## EMERALD SUBDIVISION 6544 JACK PINE CRESCENT GREELY, ONTARIO

**TIA STRATEGY REPORT (REVISED)** 

June 24, 2022

**D. J. Halpenny & Associates Ltd.** Consulting Transportation Engineers P. O. Box 774, Manotick, Ontario K4M 1A7

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Prepared for:

9287043 Canada Corporation

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#### EMERALD SUBDIVISION 6544 JACK PINE CRESCENT, GREELY ON

#### TIA STRATEGY REPORT (REVISED)

#### INTRODUCTION

The Emerald Subdivision will be situated on a parcel of land at the northwest portion of the Community of Greely. The subdivision proposes 73 single-family residential homes which will be constructed in two phases with completion expected by 2027. The subdivision will have three access points onto arterial and collector roads by way of local streets through existing subdivisions adjacent to the Emerald Subdivision.

The TIA Strategy Report will examine the operation of the subdivision's access points and connecting road segments. The report compiles the Screening (Step 1), Scoping (Step 2) and Forecasting (Step 3) Reports into a single document. The study will follow the City of Ottawa document, *Transportation Impact Assessment Guidelines (2017)*. Exhibit 1.1 in the Appendix presents the consultants Certification Form.

#### **STEP 1 - SCREENING**

A Screening Form has been prepared which is included as Exhibit 1.2 in the Appendix. The Screening Form has satisfied the trip Generation Trigger which required the study to proceed to the Scoping Document stage of the Transportation Impact Assessment (TIA). The following will address the requirements of the Scoping Document.

#### **STEP 2 - SCOPING**

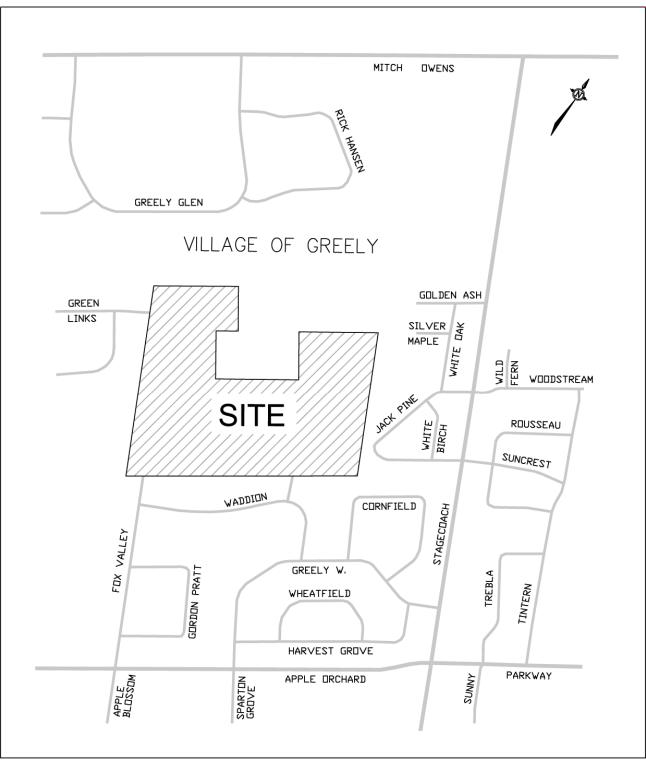
#### **MODULE 2.1 – Existing and Planned Conditions**

#### Element 2.1.1 – Proposed Development

The Emerald Subdivision is located on 35.0 ha of vacant land north of Apple Orchard Road and west of Stagecoach Road in the Community of Greely. The property has a "DR1" Zoning - Development Reserve Zone. The Site Plan proposes the subdivision to contain 73 single-family homes. Figure 2.1 provides location plan of the development.

The subdivision site will have three access points, all onto local streets connecting to collector and arterial roads. The first access would be along Jack Pine Crescent to Stagecoach Road, the second along Fox Valley Road to Apple Orchard Road, and the third along the new subdivision road called Green Links Way to Manotick Station Road.

#### FIGURE 2.1 SITE LOCATION PLAN



The Emerald Subdivision will be constructed in two phases, and is expected to have both phases completed and substantially occupied by the year 2027. Figure 2.2 provides a conceptual site plan of the total subdivision.

#### Element 2.1.2 – Existing Conditions

The site is located north of Apple Orchard Road and west of Stagecoach Road on vacant land within the residential community. The subdivision will have three accesses along local streets which will connect to the surrounding road network. The following will describe the access roads and major intersections within the study area.

#### JACK PINE CRESCENT

Jack Pine Crescent will provide access to Stagecoach Road for the east portion of the property. Jack Pine Crescent is a local street with a rural cross section and a pavement width of 6.5 m, gravel shoulders, with no sidewalks. The posted speed limit is 50 km./h.

#### FOX VALLEY ROAD

Fox Valley Road is a 7.0 m wide local road connecting the south portion of the property to Apple Orchard Road. The rural road has gravel shoulders with no pedestrian sidewalks. The road has a pedestrian pathway along the east side of the road from Apple Orchard Road to a point 75 m north of Gordon Pratt Crescent which is approximately 215 m south of the site. The speed limit is unposted.

#### **GREEN LINKS WAY**

Green Links Way is a local street constructed as part of the Emerald Links Country Estates Phase III subdivision. The street has been constructed and will provide access to the west portion of the property. Housing has not been built at the time this report is being prepared. Green Links Way is a local street with a rural cross-section and 7.0 m pavement surface with gravel shoulders. There are no sidewalks along the road.

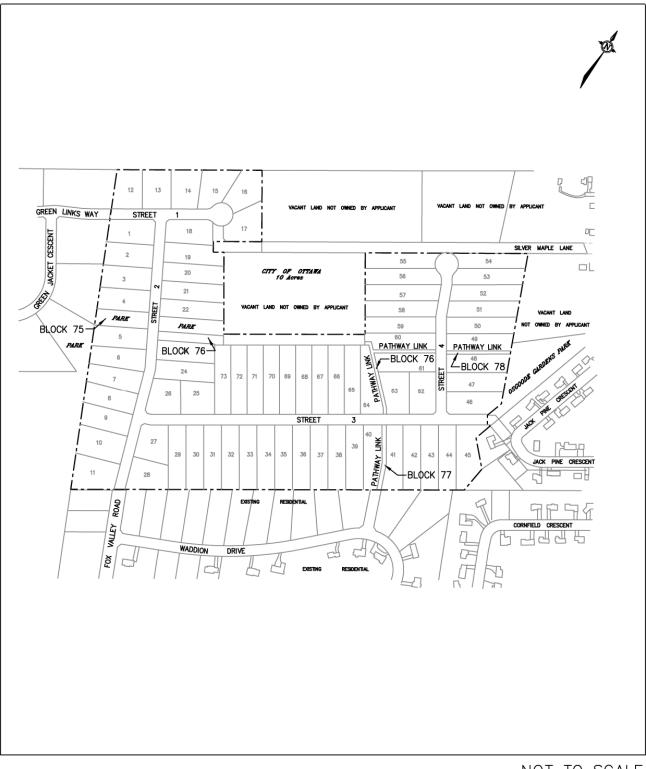
#### STAGECOACH ROAD

Stagecoach Road is a north-south road designated in the TMP as an arterial road. The road has a two lane rural cross-section and 1.5 m paved shoulders with gravel shoulders. The TMP identifies Stagecoach Road between Mitch Owens Road and Apple Orchard Road as a Spine Route in the Cycling Network-Primary Rural map. There are no sidewalks or dedicated cycling lanes along the road. The speed limit in the vicinity of the site is posted at 70 km./h.

#### <u>APPLE ORCHARD ROAD</u>

Apple Orchard Road is an east-west collector road. The road is a two lane rural road with gravel shoulders and a 7.0 m pavement width. There are no sidewalks along the road. Apple Orchard Road is a local cycling route with a speed limit posted at 70 km./h.

#### FIGURE 2.2 CONCEPTUAL SITE PLAN



#### MANOTICK STATION ROAD

Manotick Station Road is a north-south collector road with a rural cross-section. The road has a pavement width of 7.0 m with gravel shoulders and no sidewalks. The posted speed limit is 50 km./h. past Green Links Way, changing to 80 km./h. approximately 40 m south of the road. The Emerald Subdivision will link to Manotick Station Road through the new Green Links Way which was constructed in 2021.

#### INTERSECTION OF JACK PINE CRESCENT AND STAGECOACH ROAD

The Jack Pine/Stagecoach intersection is a two-way stop controlled intersection. Stagecoach Road forms the northbound/southbound approaches, and Jack Pine Crescent the eastbound and Suncrest Drive the westbound stop controlled approaches. Below is the existing lane configuration of the intersection:

Northbound Stagecoach Road Southbound Stagecoach Road Eastbound Jack Pine Crescent Westbound Suncrest Drive One shared left/through/right lane One shared left/through/right lane One shared left/through/right lane (Stop Sign) One shared left/through/right lane (Stop Sign)

An aerial photograph of the Jack Pine/Stagecoach intersection showing the intersection geometry is provided below.



#### INTERSECTION OF JACK PINE CRESCENT AND STAGECOACH ROAD

#### INTERSECTION OF FOX VALLEY ROAD AND APPLE ORCHARD ROAD

The intersection of Fox Valley Road and Apple Orchard Road is a two-way stop controlled intersection providing access to the south portion of the subdivision. Apple Orchard Road forms the eastbound and westbound approaches, and Fox Valley Road the southbound and Apple Blossom Way the northbound approaches. There are no exclusive turn lanes at the intersection with stop signs placed at the northbound and southbound approaches. Below is the existing lane configuration of the intersection of Fox Valley Road:

Northbound Apple Blossom Way Southbound Fox Valley Crescent Eastbound Apple Orchard Road Westbound Apple Orchard Road

One shared left/through/right lane (Stop Sign) One shared left/through/right lane (Stop Sign) One shared left/through/right lane One shared left/through/right lane

The intersection lane geometry is provided below in an aerial photograph.

#### INTERSECTION OF FOX VALLEY ROAD AND APPLE ORCHARD ROAD



#### INTERSECTION OF GREEN LINKS WAY AND MANOTICK STATION ROAD

The intersection of Green Links Way and Manotick Station Road is a "T" intersection with Green Links Way forming the westbound stop controlled approach, and Manotick

Station Road the northbound and southbound approaches. Green Links Way has been constructed in 2021 as part of the Emerald Links Phase III subdivision and will provide access to the northwest portion of the Emerald Subdivision. At the time this report is being prepared, the road has been constructed along with the asphalt paved surface. No housing units have been completed. Below is the existing lane configuration to the Green Links/Manotick Station intersection:

Northbound Manotick Station RoadOne shared through/right laneSouthbound Manotick Station RoadOne shared left/through laneWestbound Green Links WayOne shared left/right turn lane (Stop Sign)

An aerial photograph taken in 2019 is provided below showing the geometry of the Green Links/Manotick Station intersection.



#### INTERSECTION OF GREEN LINKS WAY AND MANOTICK STATION ROAD

#### INTERSECTION OF APPLE ORCHARD ROAD AND STAGECOACH ROAD

The intersection of Apple Orchard Road and Stagecoach Road has been recently changed from a two-way stop controlled intersection to an all-way stop controlled intersection. The intersection was modified in 2018 to align the eastbound Apple Orchard Road approach with the westbound Parkway Road approach. There are no

dedicated turn lanes at any of the approaches. Below is the existing lane configuration of the intersection of Apple Orchard Road and Stagecoach Road:

Northbound Stagecoach Road Southbound Stagecoach Road Eastbound Apple Orchard Road Westbound Parkway Road One shared left/through/right lane (Stop Sign) One shared left/through/right lane (Stop Sign) One shared left/through/right lane (Stop Sign) One shared left/through/right lane (Stop Sign)

The lane geometry is shown in an aerial photograph of the Apple Orchard/Stagecoach intersection.

#### INTERSECTION OF APPLE ORCHARD ROAD AND STAGECOACH ROAD



The most recent traffic counts were obtained from the City of Ottawa for the intersections of Jack Pine/Stagecoach (2019) and Apple Orchard/Stagecoach (2018). Traffic counts have been conducted by the consultant at the Fox Valley/Apple Orchard and Green Links/Manotick Station intersections in 2021. Figure 2.3 shows the peak AM and PM hour intersection counts. The counts are provided in the Appendix.

#### <u>TRANSIT</u>

There is no regular OC Transpo transit service to the Greely Community.

#### COLLISION HISTORY

Collision reports were obtained from the City of Ottawa through Open Data Ottawa for the five year time period between the years January 1, 2015 and December 31, 2019. The collision reports were for the Jack Pine/Stagecoach, Fox Valley/Apple Orchard and Apple Orchard/Stagecoach intersections. The Green Links/Manotick Station intersection was not completed until 2021 and no collision data is available. Reported collisions were also obtained for the Stagecoach Road segment between Apple Orchard Road and Golden Ash Lane (Pebble Trail Way), and the Apple Orchard Road segment between Stagecoach Road and Manotick Station Road.

During the five year period, the Apple Orchard/Stagecoach intersection experienced 4 collisions, the Stagecoach Road segment 3 collisions, and the Apple Orchard Road segment 2 collisions. Exhibit 2.3 summarizes the collisions by year and type.

#### Element 2.1.3 – Planned Conditions

The *Transportation Master Plan 2013* (TMP) was examined to determine if there were any road or transit projects identified within the road network of the surrounding area.

The TMP did not identify any road modifications projects in the Affordable Network Plan for the surrounding area. The Apple Orchard/Stagecoach intersection was modified in 2018 to align Apple Orchard Road with Parkway Road. Traffic control signals may be installed at a future date when warranted.

The Greely Community does not have OC Transpo bus service. There are no transit projects identified in the TMP for the Greely area.

The following is the only significant development proposed or under construction within one kilometre of the site:

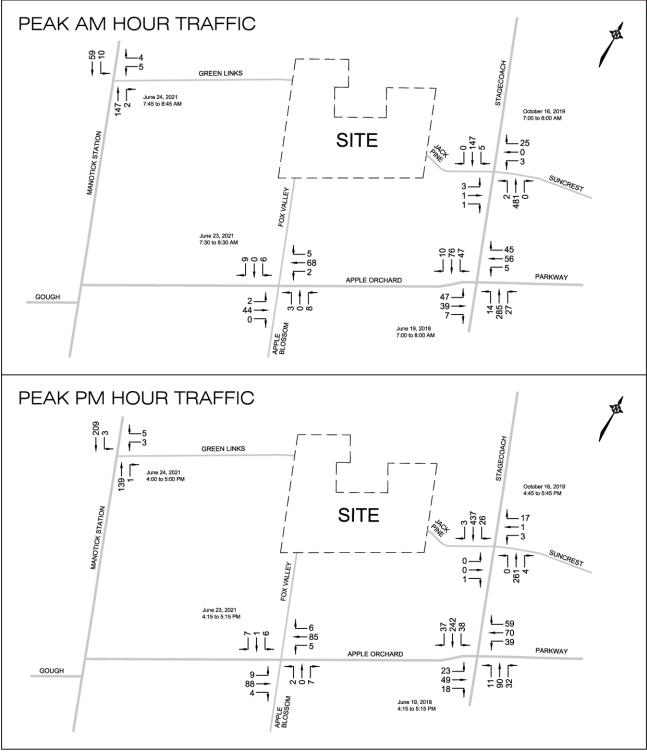
 The Emerald Links Country Estates Phase III subdivision is proposed adjacent to the west limit of the site. The subdivision proposes 43 single-family homes with one access onto Manotick Station Road, and a second access along Green Links Way which connects to Street 1 of the Emerald Subdivision. The subdivision is currently under construction and is expected to be completed by the 2027 build out date of the Emerald Subdivision.

#### MODULE 2.2 – Study Area and Time Periods

#### Element 2.2.1 – Study Area

The study area for the Emerald Subdivision will be confined to the site access points at the Jack Pine/Stagecoach, Fox Valley/Apple Orchard and Green Links/Manotick Station intersections. The Apple Orchard/Stagecoach intersection will also be included in the analysis. The intersections represent the subdivision access points and major intersections within one kilometre of the site.

#### FIGURE 2.3 PEAK AM AND PM HOUR TRAFFIC COUNTS



The study will examine the intersection geometry and roadway segments in accordance with the *Transportation Impact Assessment Guidelines (2017)*. Traffic calming measures within the internal subdivision streets will be examined in accordance with the City of Ottawa *Traffic Calming Design Guidelines, April 2019*.

#### Element 2.2.2 – Time Periods

The time period for the analysis would be the weekday peak AM and PM time period of traffic which would occur during the peak hour of the subdivision development and the adjacent road traffic when drivers are travelling to and from work.

#### Element 2.2.3 – Horizon Years

The TIA will address the impact of the site generated trips from the proposed residential subdivision. The horizon year of the study will be the total completion of the development at the year 2027. The analysis will further examine the impact at the year 2032 which is five years beyond completion.

#### MODULE 2.3 – Exemptions Review

The exemptions, which provide possible reductions to the scope of work of the TIA Study, were examined using Table 4: Possible Exemptions which is provided in the City's *Transportation Impact Assessment Guidelines (2017)*. Utilizing the table, the following lists the possible exemptions proposed for the TIA Study report:

MODULE	ELEMENT	EXEMPTION CONSIDERATIONS			
Design Review Component					
4.1 Development Design	4.1.2 Circulation and Access	<b>Not Required</b> – Only required for site plans			
	4.1.3 New Street Networks	Required - Required for subdivisions			
4.2 Derking	4.2.1 Parking Supply	<b>Not Required</b> – Only required for site plans			
4.2 Parking	4.2.2 Spillover Parking	<b>Not Required</b> - Only required for site plans			
Network Impact Compone	nt				
4.5 Transportation Demand Management	All Elements	Required – TDM measures will be examined			
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	<b>Required</b> – The site will have access onto arterial or collector roads through local streets from the subdivision			
4.8 Network Concept		<b>Not Required</b> - The subdivision would not generate more than 200 person-trips per peak hour in excess of the volume permitted by established zoning			

#### MODULE 3.1 - Development-generated Travel Demand

#### Element 3.1.1 – Trip Generation and Mode Shares

The Emerald Subdivision will consist of 73 single-family homes on a 35.0 ha parcel of land. The site will have access to Stagecoach Road, Apple Orchard Road and Manotick Station Road from three internal local streets.

The number of expected site generated trips utilized the trip statistical data documented in the *TRANS Trip Generation Manual, Summary Report October 2020*. The analysis used the Person-Trip Generation Rates from Table 3 of the TRANS document for ITE Land Use Code 210, "Single-detached". Peak period person-trips would occur between 7:00 AM and 9:30 AM, and between 3:30 PM and 6:00 PM. The person-trip rates for the AM and PM peak period are shown below in Table 3.1.

## TABLE 3.1PEAK PERIOD PERSON-TRIP GENERATION RATES AND TRIPS

Single-Family Housing	Peak AM Period	Peak PM Period
Trip Rate	2.05 T/Dwelling Units	2.48 T/Dwelling Units
Person-Trips (73 Units)	150 Person-Trips	181 Person-Trips

The Emerald Subdivision is located in the Rural Southeast sector of the region. The mode share of peak period trips was determined from Table 6 of the TRANS document for Single-Detached Housing located in Other Rural Districts sector. Since there is no transit service in the Greely area, the transit share shown in Table 6 was evenly distributed between the Auto Driver and Auto Passenger travel modes. Table 3.2 presents the peak period person-trips from the subdivision for various modes of travel.

The Mode Share of Table 3.2 presenting the peak period person-trips was adjusted to peak hour person-trips using the adjustment factors presented in Table 4 of the TRANS document. Table 3.3 shows the peak AM and PM hour person-trips.

#### TABLE 3.2 MODE SHARE SUMMARY (Peak Period Person-Trips)

FUTURE MODE SHARE TARGETS FOR SINGLE-DETACHED HOUSING						
Travel Mode	AM % Peak Period	AM Per. Trips Peak Period	PM % Peak Period	PM Per. Trips Peak Period		
Auto Driver	72%	108	74%	134		
Auto Passenger	26%	39	24%	43		
Transit	0%	0	0%	0		
Cycling	2%	3	2%	4		
Walking	0%	0	0%	0		
Total	100%	150 per. trips	100%	181 per. trips		

### TABLE 3.3

#### MODE SHARE SUMMARY (Peak AM and PM Hour Person-Trips)

PEAK AM AND PM HOUR PERSON-TRIPS						
Travel Mode Peak AM Hour Peak PM Hour						
Auto Driver	52	59				
Auto Passenger	20	19				
Transit	0	0				
Cycling	2	2				
Walking	0	0				

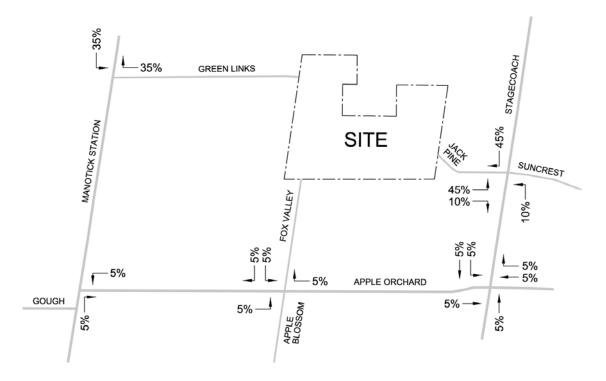
The TIA Guidelines allow for three Trip Reduction Factors. The three trip reductions would consist of trips from existing development on site, pass-by trips, and shared trips within the site between two or more uses. No trip reduction factors were applied for the following reasons:

- 1. The site is vacant with no existing development on site which would generate new trips.
- 2. The residential use would generate all primary trips with no pass-by trips.
- 3. The residential single-family home land use would be a single use with no shared trips between other uses on site.

#### Element 3.1.2 – Trip Distribution

The distribution of site generated vehicle-trips for the proposed Emerald Subdivision was determined from the traffic patterns from the peak hour traffic counts at surrounding intersections which would comprise mainly of trips to/from work. The trip pattern was applied to the access points to the subdivision assuming the shortest and most convenient route. The trip distribution for the residential trips during the weekday peak AM and PM hour is shown in the figure below.

#### SUBDIVISION TRIP DISTRIBUTION



#### Element 3.1.3 – Trip Assignment

The distribution of site generated vehicle-trips was determined by applying the directional distribution shown in Table 9 of the TRANS document for a single-detached housing type, to the Auto Driver trips shown in Table 3.3. Table 3.4 presents the distribution of vehicle-trips entering and exiting the subdivision.

## TABLE 3.4PEAK HOUR DISTRIBUTION OF VEHICLE-TRIPS

PEAK HOUR TRIPS LAND USE	WEEKDAY PEAK AM HR.		WEEKDAY PEAK PM HR.			
	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
73 Single-Family Homes	52	16 (30%)	36 (70%)	59	37 (62%)	22 (38%)

The trip distribution, as discussed in Element 3.1.2, was applied to the peak AM and PM peak hour vehicle-trips shown in Table 3.4. Figure 3.1 presents the peak AM and PM hour residential trips to/from the site.

#### MODULE 3.2 - Background Network Travel Demands

#### Element 3.2.1 – Transportation Network Plans

The City of Ottawa *Transportation Master Plan (TMP) 2013* was reviewed to identify transit and roadway projects in the vicinity of the development. The east-west approaches (Apple Orchard and Parkway) of the Apple Orchard/Stagecoach intersection were aligned during an intersection modification in 2018. The intersection is an all-way stop controlled intersection with the possibility of traffic signals at a future date when warranted. There are no transportation projects identified in the TMP.

#### Element 3.2.2 – Background Growth

Peak hour traffic counts were taken by the consultant at the Fox Valley/Apple Orchard and Green Links/Manotick Station intersections in July 2021. To convert the 2021 counts to the expected pre-COVID-19 traffic volumes, a conversion factor was applied to the counts. Traffic counts were obtained from the United Counties of Prescott and Russell which were taken along Russell Road 1.5 km east of the Drouin/Russell intersection which would be influenced by Ottawa federal government employees working remotely. The July 2018 peak hour counts were compared to the counts taken September 2020 at the east approach to the Drouin/Russell intersection. The counts showed that the 2020 counts were 11 percent lower during the peak AM hour and 15 percent lower during the peak PM hour. The peak hour counts are shown below:

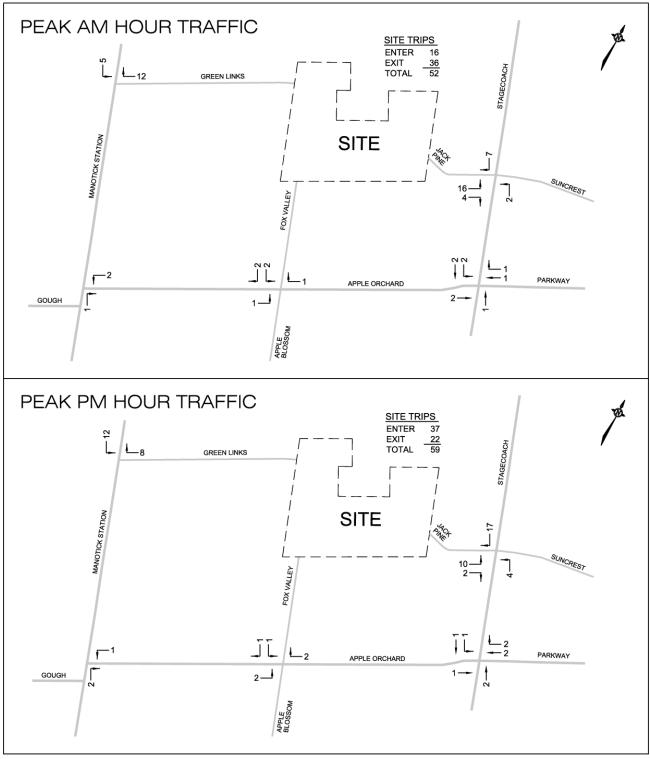
Count Date	AM	PM
July 2018	491	524
September 2020	<u>441</u>	<u>457</u>
	-11%	-15%

The study has therefore assumed a 20 percent COVID-19 adjustment factor which was applied to all approaches of the Fox Valley/Apple Orchard and Green Links/Manotick Station intersections which converted the counts to pre- COVID-19 traffic volumes.

The growth in background traffic at the intersections within the study area was determined by the following two methods:

• The examination of historical traffic counts obtained from the City of Ottawa at the Apple Orchard/Stagecoach intersection between the year of 2011 and 2018. The counts determined that the volume of background traffic decreased at an annual average compounded rate of between -2 and -3 percent.

#### FIGURE 3.1 PEAK AM AND PM HOUR SITE GENERATED TRIPS



• The trip trend of trips to/from the Rural Southeast area for auto driver trips was examined in the *National Capital Region Travel Trends* document prepared by the IBI Group. The document showed that the trip trend from the Rural Southeast area has increased at an annual average compounded rate of 0.88 percent for the peak AM hour between the years of 2005 and 2011.

