70 Mississauga Road South & 181 Lakeshore Road West

Port Credit West Village

Stage 2 Transportation Report - Microsimulation Analysis

City of Mississauga

Prepared For: Port Credit West Village Partners

April 27, 2018

45 St. Clair Avenue West, Suite 300
Toronto, ON M4V 1K9
www.bagroup.com

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF APPENDICES

1.0 EXECUTIVE SUMMARY

To supplement the March 2018 Stage 1 traffic analysis carried out to review the impacts of the Port Credit West Village development, detailed microsimulation analysis of the Lakeshore Road corridor was carried out. The *Vissim* microsimulation traffic model developed for the City of Mississauga's Lakeshore Connecting Communities Study was used to assess the future transportation network, between Lorne Park Road and Hurontario Street. This analysis reflects a future (2027) condition with no significant change in existing travel patterns and travel mode choices. The main conclusions from this modelling exercise are as follows.

Lakeshore Road Corridor Travel Times

- Travel times and delays on Lakeshore Road are projected to increase in the future background condition without development of the Port Credit West Village site. The development of the Port Credit West Village site will add traffic to the Lakeshore Road corridor, with some minor impacts on travel time and delays.
- With respect to peak hour peak direction travel times between Lorne Park Road and Hurontario Street, the change in travel time due to additional traffic volumes and access points on Lakeshore Road is approximately 1 minute eastbound in the AM peak hour and 45 seconds westbound in the PM peak hour relative to existing conditions on the corridor. (The existing eastbound AM travel time is approximately 5 minutes and 10 seconds, and the existing westbound PM travel time is approximately 5 minutes and 40 seconds based on Google API travel times.)

Vehicular Queuing on Lakeshore Road

- The increases in traffic related to the proposed development and the associated access points will not result in a significant increase in vehicular queues. *Vissim* microsimulation results indicate that modifications to signal timing corridor progression plans will generally prevent queues at traffic signals from extending through adjacent intersections.

Signal Timing and Coordination

- Ensuring that all signalized intersections operate in a coordinated manner along the Lakeshore Road corridor between Lorne Park Road and Hurontario Street will be crucial in minimizing queuing and reducing the likelihood of queue 'spillbacks' through upstream intersections.

Potential for Displacement of Existing Long-Distance Trips

- Analysis of origins and destinations of vehicle trips currently using the Lakeshore Road corridor adjacent to the Port Credit West Village site shows substantial traffic volumes currently using Lakeshore Road as an alternative route to the provincial highway network, and as an alternative to travelling by GO Transit. If travel times on Lakeshore Road increase in the future, the extent to which Lakeshore Road is perceived as an attractive alternative for long-distance trips can be expected to decrease, resulting in more capacity being used by local (City of Mississauga) traffic.

Summary

In summary, analysis results obtained from the calibrated *Vissim* microsimulation model indicate that the development of the Port Credit West Village site can be appropriately accommodated on the area road network. Through the modification of traffic signal timing plans, and restrictions in left turns in the PM peak period, increases in travel times along the Lakeshore Road corridor can be mitigated, and vehicle queue lengths can be accommodated without causing spillback conditions and traffic blockages.

2.0 INTRODUCTION

BA Group is retained by the Port Credit West Village Partnership ("the WVP") to provide urban transportation advisory services in relation to the property located at 70 Mississauga Road South and 181 Lakeshore Road in the City of Mississauga. The site is a 72-acre plot of land on the Port Credit waterfront, generally bounded by Mississauga Road to the east, an existing residential neighbourhood to the west, Lakeshore Road West to the north, and a strip of waterfront lands to the south that are not part of this application, as illustrated in Figure 1.

The WVP is seeking an Official Plan Amendment (OPA) to permit development of a mixed-use community on the subject lands, and submitted concurrent applications for a Zoning By-law Amendment (ZBA) and a Draft Plan of Subdivision. A resubmission for the Applications was submitted on March 9, 2018.

2.1 THIS REPORT

It is noted that this revised report is the second of two transportation studies completed for the OPA, ZBA and Draft Plan of Subdivision applications. The analyses conducted in the Stage 1 study report (initially submitted in August 2017 and resubmitted in March 2018) focussed on operations at the proposed connections to the adjacent municipal streets (i.e. Lakeshore Road West and Mississauga Road South) and the proposed internal future public roads and intersections. The March 2018 Stage 1 study ("the Stage 1 report") combined the requirements for a Transportation Impact Study (TIS), Transportation Demand Management Strategy and a Parking Utilization Study, as an update to the original report submitted in August 2017.

This second report ("Stage 2 report") is intended to address transportation impacts on the broader local area network, and uses the traffic microsimulation model developed as part of the ongoing Lakeshore Connecting Communities study being undertaken by the City of Mississauga. The phased submission was discussed with City Staff as the best method to work in coordination with the Lakeshore Connecting Communities study. BA Group met with City staff to discuss the assumptions leading up to the development and submission of the Stage 2 submission.

This Stage 2 transportation study includes the following elements:

- VISSIM (microsimulation) analyses;
- analyses of the 2027 and 2031 planning horizon years;
- analyses of the broader local road network including:
    - all significant public road intersections on Lakeshore Road West between Lorne Park Road and Hurontario Street;
    - all significant public road intersections on Mississauga Road between Front Street North and Lake Street; and
    - all public road intersections on Port Street West, Bay Street, Lake Street, Peter Street, John Street and Front Street South;
- consideration for increased bus transit frequency on Lakeshore Road west (5-minute headways);
- estimations of potential Heritage District (east of the site) traffic infiltration quantities;
- recommendations regarding the need for additional area transportation network improvements based on the analyses performed.

2.2 LAKESHORE CONNECTING COMMUNITIES STUDY

The City of Mississauga is currently undertaking a Transportation Master Plan study along the Lakeshore Road / Royal Windsor Drive corridor named *Lakeshore Connecting Communities*. The intention of the study is to guide the planning and implementation of the transportation network along the Lakeshore corridor over the next 25 years, including decisions about optimizing roadways, improving transit, and enhancing cycling and walking connections.

The focus of the study is improving long-term mobility for the Clarkson Village, Port Credit and Lakeview communities located along the corridor.

The *Lakeshore Connecting Communities* study will include detailed transportation modelling for existing and future conditions, with a review of network connectivity for all modes, and an investigation of opportunities to provide enhanced linkages at key locations. Potential alternatives under consideration in the *Lakeshore Connecting Communities* study include:

- Crossing of Credit River
- Transit on Lakeshore Road
- Active Transportation facilities

It is expected that the findings of the City's analysis of options for the corridor will be published in the fall of 2018. Analysis of City options is not included in the microsimulation analysis conducted for this report; however, the City's adoption of options that increase transit or active transportation options in the corridor would be expected to produce more favourable future transportation conditions than those modelled in the analysis described in this report.

2.3 *VISSIM* MICRO-SIMULATION ANALYSIS

Given the inherent limitations of standard deterministic traffic capacity analysis methods (namely the Highway Capacity Manual methodology), and given the modelling work already under way for the Lakeshore Connecting Communities Study, it was determined, through consultation with City of Mississauga staff, that in order to best assess the projected impacts of the proposed development, a *Vissim* microsimulation model of the Lakeshore Road corridor would be used. This Stage 2 transportation study for 70 Mississauga Road South provides analysis that is intended to be consistent with the methodology, assumptions and conclusions made in the City's *Lakeshore Connecting Communities* study.

The main objective of the *Vissim* modelling and simulation exercise described in this report is to assess whether the proposed development could be appropriately accommodated without undue impacts on the existing area transportation network. Specifically, this analysis has been conducted to evaluate how corridor progression and queue management signal timing plans could address potential future increases in vehicle queuing and delay.

This report first describes the *Vissim* microsimulation model development process. It then discusses the model calibration exercise and presents results demonstrating the ability of the base model to accurately reflect existing traffic operating conditions throughout the area transportation network. Finally, analysis results and conclusions detailing the projected impact of the proposed development on Lakeshore Road West are presented.

2.4 A CONSERVATIVE ANALYSIS

The analysis contained in this report can be considered to represent an analysis of worst case conditions for the following reasons:

- Trip generation for the proposed uses on the site has been assumed as described in the Stage 1 Report, and is based in part upon surveys of similar land uses and on existing travel patterns taken from the 2011 Transportation Tomorrow Survey.

- No allowance has been made for a travel mode shift for existing and future background traffic. The Region of Peel Transportation Master Plan has a target of 50% sustainable mode share by 2041, which entails a reduction from the current region-wide drive alone mode share of 63% down to 50%.

- The trip rates and land uses on which the trip generation for the proposed development have been based do not take into account any specific demographic considerations and certain potential land uses may generate fewer peak hour automobile trips.

- For new site traffic, with the exception of a 5% shift of future site generated trips from automobile to transit, the analysis essentially projects existing travel patterns (an automobile mode share of between 65% and 70%) into the future.

- Potential impacts of an increasing use of shared and autonomous vehicles have not been included in this analysis.

- Potential improvements through the City's *Lakeshore Connecting Communities* study, including future rapid transit on Lakeshore Road and potential additional crossings of the Credit River, have not been included in this analysis.

- The site will be developed in phases over 10 years, therefore changes to conditions on the Lakeshore Road corridor will be gradual as the site is developed in phases.

- The analysis quantifies existing levels of long distance automobile trips using Lakeshore Road with no origin or destination in the City of Mississauga, which may be candidates for changing travel mode, route or time of travel in response to potential future increases in travel time along the Lakeshore Road corridor.

3.0 *VISSIM* MODEL DEVELOPMENT

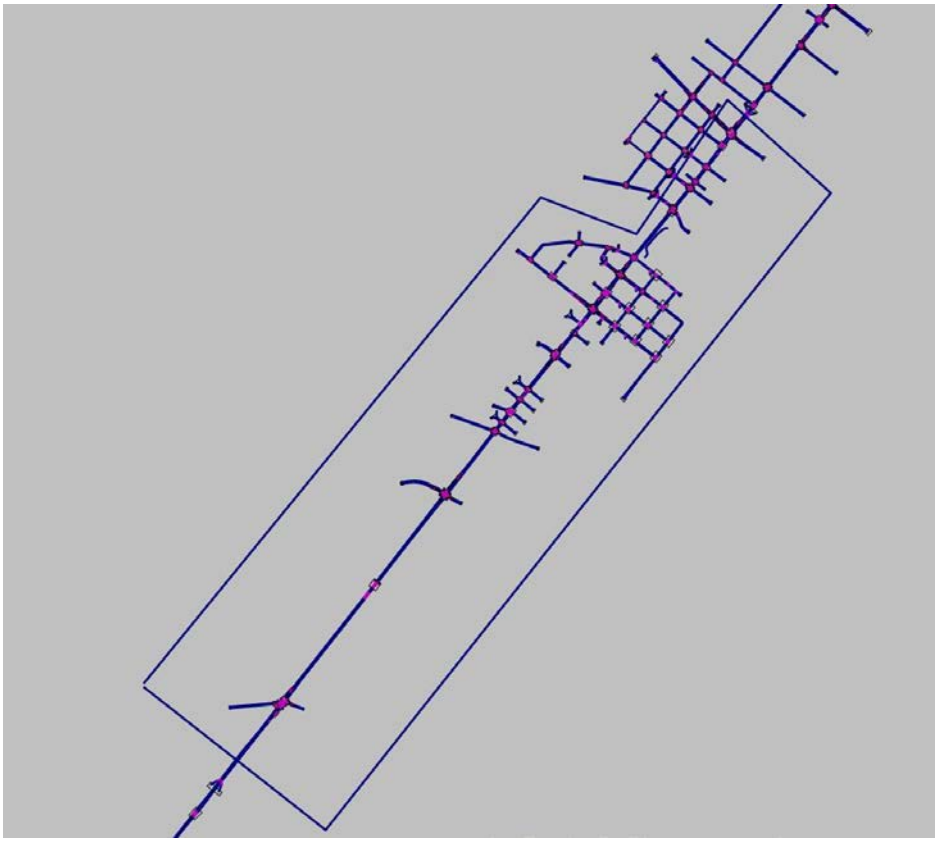
3.1 EXTENT OF THE MODEL AND STUDY AREA

The *Vissim* traffic microsimulation model that was developed for the City's *Lakeshore Connecting Communities* study included the entire length of Lakeshore Road through the City of Mississauga. For the purposes of this analysis, a portion of the City's model was used - encompassing the area from Lorne Park Road to Hurontario Street, as well as Mississauga Road between Front Street North and Lake Street.

The study area is shown in Figure 1 below, while Figure 2 provides a screenshot of the model as represented in the Vissim development environment.

FIGURE 1: VISSIM STUDY AREA

FIGURE 2: VISSIM MICROSIMULATION MODEL



3.1.1 Data Collection & Information Gathering

In order to develop a representative model of existing traffic conditions on the surrounding area road network, several different pieces of information were gathered and incorporated into the *Vissim* microsimulation model.

3.1.1.1 Road Alignment & Intersection Lane Configurations

The alignment and lane configurations of existing roads and intersections located within the study area were determined from aerial photographs obtained by BA Group, and from work already carried out in the traffic analysis included in the Stage 1 Report. Similar characteristics corresponding to proposed future site access points and yet-to-be-constructed intersections were obtained from technical drawings and proposed plans for the site.

3.1.1.2 Turning Movement Counts, Pedestrian Volumes & Signal Timing Plans

Turning movement counts, including pedestrian volumes, at signalized and unsignalized intersections covering the study area were obtained from field data collection exercises conducted during the weekday morning (AM) and afternoon (PM) peak periods by Spectrum Traffic Data Inc. on behalf of BA Group. Turning movement counts were conducted on various days in 2017. While the City's *Vissim* traffic simulation model included traffic volumes, the model was updated with traffic volumes collected by BA Group in 2017 so that the traffic volumes would be consistent with those used in BA Group's Stage 1 analysis. Updating the existing

traffic volumes in the model also resulted in traffic volumes in the model being better balanced in the study area. A comparison of the turning movement counts included in the City's model and the BA Group data (along with the GEH values for each set of data) are shown in **Appendix A**. As a general comparison between the City and BA Group counts, the existing volumes used in the City model for the morning peak hour were higher than the BA Group volumes, but lower in the afternoon peak hour. In terms of the travel times and delays, the existing afternoon peak hour is the critical case so using higher existing traffic volumes in the afternoon peak hour results in a conservative analysis.

The existing traffic signal timings were included in the City's *Vissim* traffic simulation model, and were therefore already included for intersections in the study area section. Current signal timing plans at all signalized intersections located within the study area had been previously obtained from the City of Mississauga for the analysis contained in the Stage 1 report.

3.1.1.3 Vehicle Travel Times

Vehicle travel times along the Lakeshore Road corridor, between Lorne Park Road and Hurontario Street, were obtained from field data collected by BA Group. The field data exercises were performed by sending vehicles equipped with GPS-enabled dashboard cameras to drive back-and-forth along the aforementioned corridor. Additional travel time data was extracted from video recorded during traffic volume data collection, whereby a vehicle travelling along the corridor could be identified at adjacent intersections. A third source of travel time data was available from the StreetLight InSight platform, based on "big data" sourced from GPS-enabled vehicles and smartphones.

Summaries of vehicle travel times, as obtained from the field data collected by BA Group, are presented in **Appendix B**.

