	2.0		1.205		123.0	LOS F	50.5	359.9				
Intersection	2616	2.0		1.205		117.7	LOS F	67.5	480.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

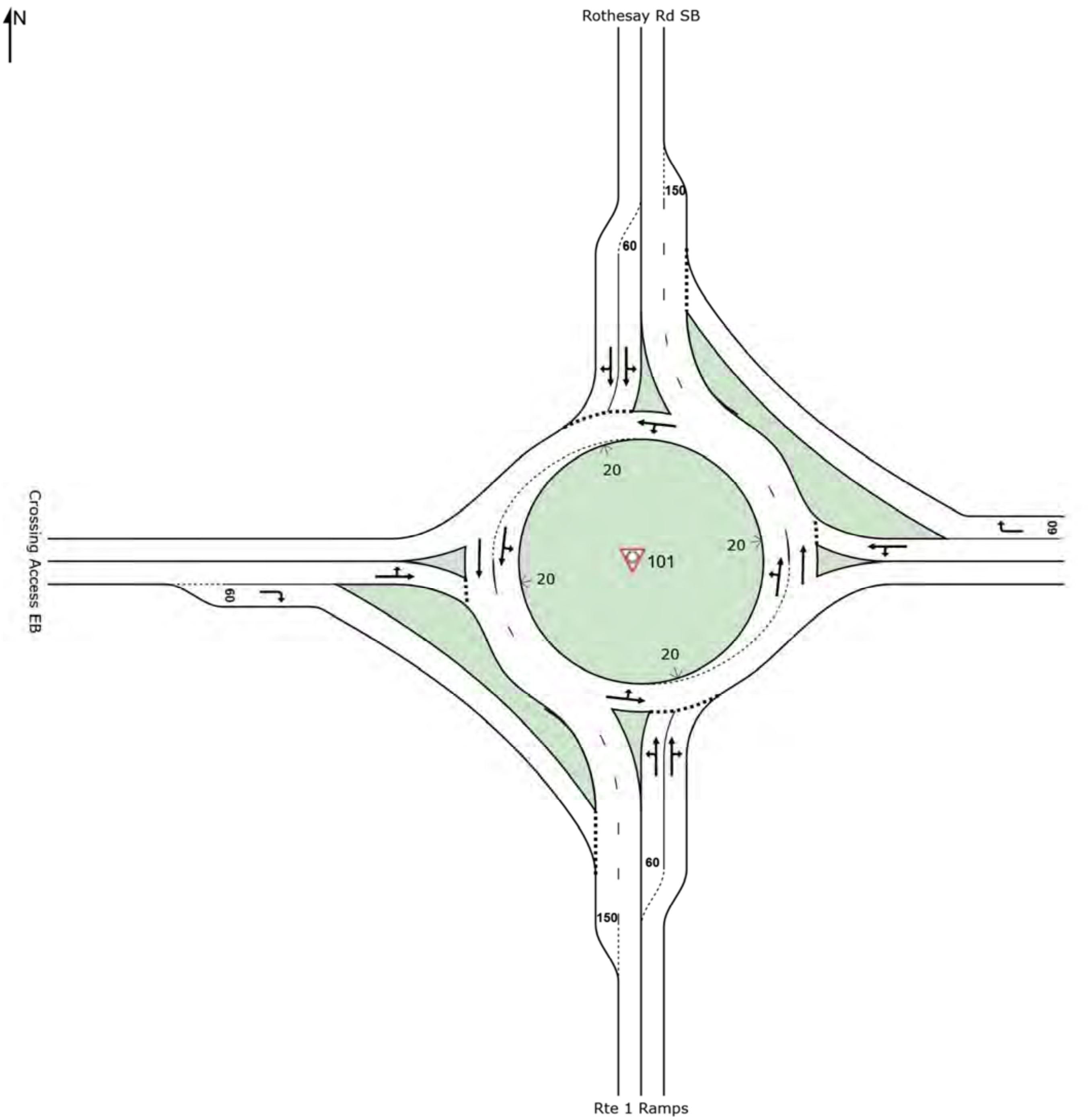
d Dominant lane on roundabout approach

Organisation: GRIFFIN TRANSPORTATION GROUP | Processed: February 3, 2017 9:06:17 AM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis
\Crossing_2023wDevelopment.sip7

SITE LAYOUT

Site: 101 [Crossing 2023 PM (Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option
Roundabout



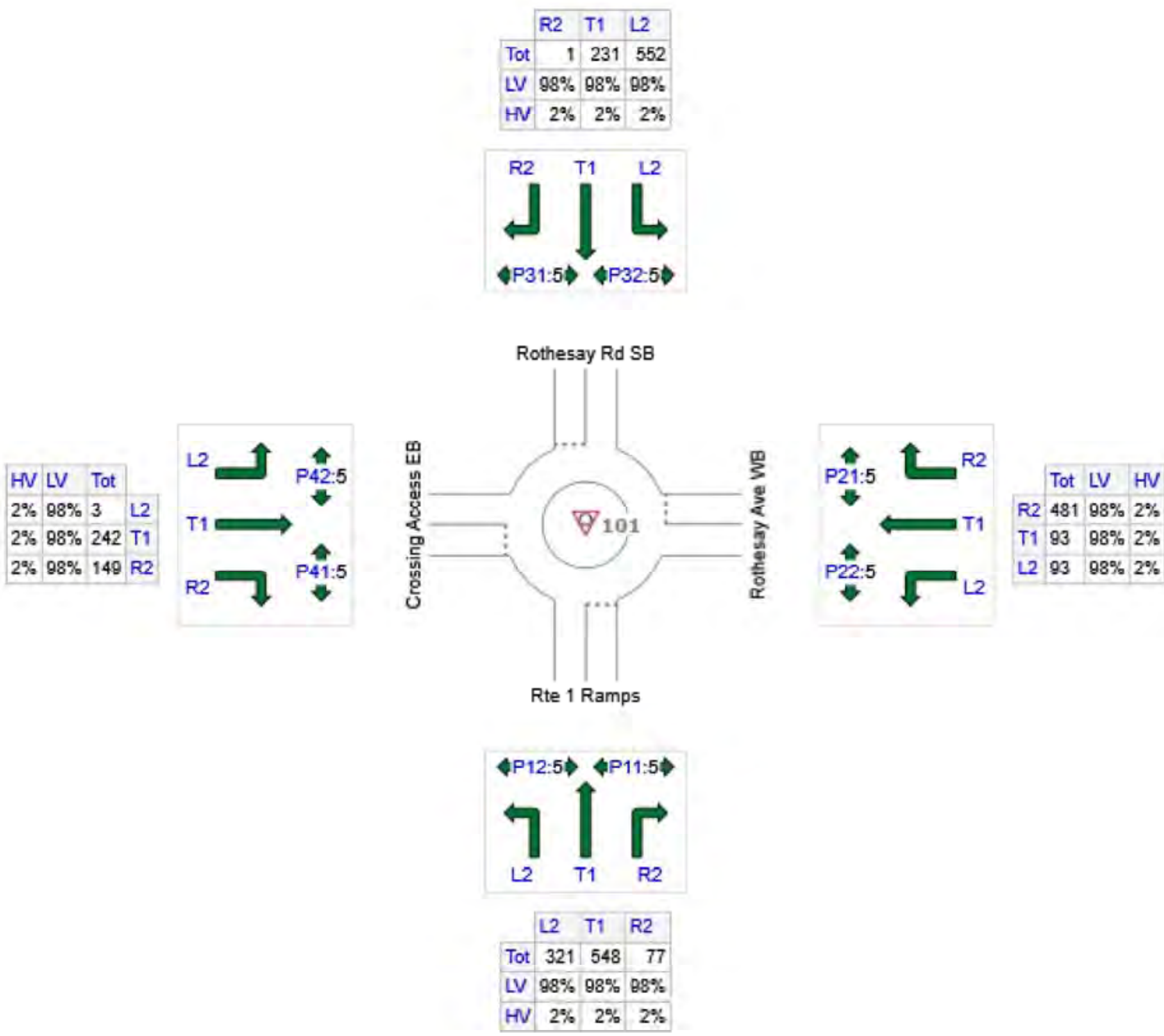
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 PM (Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	946	927	19
E: Rothesay Ave WB	667	654	13
N: Rothesay Rd SB	784	768	16
W: Crossing Access EB	394	386	8
Total	2791	2735	56

Organisation: GRIFFIN TRANSPORTATION GROUP | Created: February 3, 2017 9:56:38 AM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis \Crossing_2023wDevelopment.sip7

LANE SUMMARY

Site: 101 [Crossing 2023 PM (Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option
Roundabout

Lane Use and Performance	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	551	2.0	540	1.020	100	66.6	LOS E	27.3	194.7	Short	60	0.0	NA
Lane 2	445	2.0	480	0.927	91[6]	45.4	LOS D	16.8	119.3	Full	500	0.0	0.0
Approach	996	2.0		1.020		57.1	LOS E	27.3	194.7				
East: Rothesay Ave WB													
Lane 1[d]	196	2.0	558	0.351	100	10.4	LOS B	1.8	12.8	Full	500	0.0	0.0
Lane 2	506	2.0	718	0.705	100	10.0	LOS B	6.0	42.5	Short	60	0.0	NA
Approach	702	2.0		0.705		10.1	LOS B	6.0	42.5				
North: Rothesay Rd SB													
Lane 1[d]	581	2.0	782	0.743	100	20.8	LOS C	9.4	67.2	Short	60	0.0	NA
Lane 2	244	2.0	570	0.429	58[5]	12.4	LOS B	2.8	20.2	Full	500	0.0	0.0
Approach	825	2.0		0.743		18.3	LOS B	9.4	67.2				
West: Crossing Access EB													
Lane 1[d]	258	2.0	561	0.460	100	9.7	LOS A	2.7	19.2	Full	500	0.0	0.0
Lane 2	157	2.0	885	0.177	100	5.4	LOS A	0.8	5.6	Short	60	0.0	NA
Approach	415	2.0		0.460		8.1	LOS A	2.7	19.2				
Intersection	2938	2.0		1.020		28.1	LOS C	27.3	194.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: GRIFFIN TRANSPORTATION GROUP | Processed: February 3, 2017 9:46:12 AM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis \Crossing_2023wDevelopment.sip7

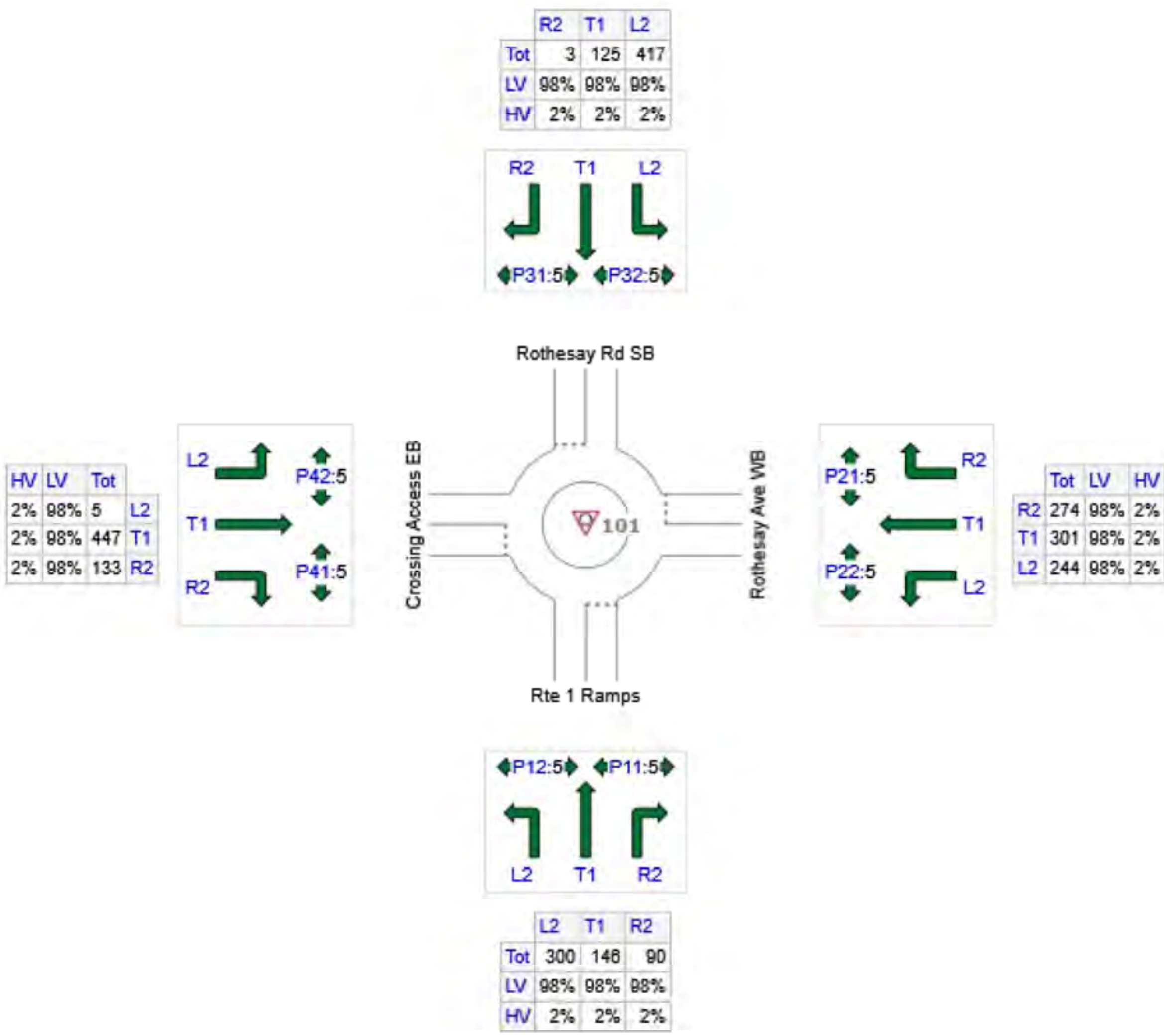
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 Sat (Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	536	525	11
E: Rothesay Ave WB	819	803	16
N: Rothesay Rd SB	545	534	11
W: Crossing Access EB	585	573	12
Total	2485	2435	50

LANE SUMMARY

Site: 101 [Crossing 2023 Sat (Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	316	2.0	527	0.600	100	25.2	LOS C	5.8	41.1	Short	60	0.0	NA
Lane 2	248	2.0	461	0.539	90[5]	20.0	LOS B	4.5	32.0	Full	500	0.0	0.0
Approach	564	2.0		0.600		22.9	LOS C	5.8	41.1				
East: Rothesay Ave WB													
Lane 1[d]	574	2.0	780	0.736	100	12.3	LOS B	7.0	49.9	Full	500	0.0	0.0
Lane 2	288	2.0	1035	0.279	100	4.7	LOS A	1.6	11.3	Short	60	0.0	NA
Approach	862	2.0		0.736		9.8	LOS A	7.0	49.9				
North: Rothesay Rd SB													
Lane 1[d]	439	2.0	530	0.829	100	37.5	LOS D	12.3	87.2	Short	60	0.0	NA
Lane 2	135	2.0	320	0.421	51[5]	20.7	LOS C	2.7	19.0	Full	500	0.0	0.0
Approach	574	2.0		0.829		33.5	LOS C	12.3	87.2				
West: Crossing Access EB													
Lane 1[d]	476	2.0	606	0.786	100	16.0	LOS B	7.7	55.0	Full	500	0.0	0.0
Lane 2	140	2.0	855	0.164	100	5.5	LOS A	0.7	5.1	Short	60	0.0	NA
Approach	616	2.0		0.786		13.6	LOS B	7.7	55.0				
Intersection	2616	2.0		0.829		18.7	LOS B	12.3	87.2				