The study has therefore assumed that the background traffic would experience an annual average compounded increase of 1.0 percent which is consistent with traffic studies for other development in the area. The 1.0 percent annual increase would translate to the following growth factors which were applied to all intersection approaches:

Growth Factor at the Jack Pine/Stagecoach Intersection

2019  $\rightarrow$  2027 = 1.083 Completion 2019  $\rightarrow$  2032 = 1.138 Completion + 5 Years

Growth Factor at the Apple Orchard/Stagecoach Intersection

2018  $\rightarrow$  2027 = 1.094 Completion 2018  $\rightarrow$  2032 = 1.149 Completion + 5 Years

Growth Factor at Fox Valley/Apple Orchard and Green Links/Manotick Station Intersections

 $2021 \rightarrow 2027 = 1.062$  Completion  $2021 \rightarrow 2032 = 1.116$  Completion + 5 Years

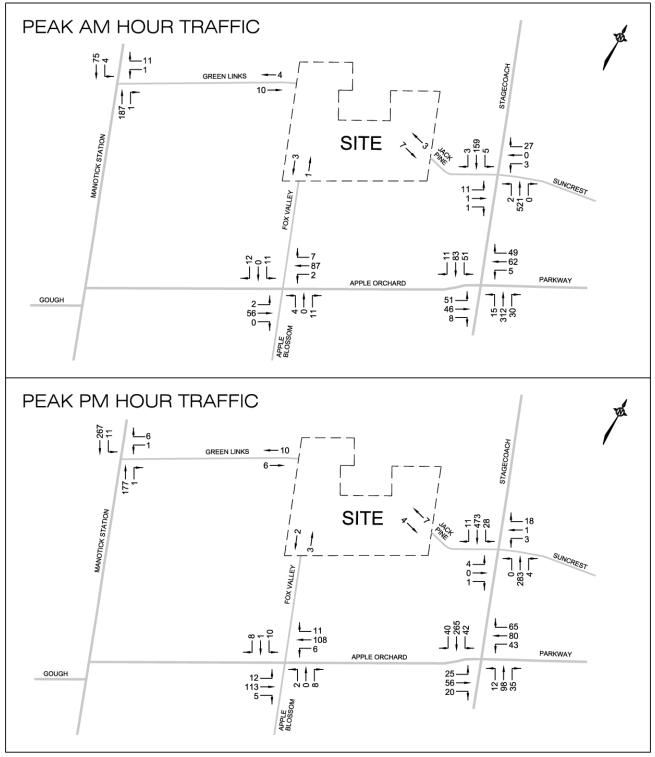
#### Element 3.2.3 – Other Developments

Other development in the area which would contribute to the increase in background traffic is the following:

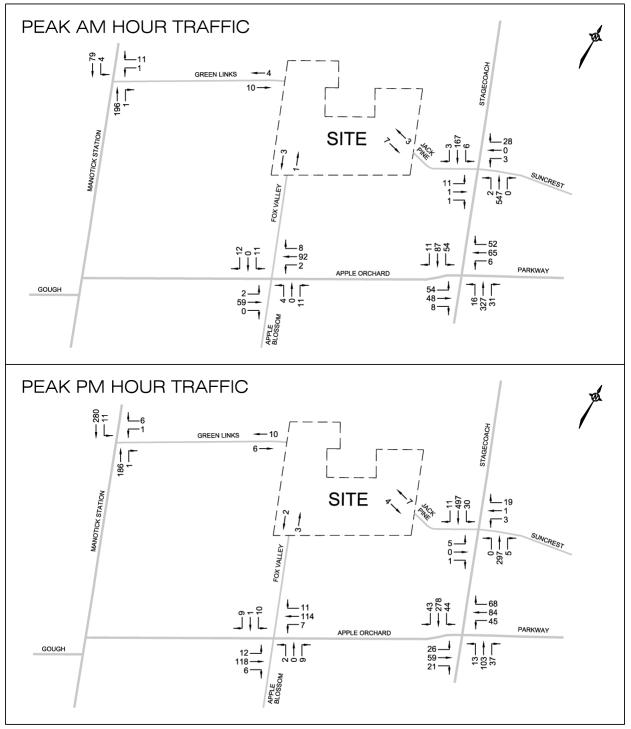
 The Emerald Links Country Estates Phase III subdivision is located adjacent to the west limit of the subdivision. The Emerald Links Country Estates will contain 43 single-family homes which are currently under construction. The development will have one access point onto Manotick Station Road, with access through the proposed Emerald Subdivision to Fox Valley Road and to Stagecoach Road by way of Jack Pine Crescent. Due to the size of the subdivision, no TIA study was required but trips were determined using the TRANS Trip Generation Manual for use in this study.

The COVID-19 adjustment, the annual average growth in background traffic, and the site generated trips from the Emerald Links Country Estates subdivision were applied to all approaches of the intersections examined in the study area. Figure 3.2 presents the 2027 peak AM and PM peak hour background vehicle traffic (does not include trips from the proposed Emerald Subdivision). Figure 3.3 shows the expected 2032 peak hour background traffic which represents five years beyond completion of the development.

#### FIGURE 3.2 2027 PEAK AM AND PM HOUR BACKGROUND TRAFFIC



#### FIGURE 3.3 2032 PEAK AM AND PM HOUR BACKGROUND TRAFFIC



#### **MODULE 3.3 - Demand Rationalization**

The Community of Greely is in a low density rural area. All roadways in the area handle a low volume of traffic and contain sufficient capacity for future development. The transportation network in the study area comprises of two lane rural roads. There are no exclusive turn lanes at any of the intersections, and all intersections are controlled by stop signs.

The trips generated by the site are expected to be low resulting in a minor impact on the surrounding road network. There would be no requirement to reduce travel demand due to insufficient infrastructure capacity. Any reduction in peak hour travel demand could be accomplished by providing OC Transpo transit service to Greely.

The total vehicular traffic is the sum of the peak hour site generated trips and the peak hour background traffic. The site generated trips would be the addition of the Emerald Subdivision trips from Figure 3.1, and the background traffic (Figure 3.2 for the year 2027 and Figure 3.3 for the year 2032). Figure 3.4 presents the total 2027 peak hour vehicular traffic and Figure 3.5 the total 2032 peak hour vehicular traffic.

#### STEP 4 – ANALYSIS

#### MODULE 4.1 – Development Design

#### Element 4.1.1 – Design for Sustainable Modes

The Emerald Subdivision is located in a rural area where there is no regular OC Transpo transit service.

There are no sidewalks in the surrounding subdivisions. There is a pedestrian pathway along the east side of Fox Valley Road from Apple Orchard Road to a point 75 m north of Gordon Pratt Crescent which is approximately 215 m south of the site. There are no plans to extend the pathway.

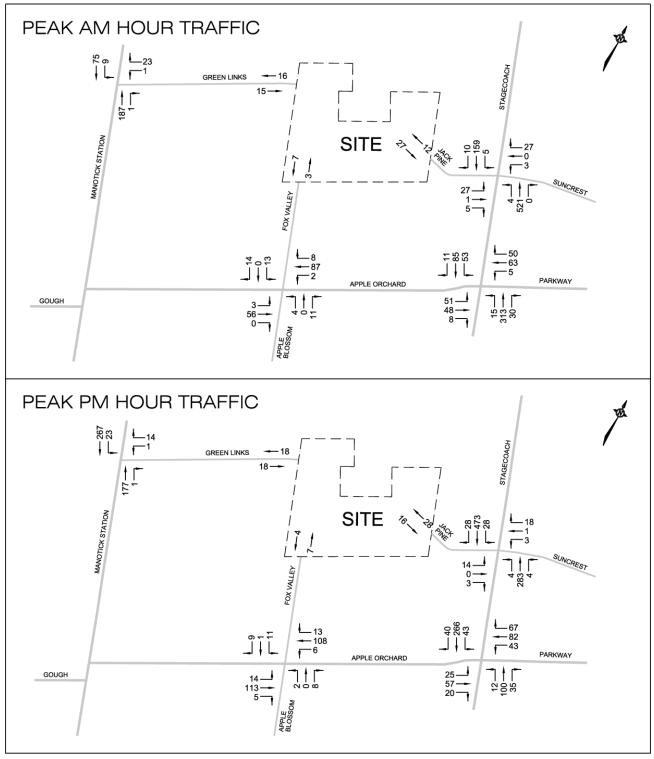
There are three future pedestrian pathway connections from a vacant parcel of land bordering the north limit of the site through the proposed subdivision. The first pathway

travels east/west from Block 76 and crosses Street 4 to Block 78 at the east border of the site. The second pathway travels north/south from Block 76 and crosses Street 3 to Block 77 at the south border of the site. The third travels east/west from Block 76 crossing Street 2 to a park in Block 75. Pedestrian crossing signs should be installed at the north and south approaches along Street 2 and Street 4, and at the east and west approaches along Street 3 alerting drivers of the pedestrian crossing. The signs would be designated as Ra-5R, with the adjacent picture showing the proposed sign.

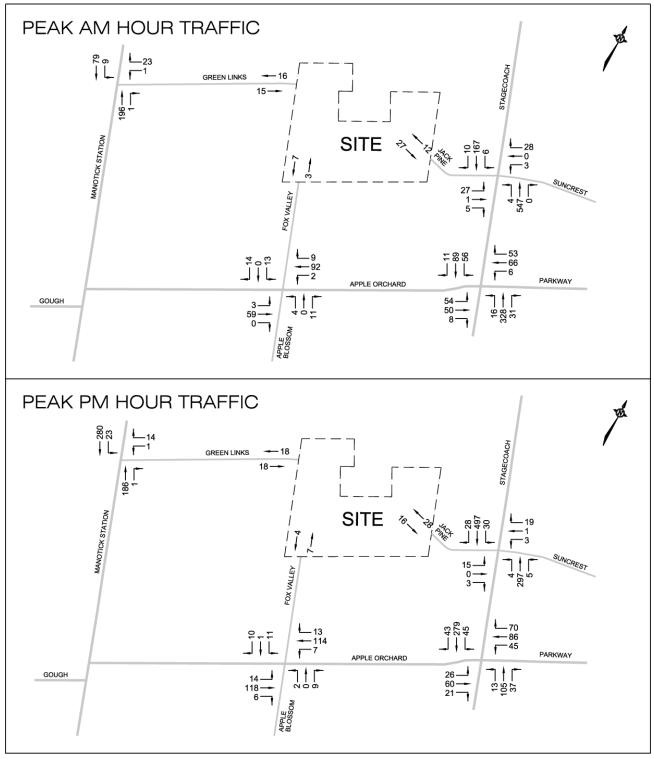
Ra-5R



#### FIGURE 3.4 2027 PEAK AM AND PM HOUR TOTAL TRAFFIC



#### FIGURE 3.5 2032 PEAK AM AND PM HOUR TOTAL TRAFFIC



#### Element 4.1.2 – Circulation and Access

Exempt as determined in the Scoping Document.

#### Element 4.1.3 – New Street Networks

The subdivision will comprise of single-family homes along rural local streets. The subdivision will have three access points with one entrance/exit in each of the east, west and south directions. The multiple access points would reduce the local traffic along the roads within the subdivision.

The interior subdivision streets would have a rural cross section with a 7.0 m paved surface and gravel shoulders. The pavement width, rural nature of the subdivision streets, and pedestrian crossings along Streets 2, 3, and 4 would tend to reduce the speed of traffic through the development.

#### MODULE 4.2 – Parking

#### Element 4.2.1 – Parking Supply

Exempt as determined in the Scoping Document.

#### Element 4.2.2 – Spillover Parking

Exempt as determined in the Scoping Document.

#### MODULE 4.3 – Boundary Street Design

The City of Ottawa Complete Streets concept allows for the safe movement of everyone whether they choose to walk, bike, drive, or take public transit. The boundary roads to the Emerald Subdivision would consist of Apple Orchard Road, Stagecoach Road and Manotick Station Road. These roads would be considered roadway links between signalized intersections. The multi-modal level of service for the street segments was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines* and the Multi-Modal Level of Service - Segments Form. The following examined the MMLOS for the various modes of travel along the Stagecoach Road, Apple Orchard Road and Manotick Station Road street segments.

#### PEDESTRIAN LEVEL OF SERVICE (PLOS)

There are no sidewalks along Stagecoach Road, Apple Orchard Road or Manotick Station Road. The posted speed limits along the road segments is 70 km./h. for Stagecoach Road and Apple Orchard Road, and 80 km./h. along Manotick Station Road. Table 4.1 presents the level of service for the street segment adjacent to the subdivision, with the MMLOS analysis sheets provided in the Appendix as Exhibit 4.1, Exhibit 4.2, and Exhibit 4.3.

Street	Segment	Level of Service	Analysis
Stagecoach	Golden Ash Ln. to Apple Orchard Rd.	F	Exhibit 4.1
Apple Orchard	Manotick Station Rd. to Stagecoach Rd.	F	Exhibit 4.2
Manotick Station	Pebblewoods Dr. to Apple Orchard Rd.	F	Exhibit 4.3

### **BICYCLE LEVEL OF SERVICE (BLOS)**

Apple Orchard Road and Manotick Station Road are both collector roads with rural cross sections and gravel shoulders. Stagecoach Road is designated as a Spine Route in the Ottawa TMP and is an arterial road with 1.5 m paved shoulders and gravel shoulders. There are no cycling facilities along the road segments. Table 4.2 presents the level of service for the road segments with the analysis sheets provided in the Appendix as Exhibits 4.1, 4.2, and 4.3.

## TABLE 4.2 BICYCLE LEVEL OF SERVICE (BLOS) – Street Segment

Street	Segment	Level of Service	Analysis
Stagecoach	Golden Ash Ln. to Apple Orchard Rd.	F	Exhibit 4.1
Apple Orchard	Manotick Station Rd. to Stagecoach Rd.	F	Exhibit 4.2
Manotick Station	Pebblewoods Dr. to Apple Orchard Rd.	F	Exhibit 4.3

## TRANSIT LEVEL OF SERVICE (TLOS)

The Greely Community is not served by regular transit service. The Transit Level of Service TLOS was not addressed in the study.

### TRUCK LEVEL OF SERVICE (TkLOS)

Table 4.3 presents the Truck level of service for the road segments with the analysis sheets provided in the Appendix.

# TABLE 4.3 TRUCK LEVEL OF SERVICE (TkLOS) – Street Segment

Street	Segment	Level of Service	Analysis
Stagecoach	Golden Ash Ln. to Apple Orchard Rd.	С	Exhibit 4.1
Apple Orchard	Manotick Station Rd. to Stagecoach Rd.	С	Exhibit 4.2
Manotick Station	Pebblewoods Dr. to Apple Orchard Rd.	С	Exhibit 4.3

Traffic collisions along the Stagecoach Road and Apple Orchard Road segments are shown in Table 2.1 of Element 2.1.2. Over the five year period between January 1, 2014 and December 31, 2018, 3 collisions were recorded along the Stagecoach Road segment and 2 along the Apple Orchard Road segment. The pattern of collisions did not identify any measures which could be taken to reduce the number of collisions.

The Stagecoach Road, Apple Orchard Road, and Manotick Station Road segments were analyzed to determine the level of service which was compared to the MMLOS targets for pedestrians, bicycles, and trucks. Regular transit service is not available in the Community of Greely, therefore the transit level of service for the road segments were not examined. The calculated Level of Service (LOS) as shown in Tables 4.1 to 4.3 is compared to the LOS targets for all modes of travel for a Village designation as designated in the Official Plan - Schedule A Rural Policy Plan. The LOS targets were obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines*. Table 4.4 summarizes the MMLOS results for the road segments and targets.

#### TABLE 4.4 MULTI-MODAL (MMLOS) SEGMENT SUMMARY TABLE - Street Segment

ROAD SEGMENT	Level of Service (LOS) – 2032				
ROAD SEGMENT	Pedestrian	Bicycle	Transit	Auto	Truck
Calculated Stagecoach	F	F	N/A	-	С
Calculated Apple Orchard	F	F	N/A	-	С
Calculated Manotick Sta.	F	F	N/A	-	С
Target	С	С	N/A	-	D

#### Street Segment - Stagecoach Road, Apple Orchard Road and Manotick Station Road

The pedestrian LOS did not meet the target due to the operation speed and lack of sidewalks along Stagecoach Road, Apple Orchard Road and Manotick Station Road. Lowering the posted speed limit and providing sidewalks along the rural roads would increase the PLOS to meet target.

The bicycle LOS target was not met because of the operating speed of traffic along Stagecoach Road, Apple Orchard Road and Manotick Station Road. Lowering the posted speed limit or providing designated bike lanes would allow the BLOS to meet target.

#### MODULE 4.4 – Access Intersection Design

#### Element 4.4.1 – Location and Design of Access

The Emerald Subdivision will have three access points. The first will be the connection of Street 2 to the north end of Fox Valley Road. The second subdivision access will be from Street 3 connecting to the Jack Pine Crescent, which would connect to Stagecoach Road at the south approach of the crescent. The third access point would be from Street 1 connecting to the east extension of Green Links Way which will be constructed as part of the Emerald Links Country Estates subdivision.

The three Emerald Subdivision access points are shown as future local streets in Schedule C - Village Road Network from the *Village of Greely Community Design Plan*, April 2012.

#### Element 4.4.2 – Intersection Control

The three interior intersections of the subdivision would be controlled by two-way stop control signs. These intersections would include Street 1/Street 2, Street 2/Street 3, and Street 3/Street 4. The stop signs would be placed at the minor street approaches to the intersections at the following locations:

Intersection	Stop Sign Approach
Street 1 and Street 2	Northbound Street 2
Street 2 and Street 3	Westbound Street 3
Street 3 and Street 4	Southbound Street 4

Access to the subdivision is from the existing intersections of Fox Valley/Apple Orchard, Jack Pine/Stagecoach, and Green Links/Manotick Station. All three of the intersections are two-way stop controlled intersections. The collision reports provided in Exhibit 2.3 did not indicate a need to modify the traffic controls. The intersections were determined to operate well as two-way stop controlled intersections. The left turn movements at all approaches were low and would not trigger a left turn lane warrant analysis.

The intersection of Apple Orchard Road and Stagecoach Road was modified in 2018 to align Apple Orchard Road with Parkway Road with two-way stop controls at the eastbound-westbound approaches of Apple Orchard Road and Parkway Road. Recently the City has modified the traffic controls to an all-way stop controlled intersection. The City is monitoring the intersection to determine when traffic control signals are triggered.

#### Element 4.4.3 – Intersection Design

The operational analysis of the Fox Valley/Apple Orchard, Jack Pine/Stagecoach, Green Links/Manotick Station, and Apple Orchard/Stagecoach intersections were completed for the number of peak AM and PM hour vehicle trips using the existing traffic counts, at the year 2027 at the completion of the subdivision, and at the year 2032. Since all intersections examined were unsignalized, only the vehicle travel mode was considered.

#### **VEHICLE LEVEL OF SERVICE (LOS) – Intersection Capacity Analysis**

The analysis of the intersections will use the *Highway Capacity Software, Version 7.9.5,* which uses the capacity analysis procedure as documented in the *Highway Capacity Manual (HCM) 2010 and HCM 6<sup>th</sup> Edition.* 

For unsignalized intersections, the level of service of each lane movement and approach is determined as a function of the average control delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected control delay at the approach.

LEVEL OF SERVICE AVERAGE CONTROL DELAY

Level of Service A	0-10 sec./vehicle	Little or No Delay
Level of Service B	>10-15 sec./vehicle	Short Traffic Delays
Level of Service C	>15-25 sec./vehicle	Average Traffic Delays
Level of Service D	>25-35 sec./vehicle	Long Traffic Delays
Level of Service E	>35-50 sec./vehicle	Very Long Traffic Delays
Level of Service F	>50 sec./vehicle	Extreme Delays – Demand Exceeds Capacity

The results of the analysis are discussed in detail in the following sections:

#### Jack Pine Crescent and Stagecoach Road Intersection

The Jack Pine/Stagecoach intersection is a two-way stop controlled intersection with Stagecoach Road forming the northbound and southbound approaches, and Jack Pine the eastbound and Suncrest Drive the westbound stop controlled approaches. All approaches consist of a single lane with no exclusive turn lanes.

The peak AM and PM hour operational analysis using the 2019 traffic counts determined that the northbound and southbound Stagecoach Road approaches functioned at a LOS "A", and the eastbound Jack Pine Crescent and westbound Sunset Drive approaches at a LOS "B". The operational work sheets are provided as Exhibits 4.4 and 4.5 with Table 4.5 summarizing the operation of the intersection.

APPROACH	WEEKDAY PEAK AM HOUR 2019 Existing 2027 Background 2032 Background 2027 Total (2032 Total)		WEEKDAY PEAK PM HOUR 2019 Existing 2027 Background 2032 Background 2027 Total (2032 Total)	
	LOS	v/c Ratio	LOS	v/c Ratio
EB Jack Pine	B <b>C</b> C <b>C</b> (C)	0.01 <b>0.04</b> <i>0.05</i> <b>0.11</b> (0.12)	B <b>C</b> C <b>C</b> (C)	0.00 <b>0.02</b> <i>0.03</i> <b>0.07</b> (0.08)
WB Suncrest	B <b>B</b> <i>B</i> <b>B</b> (B)	0.06 <b>0.07</b> <i>0.07</i> <b>0.07</b> (0.07)	B <b>B</b> <i>B</i> <b>B</b> (B)	0.04 <b>0.04</b> <i>0.05</i> <b>0.04</b> (0.05)
NB Stagecoach	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.00</b> <i>0.00</i> <b>0.00</b> (0.00)	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.00</b> <i>0.00</i> <b>0.00</b> (0.00)
SB Stagecoach	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.01</b> <i>0.01</i> <b>0.01</b> (0.01)	A <b>A</b> A <b>A</b> (A)	0.02 <b>0.02</b> <i>0.03</i> <b>0.02</b> (0.03)

## TABLE 4.5 JACK PINE/STAGECOACH INTERSECTION – LOS & v/c Ratio

The analysis using the 2027 and 2032 background traffic determined that the northbound and southbound Stagecoach Road approaches functioned at a LOS "A", the eastbound Jack Pine Crescent at a LOS "C", and the westbound Suncrest Drive approach at a LOS "B" during both the peak AM and PM hour. Exhibits 4.6 to 4.9 present the operational analysis which is summarized in Table 4.5.

For the expected 2027 and 2032 total traffic including trips from the proposed subdivision, the Jack Pine/Stagecoach intersection would operate at an acceptable level of service during both the peak AM and PM hours. For the peak AM hour the northbound and southbound approaches would function at a LOS "A", the eastbound approach at a LOS "C", and the westbound approach at a LOS "B". The 95<sup>th</sup> percentile queue showed that during the peak AM hour the eastbound queue would be 0.4 vehicles, westbound 0.2 vehicles, and the northbound and southbound Stagecoach Road queue of 0.2 vehicles. The analysis sheets for the 2027 and 2032 total traffic are provided as Exhibits 4.10 to 4.13.

#### Fox Valley Road and Apple Orchard Road Intersection

The Fox Valley/Apple Orchard intersection is a two-way stop controlled intersection with Apple Orchard Road forming the eastbound and westbound approaches, and Fox Valley Road and Apple Blossom Way the southbound and northbound stop controlled approaches. All approaches to the intersection are single lanes with shared lane movements.

The 2021 peak AM and PM hour traffic counts (Figure 2.3) determined that all approaches functioned at a Level of Service (LOS) "A" during both the peak AM and PM hours. The operational analysis sheets are provided in the Appendix as Exhibit 4.14 for the peak AM hour and Exhibit 4.15 for the peak PM hour. The operation of the intersection is summarized in Table 4.6.

APPROACH	WEEKDAY PEAK AM HOUR 2021 Existing 2027 Background 2032 Background 2027 Total (2032 Total)		WEEKDAY PEAK PM HOUR 2021 Existing 2027 Background 2032 Background 2027 Total (2032 Total)	
	LOS	v/c Ratio	LOS	v/c Ratio
EB Apple Orchard	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.00</b> <i>0.00</i> <b>0.00</b> (0.00)	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.01</b> 0.01 <b>0.01</b> (0.01)
WB Apple Orchard	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.00</b> <i>0.00</i> <b>0.00</b> (0.00)	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.00</b> <i>0.01 <b>0.00</b> (0.01)</i>
NB Apple Blossom	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.02</b> <i>0.02</i> <b>0.02</b> (0.02)	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.01</b> <i>0.01</i> <b>0.01</b> (0.01)
SB Fox Valley	A <b>A</b> A <b>A</b> (A)	0.02 0.03 <i>0.03 <b>0.03</b> (</i> 0.03)	A <b>B</b> <i>B</i> <b>B</b> (B)	0.02 <b>0.03</b> <i>0.03</i> <b>0.03 (</b> 0.03)

## TABLE 4.6 FOX VALLEY/APPLE ORCHARD INTERSECTION – LOS & v/c Ratio

At the year 2027 when the Emerald Subdivision is expected to be completed, all approaches to the intersection functioned at a LOS "A" during the peak AM hour background traffic (not including any trips from the subdivision), and during the peak PM hour the northbound, eastbound and westbound approaches functioned at a LOS "A" and southbound Fox Valley Road approach at a LOS "B". The approaches to the intersection functioned at the same level of service for the expected 2032 traffic as the 2027 background traffic. The analysis sheets are provided as Exhibit 4.16 to 4.19 with the operation of the intersection summarized in Table 4.6.

Following the development of the subdivision in 2027, the total traffic including site trips (Figure 3.4) determined that all approaches functioned at a LOS "A" during the peak AM hour, and during the peak PM hour all approaches functioned at a LOS "A" with the exception of the southbound Fox Valley Road approach which functioned at a LOS "B". The approaches to the intersection functioned at the same level of service for the 2032 total traffic (Figure 3.5) as the 2027 traffic. During the peak AM hour the 95<sup>th</sup> percentile queue was 0.0 vehicles for the eastbound and westbound approaches, and 0.1 vehicles for the northbound Apple Blossom Way and southbound Fox Valley Road approaches. The 2027 and 2032 total traffic analysis sheets are provided as Exhibit 4.20 to 4.23.

#### Green Links Way and Manotick Station Road Intersection

The proposed subdivision will have a west access to Manotick Station Road along Green Links Way which has been constructed as part of the Emerald Links Country Estates subdivision. The intersection is a two-way stop controlled "T" intersection with Manotick Station Road forming the northbound and southbound approaches, and Green Links Way the westbound stop controlled approach. All approaches are a single lane with no exclusive turn lanes.

With little development at this time, the 2021 traffic counts were mainly construction related traffic. The operational analysis determined that the southbound Manotick Station approach and westbound Green Links Way approach would both function at a

LOS "A" during the peak AM and PM hours. The analysis sheets are provided as Exhibit 4.24 and 4.25 with Table 4.7 summarizing the operation of the intersection.

## TABLE 4.7 GREEN LINKS/MANOTICK STATION INTERSECTION – LOS & v/c Ratio

APPROACH	WEEKDAY PEAK AM HOUR 2021 Existing 2027 Background 2032 Background 2027 Total (2032 Total)		2027 Backg	DAY PEAK PM HOUR 2021 Existing ground 2032 Background 7 Total (2032 Total)	
	LOS	v/c Ratio	LOS	v/c Ratio	
WB Green Links	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.02</b> <i>0.02</i> <b>0.03</b> (0.03)	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.01</b> <i>0.01 <b>0.02</b> (</i> 0.02)	
SB Manotick Sta.	A <b>A</b> A <b>A</b> (A)	0.01 <b>0.00</b> <i>0.00</i> <b>0.01</b> (0.01)	A <b>A</b> A <b>A</b> (A)	0.00 <b>0.01</b> 0.01 <b>0.02</b> (0.02)	

Following full development of the Emerald Links Country Estates subdivision, the 2027 and 2032 background traffic (not including the Emerald Subdivision) determined that all approaches to the intersection would continue to operate at a LOS "A". The analysis sheets are provided as Exhibit 4.26 to 4.29 with the results shown in Table 4.7.

The Emerald Subdivision is expected to be completed by 2027. Following full development, all approaches to the intersection would function at a LOS "A" for the 2027 and 2032 traffic. The analysis sheets are provided as Exhibits 4.30 to 4.33. During the peak PM hour the 95<sup>th</sup> percentile queue was 0.1 vehicles at both the southbound Manotick Station Road and westbound Green Links Way approaches. The results are summarized in Table 4.7.

#### Apple Orchard and Stagecoach Road Intersection

The intersection of Apple Orchard/Stagecoach was modified in 2018 to align the eastbound Apple Orchard Road approach with the westbound Parkway Road approach. At that time the intersection was controlled by two-way traffic control signs, but has been recently modified to an all-way stop controlled intersection.

The operation of the intersection has been examined for the 2018 traffic (following realignment), and assuming an all-way stop controlled intersection. The 2018 analysis determined that during the peak AM hour the eastbound, westbound, and southbound approaches functioned at a LOS "A" and northbound Stagecoach Road approach at a LOS "B". During the peak PM hour the eastbound and northbound approaches functioned at a LOS "A" and westbound and southbound approaches at a LOS "B". Table 4.8 summarizes the 2018 operation of the intersection with the analysis sheets provided as Exhibit 4.34 for the peak AM hour and 4.35 for the peak PM hour.

APPROACH	WEEKDAY PEAK AM HOUR 2018 Existing 2027 Background 2032 Background 2027 Total (2032 Total)		WEEKDAY PEAK PM HOUR 2018 Existing 2027 Background 2032 Backgrou 2027 Total (2032 Total)	
	LOS	v/c Ratio	LOS	v/c Ratio
EB Apple Orchard	A <b>B</b> <i>B</i> <b>B</b> (B)	0.16 <b>0.18</b> <i>0.20</i> <b><i>0.19</i> (0.20)</b>	A <b>B</b> <i>B</i> <b>B</b> (B)	0.15 <b>0.18</b> <i>0.19 <b>0.18</b> (</i> 0.19)
WB Parkway	A <b>A</b> B <b>A</b> (B)	0.17 <b>0.19</b> <i>0.21</i> <b>0.19</b> (0.21)	B <b>B</b> <i>B</i> <b>B</b> (B)	0.26 <b>0.31</b> <i>0</i> .33 <b><i>0</i>.32 (0.34)</b>
NB Stagecoach	B <b>B</b> <i>B</i> <b>B</b> (B)	0.48 <b>0.54</b> <i>0.57</i> <b>0.54</b> (0.57)	A <b>A</b> B <b>A</b> (B)	0.20 <b>0.23</b> <i>0.25</i> <b>0.24</b> (0.25)
SB Stagecoach	A <b>A</b> B <b>B</b> (B)	0.21 <b>0.23</b> <i>0.25</i> <b>0.24</b> (0.26)	B <b>B</b> B <b>B</b> (C)	0.47 <b>0.53</b> <i>0.57</i> <b>0.54</b> (0.58)

#### TABLE 4.8 APPLE ORCHARD/STAGECOACH INTERSECTION – LOS & v/c Ratio

At the 2027 and 2032 background traffic, all approaches functioned at a LOS "A" to "B". The analysis sheets are provided in Exhibit 4.36 to 4.39 and summarized in Table 4.8.