3.1.2 Microsimulation Model Coding

All *Vissim* microsimulation model components and network elements were coded in accordance with engineering and modelling guidelines detailed in several documents recently published by various transportation agencies operating across North America. These include, but are not limited to:

- *VISSIM Modeling Guidance*, Maryland Department of Transportation (August 2017)
- *Protocol for Vissim Simulation*, Washington State Department of Transportation (September 2014)
- *Protocol for Vissim Simulation*, Oregon Department of Transportation (June 2011)
- *WisDOT Microsimulation Guidelines*, Wisconsin Department of Transportation (November 2014)
- *Guidelines for Applying Traffic Microsimulation Modeling Software*, FHWA (June 2004)

The following lists specific parameters and the range of values assigned to them in the *Vissim* traffic simulation model:

- Desired and Reduced Speeds
    - Highway: 90 to 110 km/hr
    - Ramps – Loop: 40 to 60 km/hr
    - Right-Turns: 15 to 20 km/hr
    - Left-Turns: 20 to 25 km/hr

- Maximum and Desired Acceleration
    - Maximum auto acceleration: 3.5 m/s^2
    - Desired auto acceleration: 3.5 m/s^2
    - Maximum auto deceleration: -7.5 m/s^2
    - Desired auto deceleration: -2.8 m/s^2

- Wiedemann 99 Driving Behaviour Parameters
    - Average Standstill Distance: 1.5 to 4.0 m
    - Additive Safety Distance Parameter: 1.5 to 4.0 m
    - Multiplicative Safety Distance Parameter: 1.5 to 4.0 m

- Priority Rules Gap Acceptance Parameters
    - FromtGapDef Parameter: 0.5 to 0.75
    - RearGapDef Parameter: 0.5 to 0.75
    - AddStop Dist Parameter: 1.5 to 1.75
    - SatDistFactDef Parameter: 0.0 to 0.5

- Conflict Area Gap Acceptance Parameters
    - Min. Gap Time Parameter: 0.0 to 3.0 s
    - Min. Headway Parameter: 10.0 to 25.0 m
    - Max. Speed Parameter: 5.0 to 15.0 km/h

3.1.3 VISSIM Model Assumptions

Below is a list of items that have been used and assumed in the model:

1.- Volumes: converted into static volumes with static routing decisions and separated into 3 layers:

- Existing (BA counts used, not City)
- Future background additions
- Site volumes

2.-Traffic control signal included at Benson Avenue

3.- Left turn lanes for westbound traffic assumed at Benson/Lakeshore and at Credit Landing Plaza driveway/Lakeshore

4.- Lakeshore/Mississauga intersection (future):

- SB lanes on Mississauga Road changed to SBL/SBT/SBR for the afternoon.
- EBL on Lakeshore Road - extended left turn pocket past Wesley
- NB lanes on Mississauga Road changed to NBL/NBT/NBR

5.- No left turns allowed in between Mississauga to Hurontario unless an exclusive left turn lane present.

6.- Optimize traffic signal timings

7.- Stavebank changed to the new design and no split signal.

8.- Changed assumption for conflict areas at intersections by priority rules. The original model was not allowing two vehicles to travel through the intersection in the intergreen (using Conflict areas). Making the change, the model better reflects existing driver behaviour by letting two vehicles through in the intergreen (with Priority rules).

9.- Time horizon of 2027 was used to match the 10 year time horizon used in the Stage 1 Report, along with 2031 as requested by City staff to be comparable to modelling work being done for the *Lakeshore Connecting Communities* study.

4.0 *VISSIM* MODEL CALIBRATION

4.1 OBJECTIVE

The general objective of calibrating the *Vissim* traffic microsimulation model was, as is the case with every calibration exercise, to ensure that the model from which predictions and forecasts regarding future traffic operations on the area road network would be obtained could, as a starting point, sensibly replicate today's existing traffic conditions. In this particular case, since the existing conditions *Vissim* model was supplied by the City of Mississauga, the existing condition model was calibrated. However, since the intersection turning movement data used in the Stage 1 report was used in the Vissim model instead of the City's data, the model was recalibrated.

The outcome of the calibration exercise was therefore a model of existing conditions which, when used in conjunction with travel demand forecasts derived by BA Group, could credibly produce private vehicle and pedestrian-related predictions regarding future multi-modal traffic operations throughout the study area.

4.2 MODEL CALIBRATION PROCESS & TARGET METRICS

Data pertaining to existing traffic operations throughout the study area's transportation network were collected, summarized and used to establish targets to be replicated by the calibrated *Vissim* model.

Simulation runs were conducted and outputs corresponding to each metric were extracted and compared to their target values. Model parameters were then adjusted and simulation sets were re-run. Adjusted performance metrics were then compared to their target values. The process was repeated iteratively until model outputs were determined to match existing network metrics.

The network metrics used as targets during the calibration exercise were:

1) Traffic volumes, which were collected via turning movement counts conducted by Spectrum on behalf of BA Group at all intersections, signalized and unsignalized, located throughout the study area.

2) Vehicle travel times along the Lakeshore Road corridor between Lorne Park Road and Hurontario Street obtained from the Google Maps application programming interface (API), supplemented and validated with field data collection exercises conducted by BA Group.

4.3 MODEL CALIBRATION RESULTS

4.3.1 Intersection Traffic Volumes

Turning movement counts at all intersections throughout the study area, as produced from the calibrated *Vissim* model for existing conditions, are summarized and compared to calibration target values (i.e., field data collected via turning movement counts) in Table 1 for the AM peak hour and PM peak hour respectively.

TABLE 1: TURNING MOVEMENT COUNTS (GEH VALUES) – EXISTING CONDITIONS

	Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Lorne Park Rd & Lakeshore Ave W												
Field Data	5 (5)	485 (1030)	100 (110)	140 (145)	1150 (1020)	5 (10)	70 (65)	0 (5)	170 (120)	10 (5)	5 (0)	10 (10)
Vissim Output	0 (0)	461 (1004)	90 (105)	140 (138)	1172 (1024)	5 (9)	66 (70)	0 (5)	162 (113)	10 (3)	3 (0)	11 (12)
GEH	3.2 (3.2)	1.1 (0.8)	1.1 (0.5)	0.0 (0.6)	0.7 (0.1)	0.0 (0.3)	0.5 (0.6)	0.0 (0.1)	0.7 (0.6)	0.1 (0.8)	0.9 (0.0)	0.3 (0.5)
Shawnmar Rd & Lakeshore Ave W												
Field Data	0 (10)	565 (1120)	35 (70)	40 (30)	1185 (1060)	5 (5)	60 (40)	0 (0)	25 (20)	0 (5)	0 (0)	5 (5)
Vissim Output	0 (10)	548 (1100)	40 (64)	44 (31)	1200 (1073)	6 (5)	57 (40)	0 (0)	19 (18)	0 (0)	0 (0)	6 (4)
GEH	0.0 (0.1)	0.7 (0.6)	0.8 (0.7)	0.6 (0.3)	0.4 (0.4)	0.5 (0.1)	0.4 (0.0)	0.0 (0.0)	1.3 (0.4)	0.0 (3.2)	0.0 (0.0)	0.3 (0.4)
Maple Ave & Lakeshore Rd W												
Field Data	15 (20)	580 (1180)	10 (30)	0 (5)	1240 (1085)	10 (15)	85 (45)	0 (5)	5 (0)	15 (20)	0 (5)	15 (10)
Vissim Output	19 (19)	557 (1143)	11 (27)	0 (6)	1257 (1102)	12 (13)	87 (44)	0 (7)	7 (0)	17 (21)	0 (7)	15 (12)
GEH	0.9 (0.1)	0.9 (1.1)	0.2 (0.5)	0.0 (0.5)	0.5 (0.5)	0.7 (0.5)	0.3 (0.1)	0.0 (0.7)	0.7 (0.0)	0.4 (0.1)	0.0 (0.7)	0.1 (0.5)
Plaza Drwy & Lakeshore Rd W												
Field Data	0 (0)	620 (1210)	105 (205)	45 (100)	1375 (1065)	0 (0)	50 (185)	0 (0)	35 (120)	0 (0)	0 (0)	0 (0)
Vissim Output	0 (0)	594 (1181)	103 (218)	42 (102)	1388 (1062)	0 (0)	44 (176)	0 (0)	41 (123)	0 (0)	0 (0)	0 (0)
GEH	0.0 (0.0)	1.1 (0.8)	0.2 (0.9)	0.5 (0.2)	0.4 (0.1)	0.0 (0.0)	0.8 (0.7)	0.0 (0.0)	1.0 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Mississauga Rd & Lakeshore Rd W												
Field Data	0 (5)	580 (1200)	205 (280)	200 (225)	1195 (935)	20 (40)	455 (255)	35 (40)	90 (150)	25 (30)	30 (30)	0 (10)
Vissim Output	28 (0)	568 (1175)	217 (298)	208 (225)	1177 (948)	26 (19)	452 (278)	26 (0)	88 (166)	9 (26)	4 (0)	0 (0)
GEH	7.5 (3.2)	0.5 (0.7)	0.8 (1.1)	0.6 (0.0)	0.5 (0.4)	1.2 (3.9)	0.1 (1.4)	1.6 (8.9)	0.2 (1.3)	3.9 (0.7)	6.3 (7.7)	0.0 (4.5)
John Street & Lakeshore Rd W												
Field Data	20 (35)	775 (1475)	5 (5)	10 (5)	1640 (1190)	10 (5)	45 (30)	5 (5)	5 (10)	10 (15)	5 (5)	20 (30)
Vissim Output	21 (0)	762 (1460)	12 (9)	20 (12)	1612 (1215)	11 (4)	49 (31)	0 (0)	12 (15)	8 (0)	3 (0)	7 (0)
GEH	0.3 (8.4)	0.5 (0.4)	2.5 (1.4)	2.5 (2.5)	0.7 (0.7)	0.4 (0.4)	0.5 (0.1)	3.2 (3.2)	2.3 (1.3)	0.8 (5.5)	0.8 (3.2)	3.4 (7.7)

	Turning Movement											
	WBL	WBT	WBR	EBL	EBT	EBR	SBL	SBT	SBR	NBL	NBT	NBR
Stavebank & Lakeshore Rd W												
Field Data	5 (10)	790 (1415)	10 (45)	10 (80)	1665 (1125)	75 (125)	10 (20)	0 (0)	135 (260)	25 (90)	5 (10)	15 (10)
Vissim Output	4 (13)	789 (1364)	9 (69)	15 (55)	1620 (1088)	85 (128)	18 (36)	0 (0)	128 (254)	24 (89)	4 (11)	15 (10)
GEH	0.3 (0.9)	0.0 (1.4)	0.5 (3.2)	1.5 (3.0)	1.1 (1.1)	1.1 (0.3)	2.1 (3.1)	0.0 (0.0)	0.6 (0.4)	0.1 (0.1)	0.5 (0.3)	0.1 (0.0)
Elizabeth Rd & Lakeshore Rd W												
Field Data	5 (10)	735 (1360)	10 (30)	20 (25)	1650 (1105)	20 (25)	40 (30)	10 (15)	55 (85)	15 (25)	20 (30)	15 (15)
Vissim Output	5 (7)	726 (1326)	11 (27)	21 (32)	1615 (1056)	26 (44)	54 (51)	10 (14)	61 (94)	13 (30)	17 (38)	13 (0)
GEH	0.1 (1.0)	0.3 (0.9)	0.4 (0.5)	0.3 (1.3)	0.9 (1.5)	1.2 (3.2)	2.0 (3.3)	0.1 (0.4)	0.8 (0.9)	0.5 (1.0)	0.6 (1.4)	0.5 (5.5)
Hurontario Rd & Lakeshore Rd W												
Field Data	30 (35)	530 (1055)	235 (235)	320 (215)	1265 (885)	5 (5)	215 (250)	90 (85)	200 (340)	10 (15)	60 (115)	30 (45)
Vissim Output	33 (37)	534 (1026)	218 (226)	326 (223)	1242 (884)	6 (9)	208 (247)	82 (82)	213 (348)	9 (15)	53 (110)	37 (49)
GEH	0.6 (0.3)	0.2 (0.9)	1.1 (0.6)	0.4 (0.6)	0.7 (0.0)	0.3 (1.4)	0.5 (0.2)	0.8 (0.3)	0.9 (0.5)	0.5 (0.0)	1.0 (0.5)	1.1 (0.6)

Notes:
1. XX(XX) – AM Peak Hour Value (PM Peak Hour Value)
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

As shown in the tables above, all turning movements in the *Vissim* model accurately reflect data collected in the field, as demonstrated by the low (i.e., less than 5.0) GEH values corresponding to all individual turning movements throughout the study area. In some cases in the PM peak hour, the GEH value is above 5.0 due to differences in turning movements for cases where certain traffic movements have been assumed to be prohibited in the PM peak period.

4.3.2 Travel Times

Travel time model simulation outputs on the Lakeshore Road corridor between Lorne Park Road and Hurontario Street were compared to travel times obtained from the Google Maps API, and field data collected by BA Group using vehicles equipped with GPS-enabled dashboard cameras. Outputs from the calibrated Vissim model are presented in **Table 2** and **Figure 3**.

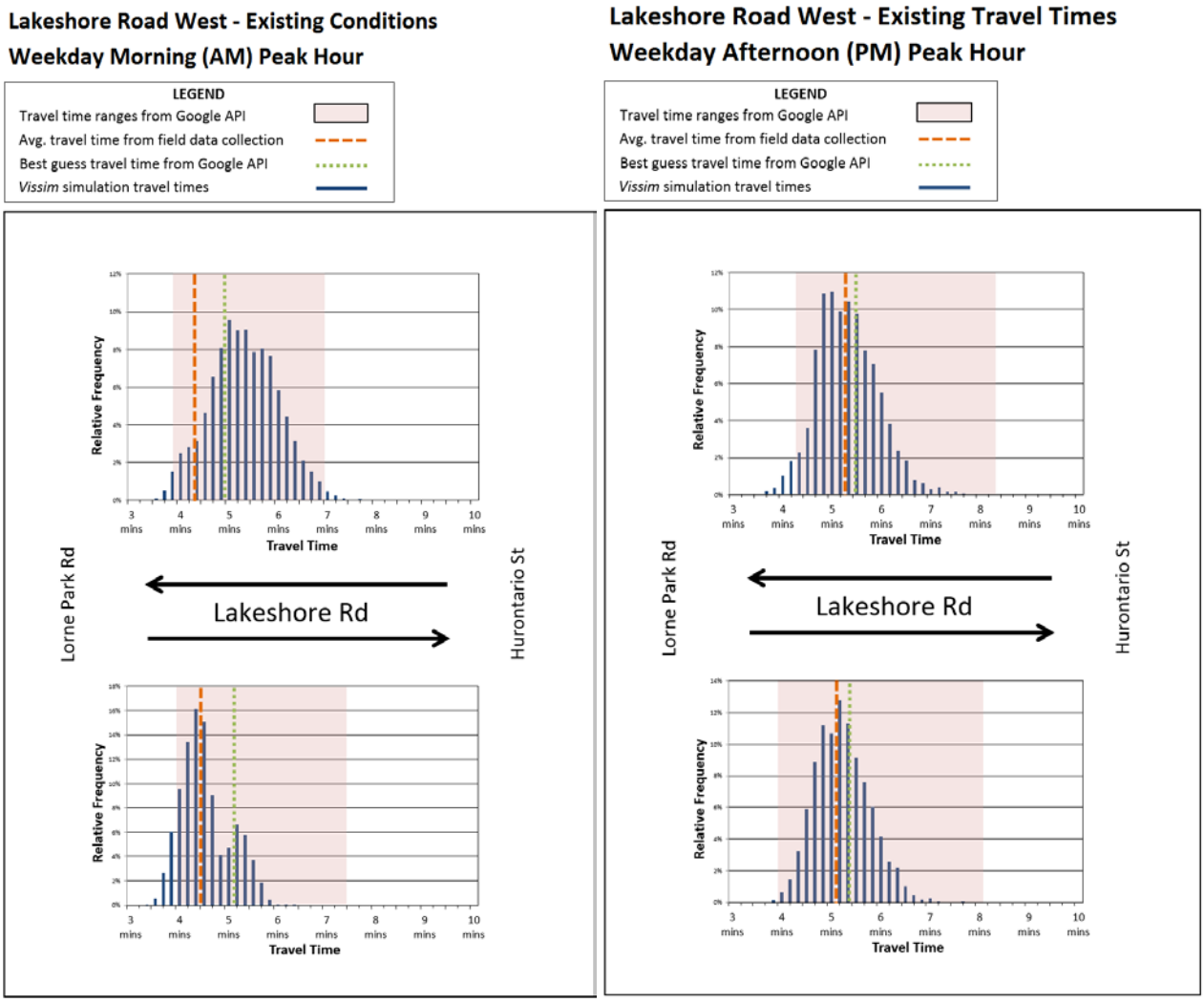
TABLE 2: EXISTING TRAVEL TIMES – *VISSIM* MODEL SIMULATION OUTPUTS

Corridor Segment	Analysis Period	Direction	BA Group Field Data Avg.[1]	Google API Best Guess[1,3]	Google API Range[1,3]	Vissim Simulation Output Range [1,2]
Lakeshore Road between Lorne Park & Hurontario Ave	Weekday Morning (AM) Peak Hour	WB	256	299	242 – 447	**252 - 392**
		EB	267	311	235 - 417	**233 - 332**
	Weekday Afternoon (PM) Peak Hour	WB	319	338	259 – 505	**268 - 386**
		EB	311	328	240 – 488	**269 - 377**

Table Notes:
1. Unit of time: seconds.
2. 90% of the distribution of all vehicles from a total of 10 *Vissim* simulations falls within this range.
3. Google API travel times based on Thursday travel times, 8:30 AM and 5:00 PM.

As shown in **Table 2** and **Figure 3**, the travel times obtained from the Google Maps API, and the average travel times from the BA Group field data collection exercises fall within the ranges produced by the *Vissim* calibrated model of future background conditions during both the weekday morning (AM) and weekday afternoon (PM) peak hours in both the eastbound and westbound directions.