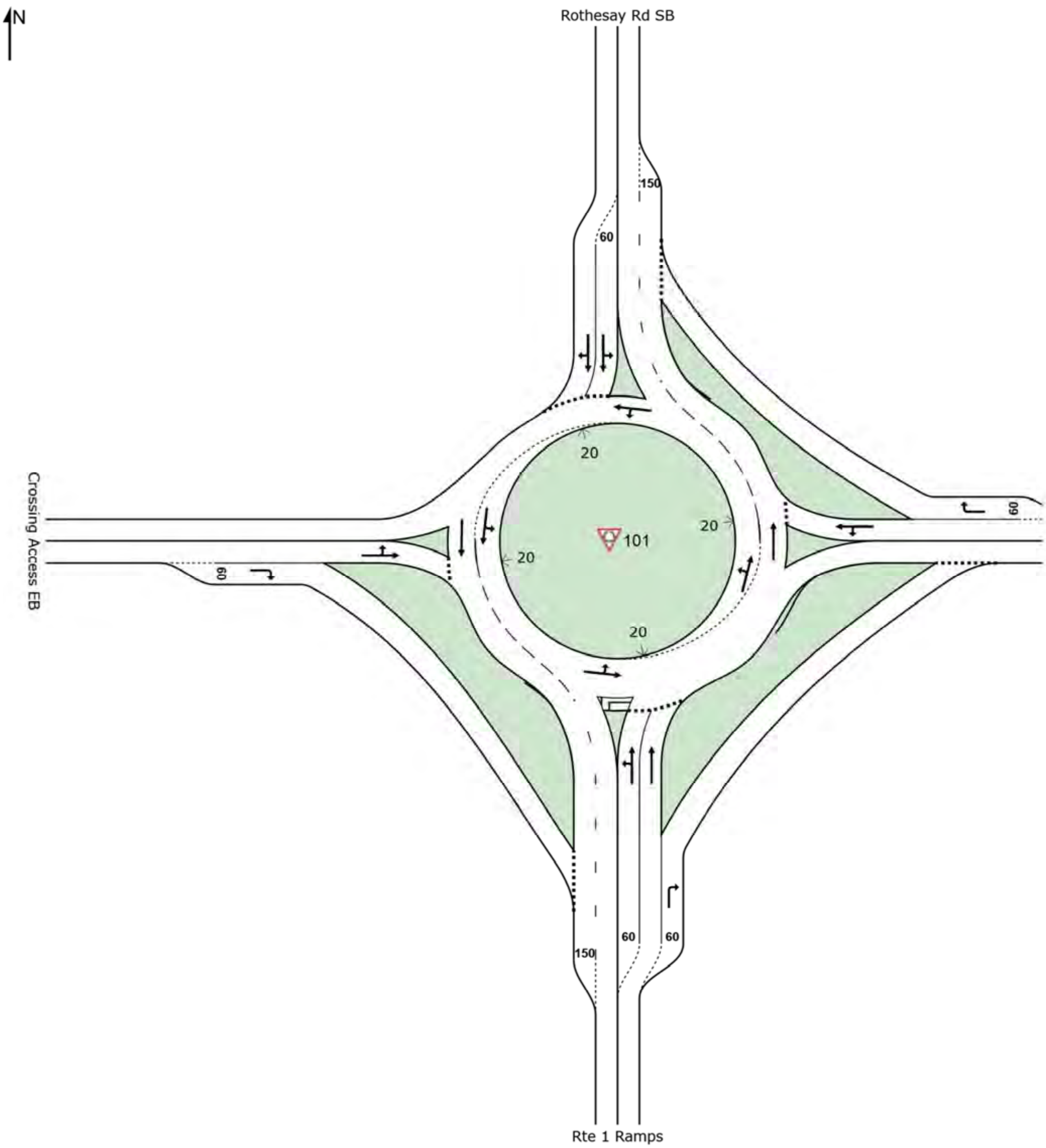
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 101 [Crossing 2023 Sat (Opt 3 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option 3
Roundabout



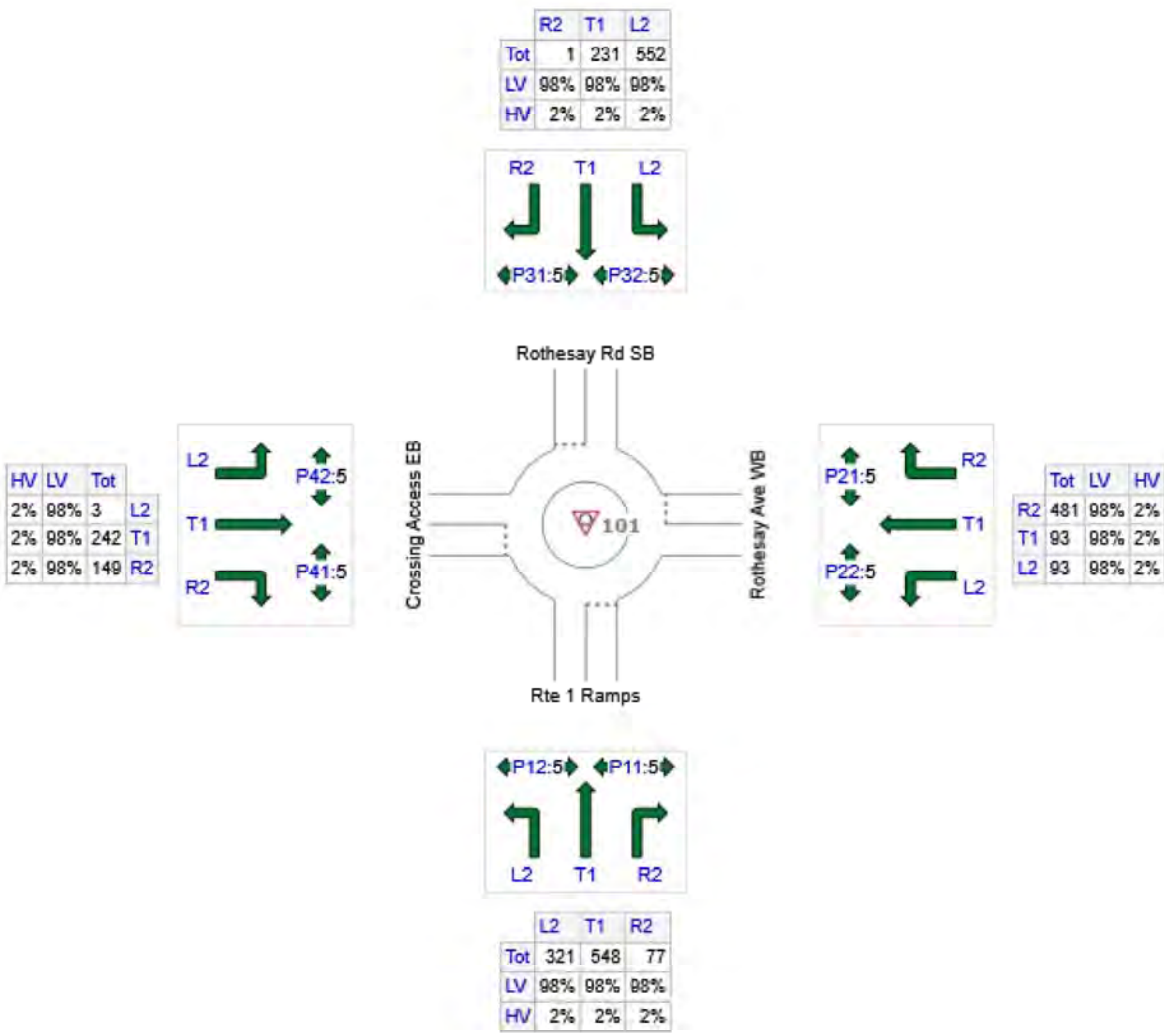
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 PM (Opt 3 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option 3
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	946	927	19
E: Rothesay Ave WB	667	654	13
N: Rothesay Rd SB	784	768	16
W: Crossing Access EB	394	386	8
Total	2791	2735	56

Organisation: GRIFFIN TRANSPORTATION GROUP | Created: February 3, 2017 4:34:42 PM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis \Crossing_2023wDevelopment.sip7

LANE SUMMARY

Site: 101 [Crossing 2023 PM (Opt 3 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option 3
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	506	2.0	539	0.939	100	48.2	LOS D	19.0	135.4	Short	60	0.0	NA
Lane 2	409	2.0	479	0.853	91[6]	35.1	LOS D	12.4	88.5	Full	500	0.0	0.0
Lane 3	81	2.0	540	0.150	100	11.8	LOS B	1.0	6.9	Short	60	0.0	NA
Approach	996	2.0		0.939		39.9	LOS D	19.0	135.4				
East: Rothesay Ave WB													
Lane 1[d]	196	2.0	556	0.352	100	10.4	LOS B	1.8	12.6	Full	500	0.0	0.0
Lane 2	506	2.0	713	0.710	100	10.3	LOS B	6.2	44.0	Short	60	0.0	NA
Approach	702	2.0		0.710		10.4	LOS B	6.2	44.0				
North: Rothesay Rd SB													
Lane 1[d]	581	2.0	776	0.749	100	21.2	LOS C	9.6	68.6	Short	60	0.0	NA
Lane 2	244	2.0	565	0.432	58[5]	12.5	LOS B	2.9	20.5	Full	500	0.0	0.0
Approach	825	2.0		0.749		18.6	LOS B	9.6	68.6				
West: Crossing Access EB													
Lane 1[d]	258	2.0	560	0.461	100	9.8	LOS A	2.7	19.3	Full	500	0.0	0.0
Lane 2	157	2.0	885	0.177	100	5.4	LOS A	0.8	5.6	Short	60	0.0	NA
Approach	415	2.0		0.461		8.1	LOS A	2.7	19.3				
Intersection	2938	2.0		0.939		22.4	LOS C	19.0	135.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

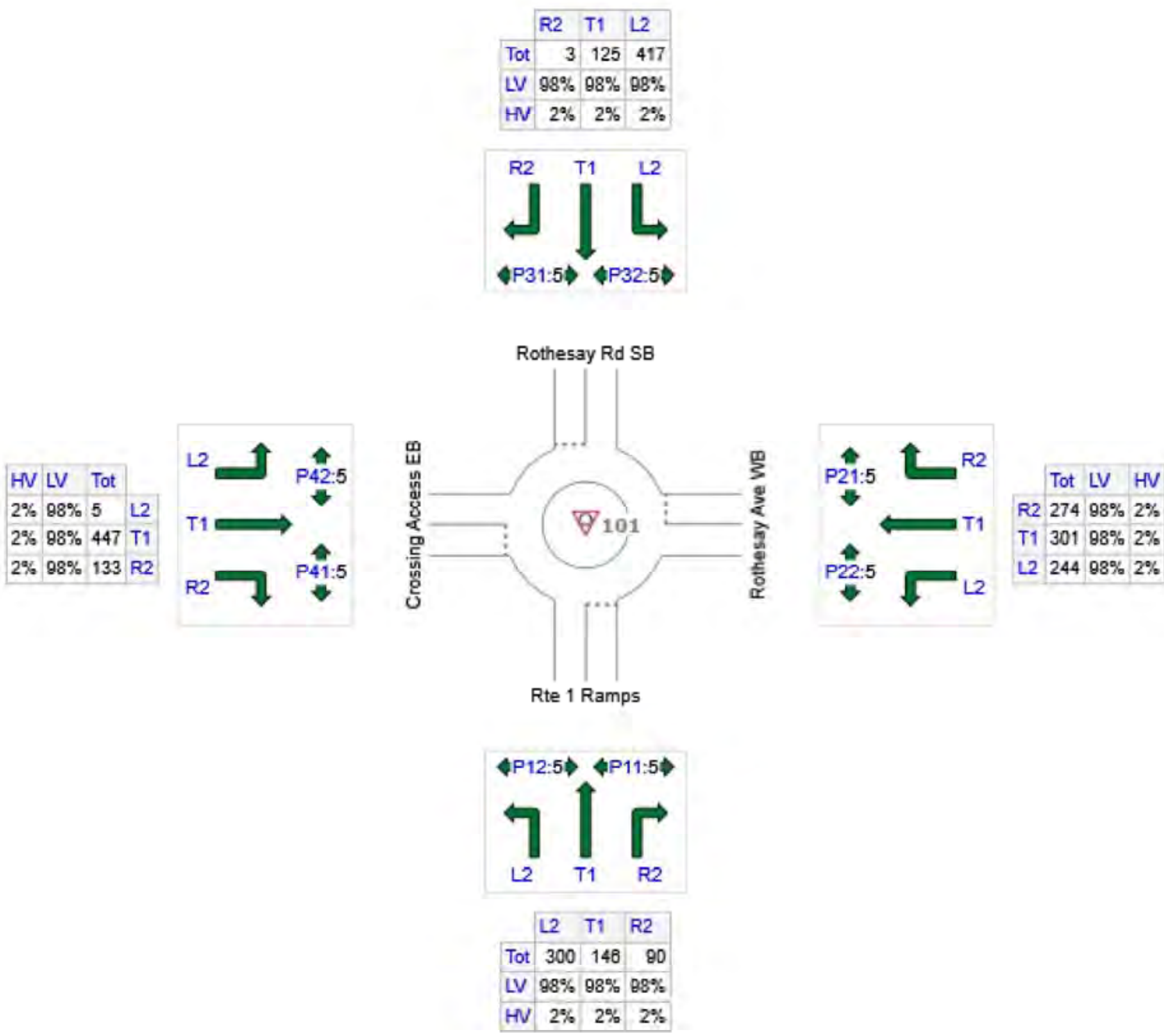
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 Sat (Opt 3 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option 3
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Rte 1 Ramps	536	525	11
E: Rothesay Ave WB	819	803	16
N: Rothesay Rd SB	545	534	11
W: Crossing Access EB	585	573	12
Total	2485	2435	50

Organisation: GRIFFIN TRANSPORTATION GROUP | Created: February 3, 2017 4:35:34 PM
Project: C:\Users\Jamie Copeland\Desktop\GRIFFIN\Projects\2017\1706 - The Crossing Rdbt Analysis\Sidra Analysis
\Crossing_2023wDevelopment.sip7

LANE SUMMARY

Site: 101 [Crossing 2023 Sat (Opt 3 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option 3
Roundabout

Lane Use and Performance														
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	316	2.0	527	0.600	100	25.2	LOS C	5.8	41.1	Short	60	0.0	NA
Lane 2	154	2.0	396	0.388	65[5]	17.7	LOS B	2.5	18.1	Full	500	0.0	0.0
Lane 3	95	2.0	531	0.179	100	13.0	LOS B	1.1	8.2	Short	60	0.0	NA
Approach	564	2.0		0.600		21.1	LOS C	5.8	41.1				
East: Rothesay Ave WB													
Lane 1[d]	574	2.0	782	0.734	100	12.3	LOS B	7.0	49.6	Full	500	0.0	0.0
Lane 2	288	2.0	1038	0.278	100	4.7	LOS A	1.6	11.1	Short	60	0.0	NA
Approach	862	2.0		0.734		9.7	LOS A	7.0	49.6				
North: Rothesay Rd SB													
Lane 1[d]	439	2.0	530	0.828	100	37.4	LOS D	12.2	87.1	Short	60	0.0	NA
Lane 2	135	2.0	320	0.421	51[5]	20.7	LOS C	2.7	19.0	Full	500	0.0	0.0
Approach	574	2.0		0.828		33.5	LOS C	12.2	87.1				
West: Crossing Access EB													
Lane 1[d]	476	2.0	606	0.786	100	16.0	LOS B	7.7	55.0	Full	500	0.0	0.0
Lane 2	140	2.0	855	0.164	100	5.5	LOS A	0.7	5.1	Short	60	0.0	NA
Approach	616	2.0		0.786		13.6	LOS B	7.7	55.0				
Intersection	2616	2.0		0.828		18.3	LOS B	12.2	87.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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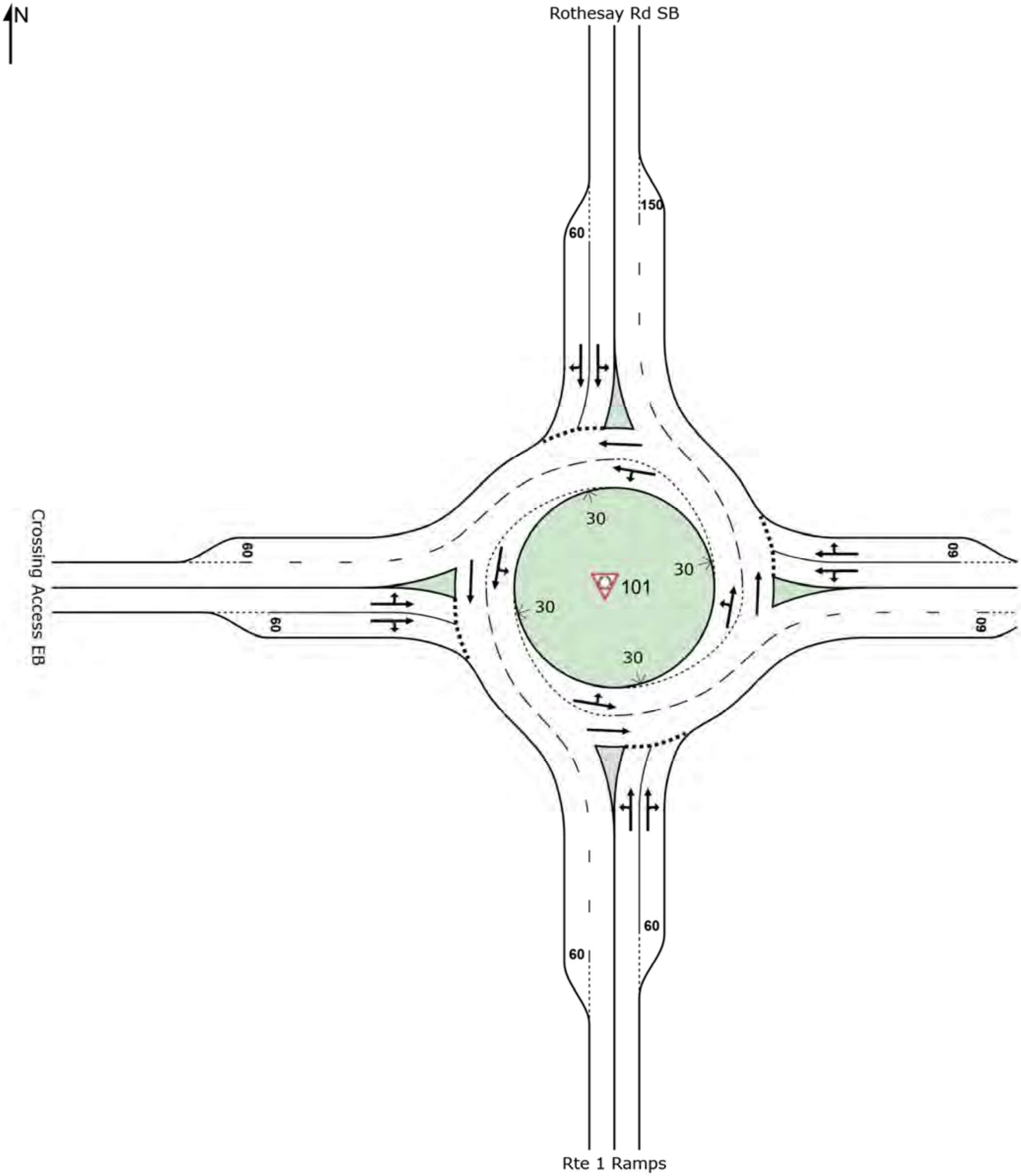
5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 101 [Crossing 2023 PM (Opt 4 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option 4
Roundabout