The analysis for the total 2027 peak AM hour traffic determined that the northbound, southbound and eastbound approaches functioned at a LOS "B", and westbound Parkway Road approach at a LOS "A". During the peak PM hour the eastbound, westbound and southbound approaches functioned at a LOS "B" and northbound Stagecoach Road approach at a LOS "A". Exhibits 4.40 and 4.41 provide the analysis and Table 4.8 a summary of the operation of the intersection.

For the total 2032 traffic, all approaches would function at a LOS "B" during the peak AM hour. During the peak PM hour the northbound, eastbound and westbound approaches would function at a LOS "B", and the southbound Stagecoach Road approach at a LOS "C". Table 4.8 summarizes the operation of the intersection. The 95<sup>th</sup> percentile queue determined that in the peak AM hour the northbound Stagecoach Road approach queue was 3.7 vehicles and eastbound Apple Orchard Road 0.7 vehicles. During the peak PM hour the queue at the southbound Stagecoach Road was 3.7 vehicles and westbound Parkway Road 1.5 vehicles. The analysis sheets are provided as Exhibit 4.42 for the peak AM hour and 4.43 for the peak PM Hour.

#### MULTI-MODAL LEVEL OF SERVICE (MMLOS) - Intersections

As documented in the *Multi-Modal Level of Service (MMLOS) Guidelines*, only signalized intersections are considered for the multi-modal intersection LOS measures. Vehicle LOS was determined utilizing the HCM guidelines and the HCS software.

#### MODULE 4.5 – Transportation Demand Management

#### Element 4.5.1 – Context for TDM

The site is located on 35.0 ha parcel of land which will have one access point onto an arterial road, and two access points onto collector roads. The subdivision will contain 73 single-family homes which would generate a small number of trips to each of the three access points. The surrounding development consists of single-family residential homes.

Due to the rural location of the subdivision, there is no OC Transpo transit service, and no sidewalks or cycling lanes in the vicinity of the site. Trips from the site would be primarily by vehicle with some cycling trips.

#### Element 4.5.2 – Need and Opportunity

The site would generate a small number of new trips which would have a minor impact on the surrounding road network. The adjacent roads currently function at an acceptable level of service with reserve capacity.

#### Element 4.5.3 – TDM Program

The study utilizes the following TDM Measures Checklist for the subdivision which examines the implementation of facilities that are supportive of sustainable modes.

# **TDM Measures Checklist:**

 $\mathbf{t}$ 

Residential Developments (multi-family, condominium or subdivision)

## Legend

The measure is generally feasible and effective, and in most cases would benefit the development and its users

**BETTER** The measure could maximize support for users of sustainable modes, and optimize development performance

The measure is one of the most dependably effective tools to encourage the use of sustainable modes

	TDM	measures: Residential developments	Check if proposed & add descriptions
	1.	TDM PROGRAM MANAGEMENT	
	1.1	Program coordinator	
BASIC 1	1.1.1	Designate an internal coordinator, or contract with an external coordinator	
	1.2	Travel surveys	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	
	2.	WALKING AND CYCLING	
	2.1	Information on walking/cycling routes & des	stinations
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances (multi-family, condominium)	□ N/A
	2.2	Bicycle skills training	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	

	TDM	measures: Residential developments	Check if proposed & add descriptions
	3.	TRANSIT	
	3.1	Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances (multi-family, condominium)	□ N/A
BETTER	3.1.2	Provide real-time arrival information display at entrances (multi-family, condominium)	□ N/A
	3.2	Transit fare incentives	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	□ N/A
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	□ N/A
	3.3	Enhanced public transit service	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels ( <i>subdivision</i> )	□ N/A
	3.4	Private transit service	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	No fare OC Transpo service is provided on Thursdays from the Greely Community Centre to Billings Bridge and South keys by Route 304
	4.	CARSHARING & BIKESHARING	
	4.1	Bikeshare stations & memberships	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station ( <i>multi-family</i> )	
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized <i>(multi-family)</i>	
	4.2	Carshare vehicles & memberships	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	
	5.	PARKING	
	5.1	Priced parking	
BASIC 🛨	5.1.1	Unbundle parking cost from purchase price (condominium)	□ N/A
BASIC ★	5.1.2	Unbundle parking cost from monthly rent (multi-family)	□ N/A

	TDM	measures: Residential developments	Check if proposed & add descriptions		
	6.	TDM MARKETING & COMMUNICATIONS	5		
	6.1	Multimodal travel information			
BASIC	★ 6.1.1	Provide a multimodal travel option information package to new residents	A multimodal travel information package can be included with the purchase agreement		
	6.2	Personalized trip planning			
BETTER	★ 6.2.1	Offer personalized trip planning to new residents			

### MODULE 4.6 – Neighbourhood Traffic Management

#### Element 4.6.1 – Adjacent Neighbourhoods

The Emerald Subdivision will access collector and arterial road through connecting local streets within the subdivision. The TIA Guidelines state that the future traffic thresholds for a local street would be 120 vehicles during the peak hour. The total 2032 traffic (Figure 3.5) determined a maximum during the peak PM hour of 39 vehicles along Fox Valley Road and 51 vehicles along Jack Pine Crescent. The expected 2032 traffic determined that the proposed subdivision trips would not change the role or classification of the local connecting streets.

#### MODULE 4.7 - Transit

#### Element 4.7.1 – Route Capacity

With no existing regular transit service within the Community of Greely, transit demands for the area are not applicable.

#### Element 4.7.2 – Transit Priority

With no existing regular transit service within the Community of Greely, transit priority measures to decrease travel time are not applicable.

#### MODULE 4.8 – Review of Network Concept

Exempt as determined in the Scoping Document.

#### **MODULE 4.9 – Intersection Design**

#### Element 4.9.1 – Intersection Control

The Jack Pine/Stagecoach, Fox Valley/Apple Orchard, and Green Links/Manotick Station intersections are all two-way stop controlled intersections. The existing traffic

counts determined that the volume of traffic at each approach is low and would not trigger the requirement of traffic control signals.

The Apple Orchard/Stagecoach intersection was recently modified from a two-way stop controlled intersection to an all-way stop controlled intersection. The City is currently monitoring the intersection for future traffic control signals.

#### Element 4.9.2 – Intersection Design

The intersections examined in the study would comprise of Jack Pine/Stagecoach, Fox Valley/Apple Orchard, and Green Links/Manotick Station which are two-way stop controlled intersections. The Apple Orchard/Stagecoach intersection is an all-way stop controlled intersection. The MMLOS Guidelines state that only signalized intersections are considered for the intersection LOS measures.

The HCM states that for two-way stop controlled intersections the vehicle LOS is defined for each minor movement and not defined as an intersection as a whole. For an all-way stop controlled intersection the vehicle LOS methodology analyzes each intersection approach independently. For this study only the 2032 peak hour vehicle LOS analysis was determined. Table 4.9 presents the vehicle LOS as a range for the intersection approaches shown in Tables 4.5 to 4.8. The vehicle LOS target was obtained from Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines.* 

INTERSECTION	Level of Service (LOS) – 2032					
INTERSECTION	Pedestrian	Bicycle	Transit	Auto	Truck	
Jack Pine/Stagecoach	-	-	-	A-C	-	
Fox Valley/Apple Orchard	-	-	-	A-B	-	
Green Links/Manotick Sta.	-	-	-	А	-	
Apple Orchard/Stagecoach	-	-	-	B-C	-	
Target	-	-	-	D	-	

#### TABLE 4.9 MULTI-MODAL (MMLOS) INTERSECTION SUMMARY TABLE - Intersection

The operational analysis of the intersections in the vicinity of the Emerald Subdivision determined that the trips generated by the subdivision would have a minor impact on the surrounding roadway network. The development of the proposed subdivision site would not trigger any modifications to the roadway geometry or intersection controls for the Jack Pine/Stagecoach, Fox Valley/Apple Orchard, Green Links/Manotick Station, and Apple Orchard/Stagecoach intersections.

The City of Ottawa will be monitoring the warrants for the future installation of traffic controls at the Apple Orchard/Stagecoach intersection.

#### SUMMARY

A Plan of Subdivision has been prepared for the development of a 35.0 ha of vacant land. The subdivision will be constructed in two phases containing 73 single-family homes. The subdivision is expected to be completed and occupied by the year 2027.

The subdivision will have three access points to Stagecoach Road, Apple Orchard Road and Manotick Station Road. The connections will be through local streets in adjacent subdivisions.

The Transportation Impact Assessment report has established a study area to include the Jack Pine/Stagecoach, Fox Valley/Apple Orchard, Green Links/Manotick Station and Apple Orchard/Stagecoach intersections. The operational analysis was completed for the weekday peak AM and PM hours at the completion of the subdivision in 2027, and at five years beyond completion at the year 2032. The TIA analysis has examined all modes of transportation along the Stagecoach Road, Apple Orchard Road and Manotick Station Road street segments, and the operation at major intersections within the study area. The transportation analysis has determined the following:

- 1. The proposed subdivision would consist of 73 housing units and is expected to generate 16 vehicle trips arriving and 36 vehicle trips departing during the weekday peak AM hour, and 37 vehicle trips arriving and 22 vehicle trips departing during the weekday peak PM hour.
- 2. The Multi-Modal Level of Service (MMLOS) was completed for the Stagecoach Road, Apple Orchard Road and Manotick Station Road street segments. The bicycle and pedestrian modes did not meet the target levels due mainly to the rural nature of the subdivision and surrounding area. The pedestrian level of service PLOS could be improved by lowering the speed limit and providing sidewalks. The bicycle level of service BLOS could be improved by lowering the speed limit and providing bike lanes. Peak AM and PM hour traffic counts at the Apple Orchard/Stagecoach and Fox Valley/Apple Orchard intersections in June determined the count of pedestrians and cyclists to be very low.
- 3. The subdivision will have three access points onto the surrounding road network utilizing the Jack Pine/Stagecoach, Fox Valley/Apple Orchard, and Green Links/Manotick Station intersections. The 2032 peak AM and PM hour operational analysis determined that all three intersections functioned at an acceptable level of service and would not require any intersection modifications due to the development of the subdivision. The Apple Orchard/Stagecoach intersection, located approximately 1.0 km. from the subdivision access point, is currently an all-way stop controlled intersection which would operate at an acceptable level of service during peak hours. The Emerald Subdivision would

not trigger any requirements for intersection modifications at the Apple Orchard/Stagecoach intersection. The City is monitoring the intersection to determine when traffic would trigger the warrants for the installation of traffic control signals.

- 4. The interior roadway layout of the subdivision provides three intersections. It is recommended that the Street 1/Street 2, Street 2/Street 3, and Street 3/Street 4 intersections be constructed as two-way stop controlled intersections. The intersections are "T" intersections with the stop signs placed at the minor street approaches.
- 5. There is a future pathway link through the subdivision along Blocks 76 and 77 which connects Waddion Drive to the south with a vacant parcel of land to the north. The pathway would cross Street 3 at a location 465 m east of Street 2 and 105 m west of Street 4. There is an east-west pathway from the Osgoode Gardens Park to the east which travels along Block 78, crosses Street 4, then through Block 76 to the vacant park north of the subdivision. A second east-west path travels from a park in the Emerald Links Country Estates through Block 75, crosses Street 2, then through Block 76 to the open space to the north. The crossings would be clearly marked by a pedestrian crossing sign (Ra-5R) placed at each approach to the crossing alerting motorists to the pedestrian pathway.

Prepared by:

David J Wal

David J. Halpenny, M. Eng., P. Eng.



# **APPENDIX**

**CERTIFICATION FORM** 

SCREENING FORM

**TRAFFIC COUNTS** 

**COLLISION SUMMARY** 

**MULTI-MODAL LEVEL OF SERVICE - Segment Forms** 

**OPERATIONAL ANALYSIS WORK SHEETS - Intersections** 

#### EXHIBIT 1.1 CERTIFICATION FORM

Transportation Impact Assessment Guidelines



**Certification Form for TIA Study PM** 

#### **TIA Plan Reports**

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

#### CERTIFICATION



I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;



I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;



I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and



I am either a licensed<sup>1</sup> or registered<sup>2</sup> professional in good standing, whose field of expertise



is either transportation engineering



or transportation planning .

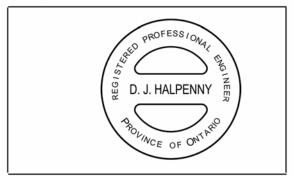
<sup>1,2</sup> License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa Infrastructure Services and Community Sustainability Planning and Growth Management 110 Laurier Avenue West, 4th fl. Ottawa, ON K1P 111 Tel. : 613-580-2424 Fax: 613-560-6006

		т	ransportation Impact Ass	essment Guidelines
Dated at Ottawa	this 2	2nd day of	September	, <sub>20</sub> <b>21</b> .
Name : David	I. Halpenny			
Professional title:	President, D. J. H	alpenny & Asso	ciates Ltd.	
DA Hal Signature of individu	eening al certifier that s/he mee	ets the above criteri	ia	
Office Contact Info	rmation (Please Print)			

Address:	P.O. Box 774				
City / Postal	City / Postal Code: Manotick ON K4M 1A7				
Telephone /	'Extens	ion: 613-692-8662			
E-Mail Addro	ess:	David@DJHalpenny.com			

Stamp



#### EXHIBIT 1.2 SCREENING FORM

# City of Ottawa 2017 TIA Guidelines Screening Form

#### **1. Description of Proposed Development**

Municipal Address	Village of Greely. One of seven parcels with address 6544 Jack Pine Cr.
Description of Location	Emerald Subdivision - 6544 Jack Pins Crescent (See Figure 2.1)
Land Use Classification	"DR1" Zoning – Development Reserve Zone
Development Size (units)	73 Single-Family Housing Units (See Figure 2.2)
Development Size (ha)	35.0 ha Lot Area
Number of Accesses and Locations	Three accesses. One access onto Fox Valley Road, second onto Jack Pine Crescent, and third onto Green Links Way
Phase of Development	Two Phases of development
Buildout Year	2027

If available, please attach a sketch of the development or site plan to this form.

#### 2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-Family homes	40 units

	Yes	No
73 Single-Family units > 40 Minimum Development Size	Х	

\* If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

#### If the proposed development size is greater than the sizes identified above, <u>the Trip Generation</u> <u>Trigger is satisfied.</u>

#### **3. Location Triggers**

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		Х
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		Х

\*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

#### 4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		Х
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		Х
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		х
Is the proposed driveway within auxiliary lanes of an intersection?		Х
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		Х

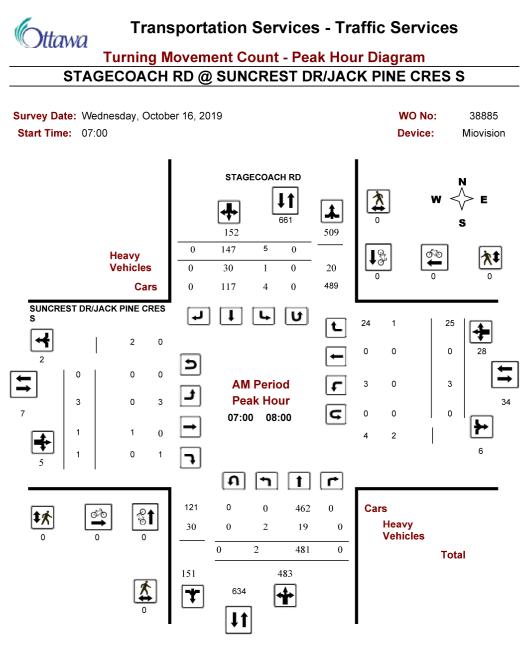
If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

#### 5. Summary

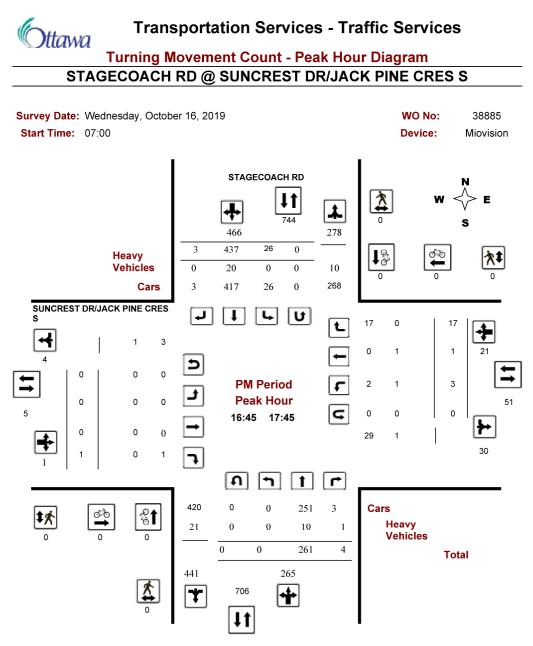
	Yes	No
Does the development satisfy the Trip Generation Trigger?	X	
Does the development satisfy the Location Trigger?		Х
Does the development satisfy the Safety Trigger?		х

If none of the triggers are satisfied, <u>the TIA Study is complete</u>. If one or more of the triggers is satisfied, <u>the TIA Study must continue into the next stage</u> (Screening and Scoping).

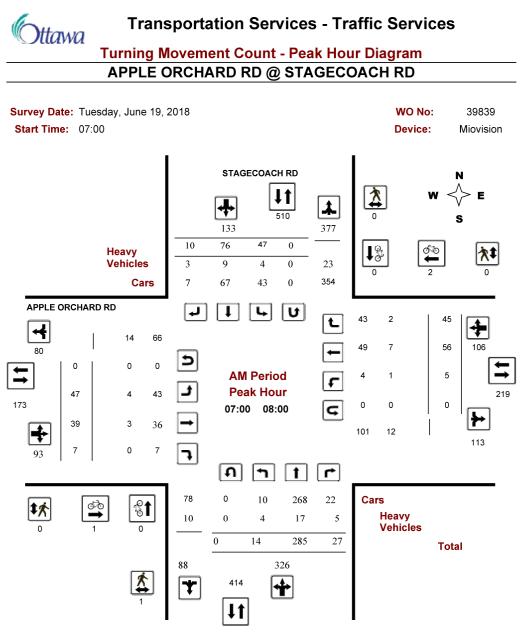
#### EXHIBIT 2.1 2019 PEAK AM HOUR TRAFFIC COUNTS - STAGECOACH/JACK PINE



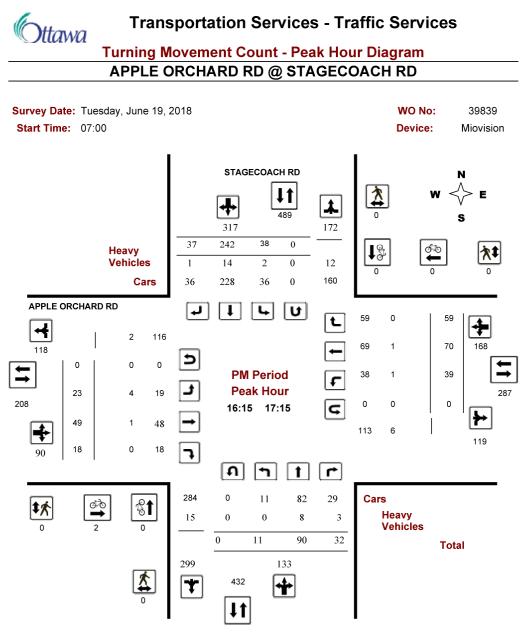
#### 2019 PEAK PM HOUR TRAFFIC COUNTS - STAGECOACH/JACK PINE



#### EXHIBIT 2.2 2018 PEAK AM HOUR TRAFFIC COUNTS - APPLE ORCHARD/STAGECOACH



#### 2018 PEAK PM HOUR TRAFFIC COUNTS - APPLE ORCHARD/STAGECOACH



## EXHIBIT 2.3 COLLISION SUMMARY

		COLLISI	ON TYPE			
YEAR	REAR END	ANGULAR	TURNING	SIDESWIPE	OTHER (SMV)	TOTAL
Intersecti	on of Jack Pi	ne Crescent a	and Stagecoa	ch Road		
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	0	0
Intersecti	on of Fox Val	ley Road and	Apple Orcha	rd Road		
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	0	0
Intersecti	on of Apple C	Drchard Road	and Stageco	ach Road		
2015	0	0	0	0	0	0
2016	0	0	1	0	0	1
2017	0	1	0	0	0	1
2018	0	1	0	0	0	1
2019	<u>0</u>	1	<u>0</u>	<u>0</u>	<u>0</u>	1
Total	0	3	1	0	0	4
Stagecoa	ch Road Seg	ment betweer	n Golden Ash	Ln. and App	le Orchard Ro	l.
2015	0	0	0	0	1	1
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>
Total	0	0	1	0	2	3
Apple Or	chard Road S	egment betw	een Stagecoa	ch Rd. and N	lanotick Stati	on Rd.
2015	0	0	0	0	1	1
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	1	1
2019	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	2	2

#### EXHIBIT 4.1 2032 MMLOS ROAD SEGMENT - STAGECOACH ROAD

#### Consultant Project Emerald Subdivision Scenario Total 2032 Traffic Date Aug-21 Comments Stagecoach Road Golden Ash Ln. to Apple Orchard Rd. Section Section Section SEGMENTS Apple Orchard Sidewalk Width no sidewalk **Boulevard Width** n/a > 3000 Avg Daily Curb Lane Traffic Volume Pedestrian > 60 km/h **Operating Speed On-Street Parking** no Exposure to Traffic PLoS F F Effective Sidewalk Width 1.2 m Pedestrian Volume 250 ped/hr **Crowding PLoS** в -F Level of Service -Type of Cycling Facility Mixed Traffic Number of Travel Lanes 2-3 lanes total ≥ 60 km/h Operating Speed # of Lanes & Operating Speed LoS F Bike Lane (+ Parking Lane) Width Bicycle **Bike Lane Width LoS** F --Bike Lane Blockages Blockage LoS -Median Refuge Width (no median = < 1.8 m) < 1.8 m refuge No. of Lanes at Unsignalized Crossing ≤ 3 lanes Sidestreet Operating Speed >40 to 50 km/h Unsignalized Crossing - Lowest LoS в F **Level of Service** Facility Type Transi Friction or Ratio Transit:Posted Speed Level of Service Truck Lane Width ≤ 3.5 m Truck Travel Lanes per Direction 1 С **Level of Service** С

#### Multi-Modal Level of Service - Segments Form

### EXHIBIT 4.2 2032 MMLOS ROAD SEGMENT - APPLE ORCHARD ROAD

Consultant Scenario	Total 2032 Traffic		Project Date	Emerald Aug-21	Subdivision
Comments	Apple Orchard Road Manotick Station Rd. to Stagecoac	h Rd.			
SEGMENTS		Apple Orchard	Section 1	Section 2	Section 3
	Sidewalk Width Boulevard Width Avg Daily Curb Lane Traffic Volume		no sidewalk n/a ≤ 3000		
strian	Operating Speed On-Street Parking	F	> 60 km/h no F	1	
Pedestrian	Exposure to Traffic PLoS Effective Sidewalk Width Pedestrian Volume	F	1.2 m 250 ped/hr		
	Crowding PLoS Level of Service		B F	-	•
	Type of Cycling Facility		Mixed Traffic		
	Number of Travel Lanes		2-3 lanes total		
	Operating Speed		≥ 60 km/h		
۵	# of Lanes & Operating Speed LoS Bike Lane (+ Parking Lane) Width		F	-	
Bicycle	Bike Lane Width LoS Bike Lane Blockages	F	•		
	Blockage LoS Median Refuge Width (no median = < 1.8 m) No. of Lanes at Unsignalized Crossing		- < 1.8 m refuge ≤ 3 lanes	<u>i</u>	
	Sidestreet Operating Speed		>40 to 50 km/h		
	Unsignalized Crossing - Lowest LoS Level of Service		B F	-	
±.	Facility Type				
<b>Γransit</b>	Friction or Ratio Transit:Posted Speed				
μ.	Level of Service		-	-	
*	Truck Lane Width		≤ 3.5 m		
Truck	Travel Lanes per Direction Level of Service	С	1 C	<b>(</b> ))	

# Multi-Modal Level of Service - Segments Form

### EXHIBIT 4.3 2032 MMLOS ROAD SEGMENT - MANOTICK STATION ROAD

#### Consultant Project Emerald Subdivision Scenario Total 2032 Traffic Date Aug-21 Manotick Station Road Comments Pebblewoods Dr. to Apple Orchard Rd. Section Section Section SEGMENTS Apple Orchard 2 Sidewalk Width no sidewalk **Boulevard Width** n/a ≤ 3000 Avg Daily Curb Lane Traffic Volume Pedestrian > 60 km/h Operating Speed **On-Street Parking** no Exposure to Traffic PLoS F F Effective Sidewalk Width 1.2 m Pedestrian Volume 250 ped/hr **Crowding PLoS** в -F Level of Service -Type of Cycling Facility Mixed Traffic Number of Travel Lanes 2-3 lanes total Operating Speed ≥ 60 km/h # of Lanes & Operating Speed LoS F Bike Lane (+ Parking Lane) Width Bicycle **Bike Lane Width LoS** F -Bike Lane Blockages Blockage LoS Median Refuge Width (no median = < 1.8 m) < 1.8 m refuge No. of Lanes at Unsignalized Crossing ≤ 3 lanes >40 to 50 km/h Sidestreet Operating Speed Unsignalized Crossing - Lowest LoS в F Level of Service Facility Type Transi Friction or Ratio Transit:Posted Speed Level of Service Truck Lane Width ≤ 3.5 m Truck Travel Lanes per Direction 1 С **Level of Service** С

#### Multi-Modal Level of Service - Segments Form

# EXHIBIT 4.4 2019 EXISTING PEAK AM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inform	natio	1						
Analyst	1							ection		•	lack [	Pine/Stag	aecoach			
Agency/Co.							Jurisd					of Ottawa	-			
Date Performed	8/19/2	2021						Nest Stre	aat			Pine Cres				
Analysis Year	2019	2021						/South S				coach R				
Time Analyzed		AM Hou	r					Hour Fac			0.92	COACH K	oau			
Intersection Orientation		-South						sis Time		hrc)	0.92					
Project Description		ld Subd	ivision				Analy	sis fille	Fellou (	1115)	0.23					
Lanes	Entera		IVISION													
				141445 *		<u>↓↓↓</u> ↓ ↓	<b>₽ L U</b>	* 14 *Y1 PC								
Vehicle Volumes and Ad	justme	nts				¶ 🕈 Ƴ Street: Nor										
Approach		Eastb	ound			West	ound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	1	1		3	0	25		2	481	0		5	147	0
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		(	)			(	)									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
	andway															
Critical and Follow-up H	eauway	/5														
Critical and Follow-up H Base Critical Headway (sec)	eauway	7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Base Critical Headway (sec)			6.5 6.51	6.2 6.21		7.1	6.5 6.51	6.2 6.21		4.1 4.11				4.1 4.11		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)		7.1														
Base Critical Headway (sec) Critical Headway (sec)		7.1 7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		7.1 7.11 3.5 3.51	6.51 4.0 4.01	6.21 3.3 3.31		7.11 3.5	6.51 4.0	6.21 3.3		4.11 2.2				4.11 2.2		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an		7.1 7.11 3.5 3.51	6.51 4.0 4.01	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01	6.21 3.3		4.11 2.2 2.21				4.11 2.2 2.21		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h)		7.1 7.11 3.5 3.51	6.51 4.0 4.01 ervice	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01 30	6.21 3.3		4.11 2.2 2.21 2				4.11 2.2 2.21		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h)		7.1 7.11 3.5 3.51	6.51 4.0 4.01 ervice 5 382	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01 30 519	6.21 3.3		4.11 2.2 2.21 2.21 2 1426				4.11 2.2 2.21 5 1049		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		7.1 7.11 3.5 3.51	6.51 4.0 4.01 ervice 5 382 0.01	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01 30 519 0.06	6.21 3.3		4.11 2.2 2.21 2 1426 0.00				4.11 2.2 2.21 5 1049 0.01		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		7.1 7.11 3.5 3.51	6.51 4.0 4.01 <b>ervice</b> 5 382 0.01 0.0	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01 30 519 0.06 0.2	6.21 3.3		4.11 2.2 2.21 2 1426 0.00 0.0				4.11 2.2 2.21 5 1049 0.01 0.0		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)		7.1 7.11 3.5 3.51	6.51 4.0 4.01 ervice 5 382 0.01	6.21 3.3 3.31		7.11 3.5	6.51 4.0 4.01 30 519 0.06	6.21 3.3		4.11 2.2 2.21 1426 0.00 0.0 7.5				4.11 2.2 2.21 5 1049 0.01 0.0 8.5		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) V/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		7.1 7.11 3.5 3.51 of Se	6.51 4.0 4.01 <b>ervice</b> 5 382 0.01 0.0 14.5	6.21 3.3 3.31		7.11 3.5 3.51	6.51 4.0 4.01 30 519 0.06 0.2 12.4	6.21 3.3		4.11 2.2 2.21 1426 0.00 0.0 7.5 A				4.11 2.2 2.21 5 1049 0.01 0.0 8.5 A	.3	