FIGURE 3: *VISSIM* MODEL TRAVEL TIME OUTPUTS – EXISTING CONDITIONS



4.3.3 Calibration Summary

The above results indicate that the *Vissim* simulation model of existing conditions is well calibrated and accurately reflects current traffic operations throughout the study area during the weekday morning (AM) and weekday afternoon (PM) peak hour. Therefore, it constitutes a suitable tool to use to evaluate the impact of different projected future traffic scenarios and alternatives on traffic operations throughout the study area.

4.4 MODEL OUTPUTS AND ASSESSMENT MEASURES

There are four main outputs from the model that were used in the assessment of traffic operations under all scenarios – delay time per movement, queue lengths on each approach at intersections, eastbound and westbound corridor segment travel times on Lakeshore Road, and vehicle throughput per hour. How these metrics are calculated and reported is described in the following sections.

4.4.1 Delay

Within VISSIM, delay is measured as the difference in travel time between a vehicle completing a movement through an intersection unimpeded (aside from a reduced turning speed) versus the average travel time experienced by a vehicle completing the same movement within the simulation.

Vehicle travel time was obtained by placing vehicle detectors upstream and downstream of all intersections on all approaches. Simulation travel time per movement is the time elapsed between when a vehicle crosses the upstream detector on the approach leg and the downstream detector on the departure leg. The reported delay time per movement is calculated as the difference between the unimpeded travel time and the average travel time of all vehicles making the specified movement within the simulated hour, across all simulations runs.

4.4.2 Vehicle Queue Lengths

Queue lengths are calculated in VISSIM based on sample measurements taken at each intersection approach in 15-second intervals. Queue definition parameters within the model are set as follows:

- Queue start speed threshold = < 5 km/h
- Queue end speed threshold = > 10 km/h
- Maximum queue headway = 20 m
- Maximum queue length = 1,500 m

The reported approach queues are based upon the simulated hour and consider all simulation runs.

4.4.3 Lakeshore Road Corridor Travel Time

One of the key metrics used to evaluate traffic operations within the study area is eastbound and westbound corridor travel time along Lakeshore Road from Lorne Park Road to Hurontario Street. Lakeshore Road corridor travel time was also used to calibrate the existing conditions model, as discussed in Section 2. Eastbound and westbound corridor travel time was calculated using vehicle detectors in the *Vissim* model.

4.4.4 Vehicle Hourly Throughput

The hourly throughput per traffic movement within the model is defined as the number of vehicles that complete the movement within the simulated hour, averaged across all simulation runs.

This output is useful when comparing traffic demand volumes (i.e. forecast volumes inputted into the model) to traffic volumes actually processed at an intersection. If the processed volumes recorded within the simulation begin to fall below the demand volumes, this indicates a condition where vehicles travelling within the hour are being displaced due to limited available traffic capacity. These displaced volumes will either travel outside of the weekday peak hour, find alternate routes to reach their destinations, or switch to non-auto-driver modes of travel, due to the fact that the road network is operating at capacity and cannot process any more traffic, regardless of demand.

5.0 *VISSIM* ANALYSIS RESULTS & CONCLUSIONS

5.1 ANALYSIS PERIODS & SCENARIOS

The *Vissim* modelling exercise examined the impact of traffic associated with the proposed Port Credit West Village development and the associated access locations on Lakeshore Road during both the weekday morning and weekday afternoon peak hours.

5.2 FUTURE TRAFFIC VOLUMES

The traffic volumes considered in this impact analysis are comprised of three main components:

- existing traffic volumes, as determined based on turning movement counts at study area intersections obtained by BA Group;
- volume allowances made for specific area 'background' land developments that are anticipated to be complete by the full build-out of the site (approximately 10 years from today); and
- forecast site-generated traffic associated with the redevelopment of the site as contemplated.

These three sets of traffic volumes are essentially 'layered' (i.e., summed) to develop the volume set assumed in the impact analysis described herein. These 'future' traffic volumes are meant to represent traffic flows that would be expected at the time the Port Credit West Village site is developed and operational.

5.2.1 Background Traffic Volumes

Traffic allowances were made for specific proposed developments in the area, identified based on discussion with City of Mississauga staff. The area developments that have been considered are summarized in **Section 11.3.2** of the **Stage 1 Report** together with a description of the development programme and traffic generation / parameters adopted for the purpose of this study.

Section 11.3.2 of the **Stage 1 Report** also describes the analysis of historic traffic volume data for the Lakeshore Road corridor to determine traffic growth trends. Annual traffic growth in addition to the traffic increases from specific developments have been applied based on the peak hour and direction of traffic.

5.2.2 Site-Generated Traffic Volumes

Traffic allowances for the planned future redevelopment of the site have been calculated for approximately 2,969 residential units in the form of apartment condominiums and townhouses, along with approximately 22,412 m^2 of commercial space (including community centre/institutional uses), approximately 14,525 m^2 of retail space and a significant portion of park land and open space. Vehicular trip generation forecasts and methodology are summarized in **Section 11.3.3** of the **Stage 1 Report**. The site trip generation used in this microsimulation analysis assumes a 5% shift of future site generated trips from automobile to transit to in part reflect the range of transportation demand management measures that will be included with the development of the site.

5.2.3 Future Total Traffic Volumes

Future total traffic volumes, which include existing traffic volumes, traffic volumes allowances made for area background developments and general corridor growth and new traffic volumes associated with the full redevelopment of the Site 1, are summarized in **Section 11.3.4** of the **Stage 1 Report**.

5.3 NETWORK PERFORMANCE EVALUATION – KEY METRICS

The projected impact of the site redevelopment (and the associated site access points) on the performance of the surrounding area transportation network were assessed using the following quantitative metrics:

1) **Vehicular Delay and Level of Service (LOS) on Lakeshore Road**

   The primary objective of this modelling exercise was to review the impact of the proposed development on delays and the level of service experienced by traffic on Lakeshore Road.

2) **Lakeshore Road Corridor Travel Times**

   Another objective of this modelling exercise was to assess the impact of the new site access points and the addition of site traffic on travel times throughout the corridor, and to mitigate those impacts with appropriate signal timing and coordination plans.

Together, these two metrics provide a good estimate of future transportation conditions throughout the area road network and identify the impact of the Port Credit West Village redevelopment. The overall intent of analyzing these model outputs is to gauge whether the area road network can appropriately accommodate the projected future conditions.

Traditional Highway Capacity Manual methodology analysis outputs have been provided in BA Group's Stage 1 Report, which was submitted to the City as part of the revised OPA/ZBA and Draft Plan of Subdivision application in August 2017 and revised in March of 2018. Taken together with the metrics discussed above, the combined analyses offer a comprehensive assessment of the performance of the future road network.

5.4 FUTURE TRAFFIC ANALYSIS RESULTS

5.4.1 Vehicular Delay and Level of Service

Projected vehicle delays and LOS for the future total traffic scenario were obtained using the *Vissim* microsimulation model. Results are presented in **Table 3** and **Table 4** for the future AM and future PM cases respectively. Delay and LOS results for the 2031 condition are presented in **Appendix C**.

TABLE 3: EXISTING, FUTURE BACKGROUND (2027), FUTURE TOTAL (2027) PROJECTED DELAYS AND LOS ON LAKESHORE ROAD (AM PEAK HOUR)

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Lorne Park Rd & Lakeshore Rd W												
Delay	- (-) [-]	1.3 (2.9) [5.1]	4.8 (6.2) [8.1]	8.3 (9.2) [11.7]	5.4 (5.5) [6.1]	7.4 (6.4) [6.4]	56.3 (55.9) [55.6]	- (-) [-]	16.9 (16.6) [17.2]	57.0 (53.5) [53.5]	78.3 (73.9) [73.9]	7.1 (5.9) [5.9]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	A (A) [B]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	B (B) [B]	E (D) [D]	E (E) [E]	A (A) [A]
Shawnmarr Rd & Lakeshore Rd W												
Delay	- (-) [-]	2.4 (2.6) [2.8]	1.9 (1.9) [2.5]	6.3 (7.1) [9.3]	3.7 (3.7) [4.2]	5.0 (6.0) [6.7]	56.5 (56.5) [56.5]	- (-) [-]	62.1 (62.1) [62.1]	- (-) [-]	- (-) [-]	6.9 (6.0) [6.1]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	A (A) [A]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	E (E) [E]	- (-) [-]	- (-) [-]	A (A) [A]
Maple Ave & Lakeshore Rd W												
Delay	11.9 (12.9) [14.9]	5.6 (6.9) [6.2]	3.0 (4.7) [2.2]	- (-) [-]	2.3 (2.4) [3.2]	2.0 (1.6) [2.0]	57.5 (57.9) [58.4]	- (-) [-]	33.5 (32.3) [34.1]	56.8 (57.5) [56.7]	- (-) [-]	14.1 (13.4) [15.3]
LOS	B (B) [B]	A (A) [A]	A (A) [A]	- (-) [-]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	C (C) [C]	E (E) [E]	- (-) [-]	B (B) [B]
Benson Ave & Lakeshore Rd W												
Delay	- (-) [14.1]	- (3.0) [3.2]	- (3.1) [3.7]	- (3.2) [4.1]	- (3.3) [5.3]	- (-) [5.7]	- (34.2) [36.1]	- (-) [-]	- (31.1) [37.4]	- (-) [34.1]	- (-) [-]	- (-) [36.5]
LOS	- (-) [B]	- (A) [A]	- (A) [A]	- (A) [A]	- (A) [A]	- (-) [A]	- (C) [D]	- (-) [-]	- (C) [D]	- (-) [C]	- (-) [-]	- (-) [D]
Plaza Drwy & Lakeshore Rd W												
Delay	- (-) [51.5]	3.4 (3.5) [4.6]	4.1 (4.3) [5.3]	8.1 (9.0) [15.4]	3.9 (3.8) [11.5]	- (-) [11.1]	54.7 (54.8) [64.1]	- (-) [-]	5.0 (5.0) [6.2]	- (-) [55.5]	- (-) [-]	- (-) [59.3]
LOS	- (-) [D]	A (A) [A]	A (A) [A]	A (A) [B]	A (A) [B]	- (-) [B]	D (D) [E]	- (-) [-]	A (A) [A]	- (-) [E]	- (-) [-]	- (-) [E]
Mississauga Rd & Lakeshore Rd W												
Delay	25.5 (15.5) [42.6]	20.3 (15.4) [31.5]	6.2 (6.0) [11.0]	21.7 (19.1) [54.8]	13.5 (9.7) [31.0]	33.8 (20.2) [39.8]	58.4 (58.6) [63.8]	33.6 (39.9) [33.9]	11.9 (11.1) [21.7]	66.0 (71.5) [47.1]	64.2 (66.3) [48.4]	- (-) [12.9]
LOS	C (B) [D]	C (B) [C]	A (A) [B]	C (B) [D]	B (A) [C]	C (C) [D]	E (E) [E]	C (D) [C]	B (B) [C]	E (E) [D]	E (E) [D]	- (-) [B]

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
John Street & Lakeshore Rd W												
Delay	11.9 (15.0) [22.7]	4.7 (4.6) [6.5]	43.1 (39.3) [63.2]	6.9 (9.2) [10.9]	3.1 (4.8) [4.6]	23.1 (27.6) [29.9]	56.3 (56.4) [57.3]	- (-) [-]	5.5 (5.9) [8.4]	36.6 (46.9) [43.9]	70.8 (74.6) [118.8]	35.4 (51.5) [52.4]
LOS	B (B) [C]	A (A) [A]	D (D) [E]	A (A) [B]	A (A) [A]	C (C) [C]	E (E) [E]	- (-) [-]	A (A) [A]	D (D) [D]	E (E) [F]	D (D) [D]
Stavebank & Lakeshore Rd W												
Delay	2.7 (5.7) [8.4]	5.6 (5.8) [6.6]	4.6 (5.6) [5.4]	13.8 (12.3) [30.7]	11.5 (12.1) [26.0]	14.0 (13.6) [21.0]	55.2 (54.8) [55.6]	- (16.1) [-]	14.9 (15.2) [18.1]	49.9 (48.2) [48.8]	61.3 (62.9) [68.0]	69.9 (71.5) [65.0]
LOS	A (A) [A]	A (A) [A]	A (A) [A]	B (B) [C]	B (B) [C]	B (B) [C]	E (D) [E]	- (B) [-]	B (B) [B]	D (D) [D]	E (E) [E]	E (E) [E]
Elizabeth Rd & Lakeshore Rd W												
Delay	28.9 (26.6) [46.2]	8.7 (9.0) [14.0]	4.9 (7.1) [14.6]	7.0 (11.9) [25.6]	4.8 (5.5) [11.1]	4.4 (5.1) [5.3]	58.3 (62.6) [63.9]	48.4 (49.2) [51.5]	12.8 (13.3) [17.5]	44.2 (44.4) [43.8]	50.3 (50.3) [50.4]	15.1 (15.0) [18.4]
LOS	C (C) [D]	A (A) [B]	A (A) [B]	A (B) [C]	A (A) [B]	A (A) [A]	E (E) [E]	D (D) [D]	B (B) [B]	D (D) [D]	D (D) [D]	B (B) [B]
Hurontario Rd & Lakeshore Rd W												
Delay	32.2 (33.5) [45.5]	15.3 (15.9) [21.8]	6.7 (7.5) [10.1]	16.5 (20.6) [58.5]	12.0 (12.1) [12.9]	3.1 (2.7) [5.5]	53.9 (53.6) [53.3]	43.7 (44.1) [42.7]	12.0 (12.1) [22.2]	35.3 (35.3) [35.1]	38.0 (38.4) [37.1]	24.5 (25.5) [28.2]
LOS	C (C) [D]	B (B) [C]	A (A) [B]	B (C) [E]	B (B) [B]	A (A) [A]	D (D) [D]	D (D) [D]	B (B) [C]	D (D) [D]	D (D) [D]	C (C) [C]

Notes:
1. XX (XX) [XX] – Existing Value (Future Background 2027 Value) [Future Total 2027 Value]
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

For AM peak hour conditions, the *Vissim* analysis indicates that (outside of the intersections physically located at the Port Credit West Village site) impacts in terms of delays and intersection level of service (LOS) are generally small. For the intersections directly impacted, (Lakeshore Road intersections with Benson Road, Credit Landing Plaza, and Mississauga Road), some increases in delay and LOS are projected, but are still within acceptable limits for urban conditions. Similar findings are evident for the 2031 conditions reported on in Appendix C.