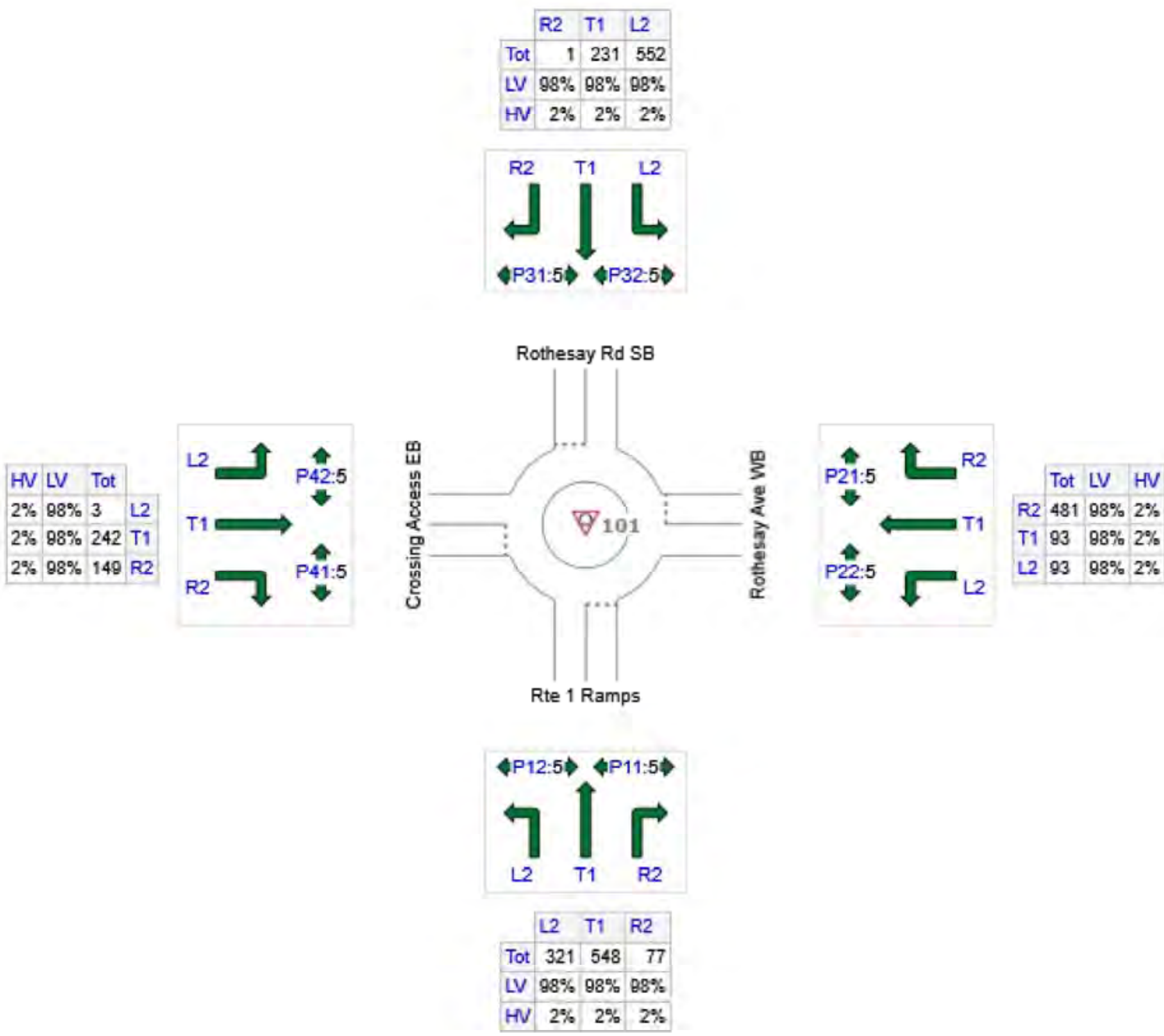
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 PM (Opt 4 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option 4
Roundabout

Volume Display Method: Total and %



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Total	2791	2735	56

LANE SUMMARY

Site: 101 [Crossing 2023 PM (Opt 4 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 PM peak w/ Development - Multi-Lane Option 4
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	511	2.0	556	0.920	100	40.4	LOS D	16.2	115.6	Full	500	0.0	0.0
Lane 2	484	2.0	535	0.905	98[6]	34.9	LOS C	14.8	105.6	Short	60	0.0	NA
Approach	996	2.0		0.920		37.7	LOS D	16.2	115.6				
East: Rothesay Ave WB													
Lane 1	196	2.0	410	0.478	57[5]	13.5	LOS B	2.5	17.7	Full	500	0.0	0.0
Lane 2[d]	506	2.0	606	0.836	100	14.7	LOS B	8.0	57.2	Short	60	0.0	NA
Approach	702	2.0		0.836		14.4	LOS B	8.0	57.2				
North: Rothesay Rd SB													
Lane 1[d]	615	2.0	783	0.786	100	21.4	LOS C	9.9	70.4	Full	500	0.0	0.0
Lane 2	210	2.0	524	0.401	51[6]	11.6	LOS B	2.3	16.1	Short	60	0.0	NA
Approach	825	2.0		0.786		18.9	LOS B	9.9	70.4				
West: Crossing Access EB													
Lane 1[d]	258	2.0	610	0.423	100	8.5	LOS A	2.5	17.7	Full	500	0.0	0.0
Lane 2	157	2.0	508	0.309	73[5]	8.4	LOS A	1.5	10.8	Short	60	0.0	NA
Approach	415	2.0		0.423		8.5	LOS A	2.5	17.7				
Intersection	2938	2.0		0.920		22.7	LOS C	16.2	115.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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d Dominant lane on roundabout approach

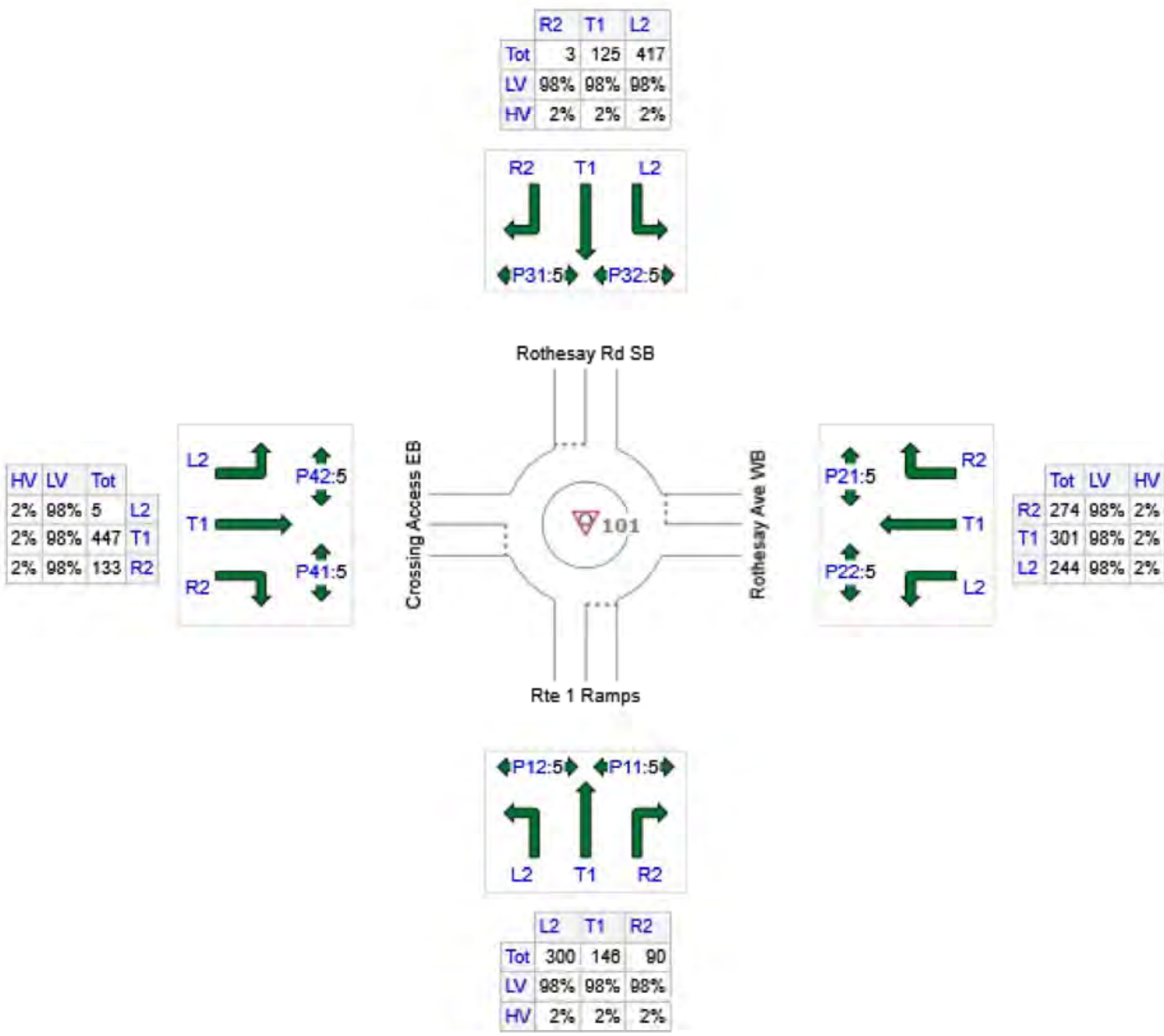
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Crossing 2023 Sat (Opt 4 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option 4
Roundabout

Volume Display Method: Total and %



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S: Rte 1 Ramps	536	525	11
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W: Crossing Access EB	585	573	12
Total	2485	2435	50

LANE SUMMARY

Site: 101 [Crossing 2023 Sat (Opt 4 Multi-Lane)]

Rothesay Rd / Rothesay Ave
2023 Sat peak w/ Development - Multi-Lane Option 4
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Rte 1 Ramps													
Lane 1[d]	316	2.0	577	0.547	100	21.2	LOS C	4.3	30.6	Full	500	0.0	0.0
Lane 2	248	2.0	525	0.473	86[5]	14.5	LOS B	3.2	23.1	Short	60	0.0	NA
Approach	564	2.0		0.547		18.3	LOS B	4.3	30.6				
East: Rothesay Ave WB													
Lane 1[d]	574	2.0	848	0.677	100	10.8	LOS B	5.8	41.4	Full	500	0.0	0.0
Lane 2	288	2.0	679	0.425	63[5]	7.0	LOS A	2.3	16.5	Short	60	0.0	NA
Approach	862	2.0		0.677		9.5	LOS A	5.8	41.4				
North: Rothesay Rd SB													
Lane 1[d]	439	2.0	553	0.794	100	31.8	LOS C	10.0	71.0	Full	500	0.0	0.0
Lane 2	135	2.0	338	0.398	50[5]	17.7	LOS B	2.3	16.1	Short	60	0.0	NA
Approach	574	2.0		0.794		28.5	LOS C	10.0	71.0				
West: Crossing Access EB													
Lane 1[d]	469	2.0	659	0.711	100	12.4	LOS B	6.3	44.6	Full	500	0.0	0.0
Lane 2	147	2.0	406	0.362	51[6]	10.9	LOS B	1.8	12.6	Short	60	0.0	NA
Approach	616	2.0		0.711		12.1	LOS B	6.3	44.6				
Intersection	2616	2.0		0.794		16.2	LOS B	10.0	71.0				

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5 Lane under-utilisation found by the program
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d Dominant lane on roundabout approach

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	242	149	93	93	481	321	547	77	551	231	1
Future Volume (vph)	3	242	149	93	93	481	321	547	77	551	231	1
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1848	0	1789	1882	0
Flt Permitted	0.692			0.255			0.603			0.122		
Satd. Flow (perm)	1303	1883	1601	480	1883	1601	1136	1848	0	230	1882	0
Satd. Flow (RTOR)			164			523		9				
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	263	162	101	101	523	349	679	0	599	252	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free	2			6		
Total Split (s)	7.5	16.5	16.5	7.6	16.6		19.3	36.5		29.4	46.6	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5		4.0	4.5		4.0	4.5	
Act Effct Green (s)	16.8	13.5	13.5	19.3	18.1	90.0	44.7	32.0		61.9	45.2	
Actuated g/C Ratio	0.19	0.15	0.15	0.21	0.20	1.00	0.50	0.36		0.69	0.50	
v/c Ratio	0.01	0.93	0.43	0.65	0.27	0.33	0.53	1.03		1.00	0.27	
Control Delay	27.3	79.6	9.7	57.9	42.2	0.5	11.0	71.8		61.6	14.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	27.3	79.6	9.7	57.9	42.2	0.5	11.0	71.8		61.6	14.4	
LOS	C	E	A	E	D	A	B	E		E	B	
Approach Delay		52.8			14.3			51.2			47.6	
Approach LOS		D			B			D			D	
Queue Length 50th (m)	0.4	~50.0	0.0	18.0	18.3	0.0	20.3	~125.3		~88.1	21.7	
Queue Length 95th (m)	2.6	#95.7	16.4	m#38.7	m32.8	0.0	31.4	#190.7		#157.7	m38.7	
Internal Link Dist (m)		251.0			124.0			199.5			85.5	
Turn Bay Length (m)	50.0		50.0	60.0		60.0	60.0			50.0		
Base Capacity (vph)	262	283	379	155	379	1601	714	662		598	944	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.01	0.93	0.43	0.65	0.27	0.33	0.49	1.03		1.00	0.27	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green, Master Intersection	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 41.6	Intersection LOS: D
Intersection Capacity Utilization 96.0%	ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 44: Rothesay Ave & Rothesay Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	447	133	244	301	274	300	146	90	417	125	3
Future Volume (vph)	5	447	133	244	301	274	300	146	90	417	125	3
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1776	0	1789	1878	0
Flt Permitted	0.306			0.216			0.668			0.287		
Satd. Flow (perm)	576	1883	1601	407	1883	1601	1258	1776	0	541	1878	0
Satd. Flow (RTOR)			130			298		31			1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	486	145	265	327	298	326	257	0	453	139	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free	2			6		
Total Split (s)	9.0	32.0	32.0	12.0	35.0		18.6	24.0		22.0	27.4	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5		4.0	4.5		4.0	4.5	
Act Effct Green (s)	26.5	26.0	26.0	36.9	36.4	90.0	35.3	21.2		43.0	25.3	
Actuated g/C Ratio	0.29	0.29	0.29	0.41	0.40	1.00	0.39	0.24		0.48	0.28	
v/c Ratio	0.02	0.89	0.26	0.91	0.43	0.19	0.57	0.58		0.90	0.26	
Control Delay	21.8	51.0	7.0	48.4	10.8	0.2	20.5	33.6		41.8	27.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	21.8	51.0	7.0	48.4	10.8	0.2	20.5	33.6		41.8	27.7	
LOS	C	D	A	D	B	A	C	C		D	C	
Approach Delay		40.7			18.5			26.3			38.4	
Approach LOS		D			B			C			D	
Queue Length 50th (m)	0.6	78.1	1.8	17.1	13.1	0.0	35.3	35.5		50.3	19.2	
Queue Length 95th (m)	3.0	#129.5	14.5	m#53.0	m33.5	m0.0	55.5	60.4		#101.3	35.4	
Internal Link Dist (m)		94.6			113.6			98.1			65.9	
Turn Bay Length (m)	50.0		50.0	60.0		60.0	60.0			50.0		
Base Capacity (vph)	237	575	579	291	760	1601	593	443		509	528	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.02	0.85	0.25	0.91	0.43	0.19	0.55	0.58		0.89	0.26	