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# EXHIBIT 4.5 2019 EXISTING PEAK PM HOUR ANALYSIS - Jack Pine/Stagecoach

	_	_	_	_	_	_	Cite 1				_	_	_	_	_	_
General Information								Inforn	natio	n						
Analyst								ection			<u> </u>	Pine/Stag				
Agency/Co.								liction				of Ottawa				
Date Performed	8/19/	2021					East/\	West Stre	eet		Jack F	Pine Cres	cent			
Analysis Year	2019						North	/South S	Street		-	coach R	oad			
Time Analyzed		PM Hou	r				Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	n-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													
Lanes																
				J 4 1 X + F C		The street Nor		* *								
Vehicle Volumes and Ad	justme	nts			Wajo	Street. No	0-3000									
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		3	1	17		0	261	4		26	437	3
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)			0				0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)	T		1				23			0				28		
Capacity, c (veh/h)			589				576			1089				1280		
v/c Ratio			0.00				0.04			0.00				0.02		
95% Queue Length, Q95 (veh)			0.0				0.1			0.0				0.1		
Control Delay (s/veh)			11.1				11.5			8.3				7.9		
Level of Service (LOS)			В				В			A				A		
Level of Service (LOS)																
Approach Delay (s/veh)		11	1.1			1:	1.5			0	.0			0	.7	

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# EXHIBIT 4.6 2027 BACKGROUND PEAK AM HOUR ANALYSIS - Jack Pine/Stagecoach

							o-Co	_		_						
General Information							Site	Inforr	natio	n						
Analyst							Inters	ection			Jack F	Pine/Stag	gecoach			
Agency/Co.							Jurisd	liction			City o	of Ottawa	9			
Date Performed	8/19/	2021					East/	West Str	eet		Jack F	Pine Cres	cent			
Analysis Year	2027						North	/South S	Street		Stage	coach R	oad			
Time Analyzed	Peak	AM Hou	r				Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													
Lanes																
				J 4 1 X 4 4 4		T Street: Nor		4 1 7 4 4 7 1 *								
Vehicle Volumes and Adj	ustme	nts				511001110										
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		11	1	1		3	0	27		2	521	0		5	159	3
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)			0				0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	eadwa	ys														
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)			14				33			2				5		
Capacity, c (veh/h)			314				490			1406				1011		
v/c Ratio			0.04				0.07			0.00				0.01		
95% Queue Length, Q₂₅ (veh)			0.1				0.2			0.0				0.0		
Control Delay (s/veh)			17.0				12.9			7.6				8.6		
Level of Service (LOS)			С				В			A				A		
Approach Delay (s/veh)		17	7.0			12	2.9			0	.0			0	.3	

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# EXHIBIT 4.7 2027 BACKGROUND PEAK PM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inforn	natio	n						
Analyst	T						Inters	ection			Jack F	vine/Stag	gecoach			
Agency/Co.	-						Jurisd	liction				of Ottawa				
Date Performed	8/19/	2021						Nest Stre	eet			Pine Cres				
Analysis Year	2027							/South S			Stage	coach R	oad			
Time Analyzed	Peak	PM Hou	r					Hour Fac			0.92					
Intersection Orientation	North	-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													_
Lanes																
				J 4 1 X 4 1 4		T T Street: Nor		* 14 * Y 1 *								
Vehicle Volumes and Adj	justme															
Approach			ound	-			bound				bound	-			bound	-
Movement	U	L	T	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
												<u> </u>	<u> </u>			
Volume (veh/h)		4	0	1		3	1	18		0	283	4		26	473	11
Volume (veh/h) Percent Heavy Vehicles (%)		4	0	1		3 1	1	18 1		0		4		26 1	473	11
		1	1			1	1					4			473	11
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)		1				1						4			473	11
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized		1	1	1		1	1					4			473	11
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage		1	1	1	vided	1	1					4			473	11
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	1	1	1	vided	1	1					4			473	11
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	1	1	1	vided	1	1					4			473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Heave	eadwa	1 () ys	1	1 Undi	vided	1		1		1		4		1	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	1 () ys 7.1	1 ) 6.5	1 Undi	vided	7.1	6.5	6.2		4.1		4		4.1	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Ho Base Critical Headway (sec) Critical Headway (sec)	eadwa	1 () () () () () () () () () () () () ()	1 6.5 6.51	1 Undi	vided	7.1	1 6.5 6.51	6.2		4.1		4		4.1	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0	6.2 6.21 3.3		1 4.1 4.11 2.2		4		1 4.1 4.11 2.2	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0	6.2 6.21 3.3		1 4.1 4.11 2.2		4		1 4.1 4.11 2.2	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	6.2 6.21 3.3		1 4.1 4.11 2.2 2.21		4		1 4.1 4.11 2.2 2.21	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice 5	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	6.2 6.21 3.3		1 4.1 4.11 2.2 2.21				1 4.1 4.11 2.2 2.21 28	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice 5 276	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 24 549	6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 0 1046				1 4.1 4.11 2.2 2.21 28 1254	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01 <b>Ervice</b> 5 276 0.02	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 24 549 0.04	6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 0 1046 0.00				1 4.1 4.11 2.2 2.21 2.21 2.21 2.21 2.21	473	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) V/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		1 ys 7.1 3.5 3.51	1 6.5 6.51 4.0 4.01 <b>ervice</b> 5 276 0.02 0.1	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 24 549 0.04 0.1	6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 1046 0.00 0.00				1 4.1 4.11 2.2 2.21 2.21 2.21 2.21 2.21	473	

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# EXHIBIT 4.8 2032 BACKGROUND PEAK AM HOUR ANALYSIS - Jack Pine/Stagecoach

							Site	Inforn	natio	n						
General Information	1							ection		-	lack F	vine/Stag	recoach			
Agency/Co.	-							liction				f Ottawa				
Date Performed	8/19/	2021						Nest Stre	eet			Pine Cres				
Analysis Year	2032	2021						/South S				coach R				
Time Analyzed		AM Hou	r					Hour Fac			0.92					
Intersection Orientation		n-South						sis Time		hrs)	0.25					
Project Description		ald Subd	ivision								0.20					
Lanes																
				J 4 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0.5	ት 1 ቀ ነ	1 2 4	* 74 * Y 1 F								
Vehicle Volumes and Adj	ustme	ents				Street: Nor										
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR									
											LTR				LTR	
Volume (veh/h)		11	1	1		3	0	28		2	LTR 547	0		6	LTR 167	3
Volume (veh/h) Percent Heavy Vehicles (%)		11 1	1	1 1		3 1		28 1		2		0		6 1		3
							0					0				3
Percent Heavy Vehicles (%)		1				1	0					0				3
Percent Heavy Vehicles (%) Proportion Time Blocked		1	1			1	0					0				3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)		1	1	1	vided	1	0					0				3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	1	1	1	vided	1	0					0				3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	1	1	1	vided	1	0					0				3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	1 ys	1	1 Undi	vided	1	0	1		1		0		1		3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	1 ys 7.1	1 ) 6.5	1 Undi	vided	7.1	0 1 	6.2		4.1		0		4.1		3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec)	eadwa	1 ys 7.1 7.11	1 6.5 6.51	1 Undi	vided	1 7.1 7.11	0 1 6.5 6.51	1 6.2 6.21		4.1				4.1		3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.51 4.0	1 6.2 6.21 3.3		1 4.1 4.11 2.2				4.1 4.11 2.2		3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.51 4.0	1 6.2 6.21 3.3		1 4.1 4.11 2.2				4.1 4.11 2.2		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		1 4.1 4.11 2.2 2.21				1 4.1 4.11 2.2 2.21		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h)		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice 14	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 34	1 6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 2				1 4.1 4.11 2.2 2.21		3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Hea Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01 ervice 14 295	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 34 471	1 6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 2.21				1 4.1 4.11 2.2 2.21 7 987		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01 <b>ervice</b> 14 295 0.05	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.5 6.51 4.0 4.01 34 471 0.07	1 6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 1396 0.00				1 4.1 4.11 2.2 2.21 7 987 0.01		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		1 ys 7.1 7.11 3.5 3.51	1 6.5 6.51 4.0 4.01 <b>ervice</b> 14 295 0.05 0.2	1 Undi 6.2 6.21 3.3 3.31	vided	1 7.1 7.11 3.5	0 1 6.5 6.5 6.51 4.0 4.01 34 471 0.07 0.2	1 6.2 6.21 3.3		1 4.1 4.11 2.2 2.21 1396 0.00 0.0				4.1 4.11 2.2 2.21 7 987 0.01 0.0		

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# EXHIBIT 4.9 2032 BACKGROUND PEAK PM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inforr	natio	n						
Analyst	T						Inters	ection			Jack F	Pine/Stag	gecoach			
Agency/Co.	-						Jurisd	liction				of Ottawa	-			
Date Performed	8/19/	2021					East/\	Nest Str	eet			vine Cres				_
Analysis Year	2032						North	/South S	Street		Stage	coach R	oad			
Time Analyzed	Peak	PM Hou	r				Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	livision													
Lanes	-															
				741441 *		۲ ۲ Street: Nor		4 1 7 4 4 7 1 *								
Vehicle Volumes and Adj	justme	nts														
Approach			ound				bound				bound				bound	
Movement	U	L	T	R	U	L	T	R	U	L	Т	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
							1	0	0	0	1	0	0		1	
Number of Lanes		0	1	0		0	1	0	Ů	0	1	0	0	0	1	0
Number of Lanes Configuration		0	LTR	0		0	LTR				LTR		0	0	LTR	0
		0 5		1		3		19		0		5	0	30		
Configuration			LTR				LTR				LTR				LTR	
Configuration Volume (veh/h)		5	LTR 0	1		3	LTR 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%)		5	LTR 0	1		3	LTR 1	19		0	LTR			30	LTR	11
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked		5	LTR 0 1	1		3	LTR 1 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)		5	LTR 0 1	1	vided	3	LTR 1 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	5	LTR 0 1	1	vided	3	LTR 1 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	5	LTR 0 1	1	vided	3	LTR 1 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Heave	eadwa	5 1	LTR 0 1	1 1 Undi	vided	3	LTR 1 1	19		0	LTR			30	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	5 1 ys 7.1	LTR 0 1 6.5	1 1 Undi	vided	3 1 7.1	LTR 1 1 6.5	19 1 6.2		0 1 4.1	LTR			30 1 .	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec)	eadwa	5 1 ys 7.1 7.11	LTR 0 1 0 6.5 6.51	1 1 Undi	vided	3 1 7.1 7.11	LTR 1 1 6.5 6.51	19 1 6.2 6.21		0 1 4.1 4.11	LTR			30 1 4.1 4.11	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.5 6.51 4.0 4.01	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.51 4.0	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2	LTR			30 1 4.1 4.11 2.2	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b>		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.5 6.51 4.0 4.01	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.51 4.0	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2	LTR			30 1 4.1 4.11 2.2	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.51 4.0 4.01	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.51 4.0 4.01	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2 2.21	LTR			30 1 4.1 4.11 2.2 2.21	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b>		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.5 4.0 4.01 <b>Ervice</b>	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.51 4.0 4.01 25	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2 2.21	LTR			30 1 4.1 4.11 2.2 2.21	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.5 6.51 4.0 4.01 <b>ervice</b> 7 249	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2 2.21 0 1023	LTR			30 1 4.1 4.11 2.2 2.21 33 1237	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h)		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.5 6.51 4.0 4.01 <b>Ervice</b> 7 249 0.03	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.51 4.0 4.01 25 531 0.05	19 1 6.2 6.21 3.3		4.1 4.1 4.11 2.2 2.21 0 1023 0.00	LTR			30 1 4.1 4.11 2.2 2.21 33 1237 0.03	LTR	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Hea Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (s		5 1 ys 7.1 7.11 3.5 3.51	LTR 0 1 6.5 6.51 4.0 4.01 <b>ervice</b> 7 249 0.03 0.1	1 1 Undi 6.2 6.21 3.3 3.31	vided	3 1 7.1 7.11 3.5	LTR 1 1 6.5 6.5 6.51 4.0 4.01 25 531 0.05 0.1	19 1 6.2 6.21 3.3		0 1 4.1 4.11 2.2 2.21 0 1023 0.00 0.00	LTR			30 1 4.1 4.11 2.2 2.21 33 1237 0.03 0.1	LTR	

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# EXHIBIT 4.10 2027 TOTAL PEAK AM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inforr	natio	1						
Analyst	1							ection		•	lack [	vine/Stag	acoach			
Agency/Co.								liction				of Ottawa				
Date Performed	8/19/	2021						Nest Str	oot			Pine Cres				
Analysis Year	2027	2021						/South S				coach R				
Time Analyzed		AM Hou	r					Hour Fac			0.92	COACH K	oau			
Intersection Orientation		n-South						sis Time		hrc)	0.92					
Project Description		ald Subd	ivision				Analy	sis nine	Period (	1115)	0.23					
Lanes	Liner		IVISION													
				74 1 7 4 P 1		*		* 74*77 PC								
Vehicle Volumes and Adj	ustme	ents				Street: Nor										
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		27	1	5		3	0	27		4	521	0		5	159	10
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)			)				D									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	eadwa	ys														
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		
Follow-Up Headway (sec)	-															
	d Leve	l of S	ervice							_						
Delay, Queue Length, an	d Leve	l of S					32			1				L C		
Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	l of S	36				33 488			4				5		
Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	l of S	36 325				488			1397				1011		
Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	l of S	36 325 0.11				488 0.07			1397 0.00				1011 0.01		
Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve		36 325 0.11 0.4				488 0.07 0.2			1397 0.00 0.0				1011 0.01 0.0		
Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	d Leve		36 325 0.11 0.4 17.4				488 0.07 0.2 12.9			1397 0.00 0.0 7.6				1011 0.01 0.0 8.6		
Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve		36 325 0.11 0.4			1:	488 0.07 0.2			1397 0.00 0.0 7.6 A	.1			1011 0.01 0.0 8.6 A	.3	

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# EXHIBIT 4.11 2027 TOTAL PEAK PM HOUR ANALYSIS - Jack Pine/Stagecoach

AnalysitIntersectionJack Pine/StagecoachAgency/Co.8/19/2021yuisdictionCity of OttawaDate Performed8/19/2021East/West StreetStagecoach RoadAnalysis Year2027Vest StreetStagecoach RoadTime AnalyzedPeak PM HourPeak PM HourPeak PM Hour Factor0.92Intersection OrientationNorth-SouthVest Street0.92Project DescriptionEmeral SubdivisorVest Street0.92Letter StreetLetter StreetAnalysis Time Period (hrs)0.25Vest StreetLetter StreetLetter StreetLetter StreetAnalysis Time Period (hrs)0.25Letter StreetLetter StreetLetter StreetLetter StreetStreet StreetStreet StreetStreet StreetStreet StreetStreet StreetStreet Street StreetNorth-SouthStreet Street Street Street StreetStreet Street Stre	General Information							Site	Inform	natio	n							
Agency Co.ImmatchemationService StreetCity of OttawImmatchemationDate Performed8/19/2021North-SouthNorth-SouthYeakOg2UUU <th></th> <th>1</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>-</th> <th>lack F</th> <th>Pine/Star</th> <th>recoach</th> <th></th> <th></th> <th></th>		1									-	lack F	Pine/Star	recoach				
Date Performed       8/19/2021       USUNCUS       Statukes Street       Statukes Stree	-	+																
Analysis Yoar2027VertwNetwSugacountSugacountVertwSugacountVertw <td></td> <td>8/19/</td> <td>2021</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>et</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		8/19/	2021							et								
Imme Analyzed Intersection OrientationPeak PM HourImme Period (res)0.23UProject DescriptionEmerale SubdividorNorth-SouthNort			LULI															
Intersection OrientationNorth-SouthEnerald SubdivisonEnerald SubdivisonEnerald SubdivisonEnerald SubdivisonLanesUNICAL SubdivisonUNICAL Subdivison <th c<="" td=""><td></td><td></td><td>PM Hou</td><td>r</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td></th>	<td></td> <td></td> <td>PM Hou</td> <td>r</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>			PM Hou	r								-					
Project Description         Implicit Descriptin <th colspa<="" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>hrs)</td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td></th>	<td></td> <td>hrs)</td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td></td>											hrs)	<u> </u>					
Interview           Verial interview           Verinterview           Verial				livision							,							
Vertice ver	-																	
Water					J 4 1 4 4 4	กา		120	14 4 7 1 F 1									
MovementULTRUULTRUULTRUULTRUULTRUULTRUULTRUULTRUUUUUUU </td <td>Vehicle Volumes and Ad</td> <td>justme</td> <td>ents</td> <td></td>	Vehicle Volumes and Ad	justme	ents															
PriorityIn101112In7891011234U456Number of LanesI001010101010100100100100010001000100010001000100001000100001000100010000100<	Approach		Eastb	ound			West	bound			North	bound			South	bound		
Number of LanesIII	Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
ConfigurationImage<	Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Volume (veh/h)Image: Normal and the state of	Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0	
Percent Heavy Vehicles (%)         I <thi< th="">         I<td>Configuration</td><td></td><td></td><td>LTR</td><td></td><td></td><td></td><td>LTR</td><td></td><td></td><td></td><td>LTR</td><td></td><td></td><td></td><td>LTR</td><td></td></thi<>	Configuration			LTR				LTR				LTR				LTR		
Proportion Time Blocked         I <thi< th="">         I         I         I</thi<>	Volume (veh/h)		14	0	3		3	1	18		4	283	4		28	473	28	
Percent Grade (%)         Image: Control International Conternatintecondecement Contect Control Internate Control Internat	Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1			
Night Turn ChannelizedII <th< td=""><td>Proportion Time Blocked</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Proportion Time Blocked																	
Median Type   Storage       Image: Storage <t< td=""><td>Percent Grade (%)</td><td></td><td></td><td>0</td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Percent Grade (%)			0				0										
Critical and Follow-up Headways       7.1       6.5       6.2       7.1       6.5       6.2       4.1       4.1       4.1       6.5         Base Critical Headway (sec)       7.1       6.51       6.21       7.11       6.51       6.21       4.11       <	Right Turn Channelized																	
Base Critical Headway (sec)       7.1       6.5       6.2       7.1       6.5       6.2       4.1       M       M       4.1       M       M       A.1       M <th< td=""><td>Median Type   Storage</td><td></td><td></td><td></td><td>Undi</td><td>vided</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Median Type   Storage				Undi	vided												
Critical Headway (sec)7.116.516.217.116.516.216.214.116.16.214.116.16.11 <th< td=""><td>Critical and Follow-up H</td><td>eadwa</td><td>ys</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Critical and Follow-up H	eadwa	ys															
Base Follow-Up Headway (sec)       3.5       4.0       3.3       3.5       4.0       3.3       4.0       3.3       2.2       6       6       6       2.2       6       6       2.2       6       6       2.2       6       7 <th7< th="">       7       7</th7<>	Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		Γ	
Follow-Up Headway (sec)3.514.013.313.514.013.312.21M2.21M2.21MMM	Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11			
Delay, Queue Length, and Level of Sevice         24         4         4         30         4           Flow Rate, v (veh/h)         18         24         4         4         30         1254         1255         <	Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2			
Flow Rate, v (veh/h)       18       24       4       4       30       30       10         Capacity, c (veh/h)       262       262       539       1030       20       1254       26       1000       1000       1254       20 <td>Follow-Up Headway (sec)</td> <td></td> <td>3.51</td> <td>4.01</td> <td>3.31</td> <td></td> <td>3.51</td> <td>4.01</td> <td>3.31</td> <td></td> <td>2.21</td> <td></td> <td></td> <td></td> <td>2.21</td> <td></td> <td></td>	Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21			
Flow Rate, v (veh/h)       18       26       24       4       4       30       30       10         Capacity, c (veh/h)       262       262       539       1030       1030       1254       1255 </td <td>Delay, Queue Length, an</td> <td>d Leve</td> <td>l of S</td> <td>ervice</td> <td></td>	Delay, Queue Length, an	d Leve	l of S	ervice														
Capacity, c (veh/h)       Image: Capacity of the state o		T						24			4				30		T	
v/c Ratio       Image: Marcine											<u> </u>				<u> </u>			
95% Queue Length, Q <sub>95</sub> (veh)       0.2       0.2       0.1       0.1       0.0       0.0       0.1																		
Control Delay (s/veh)       Image: Marcol Marc				0.2				0.1			0.0				0.1			
Level of Service (LOS) C C B B A A A A A	-			19.8				12.0			8.5				7.9			
Approach Delay (s/veh)         19.8         12.0         0.2         0.7				С				В			A				A			
						_												

# EXHIBIT 4.12 2032 TOTAL PEAK AM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inforr	natio	n						
Analyst	1							ection		•	lack [	vine/Stag	acoach			
Agency/Co.	-							liction				of Ottawa				
Date Performed	8/19/	2021						Nest Str	oot			Pine Cres				
Analysis Year	2032	2021						/South S				coach R				
Time Analyzed		AM Hou	r					Hour Fac			0.92	COACH K	oau			
Intersection Orientation		n-South						sis Time		hrc)	0.92					
Project Description		ald Subd	livicion				Analy	sis nine	Period (	1115)	0.23					
Lanes	Lines		IVISION													
				7417481		+		* 74 * Y 1 * 7								
Vehicle Volumes and Ad	iustme	ents				f 🕈 Ƴ										
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		27	1	5		3	0	28		4	547	0		6	167	10
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)			0			(	D									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
	1			<u> </u>				<u> </u>		4.11				4.11		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11						
Critical Headway (sec) Base Follow-Up Headway (sec)		3.5	6.51 4.0	6.21 3.3		7.11 3.5	6.51 4.0	3.3		2.2				2.2		
• • • •														2.2 2.21		
Base Follow-Up Headway (sec) Follow-Up Headway (sec)	d Leve	3.5 3.51	4.0 4.01	3.3 3.31		3.5	4.0	3.3		2.2				<u> </u>		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an	d Leve	3.5 3.51	4.0 4.01 ervice	3.3 3.31		3.5	4.0	3.3		2.2 2.21				2.21		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	3.5 3.51	4.0 4.01 ervice 36	3.3 3.31		3.5	4.0 4.01 34	3.3		2.2 2.21 4				2.21		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	3.5 3.51	4.0 4.01 ervice 36 305	3.3 3.31		3.5	4.0 4.01 34 470	3.3		2.2 2.21 4 1387				2.21 7 987		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	3.5 3.51	4.0 4.01 ervice 36 305 0.12	3.3 3.31		3.5	4.0 4.01 34 470 0.07	3.3		2.2 2.21 4 1387 0.00				2.21 7 987 0.01		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	3.5 3.51	4.0 4.01 ervice 36 305 0.12 0.4	3.3 3.31		3.5	4.0 4.01 34 470 0.07 0.2	3.3		2.2 2.21 4 1387 0.00 0.0				2.21 7 987 0.01 0.0		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	d Leve	3.5 3.51	4.0 4.01 ervice 36 305 0.12	3.3 3.31		3.5	4.01 4.01 34 470 0.07 0.2 13.3	3.3		2.2 2.21 4 1387 0.00 0.0 7.6				2.21 7 987 0.01 0.0 8.7		
Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	3.5 3.51 I of So	4.0 4.01 ervice 36 305 0.12 0.4 18.4	3.3 3.31		3.51	4.0 4.01 34 470 0.07 0.2	3.3		2.2 2.21 4 1387 0.00 0.0 7.6 A	.1			2.21 7 987 0.01 0.0 8.7 A	.3	

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# EXHIBIT 4.13 2032 TOTAL PEAK PM HOUR ANALYSIS - Jack Pine/Stagecoach

General Information							Site	Inforn	natio	1						
Analyst	-							ection	inacio	•	lack [	Pine/Stag	accasch			
Agency/Co.	+							liction				of Ottawa				
Date Performed	8/19/	2021						Nest Stre	oot			Pine Cres				
Analysis Year	2032	2021						/South S				coach R				
Time Analyzed		PM Hou	r					Hour Fac			0.92	COACH K	oau			
Intersection Orientation		n-South						sis Time		hrc)	0.92					
Project Description		ald Subd	ivision				Analy	sis time	Fellou (	1115)	0.23					
Lanes	Enter		IVISION													
				74174PC	)	1 1 1 1 1 1 1	1 2 4	* 14 * Y 1 * 1								
Vehicle Volumes and Ad	justme	ents				Street: Nor										
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		15	0	3		3	1	19		4	297	5		30	497	28
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)			D				0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)	T	7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)			20				25			4				33		
Capacity, c (veh/h)			241				523			1007				1237		
	-		0.08				0.05			0.00				0.03		
v/c Ratio		1					0.2			0.0				0.1		
v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	+		0.3													
95% Queue Length, $Q_{95}$ (veh)	-		0.3 21.2				12.2			8.6				8.0		
95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)																
95% Queue Length, Q <sub>95</sub> (veh)		2:	21.2			12	12.2			8.6 A	.2			8.0 A	.7	

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# EXHIBIT 4.14 2021 EXISTING PEAK AM HOUR TRAFFIC ANALYSIS - Fox Valley/Apple Orchard

General Information							Site	Inforr	natio	n						
Analyst							Inters	ection			Fox V	alley/Ap	ple Orch	nard		
Agency/Co.							Jurisc	liction			City c	of Ottawa	а			
Date Performed	8/19/	2021					East/	West Str	eet		Apple	e Orchar	d Road			
Analysis Year	2021						North	/South !	Street		Fox V	alley Ro	ad			
Time Analyzed	Peak	AM Hou	r				Peak	Hour Fa	tor		0.92					
Intersection Orientation	East-	Nest					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													
Lanes																
				J 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		T T T Street: Ea		ት በነፋ ቀጥ ተ ኮ								
Vehicle Volumes and Ad	justme	nts														
Approach			ound				bound				bound				bound	
Movement	U	L	T	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	44	0		2	68	5		3	0	8		6	0	9
Percent Heavy Vehicles (%)		1				1				1	1	1		1	1	1
Proportion Time Blocked																
Percent Grade (%)											0				0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.2
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.21				3.51	4.01	3.31		3.51	4.01	3.3
Delay, Queue Length, an	d Leve	l of S	ervice	•												
Flow Rate, v (veh/h)		2				2					12				16	
Capacity, c (veh/h)		1514				1563					958				907	
v/c Ratio		0.00				0.00					0.01				0.02	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.0				0.1	
Control Delay (s/veh)		7.4				7.3					8.8				9.0	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		0	.3			0	.2			. 8	.8			9	.0	-
Approach LOS											Ą				A	

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# EXHIBIT 4.15 2021 EXISTING PEAK PM HOUR TRAFFIC ANALYSIS - Fox Valley/Apple Orchard