TABLE 4: EXISTING, FUTURE BACKGROUND (2027), FUTURE TOTAL (2027) PROJECTED DELAYS AND LOS ON LAKESHORE ROAD (PM PEAK HOUR)

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Lorne Park Rd & Lakeshore Rd W												
Delay	- (-) [-]	6.6 (5.3) [5.6]	7.5 (6.0) [7.0]	11.3 (12.1) [14.3]	5.1 (5.5) [6.3]	4.7 (5.6) [7.0]	60.9 (60.9) [61.0]	66.4 (66.4) [66.5]	21.5 (21.9) [22.1]	61.0 (61.0) [60.3]	- (-) [-]	4.3 (4.4) [4.4]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	B (B) [B]	A (A) [A]	A (A) [A]	E (E) [E]	E (E) [E]	C (C) [C]	E (E) [E]	- (-) [-]	A (A) [A]
Shawnmarr Rd & Lakeshore Rd W												
Delay	9.4 (11.6) [20.2]	7.5 (8.2) [8.1]	8.6 (8.4) [7.7]	16.1 (15.9) [23.6]	7.5 (8.0) [9.6]	4.5 (5.4) [8.5]	33.8 (33.8) [33.8]	- (-) [-]	34.1 (34.1) [34.1]	- (-) [-]	- (-) [-]	5.8 (7.4) [10.7]
LOS	A (B) [C]	A (A) [A]	A (A) [A]	B (B) [C]	A (A) [A]	A (A) [A]	C (C) [C]	- (-) [-]	C (C) [C]	- (-) [-]	- (-) [-]	A (A) [B]
Maple Ave & Lakeshore Rd W												
Delay	10.8 (11.8) [19.2]	2.9 (6.4) [6.7]	2.2 (6.6) [7.6]	14.2 (18.1) [23.2]	5.2 (5.9) [7.5]	4.9 (6.1) [7.7]	35.8 (35.8) [37.0]	36.9 (36.8) [37.0]	- (-) [-]	38.1 (38.0) [38.0]	41.5 (41.5) [41.3]	8.4 (8.8) [10.6]
LOS	B (B) [B]	A (A) [A]	A (A) [A]	B (B) [C]	A (A) [A]	A (A) [A]	D (D) [D]	D (D) [D]	- (-) [-]	D (D) [D]	D (D) [D]	A (A) [B]
Benson Ave & Lakeshore Rd W												
Delay	- (-) [13.0]	- (2.9) [3.3]	- (3.3) [3.0]	- (3.9) [4.1]	- (2.8) [6.1]	- (-) [6.1]	- (35.8) [34.2]	- (-) [-]	- (31.3) [37.5]	- (-) [34.0]	- (-) [-]	- (-) [37.1]
LOS	- (-) [B]	- (A) [A]	- (A) [A]	- (A) [A]	- (A) [A]	- (-) [A]	- (D) [C]	- (-) [-]	- (C) [D]	- (-) [C]	- (-) [-]	- (-) [D]
Plaza Drwy & Lakeshore Rd W												
Delay	- (-) [44.3]	7.1 (5.1) [8.1]	4.9 (4.4) [6.6]	20.2 (24.1) [50.5]	6.7 (6.5) [25.8]	- (-) [26.4]	32.1 (40.6) [58.7]	- (-) [-]	8.5 (10.1) [17.3]	- (-) [45.4]	- (-) [-]	- (-) [47.6]
LOS	- (-) [D]	A (A) [A]	A (A) [A]	C (C) [D]	A (A) [C]	- (-) [C]	C (D) [E]	- (-) [-]	A (B) [B]	- (-) [D]	- (-) [-]	- (-) [D]
Mississauga Rd & Lakeshore Rd W												
Delay	- (-) [24.8]	25.2 (13.4) [21.4]	11.4 (7.4) [11.8]	46.5 (25.7) [73.7]	17.0 (8.6) [19.2]	13.7 (8.9) [17.1]	43.9 (53.1) [70.1]	- (63.6) [49.7]	8.1 (9.7) [25.3]	35.0 (61.4) [73.5]	- (-) [61.1]	- (-) [11.3]
LOS	- (-) [C]	C (B) [C]	B (A) [B]	D (C) [E]	B (A) [B]	B (A) [B]	D (D) [E]	- (E) [D]	A (A) [C]	C (E) [E]	- (-) [E]	- (-) [B]
John Street & Lakeshore Rd W												
Delay	- (-) [-]	6.1 (6.8) [14.4]	5.3 (9.6) [12.6]	42.4 (18.3) [26.2]	6.0 (5.4) [5.4]	22.1 (3.7) [5.4]	37.5 (44.6) [45.8]	- (-) [-]	14.4 (9.3) [28.9]	- (-) [-]	- (-) [-]	- (-) [-]
LOS	- (-) [-]	A (A) [B]	A (A) [B]	D (B) [C]	A (A) [A]	C (A) [A]	D (D) [D]	- (-) [-]	B (A) [C]	- (-) [-]	- (-) [-]	- (-) [-]
Stavebank & Lakeshore Rd W												
Delay	8.1 (5.3) [9.3]	10.2 (7.8) [12.5]	9.6 (6.7) [10.9]	8.8 (-) [-]	12.7 (7.1) [9.3]	10.8 (7.5) [8.0]	35.8 (54.5) [59.4]	- (-) [-]	21.1 (24.5) [43.7]	31.7 (44.9) [49.0]	27.8 (45.3) [45.2]	36.1 (-) [-]
LOS	A (A) [A]	B (A) [B]	A (A) [B]	A (-) [-]	B (A) [A]	B (A) [A]	D (D) [E]	- (-) [-]	C (C) [D]	C (D) [D]	C (D) [D]	D (-) [-]

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Elizabeth Rd & Lakeshore Rd W												
Delay	7.4 (9.1) [15.6]	7.3 (4.8) [10.7]	3.5 (2.5) [6.0]	36.5 (35.2) [48.0]	9.7 (6.5) [6.7]	7.3 (4.1) [4.6]	40.5 (59.8) [58.1]	31.8 (61.8) [65.7]	15.3 (18.4) [30.2]	32.5 (47.6) [53.5]	28.3 (49.2) [49.9]	- (-) [-]
LOS	A (A) [B]	A (A) [B]	A (A) [A]	D (D) [D]	A (A) [A]	A (A) [A]	D (E) [E]	C (E) [E]	B (B) [C]	C (D) [D]	C (D) [D]	- (-) [-]
Hurontario Rd & Lakeshore Rd W												
Delay	26.0 (21.2) [26.9]	24.6 (16.6) [26.6]	13.9 (9.9) [16.5]	29.6 (23.6) [65.0]	21.6 (12.1) [14.9]	15.2 (6.2) [9.2]	31.8 (76.7) [78.6]	22.4 (50.7) [63.7]	36.1 (21.9) [51.0]	24.3 (46.4) [46.4]	24.6 (44.9) [44.2]	15.3 (25.2) [25.7]
LOS	C (C) [C]	C (B) [C]	B (A) [B]	C (C) [E]	C (B) [B]	B (A) [A]	C (E) [E]	C (D) [E]	D (C) [D]	C (D) [D]	C (D) [D]	B (C) [C]

Notes:
1. XX (XX) [XX] – Existing Value (Future Background 2027 Value) [Future Total 2027 Value]
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

For PM peak hour conditions, despite conditions being generally more congested on the Lakeshore Road corridor, the *Vissim* analysis shows similar results to the future AM cases. That is, for the intersections directly impacted, (Lakeshore Road intersections with Benson Road, Credit Landing Plaza, and Mississauga Road), some increases in delay and LOS are projected, but are still within acceptable limits for urban conditions. Outside of the immediately adjacent intersections, impacts in terms of delays and intersection level of service (LOS) are generally small.

Similar findings are evident for the 2031 conditions reported on in Appendix C, although the increased background traffic allowance from 2027 to 2031 (four more years of corridor traffic growth) results in further increases in travel time and delay during the PM peak hour. Looking at the sensitivity analysis of a reduction in existing long-distance automobile travel on Lakeshore Road for 2031 (as described in Section 6 of this report), the levels of delay reduce accordingly.

5.4.2 Vehicular Queuing

Results of the queuing analysis under future total traffic conditions are contained in the following tables for AM and PM peak hour traffic. Queuing analysis results for the 2031 condition are presented in **Appendix D**.

TABLE 5 *VISSIM* QUEUE RESULTS FOR EXISTING, FUTURE BACKGROUND (2027) AND FUTURE TOTAL (2027) AM PEAK HOUR

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Lakeshore Road W & Hurontario	NB	90 m	1.8m (1.5m) [1.5m]	5.0m (10.6m) [10.7m]	5.3m (19.1m) [19.0m]
	SB	95 m	7.0m (10.3m) [17.1m]	18.4m (21.8m) [37.2m]	27.2m (30.3m) [58.1m]
	EB	280 m	6.6m (9.4m) [84.6m]	27.2m (30.3m) [58.1m]	93.4m (93.9m) [182.8m]
	WB	240 m	4.4m (5.3m) [25.2m]	23.0m (27.7m) [47.4m]	34.3m (45.5m) [63.9m]
Lakeshore Road W & Elizabeth	NB	100 m	3.3m (3.3m) [3.3m]	8.9m (8.9m) [8.8m]	14.6m (14.6m) [14.6m]
	SB	105 m	0.0m (0.0m) [0.0m]	1.9m (1.4m) [4.9m]	13.8m (12.7m) [14.4m]
	EB	100 m	0.0m (0.0m) [22.9m]	13.8m (12.7m) [14.4m]	84.9m (101.8m) [117.7m]
	WB	280 m	0.0m (0.0m) [0.0m]	20.6m (23.9m) [51.4m]	34.4m (43.8m) [78.2m]
Lakeshore Road W & Stavebank	NB	100 m	2.1m (2.1m) [0.0m]	2.0m (2.6m) [1.7m]	7.3m (7.4m) [6.7m]
	SB	100 m	0.0m (0.0m) [0.0m]	3.2m (5.4m) [8.2m]	10.5m (11.7m) [14.6m]
	EB	350 m	2.9m (3.9m) [81.2m]	10.5m (11.7m) [14.6m]	91.8m (89.5m) [205.3m]
	WB	100 m	0.0m (0.0m) [0.0m]	21.8m (29.5m) [35.7m]	43.9m (66.7m) [89.0m]
Lakeshore Road W & Front St	NB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	EB	180 m	0.0m (7.4m) [0.9m]	0.0m (0.0m) [0.0m]	45.4m (54.5m) [83.9m]
	WB	350 m	8.7m (4.9m) [7.8m]	22.3m (21.3m) [34.3m]	27.2m (31.0m) [48.5m]
Lakeshore Road W & Mississauga Rd	NB	105 m	0.0m (0.0m) [17.6m]	0.0m (0.0m) [50.9m]	0.0m (0.0m) [74.6m]
	SB	95 m	28.4m (29.4m) [31.1m]	49.2m (48.7m) [52.0m]	59.2m (60.8m) [67.0m]
	EB	240 m	23.2m (4.0m) [106.8m]	59.2m (60.8m) [67.0m]	96.1m (51.3m) [178.5m]
	WB	180 m	20.2m (8.0m) [36.9m]	44.6m (32.6m) [84.7m]	69.7m (54.0m) [116.1m]

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Lakeshore Road W & Plaza Driveway	NB	50 m	0.0m (0.0m) [7.8m]	0.0m (0.0m) [15.2m]	0.0m (0.0m) [19.2m]
	SB	35 m	0.0m (0.0m) [0.0m]	5.6m (5.6m) [7.0m]	13.4m (13.3m) [15.1m]
	EB	215 m	0.0m (0.0m) [11.5m]	13.4m (13.3m) [15.1m]	32.0m (30.4m) [92.5m]
	WB	240 m	0.0m (0.0m) [8.0m]	3.4m (3.7m) [49.4m]	16.0m (19.2m) [62.5m]
Benson Avenue (to be signalized in the future)	NB	300 m	-- (0.0m) [1.9m]	-- (0.0m) [13.6m]	-- (0.0m) [22.2m]
	SB	95 m	-- (6.3m) [6.8m]	-- (20.0m) [20.2m]	-- (30.0m) [32.4m]
	EB	175 m	-- (0.0m) [0.0m]	-- (30.0m) [32.4m]	-- (44.2m) [67.4m]
	WB	215 m	-- (0.0m) [0.0m]	-- (11.7m) [18.0m]	-- (31.7m) [44.0m]
Lakeshore Road W & Maple Ave	NB	300 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	4.0m (4.0m) [4.0m]
	SB	325 m	2.1m (3.0m) [2.9m]	13.9m (14.2m) [15.0m]	24.6m (24.6m) [24.6m]
	EB	340 m	0.0m (0.0m) [0.0m]	24.6m (24.6m) [24.6m]	11.5m (11.6m) [22.5m]
	WB	175 m	0.0m (0.0m) [0.0m]	7.7m (14.6m) [19.5m]	28.0m (37.3m) [43.0m]
Lakeshore Road W & Shawnmarr Road	NB	65 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	320 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	1.3m (1.3m) [1.3m]
	EB	1100 m	0.0m (0.0m) [0.0m]	1.3m (1.3m) [1.3m]	24.5m (23.6m) [27.8m]
	WB	340 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [3.4m]	5.9m (7.3m) [13.8m]
Lakeshore Road W & Lorne Park Road	NB	30 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (1.9m) [1.9m]
	SB	325 m	2.2m (2.2m) [2.2m]	26.5m (25.4m) [25.4m]	43.6m (42.2m) [42.2m]
	EB	1000 m	0.9m (0.0m) [0.0m]	43.6m (42.2m) [42.2m]	36.5m (38.0m) [44.9m]
	WB	1100 m	0.0m (0.0m) [0.0m]	0.0m (2.6m) [12.2m]	5.2m (13.3m) [22.3m]

Notes:
1. XX (XX) [XX] – Existing Value (Future Background 2027 Value) [Future Total 2027 Value]
2. Directions are WB=westbound, EB=eastbound, SB=southbound, NB=northbound

TABLE 6 *VISSIM* QUEUE RESULTS FOR EXISTING, FUTURE BACKGROUND AND FUTURE TOTAL (2027) PM PEAK HOUR

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Lakeshore Road W & Hurontario	NB	90 m	0.9m (6.6m) [5.1m]	4.1m (23.4m) [23.3m]	4.3m (36.2m) [36.2m]
	SB	95 m	29.9m (25.8m) [195.0m]	53.7m (76.9m) [223.0m]	79.6m (124.3m) [239.1m]
	EB	280 m	25.7m (4.3m) [59.7m]	79.6m (46.1m) [114.2m]	70.0m (74.6m) [171.5m]
	WB	240 m	35.5m (13.5m) [55.7m]	71.8m (58.3m) [110.4m]	97.0m (82.9m) [119.0m]
Lakeshore Road W & Elizabeth	NB	100 m	0.0m (0.0m) [0.0m]	7.3m (11.1m) [12.2m]	13.1m (19.1m) [20.4m]
	SB	105 m	0.0m (0.0m) [0.0m]	4.9m (8.1m) [13.4m]	13.0m (18.2m) [22.8m]
	EB	100 m	12.7m (0.0m) [0.0m]	13.0m (40.0m) [47.5m]	94.8m (91.3m) [104.0m]
	WB	280 m	6.4m (0.0m) [13.4m]	33.0m (19.9m) [67.4m]	52.1m (33.3m) [175.7m]
Lakeshore Road W & Stavebank	NB	100 m	5.8m (7.7m) [7.0m]	15.1m (21.2m) [21.2m]	19.9m (28.6m) [28.6m]
	SB	100 m	1.9m (3.8m) [12.8m]	17.6m (26.5m) [50.0m]	42.6m (43.9m) [64.6m]
	EB	350 m	3.5m (0.0m) [0.0m]	42.6m (16.5m) [33.0m]	60.5m (60.5m) [77.4m]
	WB	100 m	10.1m (4.3m) [33.6m]	69.4m (71.6m) [103.7m]	90.5m (95.6m) [104.2m]
Lakeshore Road W & Front St	NB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	EB	180 m	0.0m (0.0m) [0.0m]	0.0m (26.2m) [39.6m]	43.3m (65.7m) [113.8m]
	WB	350 m	2.4m (0.0m) [84.9m]	28.8m (47.1m) [259.2m]	49.7m (86.9m) [309.7m]
Lakeshore Road W & Mississauga Rd	NB	105 m	0.0m (0.0m) [21.8m]	0.0m (0.0m) [52.5m]	0.0m (0.0m) [73.8m]
	SB	95 m	14.0m (27.3m) [32.4m]	26.4m (51.7m) [58.9m]	32.0m (68.7m) [76.5m]
	EB	240 m	20.0m (12.4m) [88.4m]	32.0m (38.9m) [138.4m]	62.1m (64.4m) [201.9m]
	WB	180 m	46.7m (31.3m) [124.3m]	101.3m (83.5m) [206.4m]	153.5m (120.7m) [209.7m]
Lakeshore Road W & Plaza Driveway	NB	50 m	0.0m (0.0m) [13.0m]	0.0m (0.0m) [24.9m]	0.0m (0.0m) [28.5m]
	SB	35 m	9.2m (8.9m) [16.3m]	21.4m (22.9m) [38.9m]	27.3m (29.7m) [46.1m]
	EB	215 m	0.0m (0.0m) [45.4m]	27.3m (23.7m) [141.1m]	38.0m (46.7m) [163.0m]
	WB	240 m	0.0m (0.0m) [48.7m]	34.9m (22.2m) [124.4m]	72.5m (79.6m) [178.7m]

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Benson Avenue (to be signalized in the future)	NB	300 m	-- (0.0m) [0.0m]	-- (0.0m) [8.8m]	-- (0.0m) [14.4m]
	SB	95 m	-- (0.0m) [5.0m]	-- (12.4m) [12.2m]	-- (18.8m) [19.2m]
	EB	175 m	-- (0.0m) [0.0m]	-- (25.4m) [57.9m]	-- (46.9m) [75.3m]
	WB	215 m	-- (0.0m) [0.0m]	-- (28.1m) [40.9m]	-- (84.5m) [72.7m]
Lakeshore Road W & Maple Ave	NB	300 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	4.0m (4.0m) [4.0m]
	SB	325 m	0.0m (0.0m) [0.0m]	2.2m (2.2m) [2.9m]	6.4m (6.4m) [6.6m]
	EB	340 m	0.0m (0.0m) [0.0m]	6.4m (26.9m) [39.0m]	34.1m (41.2m) [60.5m]
	WB	175 m	0.0m (0.0m) [0.0m]	10.9m (28.0m) [37.3m]	34.0m (68.4m) [75.2m]
Lakeshore Road W & Shawnmarr Road	NB	65 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	320 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	2.0m (2.0m) [2.0m]
	EB	1100 m	0.0m (0.0m) [3.4m]	2.0m (30.5m) [42.3m]	42.7m (51.1m) [70.5m]
	WB	340 m	1.8m (3.9m) [3.8m]	19.6m (27.3m) [29.9m]	46.6m (62.5m) [55.8m]
Lakeshore Road W & Lorne Park Road	NB	30 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	325 m	14.2m (14.2m) [14.2m]	28.1m (28.7m) [28.0m]	40.5m (40.6m) [40.6m]
	EB	1000 m	4.5m (5.2m) [10.0m]	40.5m (32.2m) [43.4m]	39.8m (47.8m) [67.9m]
	WB	1100 m	5.2m (2.7m) [3.9m]	24.2m (15.9m) [29.7m]	54.3m (39.4m) [46.0m]

Notes:
1. XX (XX) [XX] – Existing Value (Future Background 2027 Value) [Future Total 2027 Value]
2. Directions are WB=westbound, EB=eastbound, SB=southbound, NB=northbound

In general, the level of queuing during peak hour conditions in 2027 is shown to have minimal change during the AM peak hour. In the PM peak hour, when congestion and queuing is more prevalent under existing conditions, the increase in queuing due to the addition of traffic generated by the Port Credit West Village site is more noticeable at locations close to Mississauga Road.