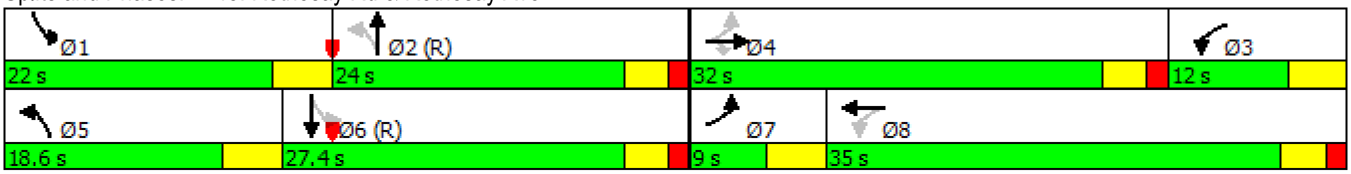
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 29.8	Intersection LOS: C
Intersection Capacity Utilization 87.5%	ICU Level of Service E

Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 48: Rothesay Rd & Rothesay Ave



Intersection	
Int Delay, s/veh	17.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	147	1	642	1	0	2	177	287	5	0	159	29
Future Vol, veh/h	147	1	642	1	0	2	177	287	5	0	159	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	160	1	698	1	0	2	192	312	5	0	173	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	890	891	189	888	903	315	204	0	0	317	0	0
Stage 1	189	189	-	699	699	-	-	-	-	-	-	-
Stage 2	701	702	-	189	204	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	264	282	853	264	277	725	1368	-	-	1243	-	-
Stage 1	813	744	-	430	442	-	-	-	-	-	-	-
Stage 2	429	440	-	813	733	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	229	234	853	42	230	725	1368	-	-	1243	-	-
Mov Cap-2 Maneuver	229	234	-	42	230	-	-	-	-	-	-	-
Stage 1	674	744	-	356	366	-	-	-	-	-	-	-
Stage 2	355	365	-	148	733	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30	37.8	3	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1368	-	-	229	853	113	1243	-	-
HCM Lane V/C Ratio	0.141	-	-	0.702	0.818	0.029	-	-	-
HCM Control Delay (s)	8.1	0	-	51	25.1	37.8	0	-	-
HCM Lane LOS	A	A	-	F	D	E	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	4.6	9.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	0	133	0	0	0	118	180	0	0	171	45
Future Vol, veh/h	86	0	133	0	0	0	118	180	0	0	171	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	800	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	93	0	145	0	0	0	128	196	0	0	186	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	662	662	210	662	687	196	235	0	0	196	0	0
Stage 1	210	210	-	452	452	-	-	-	-	-	-	-
Stage 2	452	452	-	210	235	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	375	382	830	375	370	845	1332	-	-	1377	-	-
Stage 1	792	728	-	587	570	-	-	-	-	-	-	-
Stage 2	587	570	-	792	710	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	344	341	830	284	330	845	1332	-	-	1377	-	-
Mov Cap-2 Maneuver	344	341	-	284	330	-	-	-	-	-	-	-
Stage 1	706	728	-	524	508	-	-	-	-	-	-	-
Stage 2	524	508	-	654	710	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	0	3.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1332	-	-	344	830	-	1377	-	-
HCM Lane V/C Ratio	0.096	-	-	0.272	0.174	-	-	-	-
HCM Control Delay (s)	8	0	-	19.3	10.3	0	0	-	-
HCM Lane LOS	A	A	-	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.6	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	1	642	1	0	2	441	562	5	0	159	29
Future Volume (vph)	154	1	642	1	0	2	441	562	5	0	159	29
Satd. Flow (prot)	1789	1601	0	0	1687	0	1789	1882	0	0	1844	0
Flt Permitted	0.756				0.688		0.587					
Satd. Flow (perm)	1424	1601	0	0	1179	0	1106	1882	0	0	1844	0
Satd. Flow (RTOR)		698			73			1			10	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	699	0	0	3	0	479	616	0	0	205	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	38.0	38.0		38.0	38.0		27.0	52.0		25.0	25.0	
Total Lost Time (s)	4.5	4.5			4.5		4.5	4.5			4.5	
Act Effct Green (s)	19.5	19.5			19.5		61.5	61.5			34.5	
Actuated g/C Ratio	0.22	0.22			0.22		0.68	0.68			0.38	
v/c Ratio	0.54	0.78			0.01		0.52	0.48			0.29	
Control Delay	36.1	9.0			0.0		3.8	2.9			22.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	
Total Delay	36.1	9.0			0.0		3.8	2.9			22.1	
LOS	D	A			A		A	A			C	
Approach Delay		14.3						3.3			22.1	
Approach LOS		B						A			C	
Queue Length 50th (m)	26.1	0.1			0.0		6.9	10.0			22.4	
Queue Length 95th (m)	37.0	24.5			0.0		m23.2	m30.1			48.6	
Internal Link Dist (m)		83.5			78.8			196.8			117.4	
Turn Bay Length (m)							100.0					
Base Capacity (vph)	530	1034			484		926	1286			713	
Starvation Cap Reductn	0	0			0		0	0			0	
Spillback Cap Reductn	0	0			0		0	0			0	
Storage Cap Reductn	0	0			0		0	0			0	
Reduced v/c Ratio	0.32	0.68			0.01		0.52	0.48			0.29	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 23.8 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 91.1%	ICU Level of Service F

Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

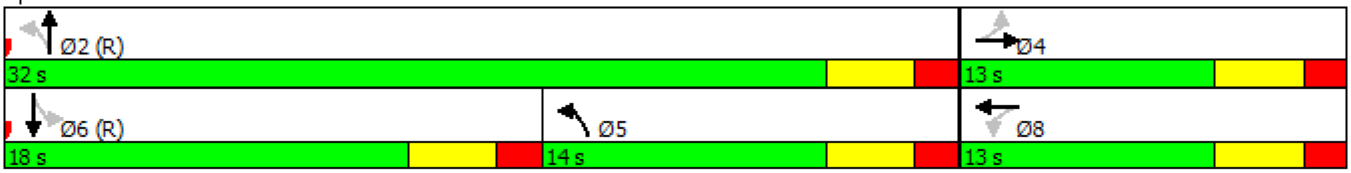
Splits and Phases: 45: Rothesay Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	0	133	0	0	0	253	173	0	0	171	45
Future Volume (vph)	93	0	133	0	0	0	253	173	0	0	171	45
Satd. Flow (prot)	1789	1601	0	0	1883	0	1789	1883	0	0	1831	0
Flt Permitted	0.757						0.612					
Satd. Flow (perm)	1426	1601	0	0	1883	0	1153	1883	0	0	1831	0
Satd. Flow (RTOR)		739									30	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	145	0	0	0	0	275	188	0	0	235	0
Turn Type	Perm	NA					pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	13.0	13.0		13.0	13.0		14.0	32.0		18.0	18.0	
Total Lost Time (s)	4.5	4.5			4.5		4.5	4.5			4.5	
Act Effct Green (s)	7.6	7.6					30.4	31.3			16.4	
Actuated g/C Ratio	0.17	0.17					0.68	0.70			0.36	
v/c Ratio	0.42	0.16					0.30	0.14			0.34	
Control Delay	22.2	0.4					3.0	2.1			12.4	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	22.2	0.4					3.0	2.1			12.4	
LOS	C	A					A	A			B	
Approach Delay		9.3						2.7			12.4	
Approach LOS		A						A			B	
Queue Length 50th (m)	7.0	0.0					4.3	2.9			12.4	
Queue Length 95th (m)	17.2	0.0					7.5	5.3			26.4	
Internal Link Dist (m)		190.2			73.2			210.7			122.0	
Turn Bay Length (m)							50.0					
Base Capacity (vph)	269	901					913	1310			687	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.38	0.16					0.30	0.14			0.34	

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 40 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 45.2%	ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 67:



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	383	487	0	564	0	0	0	0	0	262	117
Future Volume (Veh/h)	0	383	487	0	564	0	0	0	0	0	262	117
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	416	529	0	613	0	0	0	0	0	285	127
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	592	285	285	493	285	0	285			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592	285	285	493	285	0	285			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	33	30	100	2	100	100			100		
cM capacity (veh/h)	36	624	754	67	624	1085	1277			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	945	613	285	127
Volume Left	0	0	0	0
Volume Right	529	0	0	127
cSH	691	624	1700	1700
Volume to Capacity	1.37	0.98	0.17	0.07
Queue Length 95th (m)	308.0	110.0	0.0	0.0
Control Delay (s)	193.3	57.4	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	193.3	57.4	0.0	
Approach LOS	F	F		

Intersection Summary			
Average Delay	110.6		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	326	627	0	639	0	0	0	0	0	740	222
Future Volume (Veh/h)	0	326	627	0	639	0	0	0	0	0	740	222
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	354	682	0	695	0	0	0	0	0	804	241
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	1152	804	804	981	804	0	804			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1152	804	804	981	804	0	804			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	0	100	100			100		
cM capacity (veh/h)	0	316	383	0	316	1085	820			1623		

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	1036	695	804	241
Volume Left	0	0	0	0
Volume Right	682	0	0	241
cSH	357	316	1700	1700
Volume to Capacity	2.90	2.20	0.47	0.14
Queue Length 95th (m)	677.9	397.5	0.0	0.0
Control Delay (s)	885.0	574.9	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	885.0	574.9	0.0	
Approach LOS	F	F		

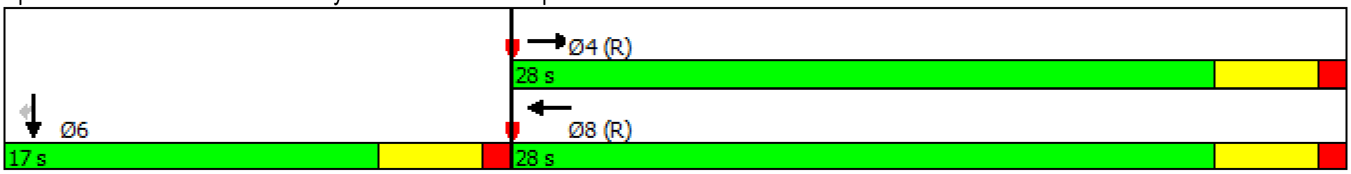
Intersection Summary			
Average Delay	474.2		
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↑						↑	↱
Traffic Volume (vph)	0	383	487	0	564	0	0	0	0	0	262	117
Future Volume (vph)	0	383	487	0	564	0	0	0	0	0	262	117
Satd. Flow (prot)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Flt Permitted												
Satd. Flow (perm)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Satd. Flow (RTOR)			369									127
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	416	529	0	613	0	0	0	0	0	285	127
Turn Type		NA	Free		NA						NA	Perm
Protected Phases		4			8						6	
Permitted Phases			Free									6
Total Split (s)		28.0			28.0						17.0	17.0
Total Lost Time (s)		4.5			4.5						4.5	4.5
Act Effct Green (s)		25.1	45.0		25.1						10.9	10.9
Actuated g/C Ratio		0.56	1.00		0.56						0.24	0.24
v/c Ratio		0.40	0.33		0.58						0.63	0.26
Control Delay		8.8	0.1		9.9						21.5	4.9
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		8.8	0.1		9.9						21.5	4.9
LOS		A	A		A						C	A
Approach Delay		4.0			9.9						16.4	
Approach LOS		A			A						B	
Queue Length 50th (m)		7.2	0.0		28.4						19.3	0.0
Queue Length 95th (m)		m7.5	m0.0		54.1						36.1	8.4
Internal Link Dist (m)		124.0			72.0			152.4			127.2	
Turn Bay Length (m)			20.0									
Base Capacity (vph)		1051	1601		1051						523	536
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.40	0.33		0.58						0.54	0.24

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 12.8 (28%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 8.4	Intersection LOS: A
Intersection Capacity Utilization 51.0%	ICU Level of Service A

Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 53: Rothesay Ave & Rte 1 off-ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↑						↑	↱
Traffic Volume (vph)	0	326	627	0	639	0	0	0	0	0	740	222
Future Volume (vph)	0	326	627	0	639	0	0	0	0	0	740	222
Satd. Flow (prot)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Flt Permitted												
Satd. Flow (perm)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Satd. Flow (RTOR)			280									128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	682	0	695	0	0	0	0	0	804	241
Turn Type		NA	Free		NA						NA	Perm
Protected Phases		4			8						6	
Permitted Phases			Free									6
Total Split (s)		43.0			43.0						47.0	47.0
Total Lost Time (s)		4.5			4.5						4.5	4.5
Act Effct Green (s)		39.6	90.0		39.6						41.4	41.4
Actuated g/C Ratio		0.44	1.00		0.44						0.46	0.46
v/c Ratio		0.43	0.43		0.84						0.93	0.30
Control Delay		14.0	0.4		34.1						41.3	7.8
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		14.0	0.4		34.1						41.3	7.8
LOS		B	A		C						D	A
Approach Delay		5.1			34.1						33.6	
Approach LOS		A			C						C	
Queue Length 50th (m)		34.6	0.0		106.0						122.8	10.7
Queue Length 95th (m)		m44.6	m0.0		#170.5						#197.8	24.6
Internal Link Dist (m)		113.6			147.0			166.4			142.0	
Turn Bay Length (m)			20.0									
Base Capacity (vph)		828	1601		828						889	823
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.43	0.43		0.84						0.90	0.29

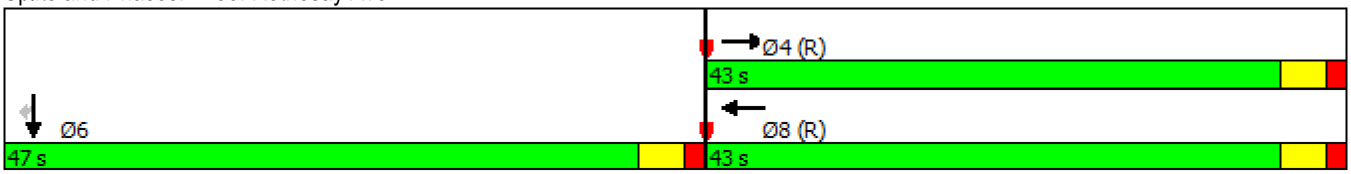
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 88 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 80.1%	ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 50: Rothesay Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	383	0	0	0	0	0	564	0	0	0	0
Future Volume (Veh/h)	0	383	0	0	0	0	0	564	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	416	0	0	0	0	0	613	0	0	0	0
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	613	613	0	821	613	613	0			613		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	613	613	0	821	613	613	0			613		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	0	100	0	100	100	100			100		
cM capacity (veh/h)	405	408	1085	0	408	492	1623			966		

Direction, Lane #	EB 1	NB 1
Volume Total	416	613
Volume Left	0	0
Volume Right	0	0
cSH	408	1700
Volume to Capacity	1.02	0.36
Queue Length 95th (m)	99.0	0.0
Control Delay (s)	82.3	0.0
Lane LOS	F	
Approach Delay (s)	82.3	0.0
Approach LOS	F	

Intersection Summary			
Average Delay	33.3		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑				
Traffic Volume (veh/h)	0	326	0	0	0	0	0	639	0	0	0	0
Future Volume (Veh/h)	0	326	0	0	0	0	0	639	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	354	0	0	0	0	0	695	0	0	0	0
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	695	695	0	872	695	695	0			695		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	695	695	0	872	695	695	0			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	3	100	100	100	100	100			100		
cM capacity (veh/h)	357	366	1085	32	366	442	1623			901		

Direction, Lane #	EB 1	NB 1
Volume Total	354	695
Volume Left	0	0
Volume Right	0	0
cSH	366	1700
Volume to Capacity	0.97	0.41
Queue Length 95th (m)	82.1	0.0
Control Delay (s)	73.5	0.0
Lane LOS	F	
Approach Delay (s)	73.5	0.0
Approach LOS	F	