Analysis Year2021Time AnalyzedPeakIntersection OrientationEast-	PM Hou West rald Subo		R 3 0		Westl L 4 0	Inters Jurisd East/North Peak Analy	ection liction West Stre l/South S Hour Fac	Street	hrs)	City o Apple Fox V 0.92 0.25	alley/Ap of Ottawa c Orchard alley Roo R 9 0	a d Road		bound T 11 11 LTR	R 12 0
Agency/Co.       8/19         Date Performed       8/19         Analysis Year       2021         Time Analyzed       Peak         Intersection Orientation       East-         Project Description       Emer         Lanes       Intersection Orientation         Vehicle Volumes and Adjutt       Karter         Approach       0         Movement       0         Volume (veh/h)       10         Priority       10         Number of Lanes       0         Configuration       0         Volume (veh/h)       10         Proportion Time Blocked       0         Percent Heavy Vehicles (%)       1         Proportion Time Blocked       0         Right Turn Channelized       0         Median Type   Storage       1         Base Critical Headway (sec)       1         Base Follow-Up Headway (sec)       1         Base Follow-Up Headway (sec)       1	PM Hou West ald Subo East L 1 0 9 9	bund 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ westl L 4 0	Jurisd East/A North Peak Analy State	R 6	Street ctor Period (I	North L 7	City o Apple Fox V 0.92 0.25	R 9 9	a Road	South L 10	T 11 1	12
Date Performed       8/19         Analysis Year       2021         Time Analyzed       Peak         Intersection Orientation       East-         Project Description       Emer         Lanes       Vehicle Volumes and Adjutt         Approach       0         Movement       0         Priority       10         Priority       10         Number of Lanes       0         Configuration       0         Volume (veh/h)       0         Percent Heavy Vehicles (%)       0         Proportion Time Blocked       0         Right Turn Channelized       0         Median Type   Storage       1         Base Critical Headway (sec)       1         Base Critical Headway (sec)       1         Follow-Up Headway (sec)       1	PM Hou West ald Subo East L 1 0 9 9	bund 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ Westl L 4 0	East/ North Peak Analy St-West	R 6	Street ctor Period (I	North L 7	Apple Fox V 0.92 0.25	R 9	d Road	L 10	T 11 1	12
Analysis Year       2021         Time Analyzed       Peak         Intersection Orientation       East-         Project Description       Emer         Lanes       Image: Construction or intersection orientation       Image: Construction or intersection orientation or intersection orientation         Vehicle Volumes and Adjutters       Image: Construction or intersection or intersectin or intersection or intersectintersection or	PM Hou West ald Subo East L 1 0 9 9	bund 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ Westl L 4 0	North Peak Analy Analy St-West St-West	R 6	Street ctor Period (I	North L 7	Fox V           0.92           0.25	R 9	ad	L 10	T 11 1	12
Time Analyzed       Peak         Intersection Orientation       East-         Project Description       Emer         Lanes       Itersection Orientation       Emer         Lanes       Itersection Orientation       Itersection Orientation         Vehicle Volumes and Adjutter       Itersection Orientation       Itersection Orientation         Approach       Itersection Orientation       Itersection Orientation         Movement       U       Priority       Itersection Orientation         Number of Lanes       0       Otersection Orientation       Itersection Orientation         Volume (veh/h)       Percent Heavy Vehicles (%)       Itersection Orientation       Itersection Orientation         Percent Grade (%)       Right Turn Channelized       Itersection Orientation       Itersection Orientation         Base Critical Headway (sec)       Ease FollowUp Headway (sec)       Itersection Orientation       Itersection Orientation         Base FollowUp Headway (sec)       Itersection Orientation       Itersection Orientation       Itersection Orientation	PM Hou West ald Subo East L 1 0 9	bund 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ Westl L 4 0	Peak Analy st-West st-West	R 6	tor Period (I	North L 7	0.92 0.25	R 9		L 10	T 11 1	12
Intersection Orientation       East-         Project Description       Emer         Lanes       Image: Construct of the second sec	Eastl L 1 9 9	bund 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ Westl L 4 0	Analy Analy st-West	R 6	Period (	North L 7	0.25	9		L 10	T 11 1	12
Project Description       Emer         Lanes       Image: Comparison of the second secon	Eastly I Compare the second se	Understand     T     2     1     LTR	R 3 0	Maju U 4U	↔ ↔ westl L 4 0	st-West	ля і Джа К Ц U *		North L 7	bound T 8 1	9		L 10	T 11 1	12
Lanes         Vehicle Volumes and Adjutter         Approach         Movement       U         Priority       1U         Number of Lanes       0         Configuration       0         Volume (veh/h)       0         Percent Heavy Vehicles (%)       0         Proportion Time Blocked       0         Right Turn Channelized       0         Median Type   Storage       0         Critical and Follow-up Headway (sec)       0         Base Critical Headway (sec)       0         Follow-Up Headway (sec)       0         Follow-Up Headway (sec)       0	Eastl	Understand     T     2     1     LTR	R 3 0	Maju U 4U	↔ ↔ westl L 4 0	st-West bound T 5 1 LTR	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	U	L 7	T 8 1	9		L 10	T 11 1	12
Vehicle Volumes and Adjuture         Approach       III         Movement       III         Priority       1U         Number of Lanes       0         Configuration       0         Volume (veh/h)       1         Percent Heavy Vehicles (%)       1         Proportion Time Blocked       1         Percent Grade (%)       1         Right Turn Channelized       1         Median Type   Storage       1         Base Critical Headway (sec)       1         Base Follow-Up Headway (sec)       1         Follow-Up Headway (sec)       1	Eastl	T 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ westl L 4 0	st-West bound T 5 1 LTR	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	U	L 7	T 8 1	9		L 10	T 11 1	12
Approach     U       Movement     U       Priority     1U       Number of Lanes     0       Configuration     0       Volume (veh/h)     0       Percent Heavy Vehicles (%)     0       Proportion Time Blocked     0       Percent Grade (%)     0       Right Turn Channelized     0       Median Type   Storage     0       Critical and Follow-up Headway (sec)     0       Base Critical Headway (sec)     0       Follow-Up Headway (sec)     0	Eastl	T 2 1 LTR	R 3 0	Maju U 4U	↔ ↔ westl L 4 0	st-West bound T 5 1 LTR	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	U	L 7	T 8 1	9	U	L 10	T 11 1	12
Approach       U         Movement       U         Priority       1U         Number of Lanes       0         Configuration       0         Configuration       0         Volume (veh/h)       0         Percent Heavy Vehicles (%)       0         Proportion Time Blocked       0         Percent Grade (%)       0         Right Turn Channelized       0         Median Type   Storage       0         Critical and Follow-up Headway (sec)       0         Base Critical Headway (sec)       0         Base Follow-Up Headway (sec)       0         Follow-Up Headway (sec)       0	Eastl	T 2 1 LTR	3	4U	L 4 0	T 5 1 LTR	6	U	L 7	T 8 1	9	U	L 10	T 11 1	12
Movement     U       Priority     1U       Number of Lanes     0       Configuration     0       Volume (veh/h)     10       Percent Heavy Vehicles (%)     10       Proportion Time Blocked     10       Percent Grade (%)     10       Right Turn Channelized     10       Median Type   Storage     10       Base Critical Headway (sec)     10       Critical Headway (sec)     10       Follow-Up Headway (sec)     10	L 1 0 9	T 2 1 LTR	3	4U	L 4 0	T 5 1 LTR	6	U	L 7	T 8 1	9	U	L 10	T 11 1	12
Priority     1U       Number of Lanes     0       Configuration     1       Volume (veh/h)     1       Percent Heavy Vehicles (%)     1       Proportion Time Blocked     1       Percent Grade (%)     1       Right Turn Channelized     1       Median Type   Storage     1       Base Critical Headway (sec)     1       Critical Headway (sec)     1       Base Follow-Up Headway (sec)     1       Follow-Up Headway (sec)     1	1 0 9	2 1 LTR	3	4U	4	5 1 LTR	6		7	8 1	9	0	10	11 1	12
Number of Lanes     0       Configuration        Volume (veh/h)        Percent Heavy Vehicles (%)        Proportion Time Blocked        Percent Grade (%)        Right Turn Channelized        Median Type   Storage        Critical and Follow-up Headway (sec)        Critical Headway (sec)        Base Follow-Up Headway (sec)        Follow-Up Headway (sec)	0	1 LTR	0		0	1 LTR				1	<u> </u>			1	
Configuration       Image: Configuration         Volume (veh/h)       Image: Configuration         Percent Heavy Vehicles (%)       Image: Configuration         Proportion Time Blocked       Image: Configuration         Proportion Time Blocked       Image: Configuration         Right Turn Channelized       Image: Configuration         Median Type   Storage       Image: Configuration         Critical and Follow-up Headway (sec)       Image: Configuration         Base Critical Headway (sec)       Image: Configuration         Base Follow-Up Headway (sec)       Image: Configuration         Follow-Up Headway (sec)       Image: Configuration	9	LTR		0		LTR	0		0		0		0		0
Volume (veh/h)       Image: Constraint of the sector of the			4		5									LTR	I
Percent Heavy Vehicles (%)       Image: Composition Time Blocked         Proportion Time Blocked       Image: Composition Time Blocked         Percent Grade (%)       Image: Composition Time Blocked         Right Turn Channelized       Image: Composition Time Blocked         Median Type   Storage       Image: Composition Time Blocked         Critical and Follow-up Headway (sec)       Image: Composition Time Blocked         Base Critical Headway (sec)       Image: Composition Time Blocked         Follow-Up Headway (sec)       Image: Composition Time Blocked		88	4		5	85				LTR			<u> </u>		<u> </u>
Proportion Time Blocked       Image: Constraint of the sector of the secto	1			1			6		2	0	7		6	1	7
Percent Grade (%)       Image: Comparison of the sector of t				<u> </u>	1				1	1	1		1	1	1
Right Turn Channelized     Image: Characterized       Median Type   Storage     Image: Characterized       Critical and Follow-up Headway (sec)       Base Critical Headway (sec)     Image: Characterized       Base Follow-Up Headway (sec)     Image: Characterized       Follow-Up Headway (sec)     Image: Characterized															
Median Type   Storage       Critical and Follow-up Headway       Base Critical Headway (sec)       Critical Headway (sec)       Base Follow-Up Headway (sec)       Follow-Up Headway (sec)										0				0	
Critical and Follow-up Headway         Base Critical Headway (sec)         Critical Headway (sec)         Base Follow-Up Headway (sec)         Follow-Up Headway (sec)															
Base Critical Headway (sec)       Critical Headway (sec)       Base Follow-Up Headway (sec)       Follow-Up Headway (sec)			Und	ivided											
Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)	ys														
Base Follow-Up Headway (sec) Follow-Up Headway (sec)	4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Follow-Up Headway (sec)	4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.21
	2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Delay, Queue Length, and Leve	2.21				2.21				3.51	4.01	3.31		3.51	4.01	3.31
	el of S	ervice	2												
Flow Rate, v (veh/h)	10				5					10				15	
Capacity, c (veh/h)	1500				1491					887				817	
v/c Ratio	0.01				0.00					0.01				0.02	
95% Queue Length, Q₂s (veh)	0.0				0.0					0.0				0.1	
Control Delay (s/veh)	7.4				7.4					9.1				9.5	
Level of Service (LOS)	-				A					A				A	
Approach Delay (s/veh)	A	0.7		-										.5	

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# EXHIBIT 4.16 2027 BACKGROUND PEAK AM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site	Inforr	natio	<b>1</b>						
Analyst	-							ection	inacioi	•	Eav V	alley/Ap	nla Orch	ard		
Agency/Co.							Jurisd					of Ottawa		aru		
Date Performed	8/19/	2021						Nest Str	t			Orchar				
Analysis Year	2027	2021						/South S				alley Ro				
		AM Hou						Hour Fac			0.92	alley KO	au			
Time Analyzed Intersection Orientation	East-		r							hre)	0.92					
		ald Subd	ivicion				Analy	sis time	Period (	nrs)	0.25					
Project Description	Emera		IVISION													
				J 4 1 4 4 1 U		*		14 4 4 4 V A								
Vehicle Volumes and Ad	justme	ents				or Street: Ea										
Approach		Eastb	ound			West	ound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	56	0		2	87	7		4	0	11		11	0	12
Percent Heavy Vehicles (%)		1				1				1	1	1		1	1	1
Proportion Time Blocked																
Percent Grade (%)										(	C				0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.2
										3.5	4.0	3.3		3.5	4.0	3.3
Base Follow-Up Headway (sec)		2.2				2.2				5.5	4.0	3.5				
Base Follow-Up Headway (sec) Follow-Up Headway (sec)		2.2				2.2 2.21				3.51	4.01	3.31		3.51	4.01	3.3
Follow-Up Headway (sec)	d Leve	2.21	ervice									<u> </u>		3.51	4.01	3.3
Follow-Up Headway (sec) Delay, Queue Length, an	d Leve	2.21 I of S	ervice			2.21					4.01	<u> </u>		3.51		3.3
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	2.21 l of So 2	ervice			2.21					4.01	<u> </u>		3.51	25	3.3
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	2.21 l of So 2 1485	ervice			2.21 2 1546					4.01 16 932	<u> </u>		3.51	25 856	3.3
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	2.21 <b>1 of S</b> 2 1485 0.00	ervice			2.21 2 1546 0.00					4.01 16 932 0.02	<u> </u>		3.51	25 856 0.03	3.3
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	2.21 2 1485 0.00 0.0	ervice			2.21 2 1546 0.00 0.0					4.01 16 932 0.02 0.1	<u> </u>		3.51	25 856 0.03 0.1	3.3
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	d Leve	2.21 <b>1 of S</b> 2 1485 0.00	ervice			2.21 2 1546 0.00					4.01 16 932 0.02	<u> </u>		3.51	25 856 0.03	3.3
Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>35</sub> (veh)	d Leve	2.21 <b>of So</b> 1485 0.00 0.0 7.4 A	ervice			2.21 2 1546 0.00 7.3 A	2			3.51	4.01 16 932 0.02 0.1 8.9	<u> </u>			25 856 0.03 0.1 9.3	3.3

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# EXHIBIT 4.17 2027 BACKGROUND PEAK PM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site	Inform	natio	•						_
									nation	•	<b>F a a b</b>	- 11 / A				
Analyst								ection			<u> </u>	alley/Ap		ard		
Agency/Co.	0/10/	2021					Jurisd					of Ottawa				
Date Performed	8/19/	2021						Nest Stre				Orchar				
Analysis Year	2027							/South S				alley Ro	аа			
Time Analyzed		PM Hou	r					Hour Fac			0.92					
Intersection Orientation	East-						Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													
Lanes																
				J 4 4 7 4 4 4 4 4		T T Street: Ea		ት የ በ								
Vehicle Volumes and Adj	ustme	nts														
Approach			ound			West					bound				bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	T	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		12	113	5		6	108	11		2	0	8		10	1	8
Percent Heavy Vehicles (%)		1				1				1	1	1		1	1	1
Proportion Time Blocked																
Percent Grade (%)										(	0				D	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
		2.21				2.21				3.51	4.01	3.31		3.51	4.01	3.31
Follow-Up Headway (sec)																
Delay, Queue Length, and	d Leve	l of S	ervice													
	d Leve	1 of So 13	ervice			7					11				21	
Delay, Queue Length, and	d Leve		ervice			7 1456					11 848				21 740	
<b>Delay, Queue Length, and</b> Flow Rate, v (veh/h)	d Leve	13	ervice													
Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	13 1462	ervice			1456					848				740	
Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	13 1462 0.01				1456 0.00					848 0.01				740 0.03	
Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	13 1462 0.01 0.0				1456 0.00 0.0					848 0.01 0.0				740 0.03 0.1	

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# EXHIBIT 4.18 2032 BACKGROUND PEAK AM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site	Inforr	natio	า						
Analyst	T						Inters	ection			Fox V	alley/Ap	ple Orch	nard		
Agency/Co.							Jurisd	iction			<u> </u>	of Ottawa	-			
Date Performed	8/19/	2021						Nest Stre	et			Orchard				
Analysis Year	2032							/South S				alley Roa				
Time Analyzed	Peak	AM Hou	r					Hour Fac			0.92					
Intersection Orientation	East-		-					sis Time		hrs)	0.25					
Project Description	Emera	ald Subd	ivision				,			-						
Lanes																
				<u> </u>		* * or Street: Ea		ት ነት ቀ ነት በ በ ካ ዛ ቀ ነት በ								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	T	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	59	0		2	92	8		4	0	11		11	0	12
Percent Heavy Vehicles (%)		1				1				1	1	1		1	1	1
Proportion Time Blocked																
											-					
Percent Grade (%)											0				0	
											0				0	
Percent Grade (%)				Undi	vided						0				0	
Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	ys		Undi	vided						0				0	
Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	<b>ys</b> 4.1		Undi	vided	4.1				7.1	6.5	6.2		7.1	6.5	6.2
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	-		Undi	vided	4.1						6.2 6.21				
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	4.1		Undi	vided	<u> </u>				7.1	6.5			7.1	6.5	6.2 6.21 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec)	adwa	4.1 4.11		Undi	vided	4.11				7.1 7.11	6.5 6.51	6.21		7.1 7.11	6.5 6.51	6.2: 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)		4.1 4.11 2.2 2.21	ervice		vided	4.11 2.2				7.1 7.11 3.5	6.5 6.51 4.0	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0	6.2
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		4.1 4.11 2.2 2.21	ervice		vided	4.11 2.2				7.1 7.11 3.5	6.5 6.51 4.0	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0	6.2 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and		4.1 4.11 2.2 2.21	ervice		vided	4.11 2.2 2.21				7.1 7.11 3.5	6.5 6.51 4.0 4.01	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0 4.01	6.2: 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h)		4.1 4.11 2.2 2.21 I of So 2	ervice		vided	4.11 2.2 2.21 2				7.1 7.11 3.5	6.5 6.51 4.0 4.01	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0 4.01	6.2 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)		4.1 4.11 2.2 2.21 I of So 2 1477	ervice		vided	4.11 2.2 2.21 2.21 2 1542				7.1 7.11 3.5	6.5 6.51 4.0 4.01 16 925	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0 4.01 25 847	6.2 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		4.1 4.11 2.2 2.21 <b>I of So</b> 2 1477 0.00	ervice		vided	4.11 2.2 2.21 2 1542 0.00				7.1 7.11 3.5	6.5 6.51 4.0 4.01 16 925 0.02	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0 4.01 25 847 0.03	6.2 3.3
Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		4.1 4.11 2.2 2.21 <b>I of So</b> 2 1477 0.00 0.0	ervice		vided	4.11 2.2 2.21 2 1542 0.00 0.0				7.1 7.11 3.5	6.5 6.51 4.0 4.01 16 925 0.02 0.1	6.21 3.3		7.1 7.11 3.5	6.5 6.51 4.0 4.01 25 847 0.03 0.1	6.2 3.3

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# EXHIBIT 4.19 2032 BACKGROUND PEAK PM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site J	Inforr	natio	1						
Analyst	1						Inters			•	Fox V	alley/Ap	nle Orch	ard		
Agency/Co.	+						Jurisd					of Ottawa		aru		
Date Performed	8/19/	2021						Nest Str	aat			Orchard				
Analysis Year	2032	2021						/South S				alley Roa				
Time Analyzed		PM Hou	r					Hour Fac			0.92	aney Not	10			
Intersection Orientation	East-						<u> </u>		Period (	hre)	0.25					
Project Description		ald Subd	ivision				Analy	sis mine	renou (	1113)	0.25					
Lanes	Linera	aiu Subu	IVISION													
				J 4 1 1 4 4 4 4		* * *		<u>ት</u> በካፋ ቁጥ ተ ኮ ሰ								
Vehicle Volumes and Ad	justme	nts				or Street: Ea										
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		12	118	6		7	114	11		2	0	9		10	1	9
Percent Heavy Vehicles (%)		1				1				1	1	1		1	1	1
Proportion Time Blocked																
Percent Grade (%)											C				D	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadway	vs														
entited and renetit up it		,-													6.5	6.2
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1		
	-	-				4.1 4.11				7.1 7.11	6.5 6.51	6.2 6.21		7.1 7.11	6.51	6.2
Base Critical Headway (sec)		4.1												<u> </u>	<u> </u>	
Base Critical Headway (sec) Critical Headway (sec)		4.1 4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.2 3.3 3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)	d Leve	4.1 4.11 2.2 2.21	ervice			4.11 2.2				7.11 3.5	6.51 4.0	6.21 3.3		7.11 3.5	6.51 4.0	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an	d Leve	4.1 4.11 2.2 2.21	ervice			4.11 2.2 2.21				7.11 3.5	6.51 4.0 4.01	6.21 3.3		7.11 3.5	6.51 4.0 4.01	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	4.1 4.11 2.2 2.21 I of So 13	ervice			4.11 2.2 2.21 8				7.11 3.5	6.51 4.0 4.01	6.21 3.3		7.11 3.5	6.51 4.0 4.01	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	4.1 4.11 2.2 2.21 I of So 13 1455	ervice			4.11 2.2 2.21 8 1448				7.11 3.5	6.51 4.0 4.01 12 844	6.21 3.3		7.11 3.5	6.51 4.0 4.01 22 734	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	4.1 4.11 2.2 2.21 <b>I of So</b> 13 1455 0.01	ervice			4.11 2.2 2.21 8 1448 0.01				7.11 3.5	6.51 4.0 4.01 12 844 0.01	6.21 3.3		7.11 3.5	6.51 4.0 4.01 22 734 0.03	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) V/c Ratio 95% Queue Length, Q <sub>35</sub> (veh)	d Leve	4.1 4.11 2.2 2.21 <b>I of So</b> 13 1455 0.01 0.0	ervice			4.11 2.2 2.21 8 1448 0.01 0.0				7.11 3.5	6.51 4.0 4.01 12 844 0.01 0.0	6.21 3.3		7.11 3.5	6.51 4.0 4.01 22 734 0.03 0.1	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) V/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	d Leve	4.1 4.11 2.2 2.21 <b>of So</b> 13 1455 0.01 0.0 7.5	ervice			4.11 2.2 2.21 8 1448 0.01 0.0 7.5				7.11 3.5	6.51 4.0 4.01 12 844 0.01 0.0 9.3	6.21 3.3		7.11 3.5	6.51 4.0 4.01 22 734 0.03 0.1 10.1	3.3
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	4.1 4.11 2.2 2.21 <b>1 of So</b> 13 1455 0.01 0.0 7.5 A				4.11 2.2 2.21 8 1448 0.01 0.0 7.5 A	.4			7.11 3.5 3.51	6.51 4.0 4.01 12 844 0.01 0.0	6.21 3.3		7.11 3.5 3.51	6.51 4.0 4.01 22 734 0.03 0.1	3.

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# EXHIBIT 4.20 2027 TOTAL PEAK AM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site	Inforr	natio	า						
Analyst	T							ection			Fox V	alley/Ap	ple Orch	hard		
Agency/Co.	-						Jurisd				<u> </u>	of Ottawa		iur u		
Date Performed	8/19/	2021						Nest Stre	eet			Orchard				
Analysis Year	2027							/South S				alley Roa				
Time Analyzed		AM Hou	r					Hour Fac			0.92	, .				
Intersection Orientation	East-		-						Period (	hrs)	0.25					
Project Description		ald Subd	ivision				,			,						
Lanes																
				74 1 X 4 1 7	<u>ר</u> ק און א	*	1	4 114 4 7 1 1								
Vehicle Volumes and Adj	justme	nts			Majo	or Street: Ea	st-West									
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR			1	1 70				1.70				1.70	
							LTR				LTR				LTR	
Volume (veh/h)		3	56	0		2	87	8		4	0	11		13	0	14
-		3 1	56	0		2 1		8		4	<u> </u>	11 1		13 1	<u> </u>	14 1
Volume (veh/h)			56	0				8			0				0	<u> </u>
Volume (veh/h) Percent Heavy Vehicles (%)			56	0				8		1	0			1	0	<u> </u>
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked			56	0				8		1	0			1	0	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)			56		vided			8		1	0			1	0	<u> </u>
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	1	56		vided			8		1	0			1	0	<u> </u>
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	1	56		vided			8		1	0			1	0	<u> </u>
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	1 ys	56		vided	1		8		1	0	1		1	0 1 0	1
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	1 ys 4.1	56		vided	4.1		8		7.1	0 1 0 6.5	6.2		7.1	0 1 6.5	6.2
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec)	eadwa	1 ys 4.1 4.11	56		vided	4.1		8		1 7.1 7.11	0 1 0 6.5 6.51	1 6.2 6.21		7.1	0 1 0 6.5 6.51	6.2 6.2
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		1 ys 4.1 4.11 2.2 2.21		Undi	vided	1 4.1 4.11 2.2		8		1 7.1 7.11 3.5	0 1 6.5 6.51 4.0	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an		1 ys 4.1 4.11 2.2 2.21 I of Se		Undi	vided	1 4.1 4.11 2.2 2.21				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)		1 ys 4.1 4.11 2.2 2.21 l of So 3		Undi	vided	1 4.1 4.11 2.2 2.21 2				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an		1 ys 4.1 4.11 2.2 2.21 I of Se		Undi	vided	1 4.1 4.11 2.2 2.21				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Head Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)		1 4.1 4.11 2.2 2.21 1 of Se 3 1484		Undi	vided	1 4.1 4.11 2.2 2.21 2 1546				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 16 929	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 29 853	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (		1 4.1 4.11 2.2 2.21 I of Se 3 1484 0.00		Undi	vided	1 4.1 4.11 2.2 2.21 2.21 1546 0.00				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 16 929 0.02	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 29 853 0.03	6.2 6.2 3.3
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Head Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		1 4.1 4.11 2.2 2.21 <b>I of So</b> 3 1484 0.00 0.0		Undi	Vided	1 4.1 4.11 2.2 2.21 1546 0.00 0.0				1 7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 16 929 0.02 0.1	1 6.2 6.21 3.3		7.1 7.11 3.5	0 1 6.5 6.51 4.0 4.01 29 853 0.03 0.1	1 6.7 6.2 3.3

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# EXHIBIT 4.21 2027 TOTAL PEAK PM HOUR ANALYSIS - Fox Valley/Apple Orchard

											_					
General Information							Site	Inforr	natio	n						
Analyst							Inters	ection			Fox V	alley/Ap	ple Orch	ard		
Agency/Co.							Jurisc	iction			City o	of Ottawa	a			
Date Performed	8/19/	2021					East/	Nest Stre	eet		Apple	Orchar	d Road			
Analysis Year	2027						North	/South S	Street		Fox V	alley Ro	ad			
Time Analyzed	Peak	PM Hou	r				Peak	Hour Fac	tor		0.92					
Intersection Orientation	East-	West					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	livision													
Lanes																
				J 4 1 1 4 4 6 0		<del>ب</del> بر Dr Street: Ea	st-West	* *								
Vehicle Volumes and Ad	justme															
Approach			ound				oound				bound				bound	
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	10	1	2	3	40	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0	<u> </u>	0	1	0
Configuration	-	14	LTR	-		6	LTR	10			LTR			11	LTR	
Volume (veh/h)		14	113	5		6	108	13		2	0	8		11	1	9
Percent Heavy Vehicles (%)	-	1				1				1	1	1		1	1	1
Proportion Time Blocked																
Percent Grade (%)											0				0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		7.11	6.51	6.2
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.21				3.51	4.01	3.31		3.51	4.01	3.3
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)		15				7					11				23	
Capacity, c (veh/h)		1460				1456					845				738	
v/c Ratio		0.01				0.00					0.01				0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.0				0.1	
Control Delay (s/veh)		7.5				7.5					9.3				10.0	
Level of Service (LOS)		A				А					A				В	
Approach Delay (s/veh)		0	.9			0	.4			9	.3			10	0.0	

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# EXHIBIT 4.22 2032 TOTAL PEAK AM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site I	Inforr	natio	า						
Analyst	T					_	Inters	ection			Fox V	alley/Ap	ple Orch	nard		
Agency/Co.	-						Jurisd					of Ottawa				
Date Performed	8/19/	2021						Nest Str	eet			e Orchard				
Analysis Year	2032							/South S				alley Roa				
Time Analyzed		AM Hou	r			_		Hour Fac			0.92					_
Intersection Orientation	East-		-						Period (	hrs)	0.25					
Project Description		ald Subd	ivision													
Lanes																
				<u> </u>		↔ • or Street: East		4 Y 4 4 1 1								
Vehicle Volumes and Adj	justme	nts														
Approach		Eastb	ound			West	ound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
			LTR				LTR				LTR				LTR	
Configuration														<u> </u>		
		3	59	0		2	92	9		4	0	11		13	0	14
Configuration		3 1	59	0		2	92	9		4	0	11 1		13 1	0 1	14 1
Configuration Volume (veh/h)			59	0			92	9			-					
Configuration Volume (veh/h) Percent Heavy Vehicles (%)			59	0			92	9		1				1		
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked			59	0			92	9		1	1			1	1	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)			59		vided		92	9		1	1			1	1	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	1	59		vided		92	9		1	1			1	1	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	1	59		vided		92	9		1	1			1	1	1
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	1 ys	59		vided	1	92	9		1	1	1		1	0	6.2
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	1 ys 4.1	59		vided	4.1	92	9		7.1	6.5	6.2		7.1	1 0 6.5	
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec)		1 ys 4.1 4.11	59		vided	4.1	92	9		1 7.1 7.11	1 	6.2		7.1	1 0 6.5 6.51	6.2 6.2
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)		1 ys 4.1 4.11 2.2 2.21		Undi	vided	1 4.1 4.11 2.2	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 0 6.5 6.51 4.0	6.2 6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		1 ys 4.1 4.11 2.2 2.21		Undi	vided	1 4.1 4.11 2.2	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 0 6.5 6.51 4.0	6.2 6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an		1 ys 4.1 4.11 2.2 2.21 I of So		Undi	vided	1 4.1 4.11 2.2 2.21	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 0 6.5 6.51 4.0 4.01	6.2 6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)		1 ys 4.1 4.11 2.2 2.21 l of So 3		Undi	vided	1 4.1 4.11 2.2 2.21	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	6.2 6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Critical Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec)		1 4.1 4.11 2.2 2.21 1 of So 3 1476		Undi	vided	1 4.1 4.11 2.2 2.21 2.21 2 1542	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 16 922	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 29 844	6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)		1 4.1 4.11 2.2 2.21 I of So 3 1476 0.00		Undi	vided	1 4.1 4.11 2.2 2.21 2.21 2 1542 0.00	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 16 922 0.02	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 29 844 0.03	6.2 3.3
Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Hea Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (s		1 4.1 4.11 2.2 2.21 <b>I of So</b> 3 1476 0.00 0.0		Undi	vided	1 4.1 4.11 2.2 2.21 2.21 1542 0.00 0.0	92	9		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 16 922 0.02 0.1	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 29 844 0.03 0.1	6.2 3.3

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# EXHIBIT 4.23 2032 TOTAL PEAK PM HOUR ANALYSIS - Fox Valley/Apple Orchard