Similar findings are evident for the 2031 conditions reported on in Appendix D, although the increased background traffic allowance from 2027 to 2031 (four more years of corridor traffic growth) results in further queueing during the PM peak hour in particular. Looking at the sensitivity analysis of a reduction in existing long-distance automobile travel on Lakeshore Road for 2031 (as described in Section 6 of this report), the levels of queuing reduce accordingly.

5.4.3 Lakeshore Road Corridor Travel Times

Projected future vehicle travel times during both the weekday morning (AM) and afternoon (PM) peak hours on the Lakeshore Road corridor segment between Lorne Park Road and Hurontario Street are presented in **Table 7**, **Figure 4,** and **Figure 5**.

TABLE 7: TRAVEL TIMES – *VISSIM* MODEL SIMULATION OUTPUTS

Corridor Segment	Analysis Period	Direction	BA Group Field Data Avg.[1]	Google API Range[1]	Vissim Simulation Output Range[1,2]		
					Existing Conditions	Future Background (2027) Conditions	Future Total (2027) Conditions
Lakeshore Road between Lorne Park & Hurontario Ave	Weekday Morning (AM) Peak Hour	WB	256	242 – 447	252 - 392	**230 - 387**	**284 - 397**
		EB	267	235 - 417	233 - 332	**237 - 343**	**267 - 481**
	Weekday Afternoon (PM) Peak Hour	WB	319	259 – 505	268 – 386	**248 - 345**	**288 - 478**
		EB	311	240 – 488	269 - 377	**242 - 350**	**277 – 460**

1. Unit of time: seconds.
2. 90% of the Vissim simulation output fall within this range.

Corridor Segment	Analysis Period	Direction	BA Group Field Data Avg.[1]	Google API Range[1]	Vissim Simulation Output Range[1,2]			
					Existing Conditions	Future Background (2031) Conditions	Future Total (2031) Conditions	Future Total (2031) Conditions – Diverted[3]
Lakeshore Road between Lorne Park & Hurontario Ave	Weekday Morning (AM) Peak Hour	WB	256	242 - 447	252 - 392	**232 - 374**	**287 - 410**	**280 - 384**
		EB	267	235 - 417	233 - 332	**237 - 340**	**261 – 430**	**244 - 369**
	Weekday Afternoon (PM) Peak Hour	WB	319	259 - 505	268 – 386	**250 - 351**	**291 - 504**	**275 - 419**
		EB	311	240 - 488	269 - 377	**243 - 352**	**275 – 445**	**273 - 414**

1. Unit of time: seconds. -
2. 90% of the Vissim simulation output fall within this range.
3. Diverted existing volumes as described in Section 6 of this report

With respect to peak hour peak direction travel times between Lorne Park Road and Hurontario Street, the change in travel time due to additional traffic volumes and access points on Lakeshore Road is approximately 1 minute eastbound in the AM peak hour and 45 seconds westbound in the PM peak hour relative to existing conditions on the corridor. (The existing eastbound AM travel time is approximately 5 minutes and 10 seconds, and the existing westbound PM travel time is approximately 5 minutes and 40 seconds based on Google API travel times.).

During the PM peak hour, existing travel times eastbound on Lakeshore Road include delays due to left turn activity and are longer than eastbound travel times during the AM peak hour. The modelled PM peak travel times for future cases in *Vissim* (with some eastbound left turns banned) indicate a reduction in the highest range of delays compared to existing travel time range from the Google API data. As described in Section 5.5, modelling the impact of eastbound left turn bans indicates that eastbound travel times would become significantly more reliable with an eastbound left turn ban in place.

Further reductions in the future estimates of corridor travel times would be expected based on an assumption of diversion or displacement of some of the existing long-distance travel that takes place on Lakeshore Road, as further described in Section 6.

FIGURE 4: EXISTING, FUTURE BACKGROUND AND FUTURE TOTAL (2027 & 2031) TRAVEL TIMES ON LAKESHORE ROAD WEST – AM PEAK HOUR

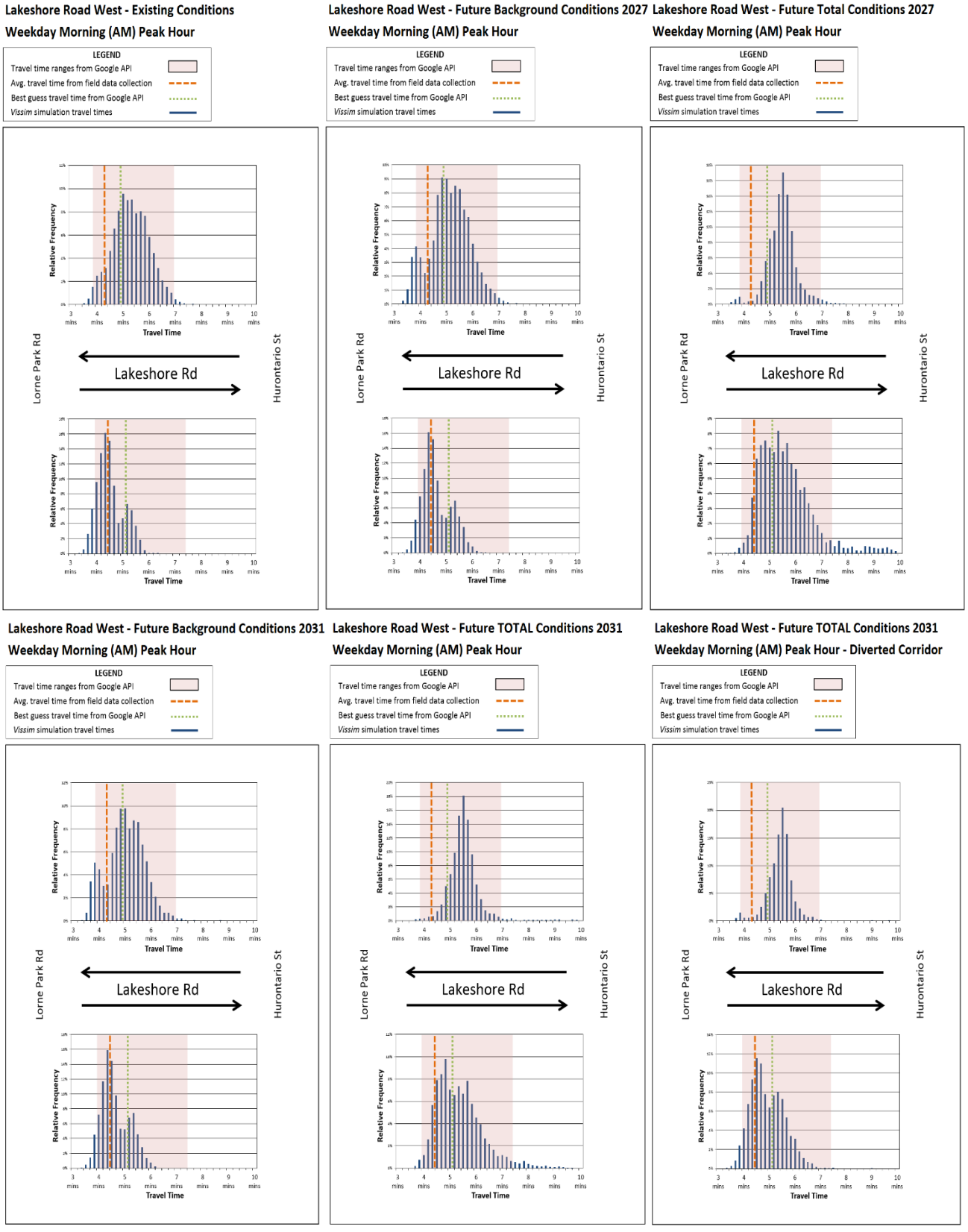
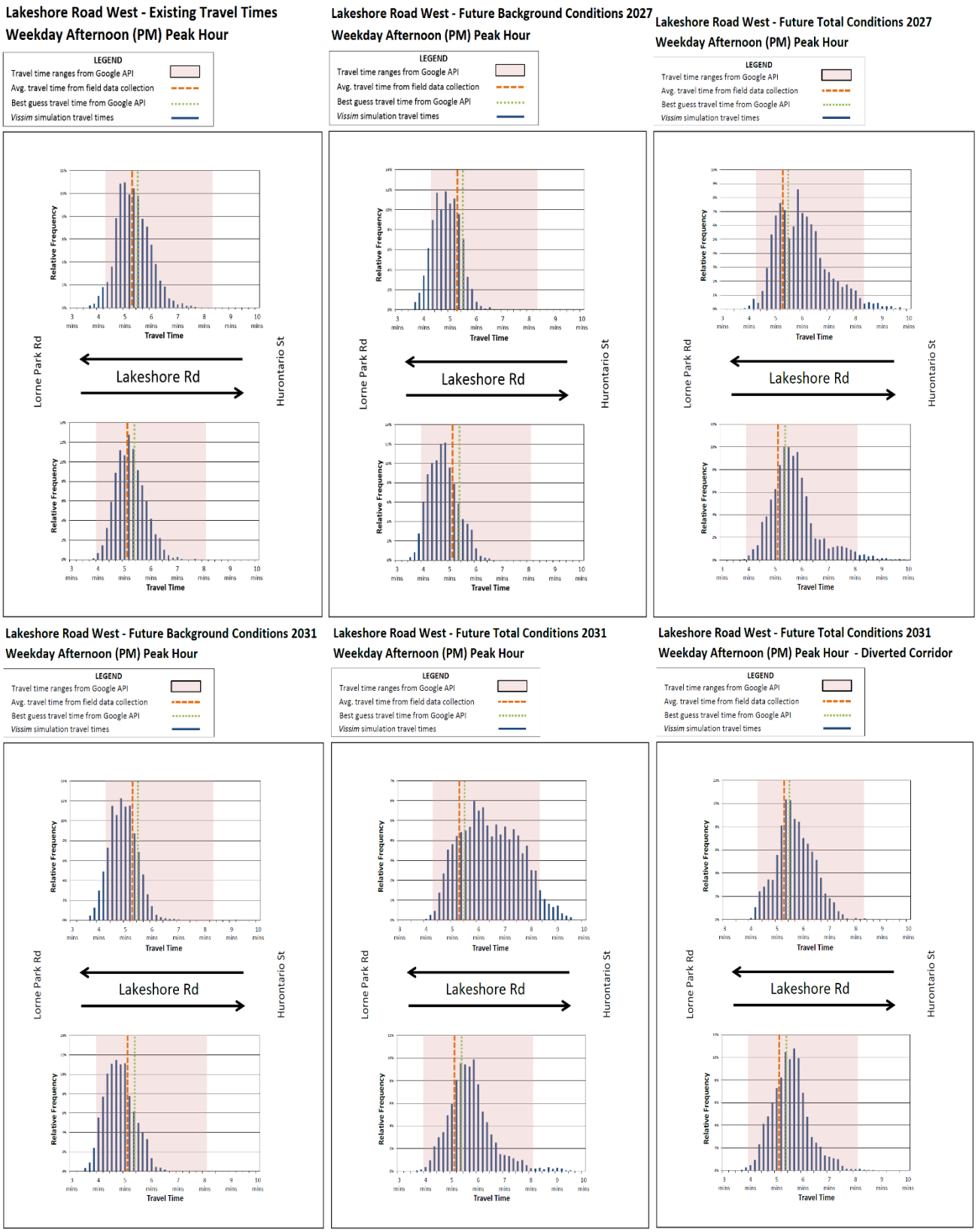


FIGURE 5: EXISTING, FUTURE BACKGROUND AND FUTURE TOTAL (2027 & 2031) TRAVEL TIMES ON LAKESHORE ROAD WEST – PM PEAK HOUR



Based on this modeling exercise, projected eastbound and westbound travel times along this segment of the Lakeshore Road corridor are anticipated to increase as a result of the redevelopment of the subject site, assuming that existing travel mode splits continue in the future, with only a 5% reduction in site traffic volumes due to an assumed shift to transit in response to the proposed site transportation demand management measures.

While the addition of traffic on the corridor (both from background traffic and from development of the West Village site), future travel times are anticipated to increase but be still generally in the range of what motorists can experience today.

5.5 IMPROVEMENTS INCLUDED IN FUTURE CONDITIONS

5.5.1 Eastbound Left Turns through Port Credit

Through the modelling and microsimulation process, it was evident that certain improvements could have a large impact on travel times along the corridor. One key change is the prohibition of eastbound left turn movements from Lakeshore Road onto Stavebank Road during the evening peak hour. The eastbound left turn is currently banned during the morning peak period, but is permitted during the evening peak hour.

In the evening peak hour, the opposing westbound flow of traffic on Lakeshore Road is high, and eastbound left turning vehicles must typically wait until the end of the eastbound signal phase to make the turn onto Stavebank Road. While doing so, the eastbound left turning vehicle blocks the centre eastbound lane. In cases where eastbound MiWay buses stop on Lakeshore Road at Stavebank Road at the same time as an eastbound left turning vehicle is waiting, the flow of traffic eastbound on Lakeshore Road is completely blocked until either the bus or the eastbound left turning vehicle move through the intersection.

The reconfigured intersection of Lakeshore and Stavebank will make operation of the intersection more efficient and reduce vehicle-pedestrian conflicts, but it is understood that left turn lanes are not included in the City's intersection redesign, and conditions are not expected to improve for eastbound left turn movements. Banning the eastbound left turn will result in some turns being made at other intersections such as Ann Street where a left turn lane exists, or may result in some drivers choosing an alternate route.

Modelling was carried out for the case with and without left turns banned in the PM peak hour. For eastbound traffic on Lakeshore Road, the average modelled travel time between Lorne Park Road and Hurontario Street decreases by 35 seconds (from 6 minutes and 25 seconds to approximately 5 minutes and 50 seconds), and the maximum modelled travel time decreases by 6 minutes, indicating that eastbound travel times would become significantly more reliable. In the westbound direction, travel times are largely unaffected.

5.5.2 Mississauga Road/Lakeshore Road Intersection

Another area identified for improvement is the intersection configuration at Mississauga/Lakeshore Road. The intersection configuration and operation had been changed 10 or more years ago to provide for dual southbound left turn lanes from Mississauga Road to Lakeshore Road. While this configuration can reduce queues and delays for the southbound left turn, the signal phasing required to operate a dual left turn can result in some inefficiencies for other movements. Through the traffic modelling process for this report and the Stage 1 Report, it was identified that there are some efficiency gains by removing the dual left turn for the

afternoon peak period when southbound left turn volumes are lower than the volumes in the morning peak hour. The modelling indicates that in the PM peak hour, the existing single southbound shared through-right lane would have limited capacity to accommodate increased traffic without taking traffic signal cycle time from westbound traffic movement on Lakeshore Road, and that alternatives to provide separate southbound through and southbound right turn lanes in the PM peak hour should be explored.

A variable lane configuration has been tested to provide separate turn lanes for southbound right, southbound through, and southbound left turns for the afternoon peak period. While this is an unconventional approach, this form of variable lane control has been used in other jurisdictions in the United States. With appropriate signage and geometric design, it can be considered as a potential design in this case, but further discussions with City of Mississauga transportation staff are required in order to confirm the specific requirements for the improvement.

Without making the change, southbound queues and delays on Mississauga Road in the afternoon peak period are projected to reach high levels in future conditions. The future delay for southbound through traffic in 2027 is modelled at approximately 50 seconds with the improvement, and 172 seconds without the improvement. Similarly, southbound queues in the 2027 afternoon peak hour were modelled at approximately 59 metres with the improvement, and 211 metres without (both queues are 85th percentile values).