Intersection Summary			
Average Delay	24.8		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	383	0	0	530	0	0
Future Volume (Veh/h)	383	0	0	530	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	416	0	0	576	0	0
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	576	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	13	100	100			
cM capacity (veh/h)	479	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	416	576
Volume Left	416	0
Volume Right	0	0
cSH	479	1700
Volume to Capacity	0.87	0.34
Queue Length 95th (m)	69.6	0.0
Control Delay (s)	44.6	0.0
Lane LOS	E	
Approach Delay (s)	44.6	0.0
Approach LOS	E	

Intersection Summary			
Average Delay	18.7		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	326	0	0	695	0	0
Future Volume (Veh/h)	326	0	0	695	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	354	0	0	755	0	0
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	755	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	755	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	6	100	100			
cM capacity (veh/h)	376	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	354	755
Volume Left	354	0
Volume Right	0	0
cSH	376	1700
Volume to Capacity	0.94	0.44
Queue Length 95th (m)	77.6	0.0
Control Delay (s)	66.2	0.0
Lane LOS	F	
Approach Delay (s)	66.2	0.0
Approach LOS	F	

Intersection Summary			
Average Delay	21.1		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Katie Hazzard
Agency/Co.: exp
Date performed: 1/23/2017
Analysis time period: PM
Freeway/Dir of Travel: EB
Junction: Rothesay Rd Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2584	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	1012	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2584		1012			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	718		281			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3158	1136	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3158 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3158	4600	No
v_{12}	3158	4400	No
$v_{FO} = v_F - v_R$	2022	4600	No
v_R	1136	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 13.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.505

Space mean speed in ramp influence area, S_R = 83.3 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 83.3 km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	WB
Junction:	Rte 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2023

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2706	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	757	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2706	757		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	752	210		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3307	850	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3307 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4157	4600	No
v_{R12}	4157	4600	No

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 19.6 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.503	
Space mean speed in ramp influence area,	S_R = 83.4	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 83.4	km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KEH
Agency/Co.: exp
Date performed: 2017
Analysis time period: Morning Peak
Freeway/Dir of Travel: Westbound
Junction: Route 100 Off Ramp
Jurisdiction: Provincial
Analysis Year: 2023
Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2706	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	1158	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2706		1158			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	752		322			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3307	1300	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3307 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3307	4600	No
v_{12}	3307	4400	No
$v_{FO} = v_F - v_R$	2007	4600	No
v_R	1300	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 15.8 pc/km/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.520

Space mean speed in ramp influence area, S_R = 82.8 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 82.8 km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2016

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2584	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	913	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2584	913		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	718	254		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV           0.909       0.990
Driver population factor, fP            1.00        1.00
Flow rate, vp                           3158        1025                  pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =                (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3158   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4183          4600            No
      FO
     v                     4183          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   21.3    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.541
                                              S
Space mean speed in ramp influence area,     S  = 82.2    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 82.2    km/h
_______________________________________________________________________________
```

Intersection	
Int Delay, s/veh	3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	102	0	131	60	0	7
Future Vol, veh/h	102	0	131	60	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	0	142	65	0	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	111	0	461	55
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	350	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1478	-	544	1001
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	713	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1478	-	492	1001
Mov Cap-2 Maneuver	-	-	-	-	492	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	644	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	1001	-	-	1478	-
HCM Lane V/C Ratio	-	0.008	-	-	0.096	-
HCM Control Delay (s)	0	8.6	-	-	7.7	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	0	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	27	19	788	179	2
Future Vol, veh/h	3	27	19	788	179	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	29	21	857	195	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1094	196	197	0	-	0
Stage 1	196	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	237	845	1376	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	845	1376	-	-	-
Mov Cap-2 Maneuver	233	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	392	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1376	-	233	845	-	-
HCM Lane V/C Ratio	0.015	-	0.014	0.035	-	-
HCM Control Delay (s)	7.7	-	20.7	9.4	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	2	805	23	3	203
Future Vol, veh/h	16	2	805	23	3	203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	2	875	25	3	221

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1115	888	0	0	900	0
Stage 1	888	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	230	343	-	-	755	-
Stage 1	402	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	229	343	-	-	755	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	402	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.3	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	229	343	755	-
HCM Lane V/C Ratio	-	-	0.076	0.006	0.004	-
HCM Control Delay (s)	-	-	22	15.6	9.8	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	2	3	827	218	1
Future Vol, veh/h	1	2	3	827	218	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	750	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	2	3	899	237	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1143	238	238	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	221	801	1329	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	221	801	1329	-	-	-
Mov Cap-2 Maneuver	221	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1329	-	221	801	-	-
HCM Lane V/C Ratio	0.002	-	0.005	0.003	-	-
HCM Control Delay (s)	7.7	-	21.4	9.5	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	9	1	41	9	133	1	696	40	93	126	1
Future Volume (vph)	1	9	1	41	9	133	1	696	40	93	126	1
Satd. Flow (prot)	1789	1857	0	1789	1620	0	1789	1868	0	1789	1882	0
Flt Permitted	0.889			0.889			0.669			0.295		
Satd. Flow (perm)	1674	1857	0	1674	1620	0	1260	1868	0	556	1882	0
Satd. Flow (RTOR)		1			145			14			1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	11	0	45	155	0	1	800	0	101	138	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	10.0		10.0	10.0		35.0	35.0		35.0	35.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	5.5	5.5		5.5	5.5		34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74		0.74	0.74	
v/c Ratio	0.01	0.05		0.23	0.48		0.00	0.58		0.25	0.10	
Control Delay	17.0	17.5		20.9	10.7		2.0	5.8		4.7	2.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.0	17.5		20.9	10.7		2.0	5.8		4.7	2.7	
LOS	B	B		C	B		A	A		A	A	
Approach Delay		17.5			13.0			5.8			3.6	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	0.1	0.7		3.3	0.7		0.0	24.5		2.2	2.7	
Queue Length 95th (m)	1.0	3.9		10.0	12.5		0.3	46.8		6.8	5.9	
Internal Link Dist (m)		212.8			58.7			111.4			178.1	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	200	223		200	321		935	1390		412	1396	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.05		0.23	0.48		0.00	0.58		0.25	0.10	

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 46	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 64: Ashburn Rd & Access 5 (main)

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	100	0	135	77	0	7
Future Vol, veh/h	100	0	135	77	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	0	147	84	0	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	109	0	486	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	377	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1481	-	540	945
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1481	-	486	945
Mov Cap-2 Maneuver	-	-	-	-	486	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	625	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.9	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	945	-	-	1481	-
HCM Lane V/C Ratio	-	0.008	-	-	0.099	-
HCM Control Delay (s)	0	8.8	-	-	7.7	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	0	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	19	35	290	135	4
Future Vol, veh/h	2	19	35	290	135	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	300	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	21	38	315	147	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	540	149	151	0	-	0
Stage 1	149	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	503	898	1430	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	490	898	1430	-	-	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1430	-	490	898	-	-
HCM Lane V/C Ratio	0.027	-	0.004	0.023	-	-
HCM Control Delay (s)	7.6	-	12.4	9.1	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0	0.1	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	3	322	31	3	166
Future Vol, veh/h	30	3	322	31	3	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	3	350	34	3	180

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	554	367	0	0	384	0
Stage 1	367	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	493	678	-	-	1174	-
Stage 1	701	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	492	678	-	-	1174	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	492	678	1174	-
HCM Lane V/C Ratio	-	-	0.066	0.005	0.003	-
HCM Control Delay (s)	-	-	12.8	10.3	8.1	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	5	352	195	1
Future Vol, veh/h	1	5	5	352	195	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	5	383	212	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	606	213	213	0	-	0
Stage 1	213	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	460	827	1357	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	458	827	1357	-	-	-
Mov Cap-2 Maneuver	458	-	-	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1357	-	458	827	-	-
HCM Lane V/C Ratio	0.004	-	0.002	0.007	-	-
HCM Control Delay (s)	7.7	-	12.9	9.4	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	20	1	18	19	159	1	196	21	114	84	2
Future Volume (vph)	2	20	1	18	19	159	1	196	21	114	84	2
Satd. Flow (prot)	1789	1870	0	1789	1631	0	1789	1855	0	1789	1878	0
Flt Permitted	0.690			0.742			0.697			0.612		
Satd. Flow (perm)	1300	1870	0	1398	1631	0	1313	1855	0	1153	1878	0
Satd. Flow (RTOR)		1			173			17			2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	23	0	20	194	0	1	236	0	124	93	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	18.0	18.0		18.0	18.0		22.0	22.0		22.0	22.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	6.8	6.8		6.8	6.8		21.2	21.2		21.2	21.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.62	0.62		0.62	0.62	
v/c Ratio	0.01	0.06		0.07	0.42		0.00	0.21		0.17	0.08	
Control Delay	10.0	10.5		10.9	6.2		5.0	4.9		5.6	4.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.0	10.5		10.9	6.2		5.0	4.9		5.6	4.6	
LOS	A	B		B	A		A	A		A	A	
Approach Delay		10.4			6.7			4.9			5.2	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	0.1	1.0		0.9	0.9		0.0	4.7		2.6	1.8	
Queue Length 95th (m)	1.0	3.9		3.7	9.7		0.4	14.4		9.4	6.6	
Internal Link Dist (m)		116.7			101.0			226.4			171.9	
Turn Bay Length (m)							100.0			100.0		
Base Capacity (vph)	513	738		551	748		810	1151		711	1159	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.03		0.04	0.26		0.00	0.21		0.17	0.08	

Intersection Summary

Cycle Length: 40

Actuated Cycle Length: 34.3

Control Type: Semi Act-Uncoord

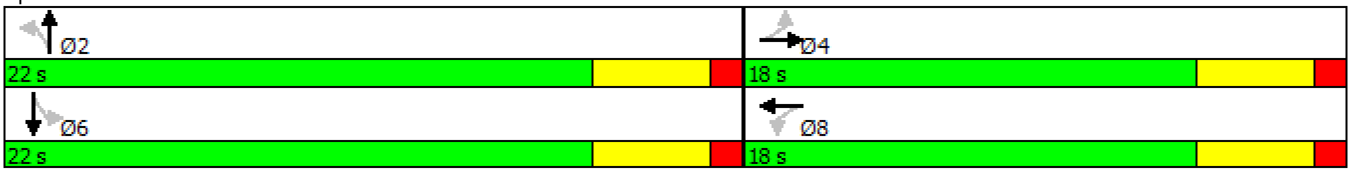
Maximum v/c Ratio: 0.42

Intersection Signal Delay: 5.7 Intersection LOS: A

Intersection Capacity Utilization 40.0% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 64: Ashburn & Access 5



Appendix D –
LOS Results with Phase 2 & 3 (2033) of Development

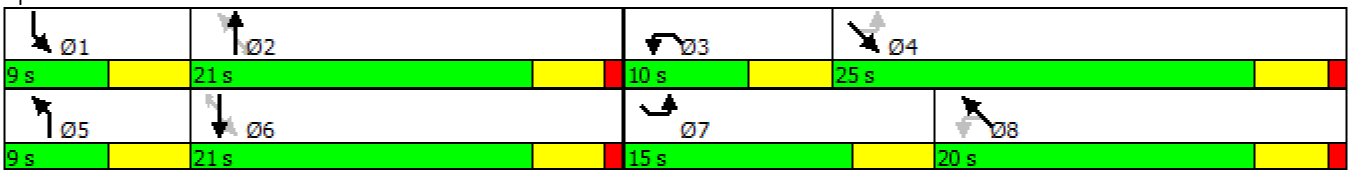
Appendix D –
LOS Results with Phase 2 & 3 (2033) of Development

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	5	294	287	127	195	183	273	20	607	236	124	35
Future Volume (vph)	5	294	287	127	195	183	273	20	607	236	124	35
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1610	0	1789	1821	0
Flt Permitted	0.625			0.331			0.425			0.392		
Satd. Flow (perm)	1177	1883	1601	623	1883	1601	800	1610	0	738	1821	0
Satd. Flow (RTOR)			312			227		462			20	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	320	312	138	212	199	297	682	0	257	173	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	9.0	21.0	21.0	9.0	21.0	21.0	15.0	25.0		10.0	20.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Act Effct Green (s)	18.3	14.1	14.1	20.5	19.1	19.1	27.2	16.0		16.9	12.2	
Actuated g/C Ratio	0.32	0.25	0.25	0.36	0.34	0.34	0.48	0.28		0.30	0.21	
v/c Ratio	0.01	0.69	0.49	0.41	0.34	0.29	0.48	0.87		0.76	0.43	
Control Delay	12.0	29.9	6.0	17.0	17.6	3.6	13.3	20.7		30.5	22.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	12.0	29.9	6.0	17.0	17.6	3.6	13.3	20.7		30.5	22.2	
LOS	B	C	A	B	B	A	B	C		C	C	
Approach Delay		18.0			12.4			18.5			27.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	0.4	34.6	0.0	10.4	17.0	0.0	21.0	21.0		17.8	15.3	
Queue Length 95th (m)	2.1	#59.8	16.3	20.7	38.7	10.4	36.3	#83.6		#40.2	30.6	
Internal Link Dist (m)		367.7			713.5			186.6			28.7	
Turn Bay Length (m)	50.0		50.0	50.0		50.0						
Base Capacity (vph)	435	580	709	333	725	756	623	902		337	541	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.01	0.55	0.44	0.41	0.29	0.26	0.48	0.76		0.76	0.32	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 56.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Foster Thurston Dr & Ashburn Rd



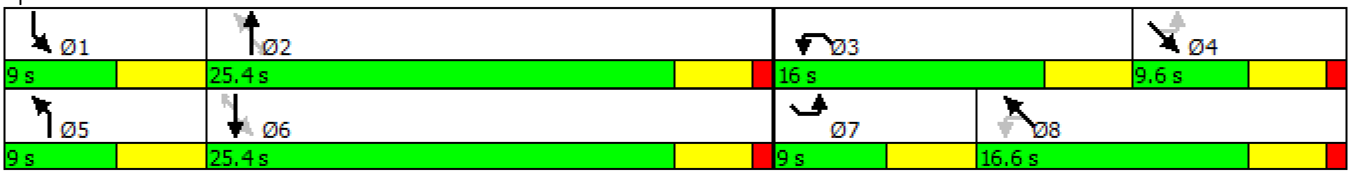
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	5	430	462	113	352	147	133	14	148	418	175	93
Future Volume (vph)	5	430	462	113	352	147	133	14	148	418	175	93
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1625	0	1789	1786	0
Flt Permitted	0.481			0.261						0.519		
Satd. Flow (perm)	906	1883	1601	492	1883	1601	1883	1625	0	978	1786	0
Satd. Flow (RTOR)			502			245		161			40	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	467	502	123	383	160	145	176	0	454	291	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	9.0	25.4	25.4	9.0	25.4	25.4	9.0	9.6		16.0	16.6	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Act Effct Green (s)	23.0	18.8	18.8	25.2	23.7	23.7	9.4	5.4		19.7	12.7	
Actuated g/C Ratio	0.43	0.35	0.35	0.47	0.44	0.44	0.17	0.10		0.36	0.23	
v/c Ratio	0.01	0.71	0.57	0.35	0.46	0.19	0.46	0.57		0.83	0.65	
Control Delay	7.6	24.0	4.6	10.9	14.0	1.2	20.3	15.8		33.0	28.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	7.6	24.0	4.6	10.9	14.0	1.2	20.3	15.8		33.0	28.0	
LOS	A	C	A	B	B	A	C	B		C	C	
Approach Delay		13.9			10.3			17.8			31.0	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	0.3	43.3	0.0	6.6	24.5	0.0	10.8	1.6		41.7	26.0	
Queue Length 95th (m)	1.5	#74.4	16.6	13.7	57.0	3.2	21.4	#21.4		#74.2	#58.3	
Internal Link Dist (m)		367.7			713.5			186.6			27.8	
Turn Bay Length (m)	50.0		50.0	50.0		50.0	50.0					
Base Capacity (vph)	471	772	952	356	933	916	317	307		547	455	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.01	0.60	0.53	0.35	0.41	0.17	0.46	0.57		0.83	0.64	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 76.1% ICU Level of Service D
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: 18/Foster Thurston Dr & Ashburn Rd



HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbound
Junction:	Foster Thurston Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2755	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	1339	vph
Length of first accel/decel lane	130	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2755		1339			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	765		372			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3367	1503	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3367 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3367	4600	No
v_{12}	3367	4400	No
$v_{FO} = v_F - v_R$	1864	4600	No
v_R	1503	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 18.1 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.538

Space mean speed in ramp influence area, S_R = 82.2 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 82.2 km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	Westbond
Junction:	Foster Thurston On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	2755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	383	vph
Length of first accel/decel lane	120	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2755	383		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	765	106		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3367        430                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L   =                 (Equation 25-2 or 25-3)
                   EQ
                  P   =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3367   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3797          4600            No
      FO
     v                     3797          4600            No
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   20.0    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.466
                                              S
Space mean speed in ramp influence area,     S  = 84.6    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 84.6    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	3/8/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbound
Junction:	Ashburn Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	90.0	km/h
Volume on freeway	3282	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	329	vph
Length of first accel/decel lane	180	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3282		329			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	912		91			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          4011        369                     pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =                (Equation 25-8 or 25-9)
                   EQ
                  P  =    1.000      Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  4011   pcph
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                           Actual        Maximum         LOS F?
     v  = v                4011          4500            No
      Fi   F
     v                     4011          4400            No
      12
     v  = v - v            3642          4500            No
      FO   F   R
     v                     369           2000            No
      R

_________________Level of Service Determination (if not F)______________________

Density,                 D = 2.642 + 0.0053 v  - 0.0183  L   =   20.6    pc/km/ln
                          R                  12           D
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                D  = 0.436
                                             S
Space mean speed in ramp influence area,    S  = 80.0    km/h
                                             R
Space mean speed in outer lanes,            S  =  N/A    km/h
                                             0
Space mean speed for all vehicles,          S  = 80.0    km/h
________________________________________________________________________________
```