General Information							Site I	Inform	natio	า						
Analyst	T					_	Inters	ection			Fox V	alley/Ap	ple Orch	nard		
Agency/Co.	-						Jurisd				<u> </u>	of Ottawa				
Date Performed	8/19/	2021				_	East/\	Vest Stre	eet			Orchard				_
Analysis Year	2032						North	/South S	Street			alley Roa				
Time Analyzed	Peak	PM Hou	r			_	Peak	Hour Fac	tor		0.92					_
Intersection Orientation	East-	Nest					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													_
Lanes																
				J 4 4 4 4 1 4		◆ ◆ Y ↑ or Street: East		<u>ት</u> በካፋ ቀጥ								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	ound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Valuma (uah /h)		14	118	6		7	114	13		2		9			1	10
Volume (veh/h)							114	15			0			11		
Percent Heavy Vehicles (%)		1				1	114	15		1	0	9		11	1	1
Percent Heavy Vehicles (%) Proportion Time Blocked		1					114			1	1			1	1	1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)		1					114	15		1				1		1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized		1					114			1	1			1	1	1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage				Undi	vided					1	1			1	1	1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa			Undi	vided		114			1	1			1	1	1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa			Undi	vided					1	1			1	1	6.2
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	ys		Undi	vided	1				1	1	1		1	0	
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	<b>ys</b> 4.1		Undi	vided	4.1				7.1	6.5 6.51 4.0	1 6.2 6.21 3.3		7.1	1 6.5 6.51 4.0	6.2
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec)	eadwa	<b>ys</b> 4.1 4.11		Undi	vided	4.1				1 7.1 7.11	1 0 6.5 6.51	6.2		7.1	1 0 6.5 6.51	6.2
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Gritical Headway (sec) Base Follow-Up Headway (sec)		<b>ys</b> 4.1 4.11 2.2 2.21	ervice		vided	1 4.1 4.11 2.2				1 7.1 7.11 3.5	6.5 6.51 4.0	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0	6.2 6.2 3.3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		<b>ys</b> 4.1 4.11 2.2 2.21	ervice		vided	1 4.1 4.11 2.2				1 7.1 7.11 3.5	6.5 6.51 4.0	1 6.2 6.21 3.3		7.1 7.11 3.5	1 6.5 6.51 4.0	6.2 3.3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and		4.1 4.11 2.2 2.21 I of So	ervice		vided	1 4.1 4.11 2.2 2.21				1 7.1 7.11 3.5	1 0 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		7.1 7.11 3.5	1 0 6.5 6.51 4.0 4.01	6.2 6.2 3.3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Head Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h)		4.1 4.11 2.2 2.21 I of Se 15	ervice		vided	1 4.1 4.11 2.2 2.21 8				1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01	1 6.2 6.21 3.3		7.1 7.11 3.5	1 0 6.5 6.51 4.0 4.01 24	6.2 3.3
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Head Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)		4.1 4.11 2.2 2.21 I of So 1452	ervice		vided	1 4.1 4.11 2.2 2.21 8 1448				1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 12 841	1 6.2 6.21 3.3		7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 224 731	6.1 6.2 3.1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		4.1 4.11 2.2 2.21 <b>I of S</b> 1452 0.01	ervice		vided	1 4.1 4.11 2.2 2.21 8 1448 0.01				1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 12 841 0.01	1 6.2 6.21 3.3		1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 24 731 0.03	6.1 6.2 3.1
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) V/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)		4.1 4.11 2.2 2.21 <b>I of So</b> 1452 0.01 0.0			vided	1 4.1 4.11 2.2 2.21 8 1448 0.01 0.0				1 7.1 7.11 3.5	1 6.5 6.51 4.0 4.01 12 841 0.01 0.0	1 6.2 6.21 3.3		7.1 7.11 3.5	1 0 6.5 6.51 4.0 4.01 24 731 0.03 0.1	6.2 3.2

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#### EXHIBIT 4.24 2021 EXISTING PEAK AM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inforr	natio	n						
Analyst	T						Inters	ection			Greer	n Links/N	/anotick	Stat		
Agency/Co.							Jurisd	liction			City c	of Ottawa	а			
Date Performed	8/19/	2021					East/	Nest Str	eet		Greer	n Links W	Vay			
Analysis Year	2021						North	/South S	Street		Mano	tick Stat	tion Roa	d		
Time Analyzed	Peak	AM Hou	ır				Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	n-South					Analy	sis Time	Period (	(hrs)	0.25					
Project Description	Emera	ald Subc	livision													
Lanes	-															
				741741		t t Street: Nor		ት ቁ ም ተ ኮ								
Vehicle Volumes and Adj	ustme	ents														
Approach		Eastb	ound			West	oound			North	bound			South	bound	_
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
				12					111					I .		
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Priority Number of Lanes		0	0	0		0	8	0	0	1	1	0	40	4	5	6
•				<u> </u>		<u> </u>			<u> </u>	<u> </u>		<u> </u>				
Number of Lanes				<u> </u>		<u> </u>	1		<u> </u>	<u> </u>		0		0		
Number of Lanes Configuration				<u> </u>		0	1	0	<u> </u>	<u> </u>	1	0 TR		0 LT	1	
Number of Lanes Configuration Volume (veh/h)				<u> </u>		0	1	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%)				<u> </u>		0 5 1	1	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked				<u> </u>		0 5 1	1 LR	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)				0	vided	0 5 1	1 LR	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	0		0	vided	0 5 1	1 LR	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	0		0	vided	0 5 1	1 LR	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	0		0	vided	0	1 LR	0	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec)		0		0	vided	0	1 LR	0 4 1 6.2	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec)		0		0	vided	0 5 1 7.1 6.41	1 LR	0 4 1 6.2 6.21	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.11	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		0		Undi	vided	0 5 1 7.1 6.41 3.5	1 LR	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, and</b>		0		Undi	vided	0 5 1 7.1 6.41 3.5		0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.11 2.2 2.21	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, and</b> Flow Rate, v (veh/h)		0		Undi	vided	0 5 1 7.1 6.41 3.5	1 LR	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.11 2.2 2.21	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, and</b> Flow Rate, v (veh/h) Capacity, c (veh/h)		0		Undi	vided	0 5 1 7.1 6.41 3.5	1 LR 	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.1 4.11 2.2 2.21 11 1423	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, and</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		0		Undi	vided	0 5 1 7.1 6.41 3.5	1 LR	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up Hea</b> Base Critical Headway (sec) Gritical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)		0		Undi	Vided	0 5 1 7.1 6.41 3.5	1 LR 	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.1 4.11 2.2 2.21 11 1423	1	
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, and</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		0		Undi	vided	0 5 1 7.1 6.41 3.5	1 LR 	0 4 1 6.2 6.21 3.3	<u> </u>	<u> </u>	1	0 TR		0 LT 10 1 4.1 4.1 2.2 2.21 11 1423 0.01 0.0	1	

#### EXHIBIT 4.25 2021 EXISTING PEAK PM HOUR ANALYSIS - Green Links/Manotick Station

Movement         U         L         T         R         U         L         T         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I         R         U         I<	General Information							Site	Inform	natio	n						
Date Performed       8/19/2021       East/West Street       Green Links Wa         Analysk Yaar       2021       North-South Street       Nanut-Ks Station Road       Imanue Ks St	Analyst							Inters	ection			Greer	n Links/N	/anotick	Stat		
Date Performed       8/19/2021       East/West Street       Green Links Wa         Analysk Yaar       2021       North-South Street       Nanut-Ks Station Road       Imanue Ks St	Agency/Co.							Jurisc	iction			City c	of Ottawa	а			
Time Analyzed         Peak PM Hour         Peak PM Factor         0.92           Intersection Orientation         North-South         Analysis Time Period (hrs)         0.25           Project Description         Emerald Subdiviso         Subdiviso         Subdiviso         Subdiviso           Colspan="4">Colspan="4"           Project Description         Emerald Subdiviso         Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4"Colspan="4">Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4"Colspan="4">Colspan="4"C		8/19/	/2021					East/	Nest Stre	eet							_
Time Analyzed         Peak PM Hour         Peak PM Hour South         Peak PM Hour South         Peak PM Hour South         0.25           Project Description         Emeral Subdiviso          Analysis Time Period (hrs)         0.25           Lanes <b>Vehicle Volumes and Adjuster Subdivisor Subditis Subditis Subdivisor Subdivisor Subditis Subdivisor Subdivisor</b>	Analysis Year														d		
Intersection Qrientation North-South Emerald Subdivisori Emerald Subdivisori Eanes		Peak	PM Hou	r								0.92					
Project Description       Emerald Subdivision         Lames         Image Subdivision         Image		<u> </u>		-							hrs)						
Lanes		Emer	ald Subc	livision													
Vertication of the second of																	
Name       Name       Name       Name         Series Name       Name       Name       Name         Approach       I       Name       Name       Name       Name         Movement       U       L       T       R       U       L       T       R       N       N       N       U       L       T       R       U       I       I       R       U       I       I       R       U       I       I       R       U       I       I       R       U       I       I       R       U       I       I       R       U       I <th< th=""><th></th><th></th><th></th><th></th><th>14477</th><th>0.5</th><th>ት 1 ቀ ሃ</th><th>1 7 6</th><th>74 *** * r</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>					14477	0.5	ት 1 ቀ ሃ	1 7 6	74 *** * r								
Movement         U         L         T         R         U         L         T         R         U         L         T         R         U         L         T         R         U         L         T         R         U         L         T         R         U         I         I         R         U         L         T         R         U         I         I         R         U         I         I         R         U         I<	Vehicle Volumes and Adj	ustme	ents			Majo	r Street: Nor	th-South									
PriorityImage: Sector of the sect	Approach		Eastb	ound			West	bound			North	bound			South	bound	
Number of Lanes         0         0         0         0         0         1         0         0         1         0         0         1         0         0         0         0         1         0         0         1         0         0         1         0         0         0         1         0         0         0         0         0         0         1         0	Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
ConfigurationImage: Sector	Priority	justments           U         L         T         R           10         11         11         11					7	8	9	10	1	2	3	4U	4	5	6
Volume (veh/h)         Image: Mode (inclusion)	Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Percent Heavy Vehicles (%)Image: Constraint of the sector of	Configuration							LR					TR		LT		
Proportion Time Blocked         I	Volume (veh/h)						3		5			139	1		3	209	
Percent Grade (%)         Image: Content of the c	Percent Heavy Vehicles (%)						1		1						1		
Right Turn Channelized         Image: Constraint of the constraint of	Proportion Time Blocked																
Median Type   Storage         Undivided         Undit         Undivided         Undit	Percent Grade (%)							0									-
Ortical and Follow-up Headways         Base Critical Headway (sec)       Image: Sec	Right Turn Channelized																
Base Critical Headway (sec)         Image: Critical Headway (sec) <thimage: (sec)<="" critical="" headway="" th=""> <thimage:< td=""><td>Median Type   Storage</td><td></td><td></td><td></td><td>Undi</td><td>vided</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thimage:<></thimage:>	Median Type   Storage				Undi	vided											
Critical Headway (sec)       Image: Sec in the section of the section o	Critical and Follow-up He	adwa	ys														
Base Follow-Up Headway (sec)         Image: Constraint of the sector	Base Critical Headway (sec)						7.1		6.2						4.1		
Base Follow-Up Headway (sec)         Image: Constraint of the system	Critical Headway (sec)						6.41		6.21						4.11		
Delay, Queue Length, and Level of Service         9         0         0         0         3							3.5		3.3						2.2		
Flow Rate, v (veh/h)       Image: Capacity, c (veh/h)       Image	Follow-Up Headway (sec)						3.51		3.31						2.21		
Flow Rate, v (veh/h)       Image: Capacity, c (veh/h)       Image	Delay, Queue Length, and	Leve	l of S	ervice													
Capacity, c (veh/h)       Image: Capacity of the state o								9							3		
v/c Ratio       Image: Constraint of the second secon								<u> </u>							1435		
95% Queue Length, Q <sub>95</sub> (veh)															0.00		
	· ·														0.0		
Control Delay (s/veh)								9.7							7.5		
	Control Delay (s/veh)		1				1						<u> </u>				
Approach Delay (s/veh) 9.7	Control Delay (s/veh) Level of Service (LOS)							A							A		

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#### **EXHIBIT 4.26** 2027 BACKGROUND PEAK AM HOUR ANALYSIS - Green Links/Manotick Station

Angenytů       Interaction       Grace Links/Marolick Sizit       Europe Marolick Sizit       <	General Information							Site	Inform	natio	n						
Agangy/Co.       Date Performed       8/19/2021       Eart/View Street       City of Ottawa         Analysis Year       207       North/South       North/South       0.9       Immedia Stationary         Time Analysed       Peak AM Hour       Peak AM Hour       Peak Hour Factor       0.92       Immedia Stationary         Time Analysed       Peak AM Hour       Peak Hour Factor       0.92       Immedia Stationary         Project Description       Tornerald Subvision       Immedia Stationary       0.25       Immedia Stationary         Subvision       Subvision       Immedia Stationary       Immedia Stationary       Immedia Stationary       0.25         Subvision       Subvisionary       Immedia Stationary       Immedia Stationary       Immedia Stationary       Immedia Stationary         Subvisionary       Subvisionary       Immedia Stationary       Immedia Stationary       Immedia Stationary       Immedia Stationary         Approach       Eastburd       Immedia Stationary       Immedia Stationary       Immedia Stationary       Immedia Stationary       Immedia Stationary         Movement       U       L       T       R       U       Immedia Stationary       Immedia Stationary         Number of Lansy       U       L       T       R       U	Analyst	1						Inters	ection			Greer	n Links/N	/anotick	Stat		
Data Performed       8/13/2021       Sum All year Sum All ye	-	-						Jurisd	liction			City c	of Ottawa	a			
Analysis Year2027VerterMarchick StaterMarchick StaterMarchick Stater0.22Intersection OrientationNorth-SouthNorth-South0.22 <td< td=""><td></td><td>8/19/</td><td>2021</td><td></td><td></td><td></td><td></td><td>East/</td><td>Nest Stre</td><td>eet</td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td></td<>		8/19/	2021					East/	Nest Stre	eet							_
Interaction Orientation       Peak AM Hour       Imanysis Time Period (trus)       0.02         Project Description       Emeral Sub-interaction Orientation       North-South       North-South       0.23         Project Description       Emeral Sub-interaction Orientation       North-South       North-South       North-South         State       Emeral Sub-interaction Orientation       Emeral Sub-interaction       North-South       North-South       North-South         State       State       State       State       State       State       State       State         State															d		
Intersection OrientationNorth-SouthAnalysis Time Period (hrs)0.25Project DescriptionEmerald SubdivisionUNIT Subdivisio			AM Hou	r													
Project Description       Enerald Subtivition         Image Subtin Subtivition <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>hrs)</td><td></td><td></td><td></td><td></td><td></td><td></td></th<>											hrs)						
Interview           Interview         Interview           Interview         Interview           Interview         Interview         Interview           Interview         Interview         Interview           Interview         Interview         Interview           Vertice         Interview         Interview           Vertice         Interview         Interview         Interview           Vertice         Interview         Interview         Interview         Interview				livision													_
Interview of the target of the target of ta	· ·																
Vertical Point of the set o					74774				7 74 *71 *								
MovementULTRUULTRUULTRUULTRUULTRUULTRUULTRUULTRUULTRUULTRUULTRUU </td <td>Vehicle Volumes and Ad</td> <td>justme</td> <td>ents</td> <td></td> <td>_</td> <td></td> <td></td> <td></td>	Vehicle Volumes and Ad	justme	ents											_			
PriorityInd101112Ind	Approach		Eastb	ound			West	oound			North	bound			South	bound	
Number of LanesIII	Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
ConfigurationImage: Solution of the state of	Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Volume (veh/h)Image: Normal and the state of	Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Percent Heavy Vehicles (%)Image: Second	Configuration							LR					TR		LT		
Proportion Time BlockedII <t< td=""><td>Volume (veh/h)</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td>11</td><td></td><td></td><td>187</td><td>1</td><td></td><td>4</td><td>75</td><td></td></t<>	Volume (veh/h)						1		11			187	1		4	75	
Percent Grade (%)       Image: Control Precent Grade (%)       Image: Control	Percent Heavy Vehicles (%)						1		1						1		
Right Turn ChannelizedImage StorageImage StorageIma	Proportion Time Blocked																
Median Type   StorageUndividend StorageUndividend StorageUndividend StorageUndividend StorageCritical And Follow-up Headway (sec)III	Percent Grade (%)							D									
Critical and Follow-up Headways         Base Critical Headway (sec)         7.1       6.2         4.1        1         Critical Headway (sec)         6.41       6.21         4.11        1         Base Follow-Up Headway (sec)          3.5       3.3          2.2        1         Follow-Up Headway (sec)         3.51       3.31          2.21        1         Follow-Up Headway (sec)         3.51       3.31          2.21          2.21            2.21             2.21             2.21            2.21             2.21               2.21	Right Turn Channelized																
Base Critical Headway (sec)Image: Critical He	Median Type   Storage				Undi	vided											
Critical Headway (sec)Image: Constraint of the section o	Critical and Follow-up H	eadwa	ys														
Base Follow-Up Headway (sec)       Image: Constraint of the adway (sec)	Base Critical Headway (sec)						7.1		6.2						4.1		
Base Follow-Up Headway (sec)       Image: Constraint of the sector of the	Critical Headway (sec)						6.41		6.21						4.11		
Delay, Queue Length, and Level of Service         13         13         4         4         13           Flow Rate, v (veh/h)         Image: Capacity, c (veh/h)         Image	Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Flow Rate, v (veh/h)       Image: Constraint of the system o	Follow-Up Headway (sec)						3.51		3.31						2.21		
Flow Rate, v (veh/h)       Image: Constraint of the system o	Delay, Queue Length, an	d Leve	l of S	ervice													
Capacity, c (veh/h)       Image:								13							4		T
v/c Ratio       Image: Constraint of the con								<u> </u>									$\vdash$
95% Queue Length, Q <sub>95</sub> (veh)       Image: Control Delay (s/veh)																	-
Control Delay (s/veh)         Image: second sec																	$\vdash$
Level of Service (LOS)																	-
Approach Delay (s/veh) 9.4 0.4	Approach Delay (s/veh)						0									.4	1
Approach LOS A	Approach LOS							•									

#### EXHIBIT 4.27 2027 BACKGROUND PEAK PM HOUR ANALYSIS - Green Links/Manotick Station

General Information Analyst																
•								Inform	natio	•	Creat	n Links/N	Annatial	Ctat		
Anna //Ca								ection						stat		
Agency/Co.	0/10/	2021						liction	4			of Ottawa				
Date Performed	8/19/	2021					-	Nest Stre				Links V				
Analysis Year	2027							/South S				tick Stat	ion Roa	a		
Time Analyzed		PM Hou	r					Hour Fac			0.92					
Intersection Orientation		-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subd	ivision													
.anes																
				7477477	<mark>ብ ጉ</mark> <sub>Major</sub>	לי איז איז Street: Nor	th-South	7 74 471 4								
/ehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		6			177	1		11	267	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
Delay, Queue Length, and	d Leve	l of S	ervice													
Flow Rate, v (veh/h)							8							12		
Capacity, c (veh/h)							781							1386		
v/c Ratio							0.01							0.01		
95% Queue Length, Q <sub>95</sub> (veh)							0.0							0.0		
Control Delay (s/veh)	-						9.7					-		7.6		
							A							A		
Level of Service (LOS)																

#### EXHIBIT 4.28 2032 BACKGROUND PEAK AM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inforr	natio	n						
	1								natio	•	Creat	a Links (N	Annatial	Chat		
Analyst								ection				n Links/N		stat		
Agency/Co.	0.00	2021						liction				of Ottawa				
Date Performed	8/19/	2021						Nest Str				n Links V				
Analysis Year	2032							/South S				otick Stat	tion Roa	d		
Time Analyzed		AM Hou	r					Hour Fac			0.92					
Intersection Orientation		n-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emera	ald Subc	livision													
Lanes																
				J 4 1 7 4 P 7		1 1 4 Y Street: Nor		74 *Y1 *								
Vehicle Volumes and Adj	ustme	ents														
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	T	R	U	L	T	R
															<u> </u>	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
		10 0	11 0	12 0		7	8 1	9 0	1U 0	1 0	2 1	3 0	4U 0	4	5	6
Priority						<u> </u>									<u> </u>	
Priority Number of Lanes						<u> </u>	1					0		0	<u> </u>	
Priority Number of Lanes Configuration						0	1	0			1	0 TR		0 LT	1	
Priority Number of Lanes Configuration Volume (veh/h)						0	1	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%)						0	1	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked						0	1 LR	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)				0	vided	0	1 LR	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	adwa	0		0	vided	0	1 LR	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage	eadwa	0		0	vided	0	1 LR	0			1	0 TR		0 LT 4	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He	eadwa	0		0	vided	0	1 LR	0			1	0 TR		0 LT 4 1	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec)	eadwa	0		0	vided	0	1 LR	0 11 1 6.2			1	0 TR		0 LT 4 1	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec)		0		0	vided	0 1 1 7.1 6.41	1 LR	0 11 1 6.2 6.21			1	0 TR		0 LT 4 1 4.1 4.1	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Base Follow-Up Headway (sec)		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up He Base Critical Headway (sec) Base Follow-Up Headway (sec)		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR 	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage <b>Critical and Follow-up He</b> Base Critical Headway (sec) Critical Headway (sec) Critical Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec)		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR 	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 4.1 4.1 4.11 2.2 2.21 4.1 1362	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Gritical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Keadway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Keadway (sec) Relay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR 	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	
Priority Number of Lanes Configuration Colume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Base Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Keadway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Keadway (sec) Follow-U		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR 	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	
Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type   Storage Critical and Follow-up Headway (sec) Gritical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Keadway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Headway (sec) Follow-Up Keadway (sec)		0		Undi	vided	0 1 1 7.1 6.41 3.5	1 LR 	0 11 1 6.2 6.21 3.3			1	0 TR		0 LT 4 1 	1	

#### EXHIBIT 4.29 2032 BACKGROUND PEAK PM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inforn	natio	n						
Analyst	1							ection	natio	•	Groor	n Links/N	Aanotick	Stat		
Agency/Co.								liction				of Ottawa		Stat		
Date Performed	8/19/	2021						Nest Stre	oot			n Links V				
Analysis Year	2032	2021					-	/South S				tick Stat		d		
		PM Hou						Hour Fac			0.92	DUCK Stat	поп коа	a		
Time Analyzed Intersection Orientation			r							la ma'						
		n-South					Analy	sis Time	Period (	nrs)	0.25					
Project Description	Emer	ald Subc	Ivision													
Lanes																
				141741	ት በ ከ Major	t t street: Nor	<mark>ት ዮ</mark> ሾ th-South	74 471 F								
Vehicle Volumes and Adj	justme	ents														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		6			186	1		11	280	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)	T					7.1		6.2						4.1		T
Critical Headway (sec)	1					6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
Delay, Queue Length, an	d Leve	l of S	ervice													-
Flow Rate, v (veh/h)							8							12		T
Capacity, c (veh/h)							° 768							1374		-
cupacity, c (ven/1)	-						0.01							0.01		-
v/c Batio	1						0.01							0.01		
v/c Ratio							0.0							0.0		
95% Queue Length, $Q_{95}$ (veh)							97							76		
95% Queue Length, Q95 (veh) Control Delay (s/veh)							9.7 A							7.6		
95% Queue Length, $Q_{95}$ (veh)						9	9.7 A							A	.4	

### EXHIBIT 4.30 2027 TOTAL PEAK AM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inforr	natio	n						
Analyst	T						Inters	ection			Greer	n Links/N	/anotick	Stat		
Agency/Co.	-						Jurisd	liction			City c	of Ottawa	а			
Date Performed	8/19/	2021					East/	West Stre	eet			n Links V				
Analysis Year	2027							n/South S				otick Stat		d		
Time Analyzed	Peak	AM Hou	ır				Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	n-South					Analy	sis Time	Period (	hrs)	0.25					
Project Description	Emer	ald Subc	livision													_
Lanes	-															
				14474		۲ ۲ ۲ ۴		74 477 FC								
Vehicle Volumes and Ad	justme	ents			Majo	r Street: Nor	th-South									
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		23			187	1		9	75	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							D									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)	T					7.1		6.2						4.1		T
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
	d Leve	l of S	ervice													-
Delay, Queue Length an							26							10		1
	1						<u> </u>									
Flow Rate, v (veh/h)							832							13/3		1
Flow Rate, v (veh/h) Capacity, c (veh/h)							832 0.03							1373		
Capacity, c (veh/h) v/c Ratio							0.03							0.01		
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)							0.03 0.1							0.01		
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)							0.03 0.1 9.5							0.01 0.0 7.6		
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)							0.03 0.1							0.01 0.0 7.6 A	.9	

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### EXHIBIT 4.31 2027 TOTAL PEAK PM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inform	natio	n						
Analyst	T						Inters	ection			Greer	n Links/N	/anotick	Stat		
Agency/Co.	-						Jurisd	liction			City c	of Ottawa	а			
Date Performed	8/19/	2021					East/	Nest Stre	eet			n Links V				_
Analysis Year	2027						North	/South S	Street		Mano	otick Stat	tion Roa	d		
Time Analyzed	Peak	PM Hou	r					Hour Fac			0.92					
Intersection Orientation		n-South	-					sis Time		hrs)	0.25					
Project Description		ald Subc	livision													
Lanes																
				14 4 Y 4 Y 4	0.5	ት ት ት ት	1 2 4	74 477 PC								
Vehicle Volumes and Ad	justme	ents			Majo	Street: Nor	th-South									
Approach		Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		14			177	1		23	267	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							D									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)	T					7.1		6.2						4.1		<b>—</b>
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
Delay, Queue Length, an	d Leve	lofs	ervice													-
Flow Rate, v (veh/h)							16							25		1
Capacity, c (veh/h)							813							1386		-
v/c Ratio	-						0.02							0.02		-
95% Queue Length, Q₂₅ (veh)							0.02							0.02		
Control Delay (s/veh)	-						9.5		_					7.6		-
control Delay (5/ Vell)		<u> </u>														-
Level of Service (LOS)																
Level of Service (LOS) Approach Delay (s/veh)	-						A .5							A 0	.8	

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### EXHIBIT 4.32 2032 TOTAL PEAK AM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inform	natio	n						
Analyst	T						Inters	ection			Greer	n Links/N	/anotick	Stat		
Agency/Co.							Jurisd	liction			City c	of Ottawa	а			
Date Performed	8/19/	2021					East/	Nest Stre	eet			n Links V				
Analysis Year	2032						-	/South S				tick Stat		d		
Time Analyzed	Peak	AM Hou	r					Hour Fac			0.92					
Intersection Orientation	North	n-South						sis Time		hrs)	0.25					
Project Description		ald Subc	livision													
Lanes																
				14 4 Y 4 P F	0.5	ት የ ቀ የ	1 2 4	7 74 477 1 1 C								
Vehicle Volumes and Ad	justme	ents			Majo	r Street: Nor	th-South									
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	Ijustments           Eastbound           U         L         T         F           10         11         1					7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		23			196	1		9	79	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)						7.1		6.2						4.1		T
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
Delay, Queue Length, an	dlava		orvice													
						1	26				1			10		1
Flow Rate, v (veh/h)							26							1262		-
Capacity, c (veh/h) v/c Ratio							821 0.03							1362		-
														0.01		-
95% Queue Length, Q₃₅ (veh)							0.1		-					0.0		-
Control Dolay (chich)		1	I	1	1	1	9.5	1		1	1	1	1	7.7		
Control Delay (s/veh)																
Control Delay (s/veh) Level of Service (LOS) Approach Delay (s/veh)	-						A							A	.8	

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### EXHIBIT 4.33 2032 TOTAL PEAK PM HOUR ANALYSIS - Green Links/Manotick Station

General Information							Site	Inforn	natio	n						
Analyst	T						Inters	ection			Greer	n Links/N	/anotick	Stat		
Agency/Co.	+						Jurisd	iction			City c	of Ottawa	а			
Date Performed	8/19/	2021						Nest Stre	eet			n Links W				
Analysis Year	2032							/South S				tick Stat		d		
Time Analyzed		PM Hou	r					Hour Fac			0.92			-		
Intersection Orientation		n-South						sis Time		hrs)	0.25					
Project Description		ald Subc	livision													_
Lanes																
				14 YY YY	0.5	ት • • • •	1 2 4	Y 14 477 1 1 C								
Vehicle Volumes and Ad	justme	ents				Street: Nor										
Approach	$\square$	Eastb	ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						1		14			186	1		23	280	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						. (	0									
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow up H	eadwa	ys														
Critical and Follow-up H			_											4.1		
Base Critical Headway (sec)						7.1		6.2		I						
Base Critical Headway (sec)						7.1 6.41		6.2 6.21						4.11		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)														4.11 2.2		
Base Critical Headway (sec) Critical Headway (sec)						6.41		6.21								
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)	d Leve	l of S	ervice			6.41 3.5		6.21 3.3						2.2		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an	d Leve	l of S	ervice			6.41 3.5	16	6.21 3.3						2.2 2.21		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	l of S	ervice			6.41 3.5	16	6.21 3.3						2.2 2.21 25		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	l of S	ervice			6.41 3.5	801	6.21 3.3						2.2 2.21 25 1374		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	l of S	ervice			6.41 3.5	801 0.02	6.21 3.3						2.2 2.21 25 1374 0.02		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	I of S	ervice			6.41 3.5	801 0.02 0.1	6.21 3.3						2.2 2.21 25 1374 0.02 0.1		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	d Leve	l of S	ervice			6.41 3.5	801 0.02 0.1 9.6	6.21 3.3						2.2 2.21 25 1374 0.02 0.1 7.7		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) <b>Delay, Queue Length, an</b> Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q <sub>95</sub> (veh)	d Leve	l of S	ervice			6.41 3.5 3.51	801 0.02 0.1	6.21 3.3						2.2 2.21 25 1374 0.02 0.1 7.7 A	.7	