6.0 FUTURE TRAFFIC VOLUME DISPLACEMENT

A key assumption inherent in the analysis in this report is that traffic levels in existing and future background conditions are assumed to persist into the future and not respond to increased travel times and delays.

It is anticipated that in response to future capacity constraints, a number of shifts in travel patterns along the corridor may occur in the future:

- Drivers may choose to travel outside of the peak hour to avoid traffic congestion and delay;
- Drivers may find alternative travel routes to reach their destination; and
- A travel mode shift away from driving (e.g. choosing to travel by GO train) may occur due to increased vehicle travel times during peak commuter periods.

A key aspect of understanding the scope for the above potential changes to take place in the future is quantifying the extent to which the Lakeshore Road corridor is used by traffic that does not have origins or destinations in the study area, or that does not have origins or destinations in the City of Mississauga.

6.1 NON-LOCAL TRAFFIC ON LAKESHORE ROAD

To review the potential for future shifts, an analysis was carried out of the origins and destinations of traffic currently using Lakeshore Road. While many trips currently using Lakeshore Road could be susceptible to making the route and travel mode changes described above, for this analysis, the prime candidates for shifting are assumed to be long-distance trips with origins and destinations outside of the City of Mississauga.

Using the StreetLight Insight traffic data platform, a review of the origins and destinations of traffic on Lakeshore Road was carried out. The StreetLight Insight traffic data platform allows a review of “big data” sourced from the movement of connected vehicles (with GPS) and GPS enabled smartphones, using data from 2016-2017. Looking at the origins and destinations of trips using Lakeshore Road provides an ability to review data to understand the level of traffic that is currently using Lakeshore Road through the study area for longer distance trips. This analysis provides an indication of the potential for some existing traffic volumes to find alternate travel routes or alternate travel modes to reach their destination. Data was reviewed for trips on Lakeshore Road in the AM peak period (7am-9am) and in the PM peak period (4pm-6pm), considering specified gateways for measurement of traffic flows, and a study area from Lorne Park Road to the Credit River.

The analysis indicates a majority of trips using Lakeshore Road in the vicinity of the West Village site are longer distance trips travelling to and from origins and destinations outside of the study area, and to or from origins or destinations outside of the City of Mississauga. This includes trips that originate outside of the City of Mississauga but that have destinations inside City boundaries.

A subset of long distance trips can be considered as trips that use Lakeshore Road but that have neither an origin nor a destination inside the City of Mississauga. Considering only these “non-Mississauga” long distance trips provides a conservatively low estimate of the proportion of long-distance trips on Lakeshore Road in the study area that could shift to other routes or modes of travel. To identify only the trips that have origins and destination outside of the City of Mississauga boundaries but that use Lakeshore Road at the Credit River, an analysis was made focusing on the below trips in particular:

- Eastbound in the AM peak period – trips with origins in Hamilton, Burlington, Milton and Oakville, and destinations east of the City of Mississauga

- Westbound in the PM peak period – trips originating in zones east of the City of Mississauga, with destinations in Hamilton, Burlington, Milton and Oakville.

For the analysis, a study area was created on the Lakeshore Road corridor, with specified gateways and zones coded into the analysis to identify origins and destination of all trips. The key data summaries from the origin destination analysis for longs-distance trips are included in Table 8 below and summarized on Figure 6.

TABLE 8: IDENTIFICATION OF LONG-DISTANCE TRIPS[1] FROM ORIGIN DESTINATION DATA

Peak Period	Trip Direction	From Zones	To Zones	% of all Trips[2]	Equivalent Long Distance peak hour trips[3]
AM	Eastbound	Hamilton, Burlington, Milton and Oakville	Toronto and York Region	20-25%	340-425 eastbound in AM Peak
	Westbound	Toronto and York Region	Hamilton, Burlington, Milton and Oakville	3-5%	25-40 vehicles westbound in AM Peak
PM	Westbound	Toronto and York Region	Hamilton, Burlington, Milton and Oakville	5-10%	75-150 vehicles westbound in PM Peak
	Eastbound	Hamilton, Burlington, Milton and Oakville	Toronto and York Region	5-10%	60-120 vehicles eastbound in PM Peak

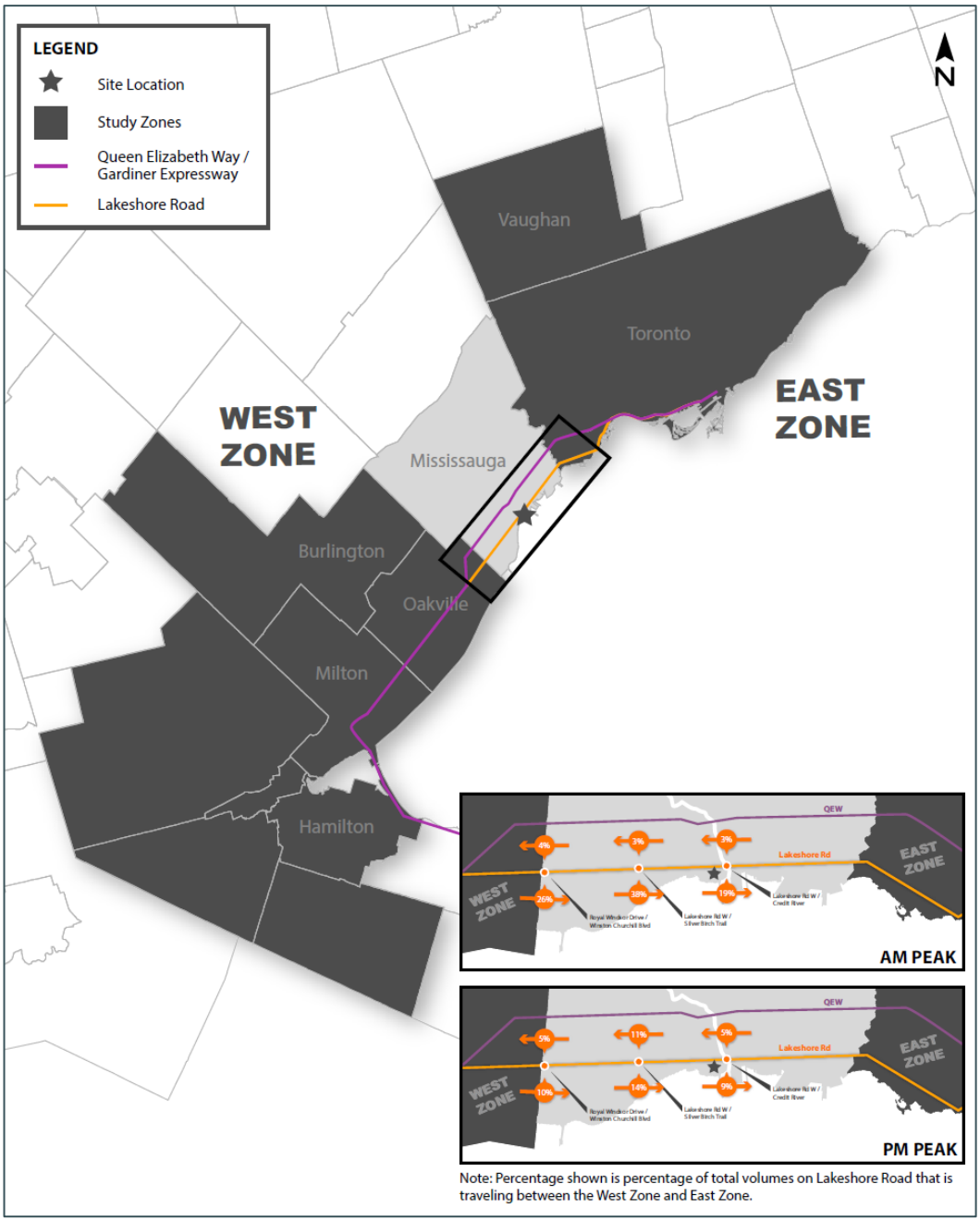
Notes:
1. Does not include any trips with origins or destinations in the City of Mississauga
2. Trips calculated at Credit River for Eastbound trips, and at Lorne Park for Westbound trips, Using StreetLight Data Index
3. Based on existing peak hour trips (from 2017 intersection counts) of 1700 EB in AM peak and 1500 WB in PM peak.

The data indicates a higher percentage of long distance trips on Lakeshore Road eastbound in the morning peak period compared to the percentage of long distance trips westbound in the PM peak period. This may be a result of the available existing connections between the provincial highway network and arterial routes. For example, the origin-destination data indicates that in the morning peak period, approximately 25% of eastbound flow on Lakeshore Road at Royal Windsor Road is made up of trips that are destined to the City of Toronto, the City of Vaughan and other zones to the east. The above table does not include any trips that have origins or destinations in the City of Mississauga, but that still could be considered long distance trips, such as (for example) trips originating in Oakville and Burlington that are destined to zones in the City of Mississauga east of Hurontario Street.

Overall, the analysis indicates that there are substantial traffic volumes that currently use Lakeshore Road as an alternative route to the provincial highway network, and that could be considered to only be using Lakeshore Road due to a perceived travel time advantage. If travel times increase in the future, the extent to which long-distance trips use Lakeshore Road can be expected to decrease, resulting in more capacity being

used by local (City of Mississauga) traffic. A sensitivity analysis was carried out to test the impact of removing a percentage of existing traffic volumes to reflect the future potential for long-distance trips on Lakeshore Road to change travel mode, route or time of travel. Results of the sensitivity analysis are shown in Figures 4 and 5 for travel time, and in the tables in Appendices C and D for delays, level of service and queues.

FIGURE 6: EXISTING LONG-DISTANCE TRIPS[1] FROM ORIGIN DESTINATION DATA



Note: Percentage shown is percentage of total volumes on Lakeshore Road that is traveling between the West Zone and East Zone.

6.2 FUTURE MODE SHIFT CHANGES

In addition to the potential for automobile trips that currently use Lakeshore Road on a discretionary basis to change their travel patterns, it is expected that some travel demands currently using the automobile mode of travel may instead choose to use transit within the 10 year study horizon.

A number of regional transit initiatives are planned within Metrolinx's Regional Transportation Plan, including increased capacity/frequency of service on the Lakeshore GO Rail corridor, higher order transit on Dundas Street, completion of the Mississauga Transitway and construction of the Hurontario-Main LRT.

Transit changes are being contemplated on Lakeshore Road in the City's *Lakeshore Connecting Communities* study, including the potential for an LRT connection between the Port Credit West Village site and the Long Branch GO Station.

In this context, the Peel Region Transportation Servicing Master Plan and Transportation Regional Official Plan Amendment states a future target mode shift that includes a drive alone reduction from the existing level of 63% to 50% in 2041, with sustainable mode share increasing from 37% to 50%.

In terms of new traffic generated by the subject site, a number of measures are being proposed to decrease the use of single-occupant vehicles, including the provision of a shuttle to the Port Credit GO Station, reduced parking standards, cycling and pedestrian facilities, and provision of various other transportation demand management measures. There is potential to reduce site-generated traffic assumed in the Stage 1 report by up to 20% during peak hours of commuter traffic when the Peel Region target mode split is achieved.

Based on the above, analysis of future traffic conditions with the assumption that existing travel mode patterns will continue in the future will result in a worst case analysis.

7.0 CONCLUSIONS & RECOMMENDATIONS

Detailed microsimulation analysis of future traffic conditions on the Lakeshore Road corridor has been carried out to determine the impact of the proposed Port Credit West Village development. Based on the analysis of a future traffic conditions with no significant change in existing travel patterns and travel mode choices, the key conclusions are as follows.

Lakeshore Road Corridor Travel Times

- Travel times and delays on Lakeshore Road are projected to increase in the future background condition without development of the Port Credit West Village site. The development of the Port Credit West Village site will add traffic to the Lakeshore Road corridor, with some minor impacts on travel time and delays.
- With respect to peak hour peak direction travel times between Lorne Park Road and Hurontario Street, the change in travel time due to additional traffic volumes and access points on Lakeshore Road is approximately 1 minute eastbound in the AM peak hour and 45 seconds westbound in the PM peak hour relative to existing conditions on the corridor. (The existing eastbound AM travel time is approximately 5 minutes and 10 seconds, and the existing westbound PM travel time is approximately 5 minutes and 40 seconds based on Google API travel times.)

Vehicular Queuing on Lakeshore Road

- The increases in traffic related to the proposed development and the associated access points will generally not result in a significant increase in vehicular queues. *Vissim* microsimulation results indicate that modifications to signal timing corridor progression plans will generally prevent queues at traffic signals from extending through adjacent intersections.

Signal Timing and Coordination

- Ensuring that all signalized intersections operate in a coordinated manner along the Lakeshore Road corridor between Lorne Park Road and Hurontario Street will be crucial in minimizing queuing and reducing the likelihood of queue ‘spillbacks’ through upstream intersections.

Potential for Displacement of Existing Long-Distance Trips

- Analysis of origins and destinations of vehicle trips currently using the Lakeshore Road corridor adjacent to the Port Credit West Village site shows substantial traffic volumes currently using Lakeshore Road as an alternative route to the provincial highway network, and as an alternative to travelling by GO Transit. If travel times on Lakeshore Road increase in the future, the extent to which Lakeshore Road is perceived as an attractive alternative for long-distance trips can be expected to decrease, resulting in more capacity being used by local (City of Mississauga) traffic.

Summary

In summary, analysis results obtained from the calibrated *Vissim* microsimulation model indicate that the development of the Port Credit West Village site can be appropriately accommodated on the area road network. Through the modification of traffic signal timing plans, and restrictions in left turns in the PM peak period, increases in travel times along the Lakeshore Road corridor can be mitigated, and vehicle queue lengths can be accommodated without causing spillback conditions and traffic blockages.

APPENDIX A:
City and BA Group Traffic Volume Data Comparison

TABLE A1 COMPARISON OF CITY AND BA GROUP TRAFFIC VOLUMES

	Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lorne Park Rd & Lakeshore Rd W												
City of Mississauga Counts	2 (18)	547 (965)	55 (154)	114 (128)	1079 (768)	8 (8)	16 (5)	5 (1)	41 (14)	128 (173)	16 (9)	54 (123)
BA Group Counts	5 (5)	485 (1030)	100 (110)	140 (145)	1150 (1020)	5 (10)	10 (5)	5 (0)	10 (10)	70 (65)	0 (5)	170 (120)
GEH	1.6 (3.8)	2.7 (2.1)	5.1 (3.8)	2.3 (1.5)	2.1 (8.4)	1.2 (0.7)	1.7 (0.0)	0.0 (1.4)	6.1 (1.2)	5.8 (9.9)	5.7 (1.5)	11.0 (0.3)
Shawnmarr Rd & Lakeshore Rd W												
City of Mississauga Counts	0 (7)	567 (1126)	21 (73)	8 (24)	1237 (929)	3 (2)	1 (3)	1 (0)	4 (9)	71 (94)	6 (0)	36 (8)
BA Group Counts	0 (10)	565 (1120)	35 (70)	40 (30)	1185 (1060)	5 (5)	0 (5)	0 (0)	5 (5)	60 (40)	0 (0)	25 (20)
GEH	0.0 (1.0)	0.1 (0.2)	2.6 (0.4)	6.5 (1.2)	1.5 (4.2)	1.0 (1.6)	1.4 (1.0)	1.4 (0.0)	0.5 (1.5)	1.4 (6.6)	3.5 (0.0)	2.0 (3.2)
Maple Ave & Lakeshore Rd W												
City of Mississauga Counts	17 (14)	574 (1183)	18 (33)	1 (1)	1296 (1018)	15 (13)	12 (22)	2 (6)	16 (5)	92 (14)	3 (0)	2 (1)
BA Group Counts	15 (20)	580 (1180)	10 (30)	0 (5)	1240 (1085)	10 (15)	15 (20)	0 (5)	15 (10)	85 (45)	0 (5)	5 (0)
GEH	0.5 (1.5)	0.2 (0.1)	2.1 (0.5)	1.4 (2.3)	1.6 (2.1)	1.4 (0.5)	0.8 (0.4)	2.0 (0.4)	0.3 (1.8)	0.7 (5.7)	2.4 (3.2)	1.6 (1.4)
Plaza Drwy & Lakeshore Rd W												
City of Mississauga Counts	0 (0)	621 (1393)	112 (180)	5 (7)	1787 (1072)	0 (0)	0 (0)	0 (0)	0 (0)	17 (6)	0 (0)	6 (3)
BA Group Counts	0 (0)	620 (1210)	105 (205)	45 (100)	1375 (1065)	0 (0)	0 (0)	0 (0)	0 (0)	50 (185)	0 (0)	35 (120)
GEH	0.0 (0.0)	0.0 (5.1)	0.7 (1.8)	8.0 (12.7)	10.4 (0.2)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	5.7 (18.3)	0.0 (0.0)	6.4 (14.9)

	Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Mississauga Rd & Lakeshore Rd W												
City of Mississauga Counts	25 (22)	646 (1390)	132 (255)	147 (164)	1635 (889)	22 (25)	48 (50)	66 (70)	55 (20)	621 (233)	129 (134)	39 (133)
BA Group Counts	0 (5)	580 (1200)	205 (280)	200 (225)	1195 (935)	20 (40)	25 (30)	30 (30)	0 (10)	455 (255)	35 (40)	90 (150)
GEH	7.1 (4.6)	2.7 (5.3)	5.6 (1.5)	4.0 (4.4)	11.7 (1.5)	0.4 (2.6)	3.8 (3.2)	5.2 (5.7)	10.5 (2.6)	7.2 (1.4)	10.4 (10.1)	6.4 (1.4)
John Street & Lakeshore Rd W												
City of Mississauga Counts	34 (21)	761 (1377)	2 (7)	14 (17)	2149 (984)	10 (5)	9 (7)	5 (2)	20 (17)	65 (18)	4 (1)	17 (15)
BA Group Counts	20 (35)	775 (1475)	5 (5)	10 (5)	1640 (1190)	10 (5)	10 (15)	5 (5)	20 (30)	45 (30)	5 (5)	5 (10)
GEH	2.7 (2.6)	0.5 (2.6)	1.6 (0.8)	1.2 (3.6)	11.7 (6.2)	0.0 (0.0)	0.3 (2.4)	0.0 (1.6)	0.0 (2.7)	2.7 (2.4)	0.5 (2.3)	3.6 (1.4)
Stavebank & Lakeshore Rd W												
City of Mississauga Counts	16 (43)	747 (1284)	13 (17)	7 (115)	2166 (842)	136 (103)	28 (71)	38 (9)	20 (36)	6 (19)	15 (9)	158 (216)
BA Group Counts	5 (10)	790 (1415)	10 (45)	10 (80)	1665 (1125)	75 (125)	25 (90)	5 (10)	15 (10)	10 (20)	0 (0)	135 (260)
GEH	3.4 (6.4)	1.6 (3.6)	0.9 (5.0)	1.0 (3.5)	11.4 (9.0)	5.9 (2.1)	0.6 (2.1)	7.1 (0.3)	1.2 (5.4)	1.4 (0.2)	5.5 (4.2)	1.9 (2.9)
Elizabeth Rd & Lakeshore Rd W												
City of Mississauga Counts	6 (21)	687 (1180)	12 (51)	3 (23)	2181 (855)	8 (19)	22 (59)	52 (31)	17 (28)	40 (48)	8 (15)	67 (105)
BA Group Counts	5 (10)	735 (1360)	10 (30)	20 (25)	1650 (1105)	20 (25)	15 (25)	20 (30)	15 (15)	40 (30)	10 (15)	55 (85)
GEH	0.4 (2.8)	1.8 (5.1)	0.6 (3.3)	5.0 (0.4)	12.1 (8.0)	3.2 (1.3)	1.6 (5.2)	5.3 (0.2)	0.5 (2.8)	0.0 (2.9)	0.7 (0.0)	1.5 (2.1)
Hurontario Rd & Lakeshore Rd W												
City of Mississauga Counts	36 (41)	619 (877)	174 (275)	327 (250)	1197 (532)	5 (7)	6 (15)	61 (107)	18 (45)	194 (257)	83 (95)	224 (357)
BA Group Counts	30 (35)	530 (1055)	235 (235)	320 (215)	1265 (885)	5 (5)	10 (15)	60 (115)	30 (45)	215 (250)	90 (85)	200 (340)
GEH	1.0 (1.0)	3.7 (5.7)	4.3 (2.5)	0.4 (2.3)	1.9 (13.3)	0.0 (0.8)	1.4 (0.0)	0.1 (0.8)	2.4 (0.0)	1.5 (0.4)	0.8 (1.1)	1.6 (0.9)

Notes:
1. XX(XX) – AM Peak Hour Value (PM Peak Hour Value)
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

APPENDIX B:
Vehicle Travel Time Survey Data

Floating car GPS survey - Travel time results
Survey March 31, 2017

AM Results

Westbound runs

Corrected Travel Time	AVERAGE	min	max
HURONTARIO RD - WB	**0:00:18**	0:00:05	0:00:35
Elizabeth Street South - WB	**0:00:31**	0:00:21	0:01:14
Stavebank Road - WB	**0:00:15**	0:00:09	0:00:49
John Street - WB	**0:00:32**	0:00:25	0:00:44
Mississauga Rd - WB	**0:00:22**	0:00:12	0:00:46
Mall Access - WB	**0:00:18**	0:00:17	0:00:21
Maple Ave - WB	**0:00:37**	0:00:29	0:00:50
Shawnmar Rd - WB	**0:00:25**	0:00:22	0:00:31
LORNE PARK RD - WB	**0:01:15**	0:01:06	0:01:33
TOTAL SUM	**0:04:34**	0:03:26	0:07:23
TOTAL of all runs	0:04:34	**0:03:59**	**0:05:37**

Eastbound runs

Corrected Travel Time			
LORNE PARK RD - EB	**0:00:06**	0:00:04	0:00:12
Shawnmar Rd - EB	**0:01:16**	0:00:59	0:01:34
Maple Ave - EB	**0:00:28**	0:00:20	0:00:52
Mall Access - EB	**0:00:31**	0:00:27	0:00:39
Mississauga Rd - EB	**0:00:28**	0:00:17	0:01:09
John Street - EB	**0:00:21**	0:00:13	0:00:45
Stavebank Road - EB	**0:00:41**	0:00:26	0:01:10
Elizabeth Street South - EB	**0:00:15**	0:00:10	0:00:31
HURONTARIO RD - EB	**0:00:27**	0:00:22	0:00:39
TOTAL SUM	**0:04:33**	0:03:18	0:07:31
TOTAL of all runs	**0:04:33**	**0:03:26**	**0:05:25**

PM Results

Corrected Travel Time	AVERAGE	min	max
HURONTARIO RD - WB	**0:00:10**	0:00:03	0:00:27
Elizabeth Street South - WB	**0:01:14**	0:00:27	0:03:01
Stavebank Road - WB	**0:00:27**	0:00:11	0:00:49
John Street - WB	**0:00:40**	0:00:24	0:01:09
Mississauga Rd - WB	**0:00:24**	0:00:15	0:00:46
Mall Access - WB	**0:00:24**	0:00:14	0:01:14
Maple Ave - WB	**0:00:53**	0:00:28	0:02:38
Shawnmar Rd - WB	**0:00:27**	0:00:11	0:01:29
LORNE PARK RD - WB	**0:00:51**	0:00:21	0:01:23
TOTAL SUM	**0:05:29**	0:02:34	0:12:56
TOTAL	0:05:29	**0:04:13**	**0:07:53**

Corrected Travel Time			
LORNE PARK RD - EB	**0:00:12**	0:00:04	0:00:41
Shawnmar Rd - EB	**0:00:59**	0:00:24	0:01:19
Maple Ave - EB	**0:00:25**	0:00:10	0:00:43
Mall Access - EB	**0:00:36**	0:00:26	0:00:49
Mississauga Rd - EB	**0:00:26**	0:00:16	0:00:52
John Street - EB	**0:00:21**	0:00:13	0:00:48
Stavebank Road - EB	**0:00:59**	0:00:28	0:02:57
Elizabeth Street South - EB	**0:00:23**	0:00:11	0:00:32
HURONTARIO RD - EB	**0:01:03**	0:00:23	0:02:12
	0:05:23	0:02:35	0:10:53
	0:05:23	**0:04:05**	**0:07:20**

APPENDIX C:
2031 Vissim Delay and LOS Results

TABLE C1: FUTURE BACKGROUND (2031), FUTURE TOTAL (2031), FUTURE TOTAL WITH DIVERSION (2031) PROJECTED DELAYS AND LOS ON LAKESHORE ROAD (AM PEAK HOUR)

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Lorne Park Rd & Lakeshore Rd W												
Delay	- (-) [-]	3.5 (5.6) [5.3]	6.6 (8.3) [8.7]	9.9 (12.0) [9.7]	5.6 (6.2) [5.4]	6.0 (6.7) [6.2]	55.7 (55.8) [55.7]	- (-) [-]	16.6 (17.3) [17.0]	53.5 (53.4) [53.4]	73.9 (74.0) [73.9]	5.9 (5.9) [5.9]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	A (B) [A]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	B (B) [B]	D (D) [D]	E (E) [E]	A (A) [A]
Shawnmarr Rd & Lakeshore Rd W												
Delay	- (-) [-]	2.6 (3.1) [2.6]	2.0 (2.9) [2.4]	7.3 (9.4) [8.3]	3.7 (4.2) [4.2]	5.8 (6.0) [2.3]	56.5 (56.5) [56.5]	- (-) [-]	62.1 (62.1) [62.1]	- (-) [-]	- (-) [-]	6.6 (6.1) [6.9]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	A (A) [A]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	E (E) [E]	- (-) [-]	- (-) [-]	A (A) [A]
Maple Ave & Lakeshore Rd W												
Delay	11.5 (13.3) [10.1]	6.5 (5.1) [5.6]	2.7 (3.1) [4.1]	- (-) [-]	2.5 (2.7) [2.5]	1.7 (2.0) [1.9]	57.8 (58.0) [57.9]	- (-) [-]	32.3 (34.1) [33.8]	53.6 (53.5) [53.5]	- (-) [-]	22.5 (23.5) [22.4]
LOS	B (B) [B]	A (A) [A]	A (A) [A]	- (-) [-]	A (A) [A]	A (A) [A]	E (E) [E]	- (-) [-]	C (C) [C]	D (D) [D]	- (-) [-]	C (C) [C]
Plaza Drwy & Lakeshore Rd W												
Delay	- (54.0) [20.0]	3.8 (5.2) [3.6]	4.3 (6.5) [4.7]	9.7 (16.1) [11.4]	3.9 (12.1) [5.4]	- (10.2) [6.0]	54.6 (83.7) [54.0]	- (-) [-]	4.9 (6.6) [5.9]	- (55.7) [53.7]	- (-) [-]	- (54.2) [45.5]
LOS	- (D) [B]	A (A) [A]	A (A) [A]	A (B) [B]	A (B) [A]	- (B) [A]	D (F) [D]	- (-) [-]	A (A) [A]	- (E) [D]	- (-) [-]	- (D) [D]
Mississauga Rd & Lakeshore Rd W												
Delay	13.2 (92.2) [39.0]	15.4 (32.7) [28.0]	5.5 (10.6) [10.2]	20.4 (65.0) [55.5]	10.2 (27.6) [21.7]	20.9 (40.6) [24.9]	57.4 (59.6) [59.2]	38.0 (33.7) [34.0]	11.1 (23.6) [19.7]	74.3 (49.0) [45.9]	66.3 (46.7) [47.9]	- (10.8) [11.9]
LOS	B (F) [D]	B (C) [C]	A (B) [B]	C (E) [E]	B (C) [C]	C (D) [C]	E (E) [E]	D (C) [C]	B (C) [B]	E (D) [D]	E (D) [D]	- (B) [B]
John Street & Lakeshore Rd W												
Delay	17.8 (27.5) [18.2]	4.6 (11.0) [6.1]	39.1 (90.4) [12.9]	10.1 (12.1) [11.0]	4.9 (2.5) [2.8]	27.6 (31.4) [0.7]	56.5 (57.2) [55.8]	- (-) [-]	7.0 (14.3) [7.2]	45.4 (44.5) [-]	75.1 (155.8) [-]	47.7 (57.5) [-]
LOS	B (C) [B]	A (B) [A]	D (F) [B]	B (B) [B]	A (A) [A]	C (C) [A]	E (E) [E]	- (-) [-]	A (B) [A]	D (D) [-]	E (F) [-]	D (E) [-]
Stavebank & Lakeshore Rd W												
Delay	5.6 (8.5) [4.9]	5.6 (7.6) [6.4]	3.6 (4.6) [4.4]	12.9 (16.6) [13.3]	11.2 (15.9) [11.8]	13.5 (15.8) [12.1]	62.5 (56.6) [62.5]	- (-) [-]	17.3 (20.6) [17.1]	49.9 (54.2) [50.2]	55.8 (54.7) [55.9]	- (-) [-]
LOS	A (A) [A]	A (A) [A]	A (A) [A]	B (B) [B]	B (B) [B]	B (B) [B]	E (E) [E]	- (-) [-]	B (C) [B]	D (D) [D]	E (D) [E]	- (-) [-]

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Elizabeth Rd & Lakeshore Rd W												
Delay	25.9 (43.1) [40.5]	9.2 (17.3) [14.5]	8.1 (16.5) [19.9]	17.6 (20.5) [17.9]	4.8 (5.9) [4.5]	3.7 (2.3) [2.5]	58.4 (57.4) [57.5]	49.1 (48.6) [49.1]	13.3 (17.8) [17.2]	42.6 (42.6) [42.5]	48.9 (49.0) [49.0]	15.5 (18.2) [16.4]
LOS	C (D) [D]	A (B) [B]	A (B) [B]	B (C) [B]	A (A) [A]	A (A) [A]	E (E) [E]	D (D) [D]	B (B) [B]	D (D) [D]	D (D) [D]	B (B) [B]
Hurontario Rd & Lakeshore Rd W												
Delay	33.2 (46.1) [23.5]	15.3 (24.3) [22.1]	7.5 (12.1) [10.7]	20.7 (46.6) [41.7]	13.5 (11.4) [12.8]	2.5 (2.7) [2.2]	1.4 (1.4) [1.3]	45.3 (45.2) [45.0]	6.0 (8.6) [8.1]	35.5 (35.4) [35.3]	39.0 (38.8) [38.8]	26.9 (29.2) [26.8]
LOS	C (D) [C]	B (C) [C]	A (B) [B]	C (D) [D]	B (B) [B]	A (A) [A]	A (A) [A]	D (D) [D]	A (A) [A]	D (D) [D]	D (D) [D]	C (C) [C]

Notes:
1. XX (XX) [XX] – Future Background 2031 Value (Future Total 2031 Value) [Future Total 2031 Diversion Value]
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

TABLE C2: FUTURE BACKGROUND (2031), FUTURE TOTAL (2031), FUTURE TOTAL WITH DIVERSION (2031) PROJECTED DELAYS AND LOS ON LAKESHORE ROAD (PM PEAK HOUR)