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM Peak
Freeway/Dir of Travel:	Eastbond
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3694	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	722	vph
Length of first accel/decel lane	150	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3694	722		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	1026	201		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4515	810	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 4515 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5325	4600	Yes
v_{R12}	5325	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 26.9 pc/km/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.086	
Space mean speed in ramp influence area,	S_R = 64.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 64.2	km/h

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	117	5	0	5	0	1028	4	4	690	1
Future Vol, veh/h	0	0	117	5	0	5	0	1028	4	4	690	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	127	5	0	5	0	1117	4	4	750	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	1881	751	1943	1880	1120	-	0	0	1122	0	0
Stage 1	-	759	-	1120	1120	-	-	-	-	-	-	-
Stage 2	-	1122	-	823	760	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	71	411	49	71	251	0	-	-	623	-	-
Stage 1	0	415	-	251	282	-	0	-	-	-	-	-
Stage 2	0	281	-	368	414	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	70	411	34	70	251	-	-	-	623	-	-
Mov Cap-2 Maneuver	-	70	-	34	70	-	-	-	-	-	-	-
Stage 1	-	410	-	251	282	-	-	-	-	-	-	-
Stage 2	-	281	-	251	409	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.6	77.8	0	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	411	60	623	-	-
HCM Lane V/C Ratio	-	-	0.309	0.181	0.007	-	-
HCM Control Delay (s)	-	-	17.6	77.8	10.8	0	-
HCM Lane LOS	-	-	C	F	B	A	-
HCM 95th %tile Q(veh)	-	-	1.3	0.6	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	26	5	0	5	0	401	1	2	421	1
Future Vol, veh/h	0	0	26	5	0	5	0	401	1	2	421	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	28	5	0	5	0	436	1	2	458	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	899	458	913	899	436	-	0	0	437	0	0
Stage 1	-	462	-	436	436	-	-	-	-	-	-	-
Stage 2	-	437	-	477	463	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	279	603	254	279	620	0	-	-	1123	-	-
Stage 1	0	565	-	599	580	-	0	-	-	-	-	-
Stage 2	0	579	-	569	564	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	278	603	242	278	620	-	-	-	1123	-	-
Mov Cap-2 Maneuver	-	278	-	242	278	-	-	-	-	-	-	-
Stage 1	-	564	-	599	580	-	-	-	-	-	-	-
Stage 2	-	579	-	541	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	15.7	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	603	348	1123	-	-
HCM Lane V/C Ratio	-	-	0.047	0.031	0.002	-	-
HCM Control Delay (s)	-	-	11.3	15.7	8.2	0	-
HCM Lane LOS	-	-	B	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	1	11	0	5	5	625	17	31	610	1
Future Vol, veh/h	2	0	1	11	0	5	5	625	17	31	610	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	500	-	-	500	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	1	12	0	5	5	679	18	34	663	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1433	1440	664	1431	1431	689	664	0	0	698	0	0
Stage 1	731	731	-	699	699	-	-	-	-	-	-	-
Stage 2	702	709	-	732	732	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	112	133	461	112	134	446	925	-	-	898	-	-
Stage 1	413	427	-	430	442	-	-	-	-	-	-	-
Stage 2	429	437	-	413	427	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	107	127	461	108	128	446	925	-	-	898	-	-
Mov Cap-2 Maneuver	107	127	-	108	128	-	-	-	-	-	-	-
Stage 1	411	411	-	428	440	-	-	-	-	-	-	-
Stage 2	421	435	-	396	411	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.5	33.3	0.1	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	925	-	-	107	461	108	446	898	-	-
HCM Lane V/C Ratio	0.006	-	-	0.02	0.002	0.111	0.012	0.038	-	-
HCM Control Delay (s)	8.9	-	-	39.3	12.8	42.4	13.2	9.2	-	-
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.4	0	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	1	46	0	10	3	650	46	13	477	1
Future Volume (Veh/h)	3	0	1	46	0	10	3	650	46	13	477	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	1	50	0	11	3	707	50	14	518	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											124	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1270	1310	518	1285	1285	732	519			757		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1241	1285	391	1257	1257	732	392			757		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	61	100	97	100			98		
cM capacity (veh/h)	129	143	582	129	148	421	1033			854		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	3	1	50	11	3	757	14	519
Volume Left	3	0	50	0	3	0	14	0
Volume Right	0	1	0	11	0	50	0	1
cSH	129	582	129	421	1033	1700	854	1700
Volume to Capacity	0.02	0.00	0.39	0.03	0.00	0.45	0.02	0.31
Queue Length 95th (m)	0.5	0.0	12.4	0.6	0.1	0.0	0.4	0.0
Control Delay (s)	33.6	11.2	49.7	13.8	8.5	0.0	9.3	0.0
Lane LOS	D	B	E	B	A		A	
Approach Delay (s)	28.0		43.2		0.0		0.2	
Approach LOS	D		E					

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	312	270	20	28	0
Future Vol, veh/h	2	312	270	20	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	339	293	22	30	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	315	0	-	0	647	304
Stage 1	-	-	-	-	304	-
Stage 2	-	-	-	-	343	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1245	-	-	-	436	736
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1245	-	-	-	435	736
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1245	-	-	-	435
HCM Lane V/C Ratio	0.002	-	-	-	0.07
HCM Control Delay (s)	7.9	0	-	-	13.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	288	300	16	12	3
Future Vol, veh/h	0	288	300	16	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	313	326	17	13	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	343	0	-	0	648	335
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	313	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1216	-	-	-	435	707
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1216	-	-	-	435	707
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	741	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1216	-	-	-	471
HCM Lane V/C Ratio	-	-	-	-	0.035
HCM Control Delay (s)	0	-	-	-	12.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	347	249	25	299	439	326	557	89	235	314	6
Future Volume (vph)	21	347	249	25	299	439	326	557	89	235	314	6
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1844	0	1789	1878	0
Flt Permitted	0.253			0.340			0.421			0.126		
Satd. Flow (perm)	477	1883	1601	640	1883	1601	793	1844	0	237	1878	0
Satd. Flow (RTOR)			271			477		12			1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	377	271	27	325	477	354	702	0	255	348	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free	2			6		
Total Split (s)	9.0	22.0	22.0	9.0	22.0		17.0	37.0		12.0	32.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5		4.0	4.5		4.0	4.5	
Act Effct Green (s)	18.3	17.8	17.8	21.4	17.8	80.0	46.5	34.9		45.4	34.2	
Actuated g/C Ratio	0.23	0.22	0.22	0.27	0.22	1.00	0.58	0.44		0.57	0.43	
v/c Ratio	0.12	0.90	0.48	0.11	0.78	0.30	0.59	0.87		0.75	0.43	
Control Delay	25.7	58.0	6.8	25.8	41.2	0.4	12.4	34.7		31.4	18.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	25.7	58.0	6.8	25.8	41.2	0.4	12.4	34.7		31.4	18.6	
LOS	C	E	A	C	D	A	B	C		C	B	
Approach Delay		36.3			17.2			27.2			24.0	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	2.7	54.3	0.0	2.3	46.4	0.0	20.4	95.7		13.7	37.5	
Queue Length 95th (m)	8.4	#104.7	17.9	m6.5	#86.4	0.0	43.3	#165.9		#70.3	60.3	
Internal Link Dist (m)		75.4			127.1			93.2			78.1	
Turn Bay Length (m)				60.0		60.0	60.0			50.0		
Base Capacity (vph)	190	420	567	244	420	1601	637	811		342	803	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.12	0.90	0.48	0.11	0.77	0.30	0.56	0.87		0.75	0.43	

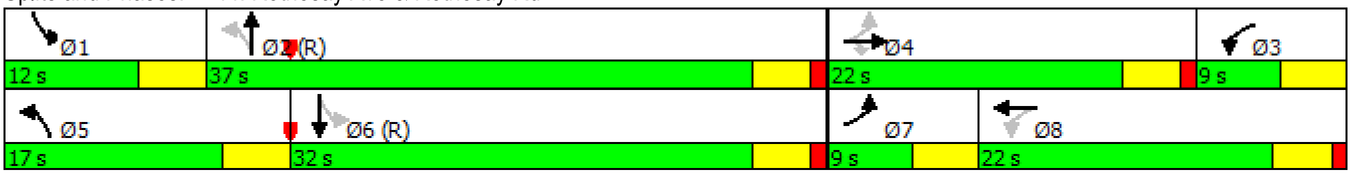
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 79.3%	ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 44: Rothesay Ave & Rothesay Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	660	277	64	705	251	366	128	109	215	248	10
Future Volume (vph)	22	660	277	64	705	251	366	128	109	215	248	10
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	1753	0	1789	1872	0
Flt Permitted	0.115			0.114			0.214			0.540		
Satd. Flow (perm)	217	1883	1601	215	1883	1601	403	1753	0	1017	1872	0
Satd. Flow (RTOR)			207			273		46			2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	717	301	70	766	273	398	257	0	234	281	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free	2			6		
Total Split (s)	7.0	39.2	39.2	9.0	41.2		18.3	27.8		14.0	23.5	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5		4.0	4.5		4.0	4.5	
Act Effct Green (s)	36.4	35.9	35.9	41.4	40.3	90.0	38.4	24.1		29.2	19.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.46	0.45	1.00	0.43	0.27		0.32	0.21	
v/c Ratio	0.17	0.95	0.39	0.38	0.91	0.17	0.99	0.51		0.57	0.71	
Control Delay	19.8	51.8	8.2	25.0	32.7	0.2	67.7	27.3		22.7	41.9	
Queue Delay	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.8	51.8	8.2	25.0	48.8	0.2	67.7	27.3		22.7	41.9	
LOS	B	D	A	C	D	A	E	C		C	D	
Approach Delay		38.5			35.3			51.8			33.2	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	2.5	120.7	10.4	4.7	59.8	0.0	~51.5	31.1		25.1	45.1	
Queue Length 95th (m)	7.3	#193.7	28.9	m9.5	#204.4	m0.0	#108.6	54.3		39.8	#76.8	
Internal Link Dist (m)		94.6			113.6			98.1			65.9	
Turn Bay Length (m)	50.0		50.0	60.0		60.0	60.0			50.0		
Base Capacity (vph)	140	752	763	186	843	1601	400	503		419	396	
Starvation Cap Reductn	0	0	0	0	88	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.17	0.95	0.39	0.38	1.01	0.17	0.99	0.51		0.56	0.71	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 39.2	Intersection LOS: D
Intersection Capacity Utilization 88.5%	ICU Level of Service E

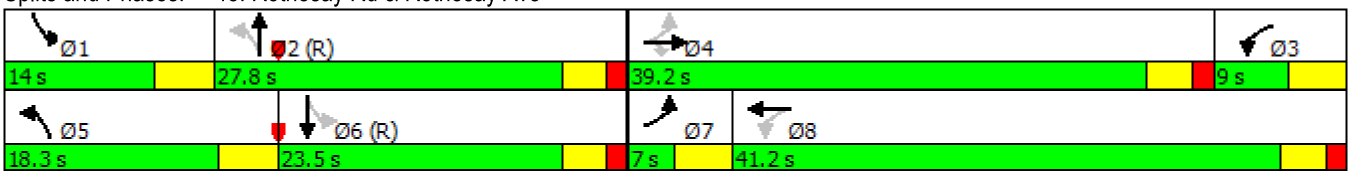
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 48: Rothesay Rd & Rothesay Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	1	244	1	0	2	222	832	5	0	165	72
Future Volume (vph)	134	1	244	1	0	2	222	832	5	0	165	72
Satd. Flow (prot)	1789	1603	0	0	1687	0	1789	1882	0	0	1806	0
Flt Permitted	0.756				0.911		0.537					
Satd. Flow (perm)	1424	1603	0	0	1561	0	1011	1882	0	0	1806	0
Satd. Flow (RTOR)		265			75			1			40	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	266	0	0	3	0	241	909	0	0	257	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	21.6	21.6		21.6	21.6		13.0	58.4		45.4	45.4	
Total Lost Time (s)	4.5	4.5			4.5		4.0	4.5			4.5	
Act Effct Green (s)	13.2	13.2			13.2		58.3	57.8			45.5	
Actuated g/C Ratio	0.16	0.16			0.16		0.73	0.72			0.57	
v/c Ratio	0.62	0.55			0.01		0.29	0.67			0.25	
Control Delay	42.3	8.5			0.0		1.7	4.8			8.9	
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	
Total Delay	42.3	8.5			0.0		1.7	4.8			8.9	
LOS	D	A			A		A	A			A	
Approach Delay		20.5						4.2			8.9	
Approach LOS		C						A			A	
Queue Length 50th (m)	20.8	0.1			0.0		1.7	7.2			15.3	
Queue Length 95th (m)	36.6	17.9			0.0		m3.3	m16.7			30.7	
Internal Link Dist (m)		83.5			78.8			204.7			117.4	
Turn Bay Length (m)							100.0					
Base Capacity (vph)	304	550			392		825	1360			1044	
Starvation Cap Reductn	0	0			0		0	0			0	
Spillback Cap Reductn	0	0			0		0	0			0	
Storage Cap Reductn	0	0			0		0	0			0	
Reduced v/c Ratio	0.48	0.48			0.01		0.29	0.67			0.25	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 30 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 83.6%	ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

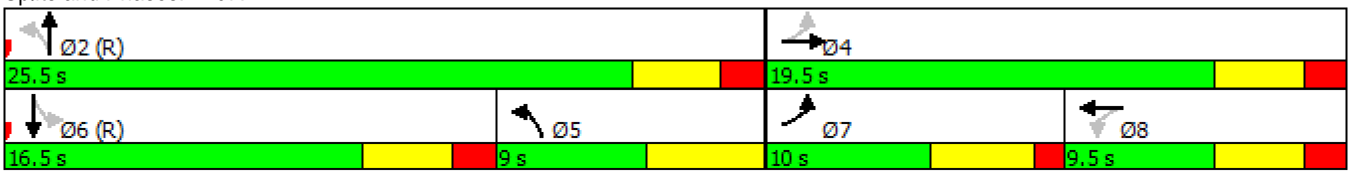
Splits and Phases: 45: Rothesay Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	0	165	0	0	0	197	195	0	0	176	110
Future Volume (vph)	138	0	165	0	0	0	197	195	0	0	176	110
Satd. Flow (prot)	1789	1601	0	0	1883	0	1789	1883	0	0	1786	0
Flt Permitted	0.950						0.571					
Satd. Flow (perm)	1789	1601	0	0	1883	0	1075	1883	0	0	1786	0
Satd. Flow (RTOR)		612									69	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	179	0	0	0	0	214	212	0	0	311	0
Turn Type	pm+pt	NA					pm+pt	NA			NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	10.0	19.5		9.5	9.5		9.0	25.5		16.5	16.5	
Total Lost Time (s)	4.5	4.5			4.5		4.0	4.5			4.5	
Act Effct Green (s)	5.5	5.5					33.0	33.4			26.2	
Actuated g/C Ratio	0.12	0.12					0.73	0.74			0.58	
v/c Ratio	0.69	0.24					0.25	0.15			0.29	
Control Delay	39.5	0.8					2.0	1.4			6.4	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	39.5	0.8					2.0	1.4			6.4	
LOS	D	A					A	A			A	
Approach Delay		18.4						1.7			6.4	
Approach LOS		B						A			A	
Queue Length 50th (m)	11.6	0.0					1.9	2.0			10.4	
Queue Length 95th (m)	#32.5	0.0					4.8	5.0			21.8	
Internal Link Dist (m)		190.2			73.2			210.7			122.0	
Turn Bay Length (m)							50.0					
Base Capacity (vph)	218	941					867	1397			1068	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.69	0.19					0.25	0.15			0.29	