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## EXHIBIT 4.34 2018 EXISTING PEAK AM HOUR ANALYSIS - Apple Orchard/Stagecoach

Site Here - Site - Sit	
Agency/Co.         City of VIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	nformation
Date Parformed         8/20/201         East/West Struet         Apple Charles         Apple Charles           Analysis Time Period (hts)         2018         Image Margine Period (hts)         0.2         Image Margine Period (hts)         I	
Analysis Time Period (hrs)Q23Verture Verture Vertur	
Analysis Time Period (Irsy)       Q2       Image and period (Irsy)       Q2         Time Analyzed       Peak All Hour	ned 8/
Time Analyzed       Pesk AM Hour         Project Description       Emeraid Subdivision         Lanes         Very Subdivision         Very Subdivision <td>r 20</td>	r 20
Project Description       Ensend Subdivision         Lanes         Substrain Sub	e Period (hrs) 0.7
Lanes Lanes Lanes Lanes Lanes Lanes Lanes Lanes Aproach Aproach Lane Aproach Lane	ed Pe
Approach         I<	ription En
Second S	
Vehicle Volume and Adjustements         image: Statements         Statements         Statements         Statements         Statements           Approach         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         I         T         T         T         S         T         S         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         T         S         S         S         S <th< th=""><th></th></th<>	
Novement         L         T         R         L         L         L         L         L         L         L         L         L         L	olume and Adjustmer
Volume47397556451428527477% Thrus in Shared LaneII	
% Thus in Shared LaneImage <t< td=""><td></td></t<>	
IaneI.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.1ConfigurationI.TR <td></td>	
ConfigurationLTRILTR <td>hared Lane</td>	hared Lane
How Rate, v (veh/n)1011011151035410145145Percent Heavy Vehicles10101010101010101010Departure Headway and Severation	I
Percent Heavy Vehicles1010101010101010Departure Headway and SeverationInitial Departure Headway, hd (s)3.20<	in L
Departure Headway and Service Time         Initial Departure Headway, hd (s)       3.20	(veh/h) 1
Initial Departure Headway, hd (s) $3.20$ <	vy Vehicles 3
Initial Degree of Utilization, x       0.090       0.102       0.102       0.315       0.102       0.129         Final Departure Headway, hd (s)       5.57       1       5.25       1       4.83       1       5.17       1         Final Degree of Utilization, x       0.157       1       0.168       1       0.476       1       0.207       1         Move-Up Time, m (s)       2.0       1       2.0       2.0       2.0       2.0       2.0       3.17       3.17         Service Time, ts (s)       3.57       1       1       3.25       1       2.83       1       3.17       3.17         Flow Rate, v (veh/h)       101       1       115       1       354       1       145       697         95% Queue Length, Qes (veh)       0.61       685       1       3.17       145       697       697         101       1       1       15       1       1       1       145       697       697       697         95% Queue Length, Qes (veh)       0.6       1       68       1       12.1       0       9.3       1       1       9.5       4       4       1       1       1       1       1 <td>e Headway and Servic</td>	e Headway and Servic
Final Departure Headway, hd (s)       5.57       Image: Second S	ture Headway, hd (s) 3
Final Degree of Utilization, x       0.157       Image: constraint of the state of th	e of Utilization, x 0.0
Move-Up Time, m (s)       2.0       Image: Constraint of the constrain	ure Headway, hd (s) 5.
Service Time, ts (s)       3.57       Image: Service Time, ts (s)       3.57       3.25       3.25       2.83       Image: Service Time, ts (s)       3.17         Capacity, Delay and Level of Service         Flow Rate, v (veh/h)       101       Image: Service Time, ts (s)       3.57       115       Service Time, ts (s)       3.57       145         Gapacity, Delay and Level of Service       101       Image: Service Time, ts (s)       101       Image: Service Time, ts (s)       354       Image: Service Time, ts (s)       145         Flow Rate, v (veh/h)       101       Image: Service Time, ts (s)       101       Image: Service Time, ts (s)       354       Image: Service Time, ts (s)       145       145       145       145       145       145       145       145       145       145       145       145       145       145	of Utilization, x 0.7
Capacity, Delay and Level of Service         101         105         115         354         145         145           Flow Rate, v (veh/h)         101         0         115         0         354         0         145         697           Capacity         646         0         685         1         745         0         697         697           95% Queue Length, Q <sub>95</sub> (veh)         0.6         0.6         0         2.6         0.8         0.9         9.5         9.5         9.5         9.5         9.5         9.5	me, m (s) 2
Flow Rate, v (veh/h)       101       Image: Normal system is a s	e, ts (s) 3
Capacity       646       646       685       685       745       697       697         95% Queue Length, Q <sub>95</sub> (veh)       0.6       0.6       0.6       2.6       0.6       0.8       0.8       0.8       0.8         Control Delay (s/veh)       9.6       0.6       9.3       0.6       12.1       0.6       9.5       9.5         Level of Service, LOS       A       0.6       A       0.8	Delay and Level of Se
95% Queue Length, Q <sub>95</sub> (veh)         0.6         0.6         0.6         0.6         2.6         0.6         0.8           Control Delay (s/veh)         9.6         0.6         9.3         0.6         12.1         0.6         9.5           Level of Service, LOS         A         0.6         A         0.6         12.1         0.6         A           Approach Delay (s/veh)         9.6         0.6         A         0.6         12.1         0.6         A	(veh/h) 1
Control Delay (s/veh)       9.6       9.6       9.3       9.3       12.1       9.5       9.5         Level of Service, LOS       A       Image: Control Delay (s/veh)       Ima	6
Level of Service, LOS         A         A         A         B         A         A           Approach Delay (s/veh)         9.6         9.3         12.1         9.5	Length, Q <sub>95</sub> (veh) C
Approach Delay (s/veh) 9.6 9.3 12.1 9.5	ay (s/veh) S
	vice, LOS
	elay (s/veh)
Approach LOS A A A B A	S

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# EXHIBIT 4.35 2018 EXISTING PEAK PM HOUR ANALYSIS - Apple Orchard/Stagecoach

				-	· · · · · · · · · · · · · · · · · · ·	_	leport					
General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	tion			City of 0	Ottawa		
Date Performed	8/20/20	21			East/We	est Street			Apple C	rchard Roa	ıd	
Analysis Year	2018				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak PN	/I Hour										
Project Description	Emeralo	Subdivisio	n									
Lanes												
			J 4 4 7 4 1 1	14*	ዮ ፖተኑና	* *						
Vehicle Volume and Adjus	tments											
Approach		Eastbound		· ·	Westbound	Ł	1	Northbound	d	S	outhboun	d
	_											
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Movement Volume	L 23	T 49	R 18	L 39	T 70	R 59	L 11	T 90	R 32	L 38	T 242	R 37
	_											
Volume	_											
Volume % Thrus in Shared Lane	23	49	18	39	70	59	11	90	32	38	242	37
Volume % Thrus in Shared Lane Lane	23 L1	49	18	39 L1	70	59	11 L1	90	32	38 L1	242	37
Volume % Thrus in Shared Lane Lane Configuration	23 L1 LTR	49	18	39 L1 LTR	70	59	11 L1 LTR	90	32	38 L1 LTR	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	23 L1 LTR 98 10	49 L2	18	39 L1 LTR 183	70	59	11 L1 LTR 145	90	32	38 L1 LTR 345	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	23 L1 LTR 98 10	49 L2	18	39 L1 LTR 183	70	59	11 L1 LTR 145	90	32	38 L1 LTR 345	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	23 L1 LTR 98 10	49 L2	18	39 L1 LTR 183 3	70	59	11 L1 LTR 145 3	90	32	38 L1 LTR 345 5	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s)	23 23 11 11 98 10 <b>Cervice Ti</b> 3.20	49 L2	18	39 L1 LTR 183 3 3.20	70	59	11 L1 LTR 145 3 3.20	90	32	38 L1 LTR 345 5 3.20	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x	23 L1 L1 98 10 <b>:ervice Ti</b> 3.20 0.087	49 L2	18	39 L1 LTR 183 3 .20 0.162	70	59	11 L1 LTR 145 3 .20 0.129	90	32	38 L1 LTR 345 5 	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s)	23 L1 L1 98 10 <b>Eervice Ti</b> 3.20 0.087 5.54	49 L2	18	39 L1 LTR 183 3 3.20 0.162 5.19	70	59	11 L1 LTR 145 3 3.20 0.129 5.07	90	32	38 L1 LTR 345 5 3.20 0.306 4.91	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Depare of Utilization, x	<ul> <li>23</li> <li>23</li> <li>4</li> <li>4</li> <li>4</li> <li>4</li> <li>7</li> <li>98</li> <li>10</li> <li>10<td>49 L2</td><td>18</td><td>39 L1 LTR 183 3 3.20 0.162 5.19 0.263</td><td>70</td><td>59</td><td>11 L1 LTR 145 3 3.20 0.129 5.07 0.203</td><td>90</td><td>32</td><td>38 L1 LTR 345 5 3.20 0.306 4.91 0.470</td><td>242</td><td>37</td></li></ul>	49 L2	18	39 L1 LTR 183 3 3.20 0.162 5.19 0.263	70	59	11 L1 LTR 145 3 3.20 0.129 5.07 0.203	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>23</li> <li>23</li> <li>L1</li> <li>LTR</li> <li>98</li> <li>10</li> <li>5.54</li> <li>0.150</li> <li>2.0</li> <li>3.54</li> </ul>	49 L2 	18	39 L1 LTR 183 3 3.20 0.162 5.19 0.263 2.0	70	59	11 L1 LTR 145 3 .20 0.129 5.07 0.203 2.0	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470 2.0	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>23</li> <li>23</li> <li>L1</li> <li>LTR</li> <li>98</li> <li>10</li> <li>5.54</li> <li>0.150</li> <li>2.0</li> <li>3.54</li> </ul>	49 L2 	18	39 L1 LTR 183 3 3.20 0.162 5.19 0.263 2.0	70	59	11 L1 LTR 145 3 .20 0.129 5.07 0.203 2.0	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470 2.0	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Service Time, ts (s) Capacity, Delay and Level	23       1       1       1       1       1       10    <	49 L2 	18	39 L1 LTR 183 3 3.20 0.162 5.19 0.263 2.0 3.19	70	59	11 L1 LTR 145 3 3.20 0.129 5.07 0.203 2.0 3.07	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470 2.0 2.91	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h)	<ul> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>28</li> <li>3.20</li> <li>3.20</li> <li>3.20</li> <li>0.087</li> <li>5.54</li> <li>0.150</li> <li>2.0</li> <li>3.54</li> <li>0.54</li> <l< td=""><td>49 L2 </td><td>18</td><td>39 L1 LTR 183 3 3 .20 0.162 5.19 0.263 2.0 3.19 .20 3.19</td><td>70</td><td>59</td><td>11 L1 LTR 145 3 0.129 5.07 0.203 2.0 3.07 3.07</td><td>90</td><td>32</td><td>38 L1 LTR 345 5 320 0.306 4.91 0.470 2.0 2.91 2.91</td><td>242</td><td>37</td></l<></ul>	49 L2 	18	39 L1 LTR 183 3 3 .20 0.162 5.19 0.263 2.0 3.19 .20 3.19	70	59	11 L1 LTR 145 3 0.129 5.07 0.203 2.0 3.07 3.07	90	32	38 L1 LTR 345 5 320 0.306 4.91 0.470 2.0 2.91 2.91	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity	23       L1       LTR       98       10       2.0       3.20       0.087       5.54       0.150       2.0       3.54       of Servic       98       650	49 L2 	18	39 L1 LTR 183 3 3 3.20 0.162 5.19 0.263 2.0 3.19 3.19 183 694	70	59	11 L1 LTR 145 3 3.20 0.129 5.07 0.203 2.0 3.07 3.07 145 710	90	32	38 L1 LTR 345 5 345 3.20 0.306 4.91 0.470 2.0 2.91 2.91 345 345	242	37
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	<ul> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>23</li> <li>24</li> <li>3.20</li> <li>3</li></ul>	49 L2 	18	39 L1 LTR 183 3 3 3 3 2.0 0.162 5.19 0.263 2.0 3.19 183 694 1.1	70	59	11 L1 LTR 145 3 3.20 0.129 5.07 0.203 2.0 3.07 3.07 145 710 0.8	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470 2.0 2.91 345 733 2.5	242	37
Volume Vo	23       23       24       25       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       3.20       98       650       98       650       0.5       9.5	49 L2 	18	39 L1 LTR 183 3 3 3 2.0 0.162 5.19 0.263 2.0 3.19 183 694 1.1 10.0	70	59	11 L1 LTR 145 3 .20 0.129 5.07 0.203 2.0 3.07 3.07 145 710 0.8 9.4	90	32	38 L1 LTR 345 5 3.20 0.306 4.91 0.470 2.0 2.91 2.91 345 733 2.5 12.2	242	37

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# EXHIBIT 4.36 2027 BACKGROUND PEAK AM HOUR ANALYSIS - Apple Orchard/Stagecoach

General Information					Site In	format	ion					
Analyst					Intersec				Annle C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict				City of C		gecouch	
Date Performed	8/20/20	21				est Street				rchard Roa	ıd	
Analysis Year	2027					outh Stree	t			ach Road		
Analysis Time Period (hrs)	0.25					our Factor	-		0.92			
Time Analyzed	Peak AN	1 Hour										
Project Description	Emerald	Subdivisio	'n									
Lanes												
			<u> </u>	ገ ፋ ጭ ነ	ዮ የተኮሰ	* 14*71						
Vehicle Volume and Adjus	tments					_						
Approach		Eastbound			Westbound	ł	1	Northboun	d	9	outhboun	d
Maximum and	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Movement	-					ĸ	<u>ـ</u>			-		
Volume	51	46	8	5	62	49	15	312	30	51	83	
	_											11
Volume	_											
Volume % Thrus in Shared Lane	51	46	8	5	62	49	15	312	30	51	83	11
Volume % Thrus in Shared Lane Lane	51 L1	46	8	5 L1	62	49	15 L1	312	30	51 L1	83	11
Volume % Thrus in Shared Lane Lane Configuration	51 L1 LTR	46	8	5 L1 LTR	62	49	15 L1 LTR	312	30	51 L1 LTR	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	51 L1 LTR 114 10	46 L2	8	5 L1 LTR 126	62	49	15 L1 LTR 388	312	30	51 L1 LTR 158	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	51 L1 LTR 114 10	46 L2	8	5 L1 LTR 126	62	49	15 L1 LTR 388	312	30	51 L1 LTR 158	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	51 L1 LTR 114 10	46 L2	8	5 L1 LTR 126 10	62	49	15 L1 LTR 388 10	312	30	51 L1 LTR 158 10	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s)	51 L1 LTR 114 10 Cervice Ti 3.20	46 L2	8	5 L1 LTR 126 10 3.20	62	49	15 L1 LTR 388 10 3.20	312	30	51 L1 LTR 158 10 3.20	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x	<ul> <li>51</li> <li>L1</li> <li>LTR</li> <li>114</li> <li>10</li> <li>Cervice Till</li> <li>3.20</li> <li>0.101</li> </ul>	46 L2	8	5 L1 LTR 126 10 3.20 0.112	62	49	15 L1 LTR 388 10 	312	30	51 L1 LTR 158 10 3.20 0.140	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s)	51 L1 LTR 114 10 LTR 3.20 0.101 5.76	46 L2	8	5 L1 LTR 126 10 3.20 0.112 5.45	62	49	15 L1 LTR 388 10 3.20 0.345 4.97	312	30	51 L1 LTR 158 10 3.20 0.140 5.33	83	11
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degreture Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>51</li> <li>L1</li> <li>LTR</li> <li>114</li> <li>0</li> <li>3.20</li> <li>0.101</li> <li>5.76</li> <li>0.183</li> <li>2.0</li> <li>3.76</li> </ul>	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191	62	49	15 L1 LTR 388 10 3.20 0.345 4.97 0.535	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degrature Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>51</li> <li>L1</li> <li>LTR</li> <li>114</li> <li>0</li> <li>3.20</li> <li>0.101</li> <li>5.76</li> <li>0.183</li> <li>2.0</li> <li>3.76</li> </ul>	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0	62	49	15 L1 LTR 388 10 .320 0.345 4.97 0.535 2.0	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degarture Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>51</li> <li>L1</li> <li>LTR</li> <li>114</li> <li>0</li> <li>3.20</li> <li>0.101</li> <li>5.76</li> <li>0.183</li> <li>2.0</li> <li>3.76</li> </ul>	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0	62	49	15 L1 LTR 388 10 .320 0.345 4.97 0.535 2.0	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Service Time, m (s) Service Time, ts (s)	51       L1       LTR       114       0.000       3.20       0.101       5.76       0.183       2.0       3.76	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0 3.45	62	49	15 L1 LTR 388 10 3.20 0.345 4.97 0.535 2.0 2.97	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0 3.33	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degreture Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h)	51       L1       114       0.101       5.76       0.183       2.0       3.76       5.76       114	46 L2 Me	8	5 L1 LTR 126 10 .10 .12 5.45 0.191 2.0 3.45	62	49	15 L1 LTR 388 10 388 10 .345 4.97 0.335 2.0 2.97 2.97	312	30	51 L1 LTR 158 10 .158 .3.20 0.140 5.33 0.234 2.0 3.33	83	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity	51       ↓	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0 3.45 126 661	62	49	15 L1 LTR 388 10 388 10 388 3.20 0.345 4.97 0.535 2.0 2.97 2.97 2.97 3.88 3.88 725	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0 3.33 2.2 3.33	83	1:
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	51       L1       LTR       114       0.0101       5.76       0.183       2.0       3.76       114       0.183       10	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0 3.45 126 661 0.7	62	49	15 L1 LTR 388 10 3.20 0.345 4.97 0.535 2.0 2.0 2.97 388 725 3.2	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0 3.33 0.234 2.0 158 675 0.9	83	1:
Volume Vo	51           1	46 L2 Me	8	5 L1 LTR 126 10 3.20 0.112 5.45 0.191 2.0 3.45 126 661 0.7 9.7	62	49	15 L1 LTR 388 10 3.20 0.345 4.97 0.535 2.0 2.97 2.97 388 725 3.88 725 3.2 1.3.5	312	30	51 L1 LTR 158 10 3.20 0.140 5.33 0.234 2.0 3.33 0.234 2.0 1.58 6.75 0.9 1.58	83	1

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# EXHIBIT 4.37 2027 BACKGROUND PEAK PM HOUR ANALYSIS - Apple Orchard/Stagecoach

General Information					Site In	format	ion					
Analyst					Intersec				Apple O	rchard/Sta	gecoach	
Agency/Co.	_				Jurisdict				City of C		gecouch	
Date Performed	8/20/20	21				st Street				rchard Roa	ıd	
Analysis Year	2027					outh Stree	t			ach Road		
Analysis Time Period (hrs)	0.25					our Factor	-		0.92			
Time Analyzed	Peak PN	/ Hour										
Project Description	Emeralo	Subdivisio	n									
Lanes												
			747744 4		₽ ₽ ₽ 1	* 14*71						
Vehicle Volume and Adjus	tments											
Approach		Eastbound			Westbound	4		Vorthbound	4		outhboun	d
Movement	L	T	R	L	T	R	L	T	R	L	Т	R
Movement Volume	L 25										T 265	R
Movement	25	T 56	R 20	L 43	T 80	R 65	L 12	T 98	R 35	L 42	265	R 40
Movement Volume % Thrus in Shared Lane Lane	25 L1	Т	R	L 43 L1	Т	R	L 12 L1	Т	R	L 42 L1		R 4(
Movement Volume % Thrus in Shared Lane	25	T 56	R 20	L 43	T 80	R 65	L 12	T 98	R 35	L 42	265	
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h)	25 L1 LTR 110	T 56	R 20	L 43 L1	T 80	R 65	L 12 L1 LTR 158	T 98	R 35	L 42 L1 LTR 377	265	R 40
Movement Volume % Thrus in Shared Lane Lane Configuration	25 L1 LTR	T 56	R 20	L 43 L1 LTR	T 80	R 65	L 12 L1 LTR	T 98	R 35	L 42 L1 LTR	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	25 L1 LTR 110 10	T 56 L2	R 20	L 43 L1 LTR 204	T 80	R 65	L 12 L1 LTR 158	T 98	R 35	L 42 L1 LTR 377	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	25 L1 LTR 110 10	T 56 L2	R 20	L 43 L1 LTR 204	T 80	R 65	L 12 L1 LTR 158	T 98	R 35	L 42 L1 LTR 377	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	25 L1 LTR 110 10	T 56 L2	R 20	L 43 L1 LTR 204 3	T 80	R 65	L 12 L1 LTR 158 3	T 98	R 35	L 42 L1 LTR 377 5	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	25 L1 LTR 110 10 Cervice Ti	T 56 L2	R 20	L 43 L1 LTR 204 3 3.20	T 80	R 65	L 12 L1 LTR 158 3 .20	T 98	R 35	L 42 L1 LTR 377 5 3.20	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x	25 L1 LTR 110 10 <b>Cervice Ti</b> 3.20 0.098	T 56 L2	R 20	L 43 L1 LTR 204 3 .200 0.182	T 80	R 65	L 12 L1 LTR 158 3 .20 0.140	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s)	25 L1 L1 110 10 Eerrice Ti 3.20 0.098 5.79	T 56 L2	R 20	L 43 L1 204 3 3.20 0.182 5.41	T 80	R 65	L 12 L1 LTR 158 3 3.20 0.140 5.30	T 98	R 35	L 42 L1 377 5 3.20 0.335 5.09	265	R 40
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Depare of Utilization, x	<ul> <li>25</li> <li>25</li> <li>110</li> <li>100</li> <li>10</li> <li>3.20</li> <li>0.098</li> <li>5.79</li> <li>0.177</li> </ul>	T 56 L2	R 20	L 43 L1 LTR 204 3 3.20 0.182 5.41 0.307	T 80	R 65	L 12 L1 LTR 158 3 .20 0.140 5.30 0.232	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335 5.09 0.533	265	R 40
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Degree of Utilization, x Final Degree of Utilization, x Move-Up Time, m (s)	<ul> <li>25</li> <li>25</li> <li>110</li> <li>10</li> </ul> 6 Control Contro Control Control Control Control Control Control Control Contro	T 56 L2 2 	R 20	L 43 L1 LTR 204 3 3 .20 0.182 5.41 0.307 2.0	T 80	R 65	L 12 L1 LTR 158 3 .20 0.140 5.30 0.232 2.0	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335 5.09 0.533 2.0	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>25</li> <li>25</li> <li>110</li> <li>10</li> </ul> 6 Control Contro Control Control Control Control Control Control Control Contro	T 56 L2 2 	R 20	L 43 L1 LTR 204 3 3 .20 0.182 5.41 0.307 2.0	T 80	R 65	L 12 L1 LTR 158 3 .20 0.140 5.30 0.232 2.0	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335 5.09 0.533 2.0	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Service Time, ts (s) Capacity, Delay and Level	<ul> <li>25</li> <li>25</li> <li>4</li> <li>4</li> <li>4</li> <li>110</li> <li>10</li> <li>6</li> <li>7</li> <li>3.20</li> <li>0.098</li> <li>5.79</li> <li>0.177</li> <li>2.0</li> <li>3.79</li> <li>5</li> <li>5</li> <li>5</li> <li>7</li> <li7< li=""> <li8< li=""> <li8< li=""> <li>8</li> <li>8&lt;</li></li8<></li8<></li7<></ul>	T 56 L2 2 	R 20	L 43 L1 LTR 204 3 3 .20 0.182 5.41 0.307 2.0 3.41	T 80	R 65	L 12 L1 LTR 158 3 () () () () () () () () () () () () ()	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335 5.09 0.533 2.0 3.09	265	F 41
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h)	<ul> <li>25</li> <li>25</li> <li>4</li> <li>4</li> <li>110</li> <li>10</li> <li>10</li> <li>6</li> <li>5.79</li> <li>0.177</li> <li>2.0</li> <li>3.79</li> <li>6</li> <li>5</li> <li>7</li> <li>110</li> </ul>	T 56 L2 2 	R 20	L 43 L1 204 3 3.20 0.182 5.41 0.307 2.0 3.41	T 80	R 65	L 12 L1 LTR 158 3 .20 0.140 5.30 0.232 2.0 3.30	T 98	R 35	L 42 L1 377 5 3.20 0.335 5.09 0.533 2.0 3.09	265	F 4
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity	25       1	T 56 L2 2 	R 20	L 43 L1 204 3 3.20 0.182 5.41 0.307 2.0 3.41 2.04 665	T 80	R 65	L 12 L1 LTR 158 3 3 .20 0.140 5.30 0.232 2.0 0.232 2.0 3.30	T 98	R 35	L 42 L1 377 5 320 0.335 5.09 0.533 2.0 3.09 3.09	265	F 4
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% (veh)	<ul> <li>25</li> <li>25</li> <li>25</li> <li>25</li> <li>25</li> <li>25</li> <li>25</li> <li>3.20</li> <li>3.20</li></ul>	T 56 L2 2 	R 20	L 43 L1 LTR 204 3 3 .200 0.182 5.41 0.307 2.0 3.41 2.0 3.41 2.04 665 1.3	T 80	R 65	L 12 L1 LTR 158 3 3 .20 0.140 5.30 0.232 2.0 3.30 3.30 158 679 0.9	T 98	R 35	L 42 L1 LTR 377 5 3.20 0.335 5.09 0.533 2.0 3.09 3.09 3.77 708 3.2	265	F 41
Movement Volume Volume Volume Volums Normate Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway, hd (s) Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)  Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	25       1	T 56 L2 2 	R 20	L 43 L1 204 3 3 3 3 204 0.182 5.41 0.307 2.0 3.41 0.307 2.0 3.41 2.0 4 665 1.3 10.8	T 80	R 65	L 12 L1 LTR 158 3 3 .20 0.140 5.30 0.232 2.0 3.30 0.232 2.0 3.30 158 679 0.9 9.9	T 98	R 35	L 42 L1 377 5 3.20 0.335 5.09 0.533 2.0 3.09 3.09 3.09 3.09 3.09 3.09	265	4