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Lorne Park Rd & Lakeshore Rd W												
Delay	- (-) [-]	5.6 (6.1) [6.3]	6.4 (7.0) [7.0]	12.1 (13.6) [13.3]	5.7 (6.6) [6.4]	5.6 (7.3) [6.5]	61.0 (60.9) [61.0]	66.5 (66.4) [66.6]	22.1 (22.3) [22.2]	60.9 (61.0) [60.7]	- (-) [-]	4.4 (4.4) [4.5]
LOS	- (-) [-]	A (A) [A]	A (A) [A]	B (B) [B]	A (A) [A]	A (A) [A]	E (E) [E]	E (E) [E]	C (C) [C]	E (E) [E]	- (-) [-]	A (A) [A]
Shawnmarr Rd & Lakeshore Rd W												
Delay	11.9 (21.7) [18.3]	8.0 (8.2) [8.1]	8.3 (7.2) [9.2]	16.7 (21.9) [22.8]	8.2 (9.6) [9.3]	5.8 (10.0) [11.3]	33.8 (33.8) [33.8]	- (-) [-]	34.1 (34.0) [34.1]	- (-) [-]	- (-) [-]	7.1 (8.6) [8.6]
LOS	B (C) [B]	A (A) [A]	A (A) [A]	B (C) [C]	A (A) [A]	A (A) [B]	C (C) [C]	- (-) [-]	C (C) [C]	- (-) [-]	- (-) [-]	A (A) [A]
Maple Ave & Lakeshore Rd W												
Delay	12.1 (19.1) [20.7]	6.3 (6.8) [6.9]	6.1 (7.1) [7.2]	16.7 (17.6) [12.6]	5.8 (7.2) [7.1]	5.6 (5.1) [6.0]	35.7 (36.8) [36.0]	36.7 (37.1) [36.9]	- (-) [-]	38.0 (38.0) [37.8]	41.5 (41.5) [41.5]	8.8 (10.8) [9.5]
LOS	B (B) [C]	A (A) [A]	A (A) [A]	B (B) [B]	A (A) [A]	A (A) [A]	D (D) [D]	D (D) [D]	- (-) [-]	D (D) [D]	D (D) [D]	A (B) [A]
Plaza Drwy & Lakeshore Rd W												
Delay	- (44.8) [39.9]	6.2 (7.9) [8.3]	4.5 (6.8) [6.3]	26.2 (44.9) [37.0]	7.0 (22.8) [22.1]	- (24.3) [21.8]	41.1 (55.7) [50.2]	- (-) [-]	10.0 (16.5) [12.6]	- (45.2) [45.7]	- (-) [-]	- (47.7) [42.3]
LOS	- (D) [D]	A (A) [A]	A (A) [A]	C (D) [D]	A (C) [C]	- (C) [C]	D (E) [D]	- (-) [-]	A (B) [B]	- (D) [D]	- (-) [-]	- (D) [D]
Mississauga Rd & Lakeshore Rd W												
Delay	- (26.0) [23.3]	13.8 (22.0) [20.5]	7.5 (13.9) [10.8]	26.6 (70.2) [58.6]	8.5 (19.3) [18.6]	8.3 (15.5) [17.4]	53.6 (89.0) [80.7]	63.6 (56.9) [51.3]	9.8 (31.6) [22.1]	61.9 (71.5) [73.7]	- (62.5) [63.8]	- (12.8) [11.8]
LOS	- (C) [C]	B (C) [C]	A (B) [B]	C (E) [E]	A (B) [B]	A (B) [B]	D (F) [F]	E (E) [D]	A (C) [C]	E (E) [E]	- (E) [E]	- (B) [B]
John Street & Lakeshore Rd W												
Delay	- (-) [-]	7.3 (15.9) [11.9]	9.8 (13.1) [10.3]	18.6 (43.4) [29.6]	5.2 (4.9) [5.3]	4.9 (5.2) [3.4]	45.2 (47.1) [48.0]	- (-) [-]	8.8 (19.5) [17.4]	- (-) [-]	- (-) [-]	- (-) [-]
LOS	- (-) [-]	A (B) [B]	A (B) [B]	B (D) [C]	A (A) [A]	A (A) [A]	D (D) [D]	- (-) [-]	A (B) [B]	- (-) [-]	- (-) [-]	- (-) [-]
Stavebank & Lakeshore Rd W												
Delay	6.7 (10.7) [6.0]	7.9 (18.0) [9.4]	6.6 (13.7) [8.8]	- (-) [-]	7.4 (10.2) [8.6]	7.6 (9.0) [7.4]	54.3 (79.4) [58.5]	- (-) [-]	25.5 (78.6) [33.7]	44.8 (54.3) [46.4]	45.2 (45.2) [45.2]	- (-) [-]
LOS	A (B) [A]	A (B) [A]	A (B) [A]	- (-) [-]	A (B) [A]	A (A) [A]	D (E) [E]	- (-) [-]	C (E) [C]	D (D) [D]	D (D) [D]	- (-) [-]

	Delay (seconds) and Level of Service (LOS) for Turning Movement											
	WBL	**WBT**	**WBR**	**EBL**	**EBT**	**EBR**	**SBL**	**SBT**	**SBR**	**NBL**	**NBT**	**NBR**
Elizabeth Rd & Lakeshore Rd W												
Delay	7.7 (20.7) [12.9]	5.0 (16.5) [8.6]	2.3 (14.0) [4.3]	32.6 (74.8) [38.8]	6.6 (7.9) [6.3]	3.9 (5.1) [3.9]	59.9 (71.7) [60.6]	58.5 (83.6) [57.7]	18.8 (57.6) [23.9]	47.4 (53.5) [48.0]	48.8 (51.3) [48.8]	- (-) [-]
LOS	A (C) [B]	A (B) [A]	A (B) [A]	C (E) [D]	A (A) [A]	A (A) [A]	E (E) [E]	E (F) [E]	B (E) [C]	D (D) [D]	D (D) [D]	- (-) [-]
Hurontario Rd & Lakeshore Rd W												
Delay	22.3 (28.9) [26.3]	17.3 (29.4) [23.3]	10.5 (19.3) [14.6]	25.4 (82.8) [61.1]	12.5 (17.7) [15.5]	7.4 (11.1) [9.6]	73.6 (80.0) [78.9]	48.4 (63.6) [63.8]	21.4 (53.1) [48.3]	46.3 (46.4) [47.1]	44.0 (44.5) [44.5]	25.1 (26.5) [25.1]
LOS	C (C) [C]	B (C) [C]	B (B) [B]	C (F) [E]	B (B) [B]	A (B) [A]	E (E) [E]	D (E) [E]	C (D) [D]	D (D) [D]	D (D) [D]	C (C) [C]

Notes:
1. XX (XX) [XX] – Future Background 2031 Value (Future Total 2031 Value) [Future Total 2031 Diversion Value]
2. WBL=westbound left, WBT=westbound through, WBR= westbound right - etc for eastbound, southbound, northbound

APPENDIX D:
2031 Vissim Queue Analysis Results

TABLE D1 *VISSIM* QUEUE RESULTS FOR FUTURE BACKGROUND (2031), FUTURE TOTAL (2031) AND FUTURE TOTAL WITH DIVERSION (2031) AM PEAK HOUR

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Lakeshore Road W & Hurontario	NB	90 m	1.5m (1.5m) [1.5m]	10.5m (11.2m) [10.5m]	20.1m (20.1m) [20.1m]
	SB	95 m	8.0m (10.7m) [10.4m]	20.7m (26.3m) [26.2m]	29.8m (36.0m) [36.7m]
	EB	280 m	9.7m (77.0m) [68.0m]	29.8m (36.0m) [36.7m]	91.6m (151.3m) [112.4m]
	WB	240 m	11.5m (29.9m) [29.6m]	30.1m (66.2m) [62.7m]	44.8m (74.1m) [70.2m]
Lakeshore Road W & Elizabeth	NB	100 m	3.3m (3.3m) [3.3m]	10.1m (10.1m) [10.1m]	14.7m (14.7m) [14.7m]
	SB	105 m	0.0m (0.0m) [0.0m]	2.6m (3.1m) [6.3m]	13.4m (13.0m) [15.7m]
	EB	100 m	0.0m (0.0m) [0.0m]	13.4m (13.0m) [15.7m]	81.8m (103.5m) [78.4m]
	WB	280 m	0.0m (3.8m) [1.0m]	26.7m (72.6m) [59.3m]	53.6m (109.9m) [99.9m]
Lakeshore Road W & Stavebank	NB	100 m	0.0m (0.0m) [0.0m]	6.0m (6.3m) [6.1m]	11.6m (11.7m) [11.7m]
	SB	100 m	0.0m (0.0m) [0.0m]	5.6m (8.0m) [6.7m]	14.5m (16.3m) [12.3m]
	EB	350 m	9.1m (16.0m) [12.2m]	14.5m (16.3m) [12.3m]	86.0m (159.4m) [96.3m]
	WB	100 m	0.9m (2.4m) [0.9m]	23.3m (70.5m) [40.2m]	52.4m (101.4m) [101.3m]
Lakeshore Road W & Front St	NB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.8m (0.8m) [0.0m]
	SB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	EB	180 m	6.1m (0.9m) [0.8m]	0.0m (0.0m) [0.0m]	58.9m (82.2m) [75.7m]
	WB	350 m	5.2m (13.3m) [11.6m]	20.9m (109.9m) [39.5m]	36.1m (133.7m) [53.5m]
Lakeshore Road W & Mississauga Rd	NB	105 m	0.0m (16.1m) [14.5m]	0.0m (43.3m) [38.9m]	0.0m (74.3m) [67.4m]
	SB	95 m	28.1m (29.6m) [29.5m]	47.9m (47.9m) [48.0m]	59.4m (61.7m) [60.5m]
	EB	240 m	2.0m (98.9m) [52.7m]	59.4m (61.7m) [60.5m]	58.0m (195.7m) [133.1m]
	WB	180 m	9.3m (49.7m) [35.5m]	34.2m (130.5m) [81.5m]	63.2m (151.9m) [106.2m]
Lakeshore Road W & Plaza Driveway	NB	50 m	0.0m (6.2m) [5.0m]	0.0m (15.4m) [13.6m]	0.0m (20.6m) [17.2m]
	SB	35 m	0.0m (0.0m) [0.0m]	5.6m (7.8m) [5.5m]	13.3m (14.9m) [12.9m]
	EB	215 m	0.0m (13.8m) [3.0m]	13.3m (14.9m) [12.9m]	35.1m (85.5m) [34.4m]
	WB	240 m	0.0m (6.1m) [1.1m]	5.9m (55.6m) [10.1m]	26.9m (76.3m) [24.6m]

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Benson Avenue (to be signalized in the future)	NB	300 m	0.0m (3.9m) [0.0m]	0.0m (17.1m) [17.2m]	0.0m (25.2m) [27.4m]
	SB	95 m	6.0m (6.1m) [6.1m]	19.4m (22.6m) [19.5m]	32.0m (32.4m) [30.9m]
	EB	175 m	0.0m (0.0m) [0.0m]	32.0m (32.4m) [30.9m]	39.0m (72.0m) [49.2m]
	WB	215 m	0.0m (0.0m) [0.0m]	13.9m (20.3m) [13.7m]	33.3m (57.7m) [39.6m]
Lakeshore Road W & Maple Ave	NB	300 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	5.2m (5.2m) [5.2m]
	SB	325 m	2.1m (2.1m) [2.1m]	13.9m (13.9m) [13.9m]	24.6m (24.7m) [24.6m]
	EB	340 m	0.0m (0.0m) [0.0m]	24.6m (24.7m) [24.6m]	12.6m (14.0m) [12.5m]
	WB	175 m	0.0m (0.0m) [0.0m]	14.4m (13.7m) [14.6m]	42.5m (43.0m) [40.6m]
Lakeshore Road W & Shawnmarr Road	NB	65 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	320 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	1.3m (1.3m) [1.3m]
	EB	1100 m	0.0m (0.0m) [1.6m]	1.3m (1.3m) [1.3m]	23.9m (26.7m) [24.0m]
	WB	340 m	0.0m (0.0m) [0.0m]	0.0m (1.6m) [0.0m]	9.9m (11.9m) [8.3m]
Lakeshore Road W & Lorne Park Road	NB	30 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	1.9m (1.9m) [1.9m]
	SB	325 m	2.2m (2.2m) [2.2m]	25.4m (25.6m) [25.5m]	42.2m (42.2m) [42.2m]
	EB	1000 m	2.4m (0.0m) [0.0m]	42.2m (42.2m) [42.2m]	39.1m (46.8m) [33.9m]
	WB	1100 m	0.0m (0.0m) [0.0m]	5.3m (12.2m) [11.7m]	15.2m (26.8m) [24.0m]

Notes:
1. XX (XX) [XX] – Future Background 2031 Value (Future Total 2031 Value) [Future Total 2031 Diversion Value]
2. Directions are WB=westbound, EB=eastbound, SB=southbound, NB=northbound

TABLE D2 *VISSIM* QUEUE RESULTS FOR FUTURE BACKGROUND (2031), FUTURE TOTAL (2031) AND FUTURE TOTAL WITH DIVERSION (2031) PM PEAK HOUR

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Lakeshore Road W & Hurontario	NB	90 m	5.1m (6.4m) [5.1m]	23.3m (23.4m) [23.4m]	36.1m (36.2m) [36.1m]
	SB	95 m	18.0m (191.8m) [185.9m]	66.0m (221.6m) [212.8m]	108.8m (229.7m) [227.2m]
	EB	280 m	6.2m (96.7m) [85.7m]	108.8m (229.7m) [227.2m]	78.1m (266.4m) [151.1m]
	WB	240 m	16.4m (68.6m) [36.8m]	62.9m (115.9m) [94.2m]	88.9m (119.7m) [116.7m]
Lakeshore Road W & Elizabeth	NB	100 m	0.0m (0.0m) [0.0m]	11.1m (11.4m) [11.2m]	18.7m (18.7m) [18.7m]
	SB	105 m	0.0m (1.4m) [0.0m]	8.5m (41.2m) [9.7m]	18.6m (66.6m) [20.0m]
	EB	100 m	0.0m (0.0m) [0.0m]	18.6m (66.6m) [20.0m]	97.2m (102.8m) [101.8m]
	WB	280 m	0.0m (28.7m) [5.4m]	20.2m (183.7m) [37.4m]	35.3m (285.6m) [67.7m]
Lakeshore Road W & Stavebank	NB	100 m	7.7m (7.8m) [7.7m]	21.2m (21.1m) [21.2m]	28.6m (27.9m) [28.6m]
	SB	100 m	3.9m (21.8m) [9.0m]	30.8m (75.9m) [46.1m]	48.0m (82.3m) [62.5m]
	EB	350 m	0.0m (0.0m) [0.0m]	48.0m (82.3m) [62.5m]	57.7m (82.2m) [70.6m]
	WB	100 m	6.4m (47.0m) [16.8m]	81.8m (103.9m) [102.3m]	103.9m (104.3m) [104.1m]
Lakeshore Road W & Front St	NB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	100 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	EB	180 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	60.6m (131.6m) [131.0m]
	WB	350 m	0.0m (150.2m) [34.0m]	50.5m (305.4m) [185.0m]	95.8m (360.2m) [268.3m]
Lakeshore Road W & Mississauga Rd	NB	105 m	0.0m (22.6m) [23.5m]	0.0m (56.9m) [62.0m]	0.0m (77.7m) [81.3m]
	SB	95 m	26.5m (41.8m) [38.0m]	52.6m (102.9m) [75.4m]	70.1m (182.0m) [117.9m]
	EB	240 m	20.6m (88.7m) [76.4m]	70.1m (182.0m) [117.9m]	60.4m (186.9m) [173.3m]
	WB	180 m	20.4m (121.7m) [96.4m]	97.8m (206.4m) [199.5m]	146.6m (208.9m) [208.3m]
Lakeshore Road W & Plaza Driveway	NB	50 m	0.0m (12.1m) [11.2m]	0.0m (24.0m) [21.1m]	0.0m (28.6m) [25.7m]
	SB	35 m	11.7m (15.1m) [11.6m]	26.1m (34.2m) [27.3m]	33.5m (42.1m) [33.9m]
	EB	215 m	0.0m (29.7m) [36.3m]	33.5m (42.1m) [33.9m]	53.0m (142.0m) [147.6m]
	WB	240 m	0.0m (37.9m) [43.5m]	33.1m (119.9m) [109.8m]	86.6m (190.9m) [153.0m]

Intersection	Direction	Critical length	Queue Length (metres)		
			50th Percentile	85th Percentile	95th Percentile
Benson Avenue (to be signalized in the future)	NB	300 m	0.0m (0.0m) [0.0m]	0.0m (8.6m) [8.8m]	0.0m (13.9m) [13.9m]
	SB	95 m	5.0m (5.3m) [5.1m]	12.1m (12.6m) [12.1m]	20.1m (18.8m) [19.8m]
	EB	175 m	0.0m (0.0m) [0.0m]	20.1m (18.8m) [19.8m]	47.3m (76.3m) [74.3m]
	WB	215 m	0.0m (0.0m) [0.0m]	33.4m (32.2m) [36.0m]	78.4m (74.3m) [66.1m]
Lakeshore Road W & Maple Ave	NB	300 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	4.0m (4.0m) [4.0m]
	SB	325 m	0.0m (0.0m) [0.0m]	2.2m (3.0m) [2.2m]	6.4m (6.4m) [6.5m]
	EB	340 m	0.0m (0.0m) [0.0m]	6.4m (6.4m) [6.5m]	41.7m (60.0m) [55.0m]
	WB	175 m	0.0m (0.0m) [0.0m]	27.2m (36.1m) [33.3m]	71.8m (80.0m) [70.0m]
Lakeshore Road W & Shawnmarr Road	NB	65 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	320 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	2.0m (2.0m) [2.0m]
	EB	1100 m	0.0m (2.1m) [1.9m]	2.0m (2.0m) [2.0m]	54.9m (75.6m) [69.5m]
	WB	340 m	2.1m (1.7m) [2.1m]	25.6m (41.6m) [37.1m]	62.9m (66.0m) [62.6m]
Lakeshore Road W & Lorne Park Road	NB	30 m	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]	0.0m (0.0m) [0.0m]
	SB	325 m	14.2m (14.2m) [14.2m]	28.2m (28.1m) [28.6m]	40.5m (40.6m) [40.6m]
	EB	1000 m	7.2m (9.9m) [5.2m]	40.5m (40.6m) [40.6m]	53.1m (74.0m) [62.4m]
	WB	1100 m	2.8m (7.1m) [6.4m]	14.6m (32.0m) [29.2m]	38.7m (54.1m) [52.5m]

Notes:
1. XX (XX) [XX] – Future Background 2031 Value (Future Total 2031 Value) [Future Total 2031 Diversion Value]
2. Directions are WB=westbound, EB=eastbound, SB=southbound, NB=northbound