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 29 (64%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 48.4%	ICU Level of Service A

Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 67:



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	282	214	0	625	0	0	0	0	0	199	155
Future Volume (vph)	0	282	214	0	625	0	0	0	0	0	199	155
Satd. Flow (prot)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Flt Permitted												
Satd. Flow (perm)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Satd. Flow (RTOR)			233									168
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	307	233	0	679	0	0	0	0	0	216	168
Turn Type		NA	Free		NA						NA	Perm
Protected Phases		4			8						6	
Permitted Phases			Free									6
Total Split (s)		27.0			27.0						13.0	13.0
Total Lost Time (s)		4.5			4.5						4.5	4.5
Act Effct Green (s)		26.0	40.0		26.0						8.0	8.0
Actuated g/C Ratio		0.65	1.00		0.65						0.20	0.20
v/c Ratio		0.25	0.15		0.55						0.57	0.37
Control Delay		5.9	0.1		7.8						21.0	5.9
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		5.9	0.1		7.8						21.0	5.9
LOS		A	A		A						C	A
Approach Delay		3.4			7.8						14.4	
Approach LOS		A			A						B	
Queue Length 50th (m)		20.2	0.0		25.9						13.1	0.0
Queue Length 95th (m)		m23.6	m0.0		49.4						#27.5	9.9
Internal Link Dist (m)		127.1			72.0			152.4			127.2	
Turn Bay Length (m)			25.0									
Base Capacity (vph)		1226	1601		1226						400	472
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.25	0.15		0.55						0.54	0.36

Intersection Summary	
Cycle Length: 40	
Actuated Cycle Length: 40	
Offset: 16 (40%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 7.9	Intersection LOS: A
Intersection Capacity Utilization 50.9%	ICU Level of Service A

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 53: Rothesay Ave & Rte 1 off-ramp

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	437	468	0	661	0	0	0	0	0	549	413
Future Volume (vph)	0	437	468	0	661	0	0	0	0	0	549	413
Satd. Flow (prot)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Flt Permitted												
Satd. Flow (perm)	0	1883	1601	0	1883	0	0	0	0	0	1883	1601
Satd. Flow (RTOR)			156									162
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	475	509	0	718	0	0	0	0	0	597	449
Turn Type		NA	Free		NA						NA	Perm
Protected Phases		4			8						6	
Permitted Phases			Free									6
Total Split (s)		49.0			49.0						41.0	41.0
Total Lost Time (s)		4.5			4.5						4.5	4.5
Act Effct Green (s)		47.1	90.0		47.1						33.9	33.9
Actuated g/C Ratio		0.52	1.00		0.52						0.38	0.38
v/c Ratio		0.48	0.32		0.73						0.84	0.64
Control Delay		7.5	0.3		22.8						37.6	18.4
Queue Delay		0.5	0.0		1.8						0.0	0.1
Total Delay		8.0	0.3		24.6						37.6	18.4
LOS		A	A		C						D	B
Approach Delay		4.0			24.6						29.3	
Approach LOS		A			C						C	
Queue Length 50th (m)		27.4	0.0		96.8						87.7	37.2
Queue Length 95th (m)		m32.1	m0.0		142.9						#130.3	67.4
Internal Link Dist (m)		113.6			461.9			166.4			142.0	
Turn Bay Length (m)			20.0									
Base Capacity (vph)		986	1601		986						763	745
Starvation Cap Reductn		201	0		0						0	0
Spillback Cap Reductn		0	0		133						0	11
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.61	0.32		0.84						0.78	0.61

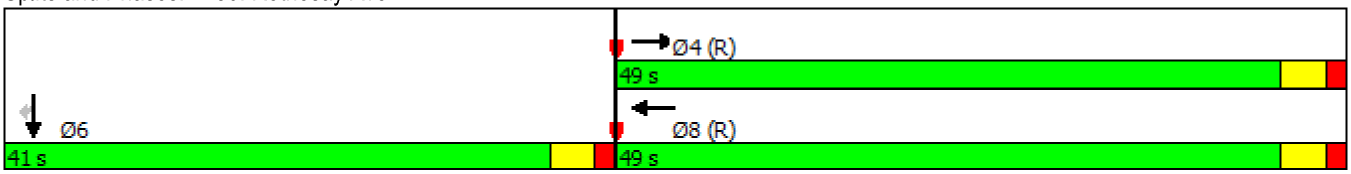
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 24 (27%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 71.2%	ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 50: Rothesay Ave



Intersection							
Int Delay, s/veh	10.6						

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑		↰	
Traffic Vol, veh/h	0	0	624	0	282	0
Future Vol, veh/h	0	0	624	0	282	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	678	0	307	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	0	-	678	-
Stage 1	-	-	0	-
Stage 2	-	-	678	-
Critical Hdwy	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	-	-	3.518	-
Pot Cap-1 Maneuver	-	0	418	0
Stage 1	-	0	-	0
Stage 2	-	0	504	0
Platoon blocked, %	-			
Mov Cap-1 Maneuver	-	-	418	0
Mov Cap-2 Maneuver	-	-	418	0
Stage 1	-	-	-	0
Stage 2	-	-	504	0

Approach	NB	SB
HCM Control Delay, s	0	33.9
HCM LOS		D

Minor Lane/Major Mvmt	NBT	SBLn1
Capacity (veh/h)	-	418
HCM Lane V/C Ratio	-	0.733
HCM Control Delay (s)	-	33.9
HCM Lane LOS	-	D
HCM 95th %tile Q(veh)	-	5.8

Intersection	
Int Delay, s/veh	56.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑		↰	
Traffic Vol, veh/h	0	0	661	0	437	0
Future Vol, veh/h	0	0	661	0	437	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	718	0	475	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	0	-	718	-
Stage 1	-	-	0	-
Stage 2	-	-	718	-
Critical Hdwy	-	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.42	-
Follow-up Hdwy	-	-	3.518	-
Pot Cap-1 Maneuver	-	0	~ 396	0
Stage 1	-	0	-	0
Stage 2	-	0	483	0
Platoon blocked, %	-			
Mov Cap-1 Maneuver	-	-	~ 396	0
Mov Cap-2 Maneuver	-	-	~ 396	0
Stage 1	-	-	-	0
Stage 2	-	-	483	0

Approach	NB	SB
HCM Control Delay, s	0	142.2
HCM LOS		F

Minor Lane/Major Mvmt	NBT	SBLn1
Capacity (veh/h)	-	396
HCM Lane V/C Ratio	-	1.199
HCM Control Delay (s)	-	142.2
HCM Lane LOS	-	F
HCM 95th %tile Q(veh)	-	19.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	282	0	0	574	0	0
Future Volume (Veh/h)	282	0	0	574	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	307	0	0	624	0	0
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	624	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	624	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	32	100	100			
cM capacity (veh/h)	449	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	307	624
Volume Left	307	0
Volume Right	0	0
cSH	449	1700
Volume to Capacity	0.68	0.37
Queue Length 95th (m)	38.3	0.0
Control Delay (s)	28.6	0.0
Lane LOS	D	
Approach Delay (s)	28.6	0.0
Approach LOS	D	

Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	437	0	0	738	0	0
Future Volume (Veh/h)	437	0	0	738	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	475	0	0	802	0	0
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	802	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	802	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	100	100			
cM capacity (veh/h)	353	1085	1623			

Direction, Lane #	EB 1	NB 1
Volume Total	475	802
Volume Left	475	0
Volume Right	0	0
cSH	353	1700
Volume to Capacity	1.34	0.47
Queue Length 95th (m)	174.6	0.0
Control Delay (s)	203.2	0.0
Lane LOS	F	
Approach Delay (s)	203.2	0.0
Approach LOS	F	