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# EXHIBIT 4.38 2032 BACKGROUND PEAK AM HOUR ANALYSIS - Apple Orchard/Stagecoach

							leport			_		
General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	tion			City of C	Ottawa		
Date Performed	8/20/20	21			East/We	est Street			Apple C	rchard Roa	ıd	
Analysis Year	2032				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak AN	/I Hour										
Project Description	Emerald	Subdivisio	n									
Lanes												
			J 4 4 4 4 1	114	ት የተኑሰ	* 1 * * Y						
Vehicle Volume and Adjus	tments											
Approach		Eastbound		· ·	Westbound	k	1	Northbound	d	5	Southboun	d
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	L 54	T 48	R 8	L 6	T 65	R 52	L 16	T 327	R 31	L 54	T 87	R 11
Volume												
Volume % Thrus in Shared Lane	54	48	8	6	65	52	16	327	31	54	87	11
Volume % Thrus in Shared Lane Lane	54 L1	48	8	6 L1	65	52	16 L1	327	31	54 L1	87	11
Volume % Thrus in Shared Lane Lane Configuration	54 54 L1 LTR	48	8	6 L1 LTR	65	52	16 L1 LTR	327	31	54 L1 LTR	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	54 L1 LTR 120 10	48 L2	8	6 L1 LTR 134	65	52	16 L1 LTR 407	327	31	54 L1 LTR 165	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	54 L1 LTR 120 10	48 L2	8	6 L1 LTR 134	65	52	16 L1 LTR 407	327	31	54 L1 LTR 165	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	54 L1 LTR 120 10 ervice Ti	48 L2	8	6 L1 LTR 134 10	65	52	16 L1 LTR 407 10	327	31	54 L1 LTR 165 10	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	54 L1 LTR 120 10 ervice Til 3.20	48 L2	8	6 L1 LTR 134 10 3.20	65	52	16 L1 LTR 407 10 3.20	327	31	54 L1 LTR 165 10 3.20	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>LTR</li> <li>120</li> <li>10</li> </ul> ervice Till <ul> <li>3.20</li> <li>0.106</li> </ul>	48 L2	8	6 L1 LTR 134 10 3.20 0.119	65	52	16 L1 LTR 407 10 3.20 0.361	327	31	54 L1 LTR 165 10 3.20 0.147	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	<ul> <li>54</li> <li>L1</li> <li>LTR</li> <li>120</li> <li>10</li> </ul> ervice Till <ul> <li>3.20</li> <li>0.106</li> <li>5.89</li> </ul>	48 L2	8	6 L1 LTR 134 10 3.20 0.119 5.57	65	52	16 L1 LTR 407 10 3.20 0.361 5.04	327	31	54 L1 LTR 165 10 3.20 0.147 5.44	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Degree of Utilization, x	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>120</li> <li>10</li> </ul> Ervice Till <ul> <li>3.20</li> <li>0.106</li> <li>5.89</li> <li>0.196</li> </ul>	48 L2	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250	87	11
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degreture Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s)	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>120</li> <li>10</li> <li>3.20</li> <li>0.106</li> <li>5.89</li> <li>0.196</li> <li>2.0</li> <li>3.89</li> </ul>	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Degree of Utilization, x Final Degarture Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>120</li> <li>10</li> <li>3.20</li> <li>0.106</li> <li>5.89</li> <li>0.196</li> <li>2.0</li> <li>3.89</li> </ul>	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Service Time, ts (s) Capacity, Delay and Level	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>LTR</li> <li>120</li> <li>10</li> <li>3.20</li> <li>0.106</li> <li>5.89</li> <li>0.196</li> <li>2.0</li> <li>3.89</li> <li>5 Service</li> </ul>	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0 3.57	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0 3.04	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0 3.44	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Final Degree of Utilization, x Final Degree of Utilization, x Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h)	<ul> <li>54</li> <li>54</li> <li>L1</li> <li>120</li> <li>10</li> <li>3.20</li> <li>0.106</li> <li>5.89</li> <li>0.196</li> <li>2.0</li> <li>3.89</li> <li>OF Servic</li> <li>120</li> </ul>	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0 3.57 2.0 3.57	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0 3.04	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0 3.44	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final	54       L1       LTR       120       10       3.20       0.106       5.89       0.196       2.0       3.89       55       120       120       120       120       120       120       120       611	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0 3.57 2.0 134 646	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0 3.04 3.04	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0 2.0 3.44 3.44	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	54       L1       LTR       120       0.00       3.20       0.106       5.89       0.196       2.0       3.89       0120       120       120       120       120       120       120       0.120       0.120       0.7	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0 3.57 2.0 3.57	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0 3.04 407 715 3.6	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0 3.44 2.0 3.44 165 661 1.0	87	11
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final	54           120           120           120           120           10           5.89           0.106           5.89           0.196           2.0           3.89           120	48 L2 	8	6 L1 LTR 134 10 3.20 0.119 5.57 0.207 2.0 3.57 2.0 1.34 646 0.8 10.0	65	52	16 L1 LTR 407 10 3.20 0.361 5.04 0.569 2.0 3.04 2.0 3.04 407 7.15 3.6 14.5	327	31	54 L1 LTR 165 10 3.20 0.147 5.44 0.250 2.0 3.44 105 661 1.0 100	87	11

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## EXHIBIT 4.39 2032 BACKGROUND PEAK PM HOUR ANALYSIS - Apple Orchard/Stagecoach

General Information					Sito In	format	ion					
											1	
Analyst					Intersec					rchard/Sta	gecoach	
Agency/Co.	0.000.000				Jurisdict				City of C			
Date Performed	8/20/20	21				est Street				rchard Roa	d	
Analysis Year	2032 0.25					outh Stree	t		0.92	ach Road		
Analysis Time Period (hrs)	Peak PN	4 Hour			Реак по				0.92			
Time Analyzed Project Description		Subdivisio										
Lanes	Emeraic	Subalvisio	)(I)									
			14 1 7 4 P 1	ייייייייייייייייייייייייייייייייייייי		* 1447177						
Vehicle Volume and Adjus	tments		1									
Ammroach		Eastbound			Westbound	-1			-1		outhbound	d
Approach		EastDound			westbound		, r	Northbound				
Movement	L	T	R	L	T	R	L	T	R	L	Т	R
	L 26									<u> </u>		
Movement	_	Т	R	L	Т	R	L	Т	R	L	Т	R
Movement Volume	_	Т	R	L	Т	R	L	Т	R	L	Т	R
Movement Volume % Thrus in Shared Lane	26	T 59	R 21	L 45	T 84	R 68	L 13	T 103	R 37	L 44	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane	26	T 59	R 21	L 45 L1	T 84	R 68	L 13 L1	T 103	R 37	L 44 L1	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration	26 L1 LTR	T 59	R 21	L 45 L1 LTR	T 84	R 68	L 13 L1 LTR	T 103	R 37	L 44 L1 LTR	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	26 L1 LTR 115 10	T 59 L2	R 21	L 45 L1 LTR 214	T 84	R 68	L 13 L1 LTR 166	T 103	R 37	L 44 L1 LTR 397	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	26 L1 LTR 115 10	T 59 L2	R 21	L 45 L1 LTR 214	T 84	R 68	L 13 L1 LTR 166	T 103	R 37	L 44 L1 LTR 397	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	26 L1 LTR 115 10 ervice Ti	T 59 L2	R 21	L 45 L1 LTR 214 3	T 84	R 68	L 13 L1 LTR 166 3	T 103	R 37	L 44 L1 LTR 397 5	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	26 26 11 11 115 10 ervice Ti 3.20	T 59 L2	R 21	L 45 L1 LTR 214 3 3.20	T 84	R 68	L 13 L1 LTR 166 3 .20	T 103	R 37	L 44 L1 LTR 397 5 3.20	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x	<ul> <li>26</li> <li>21</li> <li>2</li></ul>	T 59 L2	R 21	L 45 L1 LTR 214 3 .20 0.190	T 84	R 68	L 13 L1 LTR 166 3 .20 0.148	T 103	R 37	L 44 L1 LTR 397 5 3.20 0.353	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	26 26 11 115 10 ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	T 59 L2	R 21	L 45 L1 214 3 3.20 0.190 5.52	T 84	R 68	L 13 L1 LTR 166 3	T 103	R 37	L 44 L1 LTR 397 5 320 0.353 5.17	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s)	<ul> <li>26</li> <li>26</li> <li>11</li> <li>115</li> <li>10</li> </ul> ervice Ti <ul> <li>3.20</li> <li>0.102</li> <li>5.92</li> <li>0.189</li> </ul>	T 59 L2	R 21	L 45 L1 LTR 214 3 3.20 0.190 5.52 0.328	T 84	R 68	L 13 L1 LTR 166 3	T 103	R 37	L 44 L1 LTR 397 5 320 0.353 5.17 0.570	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Depare of Utilization, x Final Depare of Utilization, x Move-Up Time, m (s)	<ul> <li>26</li> <li>26</li> <li>27</li> <li>115</li> <li>10</li> </ul> ervice Ti <ul> <li>3.20</li> <li>0.102</li> <li>5.92</li> <li>0.189</li> <li>2.0</li> <li>3.92</li> </ul>	T 59 L2 	R 21	L 45 L1 LTR 214 3 3.20 0.190 5.52 0.328 2.0	T 84	R 68	L 13 L1 LTR 166 3	T 103	R 37	L 44 L1 397 5 3.20 0.353 5.17 0.570 2.0	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	<ul> <li>26</li> <li>26</li> <li>27</li> <li>115</li> <li>10</li> </ul> ervice Ti <ul> <li>3.20</li> <li>0.102</li> <li>5.92</li> <li>0.189</li> <li>2.0</li> <li>3.92</li> </ul>	T 59 L2 	R 21	L 45 L1 LTR 214 3 3.20 0.190 5.52 0.328 2.0	T 84	R 68	L 13 L1 LTR 166 3	T 103	R 37	L 44 L1 397 5 3.20 0.353 5.17 0.570 2.0	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final He	26       21       21       21       21       21       21       21       22       23       24       25       20       20       20       21       22       20       320 <td< td=""><td>T 59 L2 </td><td>R 21</td><td>L 45 L1 LTR 214 3 3.20 0.190 5.52 0.328 2.0 3.52</td><td>T 84</td><td>R 68</td><td>L 13 L1 LTR 166 3 3 .20 0.148 5.41 0.250 2.0 3.41</td><td>T 103</td><td>R 37</td><td>L 44 L1 397 5 3.20 0.353 5.17 0.570 2.0 3.17</td><td>T 278</td><td>R 43</td></td<>	T 59 L2 	R 21	L 45 L1 LTR 214 3 3.20 0.190 5.52 0.328 2.0 3.52	T 84	R 68	L 13 L1 LTR 166 3 3 .20 0.148 5.41 0.250 2.0 3.41	T 103	R 37	L 44 L1 397 5 3.20 0.353 5.17 0.570 2.0 3.17	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Final Degree of Utilization, x	<ul> <li>26</li> <li>26</li> <li>27</li> <li>115</li> <li>10</li> <li>10</li> <li>3.20</li> <li>0.102</li> <li>5.92</li> <li>0.189</li> <li>2.0</li> <li>3.92</li> <li>5.92</li> <li>5.92</li> <li>0.189</li> <li>10</li> </ul>	T 59 L2 	R 21	L 45 L1 214 3 3.20 0.190 5.52 0.328 2.0 3.52	T 84	R 68	L 13 L1 LTR 166 3 .20 0.148 5.41 0.250 2.0 3.41	T 103	R 37	L 44 L1 397 5 3.20 0.353 5.17 0.570 2.0 3.17	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (	26       21       21       21       21       21       21       21       21       22       23       20       3.92       0115       3.92       0115       115       608	T 59 L2 	R 21	L 45 214 3 3.20 0.190 5.52 0.328 2.0 3.52 2.14 4.52	T 84	R 68	L 13 L1 LTR 166 3 .3 .20 0.148 5.41 0.250 2.0 2.0 3.41 .166 .665	T 103	R 37	L 44 L1 397 5 320 0.353 5.17 0.570 2.0 3.17 397 6996	T 278	R 43
Movement Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (	26       21       226       21       21       21       21       21       21       320       320       0.102       5.92       0.189       2.0       3.92       5.92       115       5.92       115       608       0.7	T 59 L2 	R 21	L 45 214 3 3.20 0.190 5.52 0.328 2.0 3.52 2.0 3.52 2.14 652 1.4	T 84	R 68	L 13 L1 LTR 166 3 3.20 0.148 5.41 0.250 2.0 2.0 3.41 166 665 1.0	T 103	R 37	L 44 L1 LTR 397 5 397 397 0.353 5.17 0.570 2.0 3.17 3.17 397 696 3.6	T 278	R 43
Movement Volume Volume Volume Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure	26       2       2       1       1       1       1       1       1       1       10	T 59 L2 	R 21	L 45 L1 214 3 3 3.20 0.190 5.52 0.328 2.0 3.52 3.52 2.0 3.52 2.0 3.52 2.14 4.11.2	T 84	R 68	L 13 L1 L1 166 3 3 .20 0.148 5.41 0.250 2.0 3.41 0.250 2.0 3.41 106 665 1.0 10.2	T 103	R 37	L 44 L1 397 5 320 0.353 5.17 0.570 2.0 3.17 3.97 3.97 696 3.6 14.8	T 278	R 43

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# EXHIBIT 4.40 2027 TOTAL PEAK AM HOUR ANALYSIS - Apple Orchard/Stagecoach

		HCS7	All-W	/ay Sto	op Cor	ntrol R	eport					
General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	ion			City of 0	Ottawa		
Date Performed	8/20/20	21			East/We	st Street			Apple C	rchard Roa	ıd	
Analysis Year	2027				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak AN	/I Hour										
Project Description	Emerald	Subdivisio	n									
Lanes												
			J 4 4 4 4 4 4	144	ት የተኮሰ	↑ ↑ ↑ ↑ ↑ ↑						
Vehicle Volume and Adjus	tments					-						
Approach		Eastbound			Westbound	ł	1	Northboun	d	9	Southboun	d
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	51	48	8	5	63	50	15	313	30	53	85	11
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	116			128			389			162		
Percent Heavy Vehicles	10			10			10			10		
Departure Headway and S	ervice Ti	me										
Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.103			0.114			0.346			0.144		
Final Departure Headway, hd (s)	5.78			5.47			4.99			5.36		
Final Degree of Utilization, x	0.187			0.195			0.540			0.241		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.78			3.47			2.99			3.36		
Capacity, Delay and Level	of Servic	e										
Flow Rate, v (veh/h)	116			128			389			162		
Capacity	623			658			721			672		
95% Queue Length, Q₂₅ (veh)	0.7			0.7			3.3			0.9		
Control Delay (s/veh)	10.1			9.8			13.7			10.1		
Level of Service, LOS	В			A			В			В		
Approach Delay (s/veh)		10.1			9.8			13.7			10.1	
Approach LOS		В			A			В			В	

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# EXHIBIT 4.41 2027 TOTAL PEAK PM HOUR ANALYSIS - Apple Orchard/Stagecoach

			_		_	_	eport					
General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	ion			City of 0	Ottawa		
Date Performed	8/20/20	21			East/We	st Street			Apple C	rchard Roa	ıd	
Analysis Year	2027				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak PN	1 Hour										
Project Description	Emerald	Subdivisio	n									
Lanes												
			J 4 4 4 4 4	14 <b>4</b> 1	ዮ የተኮሰ	* *						
Vehicle Volume and Adjus	tments											
Approach		Eastbound			Westbound	ł	1	Northboun	d	S	outhboun	4
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	25	57	20	43	82	67	12	100	35	43	266	40
% Thrus in Shared Lane												
% Thrus in Shared Lane Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
	L1 LTR	L2	L3	L1 LTR	L2	L3	L1 LTR	L2	L3	L1 LTR	L2	L3
Lane		L2	L3		L2	L3		L2	L3		L2	L3
Lane Configuration	LTR	L2	L3	LTR	L2	L3	LTR	L2	L3	LTR	L2	L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	LTR 1111 10		L3	LTR 209	L2	L3	LTR 160	L2	L3	LTR 379	L2	L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	LTR 1111 10		L3	LTR 209	L2	L3	LTR 160	L2	L3	LTR 379	L2	L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	LTR 111 10 ervice Tit		L3	LTR 209 3	L2	L3	LTR 160 3	L2	L3	LTR 379 5	L2	L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	LTR 1111 10 ervice Tin 3.20		L3	LTR 209 3 3.20	L2	L3	LTR 160 3 3.20	L2		LTR 379 5 3.20	L2	L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x	LTR 1111 10 ervice Tin 3.20 0.099			LTR 209 3 3.20 0.186			LTR 160 3 3.20 0.142			LTR 379 5 3.20 0.337		L3
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	LTR 1111 0 ervice Tin 3.20 0.099 5.82			LTR 209 3 3.20 0.186 5.43	L2		LTR 160 3 3.20 0.142 5.33			LTR 379 5 3.20 0.337 5.11		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x	LTR 1111 ervice Til 3.20 0.099 5.82 0.179			LTR 209 3 3.20 0.186 5.43 0.315			LTR 160 3 3.20 0.142 5.33 0.237			LTR 379 5 3.20 0.337 5.11 0.539		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s)	LTR 111 0 0.099 5.82 0.179 2.0 3.82	me		LTR 209 3 3.20 0.186 5.43 0.315 2.0			LTR 160 3 3.20 0.142 5.33 0.237 2.0			LTR 379 5 3.20 0.337 5.11 0.539 2.0		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	LTR 111 0 0.099 5.82 0.179 2.0 3.82	me		LTR 209 3 3.20 0.186 5.43 0.315 2.0			LTR 160 3 3.20 0.142 5.33 0.237 2.0			LTR 379 5 3.20 0.337 5.11 0.539 2.0		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) <b>Capacity, Delay and Level</b>	LTR 111 3.20 3.20 5.82 0.099 5.82 0.179 2.0 3.82 0.179	me		LTR 209 3 3.20 0.186 5.43 0.315 2.0 3.43			LTR 160 3 3.20 0.142 5.33 0.237 2.0 3.33			LTR 379 5 3.20 0.337 5.11 0.539 2.0 3.11		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) <b>Capacity, Delay and Level</b> Flow Rate, v (veh/h)	LTR 111 0 0.099 5.82 0.179 2.0 3.82 0 5 5 8 2.0 111	me		LTR 209 3 3.20 0.186 5.43 0.315 2.0 3.43 2.09			LTR 160 3 			LTR 379 5 3.20 0.337 5.11 0.539 2.0 3.11 3.79		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h) Capacity	LTR 111 10 20,099 5.82 0,099 2,0 2,0 3.82 0179 0,179 3.82 0,179 1,11 6,18	me		LTR 209 3 0.186 5.43 0.315 2.0 3.43 209 663			LTR 160 3 0.142 5.33 0.237 2.0 3.33 160 675			LTR 379 5 3.20 0.337 5.11 0.539 2.0 3.11 3.11 3.79 7.04		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) <b>Capacity, Delay and Level</b> Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	LTR 111 10 3.20 5.82 0.099 5.82 0.179 2.0 3.82 0.179 1.11 618 0.6	me		LTR 209 3 3.20 0.186 5.43 0.315 2.0 3.43 209 663 1.3			LTR 160 3 			LTR 379 5 3.20 0.337 5.11 0.539 2.0 3.11 3.11 379 704 3.2		
Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Eapacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh) Control Delay (s/veh)	LTR 1111 0 0.099 0.099 0.079 0.	me		LTR 209 3 	L2		LTR 160 3 0.142 5.33 0.237 2.0 3.33 160 675 0.9 10.0	L2		LTR 379 5 	L2	

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# EXHIBIT 4.42 2032 TOTAL PEAK AM HOUR ANALYSIS - Apple Orchard/Stagecoach

		_					leport				_	
General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	tion			City of C	Ottawa		
Date Performed	8/20/20	21			East/We	est Street			Apple C	rchard Roa	ıd	
Analysis Year	2032				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak AN	1 Hour										
Project Description	Emerald	Subdivisio	n									
Lanes												
			J 4 4 4 4 4	ነተቀי	ም የተኑነ	4 Y 4 4 6						
Vehicle Volume and Adjus	tments											
Approach		Eastbound	-		Westbound	ł	1	Northboun	d	9	outhbound	d
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	54	50	8	6	66	53	16	328	31	56	89	13
Volume % Thrus in Shared Lane	54	50	8	6	66	53	16	328	31	56	89	13
	54	50 L2	8 	6 L1	66 L2	53 L3	16 	328 L2	31 L3	56 L1	89 	11 L3
% Thrus in Shared Lane												
% Thrus in Shared Lane Lane	L1			L1			L1			L1		
% Thrus in Shared Lane Lane Configuration	L1 LTR			L1 LTR			L1 LTR			L1 LTR		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	L1 LTR 122 10	L2		L1 LTR 136			L1 LTR 408			L1 LTR 170		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	L1 LTR 122 10	L2		L1 LTR 136			L1 LTR 408			L1 LTR 170		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	L1 LTR 122 10 ervice Ti	L2		L1 LTR 136 10			L1 LTR 408 10			L1 LTR 170 10		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	L1 LTR 122 10 ervice Ti 3.20	L2		L1 LTR 136 10 3.20			L1 LTR 408 10 3.20			L1 LTR 170 10 3.20		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x	L1 LTR 122 10 Ervice Tin 3.20 0.108	L2		L1 LTR 136 10 3.20 0.121			L1 LTR 408 10 3.20 0.362			L1 LTR 170 10 3.20 0.151		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Departure Headway, hd (s)	L1 LTR 122 10 Ervice Til 3.20 0.108 5.92	L2		L1 LTR 136 10 3.20 0.121 5.60			L1 LTR 408 10 3.20 0.362 5.06			L1 LTR 170 10 3.20 0.151 5.47		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departe of Utilization, x	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> <li>3.20</li> <li>0.108</li> <li>5.92</li> <li>0.200</li> </ul>	L2		L1 LTR 136 10 3.20 0.121 5.60 0.211			L1 LTR 408 10 3.20 0.362 5.06 0.573			L1 LTR 170 10 3.20 0.151 5.47 0.258		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> </ul> ervice The second se	L2 me		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> </ul> ervice The second se	L2 me		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> <li>************************************</li></ul>	L2 me		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0 3.60			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0 3.06			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0 3.47		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) <b>Capacity, Delay and Level</b> Flow Rate, v (veh/h)	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> </ul> ervice Tip <ul> <li>3.20</li> <li>0.108</li> <li>5.92</li> <li>0.200</li> <li>2.0</li> <li>3.92</li> </ul> of Servic	L2 me		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0 3.60			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0 3.06			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0 3.47		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Depart	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> <li>3.20</li> <li>0.108</li> <li>5.92</li> <li>0.200</li> <li>2.0</li> <li>3.92</li> <li>3.92</li> <li>5.92</li> <li>122</li> <li>608</li> </ul>	L2 		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0 3.60 3.60			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0 3.06 3.06 408 711			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0 3.47 3.47		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departu	<ul> <li>L1</li> <li>LTR</li> <li>122</li> <li>10</li> <li>3.20</li> <li>0.108</li> <li>5.92</li> <li>0.200</li> <li>2.0</li> <li>3.92</li> <li>5.92</li> <li>0.200</li> <li>122</li> <li>608</li> <li>0.7</li> </ul>	L2 		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0 3.60 3.60			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0 3.06 3.06 408 711 3.7			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0 3.47 2.0 3.47		
% Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) <b>Capacity, Delay and Level</b> Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	<ul> <li>L1</li> <li>L1R</li> <li>122</li> <li>10</li> <li></li></ul>	L2 		L1 LTR 136 10 3.20 0.121 5.60 0.211 2.0 3.60 3.60 136 643 0.8 10.1			L1 LTR 408 10 3.20 0.362 5.06 0.573 2.0 3.06 3.06 408 7.11 3.7 14.6			L1 LTR 170 10 3.20 0.151 5.47 0.258 2.0 3.47 3.47 170 658 1.0 458		

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# EXHIBIT 4.43 2032 TOTAL PEAK PM HOUR ANALYSIS - Apple Orchard/Stagecoach

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General Information					Site In	format	ion					
Analyst					Intersec	tion			Apple C	rchard/Sta	gecoach	
Agency/Co.					Jurisdict	tion			City of 0	Ottawa		
Date Performed	8/20/20	21			East/We	est Street			Apple C	rchard Roa	ıd	
Analysis Year	2032				North/S	outh Stree	t		Stageco	ach Road		
Analysis Time Period (hrs)	0.25				Peak Ho	our Factor			0.92			
Time Analyzed	Peak PN	1 Hour										
Project Description	Emerald	Subdivisio	'n									
Lanes												
			J 4 4 4 4 4 4		ዮ የተኮሰ	↑ ↑ ↑ ↑ ↑ ↑						
Vehicle Volume and Adjus	tments					-						
Approach		Eastbound			Westbound	ł	1	Northboun	d	S	outhbound	d
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Movement Volume	L 26	т 60	R 21	L 45	Т 86	R 70	L 13	T 105	R 37	L 45	T 279	R 43
Volume												
Volume % Thrus in Shared Lane	26	60	21	45	86	70	13	105	37	45	279	43
Volume % Thrus in Shared Lane Lane	26	60	21	45 	86	70	13 L1	105	37	45 L1	279	43
Volume % Thrus in Shared Lane Lane Configuration	26 L1 LTR	60	21	45 L1 LTR	86	70	13 L1 LTR	105	37	45 L1 LTR	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	26 26 11 11 116 10	60 L2	21	45 L1 LTR 218	86	70	13 L1 LTR 168	105	37	45 L1 LTR 399	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles	26 26 11 11 116 10	60 L2	21	45 L1 LTR 218	86	70	13 L1 LTR 168	105	37	45 L1 LTR 399	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S	26 L1 LTR 116 10 ervice Tit	60 L2	21	45 L1 LTR 218 3	86	70	13 L1 LTR 168 3	105	37	45 L1 LTR 399 5	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s)	26 26 11 11 116 10 <b>Ervice Ti</b> 3.20	60 L2	21	45 L1 LTR 218 3 .20	86	70	13 L1 LTR 168 3 3.20	105	37	45 L1 LTR 399 5 3.20	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles <b>Departure Headway and S</b> Initial Departure Headway, hd (s) Initial Degree of Utilization, x	26       1       1       1       1       1       1       1       1       1       1       1       1       1       1       10       10       10       10       10       10       10       10	60 L2	21	45 L1 LTR 218 3 .20 0.194	86	70	13 L1 LTR 168 3 .20 0.150	105	37	45 L1 LTR 399 5 	279	43
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s)	26       L1       LTR       116       10       SUBJECT TIME       3.20       0.103       5.95	60 L2	21	45 L1 LTR 218 3 3.20 0.194 5.54	86	70	13 L1 LTR 168 3 3.20 0.150 5.44	105	37	45 L1 LTR 399 5 3.20 0.355 5.20	279	43
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s)	26       11       116       10       20       3.20       0.103       5.95       0.192	60 L2	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336	86	70	13 L1 LTR 168 3 3.20 0.150 5.44 0.255	105	37	45 L1 LTR 399 5 3.20 0.355 5.20 0.576	279	43
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Departure Headway, hd (s) Final Degree of Utilization, x Ginal Degree of Utilization, x Final Degree of Utilization, x Ginal Degree of Utilization, x	26           L1           LTR           116           3.20           3.20           0.103           5.95           0.192           2.0           3.395	60 L2 Me	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336 2.0	86	70	13 L1 LTR 168 3 3.20 0.150 5.44 0.255 2.0	105	37	45 L1 LTR 399 5	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)	26       L1       LTR       116       3.20       3.20       0.103       5.95       0.192       2.0       3.95	60 L2 Me	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336 2.0	86	70	13 L1 LTR 168 3 3.20 0.150 5.44 0.255 2.0	105	37	45 L1 LTR 399 5	279	43
Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Departure Headway, hd (s) Final Departure Headway, hd (s) Service Time, ts (s) Capacity, Delay and Level	26       26       27       28       29       20       2111       20       210       20	60 L2 Me	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336 2.0 3.54	86	70	13 L1 LTR 168 3 3.20 0.150 5.44 0.255 2.0 3.44	105	37	45 L1 LTR 399 5 3.20 0.355 5.20 0.576 2.0 3.20	279	43
Volume Volume % Thrus in Shared Lane Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s) Capacity, Delay and Level Flow Rate, v (veh/h)	26       26       27       28       29       20       2116       320       3.20	60 L2 Me	21	45 L1 LTR 218 3 3 .20 0.194 5.54 0.336 2.0 3.54 2.0 3.54	86	70	13 L1 LTR 168 3	105	37	45 L1 LTR 399 5	279	43
Volume Volume Volume Volume Volume Volume Volume Volume Volume Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway and S Initial Departure Headway, hd (s) Initial Departure Headway, hd (s) Final Headway, hd (s) Final Headway, hd (s) Final Headway, hd (s) F	26       1	60 L2 Me	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336 2.0 3.54 2.0 3.54 2.18	86	70	13 L1 LTR 168 3 3 .20 0.150 5.44 0.255 2.0 3.44 3.44 168 662	105	37	45 L1 LTR 399 5 320 0.355 5.20 0.576 2.0 3.20 3.20 3.20	279	43
Volume Volume Volume Volume Volume Volume Volume Volume Volume Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)  Capacity, Delay and Level Flow Rate, v (veh/h) Capacity 95% Queue Length, Q <sub>95</sub> (veh)	26       26       27       28       29       20       2116       20       320       320       0.103       3.20       0.103       5.95       0.192       2.0       3.95       5.95       116       605       0.7	60 L2 Me	21	45 L1 LTR 218 3 3 .20 0.194 5.54 0.336 2.0 3.54 2.0 3.54 2.0 3.54	86	70	13 L1 LTR 168 3 3 3.20 0.150 5.44 0.255 2.0 3.44 3.44 168 662 1.0	105	37	45 L1 LTR 399 5 3.20 0.355 5.20 0.576 2.0 3.20 3.20 3.20	279	43
Volume Volume Volume Volume Volume Volume Volume Volume Lane Configuration Flow Rate, v (veh/h) Percent Heavy Vehicles  Departure Headway and S Initial Departure Headway, hd (s) Initial Degree of Utilization, x Final Departure Headway, hd (s) Final Degree of Utilization, x Move-Up Time, m (s) Service Time, ts (s)  Capacity, Delay and Level Flow Rate, v (veh/h) Capacity Sty Queue Length, Q <sub>85</sub> (veh) Control Delay (s/veh)	26           226           126           111           1116           10           200100           3.20           0.103           5.95           0.103           2.0           3.95           0.192           116           2.0           3.95           0.192           116           605           0.77           10.4           10.4	60 L2 Me	21	45 L1 LTR 218 3 3.20 0.194 5.54 0.336 2.0 3.54 2.0 3.54 2.0 3.54 2.0 3.54 2.0 1.5 1.5	86	70	13 L1 LTR 168 3 3 .20 0.150 5.44 0.255 2.0 3.44 0.255 2.0 3.44 168 662 1.0 10.3	105	37	45 L1 LTR 399 5 3.20 0.355 5.20 0.576 2.0 3.20 3.	279	43

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