Intersection Summary			
Average Delay	75.6		
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	PM
Freeway/Dir of Travel:	EB
Junction:	Rothesay Rd Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033
Description:	The Crossing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3137	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	1106	vph
Length of first accel/decel lane	300	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3137		1106			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	871		307			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3834	1241	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3834 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3834	4600	No
v_{12}	3834	4400	No
$v_{FO} = v_F - v_R$	2593	4600	No
v_R	1241	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 17.5 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 83.0	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 83.0	km/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Katie Hazzard
Agency/Co.:	exp
Date performed:	1/23/2017
Analysis time period:	AM Peak
Freeway/Dir of Travel:	WB
Junction:	Ashburn On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3240	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	854	vph
Length of first accel/decel lane	280	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3240	854		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	900	237		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

```
Heavy vehicle adjustment, fHV          0.909       0.990
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3960        958                     pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =               (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000      Using Equation  0
                   FM
                  v  = v  (P  ) =  3960   pcph
                   12   F   FM
_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4918          4600            Yes
      FO
     v                     4918          4600            Yes
      R12

_________________Level of Service Determination (if not F)_____________________

Density, D = 3.402 + 0.00456 v  + 0.0048 v   - 0.01278 L   =   23.2    pc/km/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  F

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.787
                                              S
Space mean speed in ramp influence area,     S  = 74.0    km/h
                                              R
Space mean speed in outer lanes,             S  =  N/A    km/h
                                              0
Space mean speed for all vehicles,           S  = 74.0    km/h
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Morning Peak
Freeway/Dir of Travel:	Westbound
Junction:	Route 100 Off Ramp
Jurisdiction:	Provincial
Analysis Year:	2033
Description:	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3240	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	60.0	km/h
Volume on ramp	1068	vph
Length of first accel/decel lane	240	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3240		1068			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	900		297			v
Trucks and buses	6		2			%
Recreational vehicles	1		0			%
Terrain type:	Rolling		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	km	0.00	km		km
Trucks and buses PCE, ET	2.5		1.5			
Recreational vehicle PCE, ER	2.0		1.2			

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3960	1199	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3960 pcph

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3960	4600	No
v_{12}	3960	4400	No
$v_{FO} = v_F - v_R$	2761	4600	No
v_R	1199	2000	No

Level of Service Determination (if not F)

Density, $D_R = 2.642 + 0.0053\ v_{12} - 0.0183\ L_D$ = 19.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 83.1 km/h

Space mean speed in outer lanes, S_0 = N/A km/h

Space mean speed for all vehicles, S = 83.1 km/h

HCS2000: Ramps and Ramp Junctions Release 4.1f

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KEH
Agency/Co.:	exp
Date performed:	2017
Analysis time period:	Evening Peak
Freeway/Dir of Travel:	EB
Junction:	Route 100 On Ramp
Jurisdiction:	Provincial
Analysis Year:	2033

Description: The Crossing

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	100.0	km/h
Volume on freeway	3110	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	60.0	km/h
Volume on ramp	829	vph
Length of first accel/decel lane	250	m
Length of second accel/decel lane		m

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		m

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3110	829		vph
Peak-hour factor, PHF	0.92	0.92		
Peak 15-min volume, v15	845	225		v
Trucks and buses	6	2		%
Recreational vehicles	1	0		%
Terrain type:	Rolling	Level		
Grade	%	%	%	
Length	km	km	km	
Trucks and buses PCE, ET	2.5	1.5		
Recreational vehicle PCE, ER	2.0	1.2		

Heavy vehicle adjustment, fHV	0.909	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3718	910	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3718 pcph

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4628	4600	Yes
v_{R12}	4628	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 3.402 + 0.00456\ v_R + 0.0048\ v_{12} - 0.01278\ L_A$ = 22.2 pc/km/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.660	
Space mean speed in ramp influence area,	S_R = 78.2	km/h
Space mean speed in outer lanes,	S_0 = N/A	km/h
Space mean speed for all vehicles,	S = 78.2	km/h

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	312	0	6	270	0	1
Future Vol, veh/h	312	0	6	270	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	0	7	293	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	339	0	646	339
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	307	-
Critical Hdwy	-	-	4.12	-	7.12	6.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1220	-	385	703
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1220	-	383	703
Mov Cap-2 Maneuver	-	-	-	-	383	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	703	-	-	1220	-
HCM Lane V/C Ratio	-	0.002	-	-	0.005	-
HCM Control Delay (s)	0	10.1	-	-	8	-
HCM Lane LOS	A	B	-	-	A	-
HCM 95th %tile Q(veh)	-	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	32	22	450	266	4
Future Vol, veh/h	6	32	22	450	266	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	35	24	489	289	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	828	291	293	0	-	0
Stage 1	291	-	-	-	-	-
Stage 2	537	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	341	748	1269	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	748	1269	-	-	-
Mov Cap-2 Maneuver	335	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	575	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1269	-	335	748	-	-
HCM Lane V/C Ratio	0.019	-	0.019	0.047	-	-
HCM Control Delay (s)	7.9	-	16	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	4	468	22	4	294
Future Vol, veh/h	24	4	468	22	4	294
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	4	509	24	4	320

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	849	521	0	0	533	0
Stage 1	521	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	331	555	-	-	1035	-
Stage 1	596	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	330	555	-	-	1035	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	330	555	1035	-
HCM Lane V/C Ratio	-	-	0.079	0.008	0.004	-
HCM Control Delay (s)	-	-	16.8	11.5	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	3	4	489	317	1
Future Vol, veh/h	1	3	4	489	317	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	4	532	345	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	885	345	346	0	-	0
Stage 1	345	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	315	698	1213	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	314	698	1213	-	-	-
Mov Cap-2 Maneuver	314	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	582	-	-	-	-	-

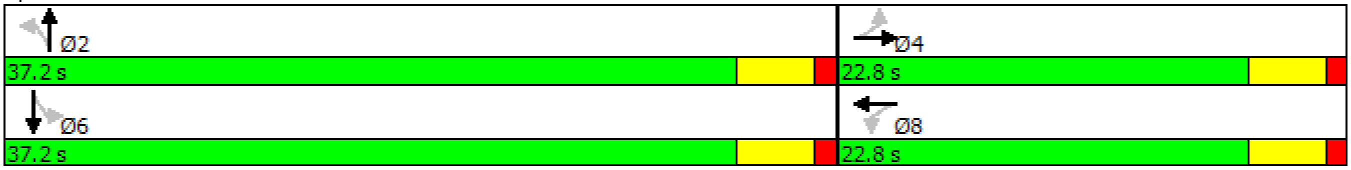
Approach	EB	NB	SB
HCM Control Delay, s	11.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1213	-	314	698	-	-
HCM Lane V/C Ratio	0.004	-	0.003	0.005	-	-
HCM Control Delay (s)	8	-	16.5	10.2	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	32	5	179	6	59	4	432	204	34	284	2
Future Volume (vph)	2	32	5	179	6	59	4	432	204	34	284	2
Satd. Flow (prot)	1789	1848	0	1789	1629	0	1789	1793	0	1789	1882	0
Flt Permitted	0.711			0.731			0.570			0.299		
Satd. Flow (perm)	1339	1848	0	1377	1629	0	1074	1793	0	563	1882	0
Satd. Flow (RTOR)		5			64			62			1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	40	0	195	71	0	4	692	0	37	311	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	22.8	22.8		22.8	22.8		37.2	37.2		37.2	37.2	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	13.0	13.0		13.0	13.0		35.7	35.7		35.7	35.7	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.62	0.62		0.62	0.62	
v/c Ratio	0.01	0.10		0.63	0.17		0.01	0.61		0.11	0.27	
Control Delay	15.0	14.7		28.8	6.8		5.8	10.0		6.9	6.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	14.7		28.8	6.8		5.8	10.0		6.9	6.6	
LOS	B	B		C	A		A	A		A	A	
Approach Delay		14.7			22.9			10.0			6.6	
Approach LOS		B			C			A			A	
Queue Length 50th (m)	0.2	2.7		17.1	0.5		0.2	32.9		1.3	12.3	
Queue Length 95th (m)	1.4	8.3		33.5	7.7		1.2	78.5		5.7	29.1	
Internal Link Dist (m)		116.7			101.0			79.1			152.8	
Turn Bay Length (m)							25.0			50.0		
Base Capacity (vph)	426	592		439	563		664	1133		348	1164	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.07		0.44	0.13		0.01	0.61		0.11	0.27	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 64: Ashburn & Access 5



Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	25	586	113	33	435
Future Vol, veh/h	58	25	586	113	33	435
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	27	637	123	36	473

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1243	698	0	0	760	0
Stage 1	698	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	193	440	-	-	852	-
Stage 1	494	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	185	440	-	-	852	-
Mov Cap-2 Maneuver	185	-	-	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	556	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	185	440	852	-
HCM Lane V/C Ratio	-	-	0.341	0.062	0.042	-
HCM Control Delay (s)	-	-	34.2	13.7	9.4	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	1.4	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	20	42	10	5	17	7	647	62	19	506	7
Future Vol, veh/h	31	20	42	10	5	17	7	647	62	19	506	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	250	-	-	500	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	22	46	11	5	18	8	703	67	21	550	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1359	1381	554	1381	1351	737	558	0	0	771	0	0
Stage 1	595	595	-	752	752	-	-	-	-	-	-	-
Stage 2	764	786	-	629	599	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	126	144	532	121	150	418	1013	-	-	844	-	-
Stage 1	491	492	-	402	418	-	-	-	-	-	-	-
Stage 2	396	403	-	470	490	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	139	532	95	145	418	1013	-	-	844	-	-
Mov Cap-2 Maneuver	114	139	-	95	145	-	-	-	-	-	-	-
Stage 1	487	480	-	399	415	-	-	-	-	-	-	-
Stage 2	371	400	-	400	478	-	-	-	-	-	-	-

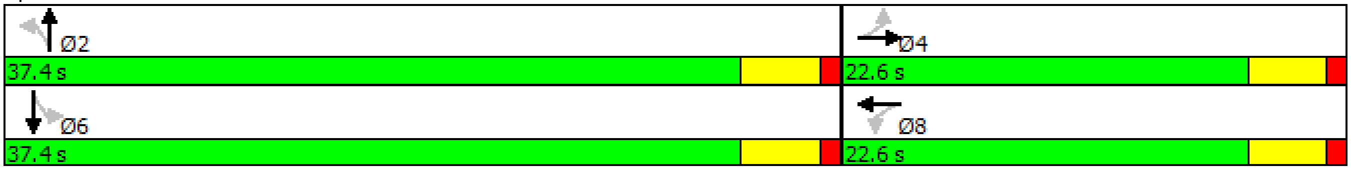
Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	27.6	0.1	0.3
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1013	-	-	114	278	95	293	844	-	-
HCM Lane V/C Ratio	0.008	-	-	0.296	0.242	0.114	0.082	0.024	-	-
HCM Control Delay (s)	8.6	-	-	49.3	22	47.7	18.4	9.4	-	-
HCM Lane LOS	A	-	-	E	C	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.9	0.4	0.3	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	12	16	87	13	16	18	654	62	18	531	20
Future Volume (vph)	18	12	16	87	13	16	18	654	62	18	531	20
Satd. Flow (prot)	1789	1723	0	1789	1729	0	1789	1859	0	1789	1872	0
Flt Permitted	0.737			0.738			0.387			0.275		
Satd. Flow (perm)	1388	1723	0	1390	1729	0	729	1859	0	518	1872	0
Satd. Flow (RTOR)		17			17			13			5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	30	0	95	31	0	20	778	0	20	599	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	22.6	22.6		22.6	22.6		37.4	37.4		37.4	37.4	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	8.8	8.8		8.8	8.8		31.5	31.5		31.5	31.5	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.70	0.70		0.70	0.70	
v/c Ratio	0.07	0.09		0.35	0.09		0.04	0.60		0.06	0.46	
Control Delay	16.7	11.5		21.1	11.6		4.4	8.4		4.8	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.7	11.5		21.1	11.6		4.4	8.4		4.8	6.5	
LOS	B	B		C	B		A	A		A	A	
Approach Delay		13.5			18.7			8.3			6.5	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	1.3	0.8		6.4	0.9		0.5	32.5		0.5	21.5	
Queue Length 95th (m)	5.8	6.0		18.0	6.2		2.6	76.1		2.8	49.1	
Internal Link Dist (m)		97.7			79.8			100.5			62.0	
Turn Bay Length (m)							50.0			25.0		
Base Capacity (vph)	581	732		582	734		537	1374		382	1382	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.04		0.16	0.04		0.04	0.57		0.05	0.43	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 45.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 77: Ashburn & Access 8



Intersection	
Int Delay, s/veh	2

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	25	734	566	46	48	26
Future Vol, veh/h	25	734	566	46	48	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	798	615	50	52	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	665	0	-	0	1492	640
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	852	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	924	-	-	-	136	475
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	418	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	924	-	-	-	132	475
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	406	-

Approach	NB	SB	SE
HCM Control Delay, s	0.3	0	36.5
HCM LOS			E

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SELn2	SBT	SBR
Capacity (veh/h)	924	-	132	475	-	-
HCM Lane V/C Ratio	0.029	-	0.395	0.059	-	-
HCM Control Delay (s)	9	-	49.1	13.1	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.7	0.2	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	288	0	6	300	0	1
Future Vol, veh/h	288	0	6	300	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	313	0	7	326	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	313	0	652	313
Stage 1	-	-	-	-	313	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1247	-	433	727
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1247	-	431	727
Mov Cap-2 Maneuver	-	-	-	-	431	-
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	727	-	-	1247	-
HCM Lane V/C Ratio	-	0.001	-	-	0.005	-
HCM Control Delay (s)	0	10	-	-	7.9	-
HCM Lane LOS	A	B	-	-	A	-
HCM 95th %tile Q(veh)	-	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	44	44	302	293	5
Future Vol, veh/h	5	44	44	302	293	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	48	48	328	318	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	745	321	324	0	-	0
Stage 1	321	-	-	-	-	-
Stage 2	424	-	-	-	-	-
Critical Hdwy	7.12	6.22	4.12	-	-	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	330	720	1236	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	320	720	1236	-	-	-
Mov Cap-2 Maneuver	320	-	-	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	584	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1236	-	320	720	-	-
HCM Lane V/C Ratio	0.039	-	0.017	0.066	-	-
HCM Control Delay (s)	8	-	16.4	10.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	27	3	343	31	3	334
Future Vol, veh/h	27	3	343	31	3	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	3	373	34	3	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	760	390	0	0	407	0
Stage 1	390	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	374	658	-	-	1152	-
Stage 1	684	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	373	658	-	-	1152	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	373	658	1152	-
HCM Lane V/C Ratio	-	-	0.079	0.005	0.003	-
HCM Control Delay (s)	-	-	15.5	10.5	8.1	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	6	373	360	1
Future Vol, veh/h	1	5	6	373	360	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	7	405	391	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	810	392	392	0	-	0
Stage 1	392	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	349	657	1167	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	347	657	1167	-	-	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	660	-	-	-	-	-

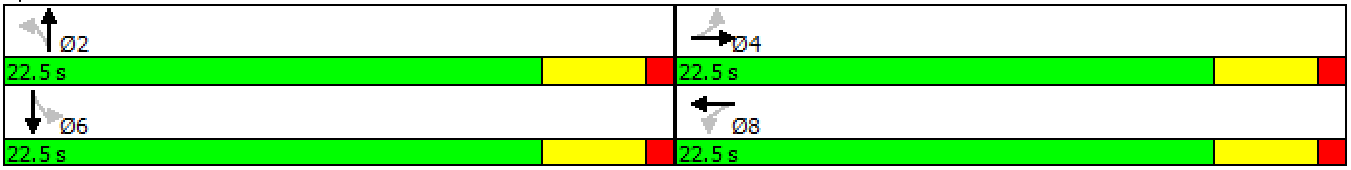
Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1167	-	347	657	-	-
HCM Lane V/C Ratio	0.006	-	0.003	0.008	-	-
HCM Control Delay (s)	8.1	-	15.4	10.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	16	10	110	15	75	9	301	154	85	275	3
Future Volume (vph)	3	16	10	110	15	75	9	301	154	85	275	3
Satd. Flow (prot)	1789	1772	0	1789	1646	0	1789	1787	0	1789	1882	0
Flt Permitted	0.694			0.739			0.576			0.446		
Satd. Flow (perm)	1307	1772	0	1392	1646	0	1085	1787	0	840	1882	0
Satd. Flow (RTOR)		11			82			68			1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	28	0	120	98	0	10	494	0	92	302	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	8.5	8.5		8.5	8.5		23.3	23.3		23.3	23.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.61	0.61		0.61	0.61	
v/c Ratio	0.01	0.07		0.38	0.23		0.02	0.44		0.18	0.26	
Control Delay	9.7	8.3		15.3	5.6		5.3	6.8		6.8	6.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.7	8.3		15.3	5.6		5.3	6.8		6.8	6.2	
LOS	A	A		B	A		A	A		A	A	
Approach Delay		8.5			10.9			6.8			6.3	
Approach LOS		A			B			A			A	
Queue Length 50th (m)	0.2	0.8		5.8	0.7		0.3	13.3		2.5	8.5	
Queue Length 95th (m)	1.2	4.2		14.3	7.1		1.7	35.9		9.2	22.2	
Internal Link Dist (m)		116.7			101.0			79.1			152.8	
Turn Bay Length (m)							25.0			50.0		
Base Capacity (vph)	622	849		662	826		666	1124		516	1157	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.03		0.18	0.12		0.02	0.44		0.18	0.26	

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 37.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 53.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 64: Ashburn & Access 5



Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	25	439	100	38	360
Future Vol, veh/h	58	25	439	100	38	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	500	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	27	477	109	41	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1006	532	0	0	586	0
Stage 1	532	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	267	547	-	-	989	-
Stage 1	589	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	256	547	-	-	989	-
Mov Cap-2 Maneuver	256	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	600	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	256	547	989	-
HCM Lane V/C Ratio	-	-	0.246	0.05	0.042	-
HCM Control Delay (s)	-	-	23.6	11.9	8.8	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	4	5	40	5	37	6	496	152	57	354	7
Future Vol, veh/h	6	4	5	40	5	37	6	496	152	57	354	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	250	-	-	500	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	4	5	43	5	40	7	539	165	62	385	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1171	1230	389	1152	1151	622	392	0	0	704	0	0
Stage 1	513	513	-	635	635	-	-	-	-	-	-	-
Stage 2	658	717	-	517	516	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	170	178	659	175	198	487	1167	-	-	894	-	-
Stage 1	544	536	-	467	472	-	-	-	-	-	-	-
Stage 2	453	434	-	541	534	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	144	165	659	160	183	487	1167	-	-	894	-	-
Mov Cap-2 Maneuver	144	165	-	160	183	-	-	-	-	-	-	-
Stage 1	541	499	-	464	469	-	-	-	-	-	-	-
Stage 2	408	431	-	495	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.4	25.1	0.1	1.3
HCM LOS	C	D		

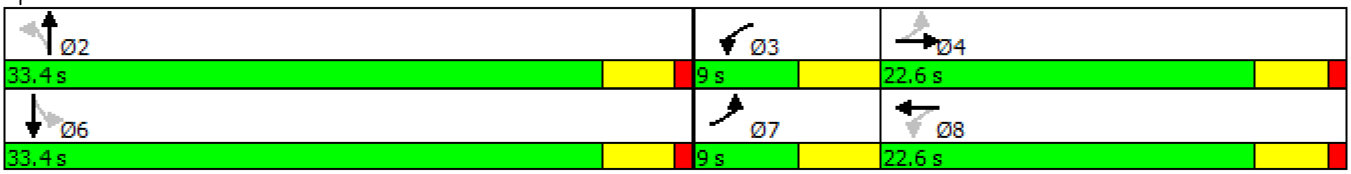
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	144	283	160	407	894	-	-
HCM Lane V/C Ratio	0.006	-	-	0.045	0.035	0.272	0.112	0.069	-	-
HCM Control Delay (s)	8.1	-	-	31.2	18.2	35.7	15	9.3	-	-
HCM Lane LOS	A	-	-	D	C	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	1	0.4	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	8	11	135	7	37	9	543	152	57	331	11
Future Volume (vph)	12	8	11	135	7	37	9	543	152	57	331	11
Satd. Flow (prot)	1789	1721	0	1789	1648	0	1789	1821	0	1789	1874	0
Flt Permitted				0.755			0.532			0.268		
Satd. Flow (perm)	1883	1721	0	1422	1648	0	1002	1821	0	505	1874	0
Satd. Flow (RTOR)		12			40			28			3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	21	0	147	48	0	10	755	0	62	372	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	9.0	22.6		9.0	22.6		33.4	33.4		33.4	33.4	
Total Lost Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	6.5	6.1		7.3	6.2		32.9	32.9		32.9	32.9	
Actuated g/C Ratio	0.14	0.13		0.16	0.13		0.70	0.70		0.70	0.70	
v/c Ratio	0.05	0.09		0.55	0.19		0.01	0.59		0.18	0.28	
Control Delay	15.6	14.7		24.9	11.2		4.8	8.8		6.5	5.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.6	14.7		24.9	11.2		4.8	8.8		6.5	5.2	
LOS	B	B		C	B		A	A		A	A	
Approach Delay		15.0			21.6			8.8			5.3	
Approach LOS		B			C			A			A	
Queue Length 50th (m)	0.9	0.6		10.6	0.5		0.2	22.3		1.3	8.5	
Queue Length 95th (m)	3.8	5.6		21.8	7.9		2.1	#100.7		9.0	33.7	
Internal Link Dist (m)		97.7			79.8			100.5			62.0	
Turn Bay Length (m)							50.0			25.0		
Base Capacity (vph)	249	677		268	666		703	1287		354	1316	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.03		0.55	0.07		0.01	0.59		0.18	0.28	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 46.9	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 67.4%	ICU Level of Service C
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 77: Ashburn & Access 8



Intersection	
Int Delay, s/veh	1.7

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	25	673	463	46	48	26
Future Vol, veh/h	25	673	463	46	48	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	732	503	50	52	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	553	0	-	0	1314	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	786	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1017	-	-	-	174	550
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	449	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1017	-	-	-	169	550
Mov Cap-2 Maneuver	-	-	-	-	169	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	437	-

Approach	NB	SB	SE
HCM Control Delay, s	0.3	0	27.2
HCM LOS			D

Minor Lane/Major Mvmt	NBL	NBT	SELn1	SELn2	SBT	SBR
Capacity (veh/h)	1017	-	169	550	-	-
HCM Lane V/C Ratio	0.027	-	0.309	0.051	-	-
HCM Control Delay (s)	8.6	-	35.5	11.9	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	0.2	-	-

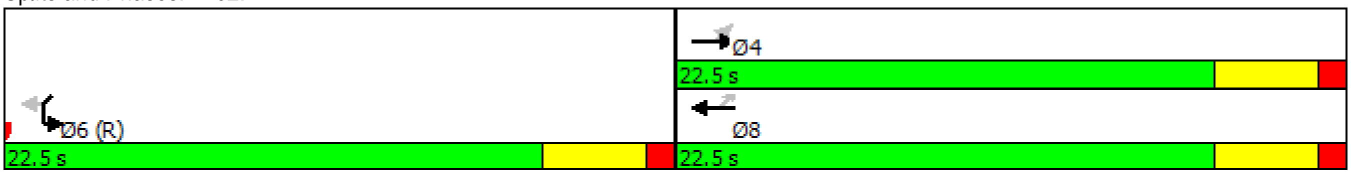
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	145	329	443	388	489	309
Future Volume (vph)	145	329	443	388	489	309
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.342				0.950	
Satd. Flow (perm)	644	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				422		226
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	158	358	482	422	532	336
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.61	0.48	0.64	0.47	0.74	0.43
Control Delay	25.2	12.6	15.7	3.3	20.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	12.6	15.7	3.3	20.3	5.6
LOS	C	B	B	A	C	A
Approach Delay		16.5	9.9		14.6	
Approach LOS		B	A		B	
Queue Length 50th (m)	9.3	19.6	28.7	0.0	33.6	5.2
Queue Length 95th (m)	#31.2	36.4	52.4	11.9	#73.9	17.7
Internal Link Dist (m)		146.4	432.6		133.7	
Turn Bay Length (m)	50.0			50.0		
Base Capacity (vph)	257	753	753	893	715	776
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.48	0.64	0.47	0.74	0.43

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 0 (0%), Referenced to phase 2: and 6:SWL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 13.2	Intersection LOS: B
Intersection Capacity Utilization 69.7%	ICU Level of Service C

Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 62:



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	134	456	245	709	673	189
Future Volume (vph)	134	456	245	709	673	189
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.390				0.950	
Satd. Flow (perm)	735	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				771		205
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	146	496	266	771	732	205
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			2		8
Total Split (s)	9.0	36.0	27.0	27.0	39.0	39.0
Total Lost Time (s)	4.0	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	25.5	25.0	18.4	18.4	30.8	30.8
Actuated g/C Ratio	0.39	0.38	0.28	0.28	0.47	0.47
v/c Ratio	0.39	0.69	0.50	0.77	0.87	0.24
Control Delay	17.0	22.8	25.0	7.9	30.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	22.8	25.0	7.9	30.2	2.8
LOS	B	C	C	A	C	A
Approach Delay		21.5	12.3		24.2	
Approach LOS		C	B		C	
Queue Length 50th (m)	12.4	53.4	30.4	0.0	82.5	0.0
Queue Length 95th (m)	23.3	83.4	51.0	27.2	#157.4	10.0
Internal Link Dist (m)		152.1	429.7		108.5	
Turn Bay Length (m)	50.0			50.0		
Base Capacity (vph)	372	954	681	1071	992	980
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.52	0.39	0.72	0.74	0.21

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 65.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 27: