Appendix A

Town of Oakville

Evaluation of Traffic Operations on Bronte Road between Lakeshore Road West and Marine Drive

FINAL REPORT

To view the full report with appendices, click here

CIMA+ project number: Z0021069
7-May- 2025 – Review 00

Town of Oakville

Evaluation of Traffic Operations on Bronte Road between Lakeshore Road West and Marine Drive

FINAL REPORT

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1. Introduction and Background

CIMA has been retained by the Town of Oakville to carry out a traffic study in Bronte Village relating to the potential permanent conversion of Bronte Road between Lakeshore Road West and Marine Drive to one-way operation. This section of road was converted to one-way southbound operation in March 2024 due to construction activity occurring on the east side of Bronte Road that necessitated the closure of the northbound lane. The closure and subsequent one-way operation relate to a condominium and commercial development (The Residences at Bronte Lakeside) that is being constructed on the southeast corner of the intersection of Lakeshore Road and Bronte Road.

As a result of the conversion of Bronte Road to one-way operation southbound, northbound traffic on Bronte Road must use adjacent streets to access Lakeshore Road. The Town of Oakville wishes to better understand the traffic impacts of this closure and whether the closure should remain in place upon completion of the development. Several considerations will factor into this decision as discussed below.

Historically, the Town has had concerns with the skewness of the intersection of Bronte Road and Lakeshore Road West which has resulted in issues with sightlines for northbound and southbound left turning vehicles. Conversion to one-way southbound has however mitigated (in part) this issue. Prior to making the decision to reverting to two-way operation, the Town wishes to have a fuller understanding of the benefits of continuing one-way operation at the intersection versus reverting back to two-way operation. If reverting to two-way operation, mitigating measures need to be identified that would reduce the impact of the skewness.

Traffic analysis performed to evaluate traffic impacts relating to the development at The Residences at Bronte Lakeside was predicated on Bronte Road operating as a two-way road. The sole access to the development is on Bronte Road. If the section in front of the development continues to operate under one-way operation, all traffic entering the access will be required to enter from the north and exit to the south. Traffic exiting the development would need to use the surrounding road network to access Lakeshore Boulevard. This may in turn result in delays and congestion to the surrounding road network, necessitating changes to traffic control and/or capacity improvements.

The recommendations developed by CIMA, whether to continue operating Bronte Road under one-way southbound operation or revert to two-way operation, along with any identified improvements to Bronte Road and the surrounding road network, will inform the recommendations of a broader streetscaping study being conducted in Bronte Village.

The methodology presented in the Canadian Guide to *In-Service Road Safety Reviews* (ISRSR) published by the Transportation Association of Canada (TAC) was used as a basis for this study. The primary objective of this study is to conduct a review of the historical safety performance of the study area, identify potential safety issues, and provide short, medium, and long-term recommendations for inclusion in future condition designs.

This study includes a review of background data provided and collected (e.g., traffic volumes), a thorough field investigation of the study area, an assessment of findings, and the development of potential treatments.

To summarize, this report is divided into the sections listed below:

- **Section 1 – Introduction:** Provides general background on the project and introduces the study area and methodology used;
- **Section 2 – Office Review:** Provides an overview of the findings from historical collision trend analysis, traffic operation results and vehicle operational speed analysis;
- **Section 3 – Field Investigation:** Review of roadway cross section, roadside safety, geometrics, signs and pavement markings and summarizes the road user behaviours observed in the field; and
- **Section 4 – Findings and Recommendations:** Outlines the issues observed based on the office review and field investigation and provides recommended treatments.

1.1 Study Area

The study area, shown with a red dashed line, for this project is shown in **Figure 1.** The study area is bounded by Bronte Road on the west side, Lakeshore Road West on the north side, East Street on the east side and Ontario Street on the south side. Roads internal to the study area are Jones Street, Nelson Street and Marine Drive. The area where one-way operation is currently in place is shown with an orange dashed line. The main focus of the study was the section of Bronte Road between Lakeshore Road West and Marine Drive, along with the two intersections on either side.

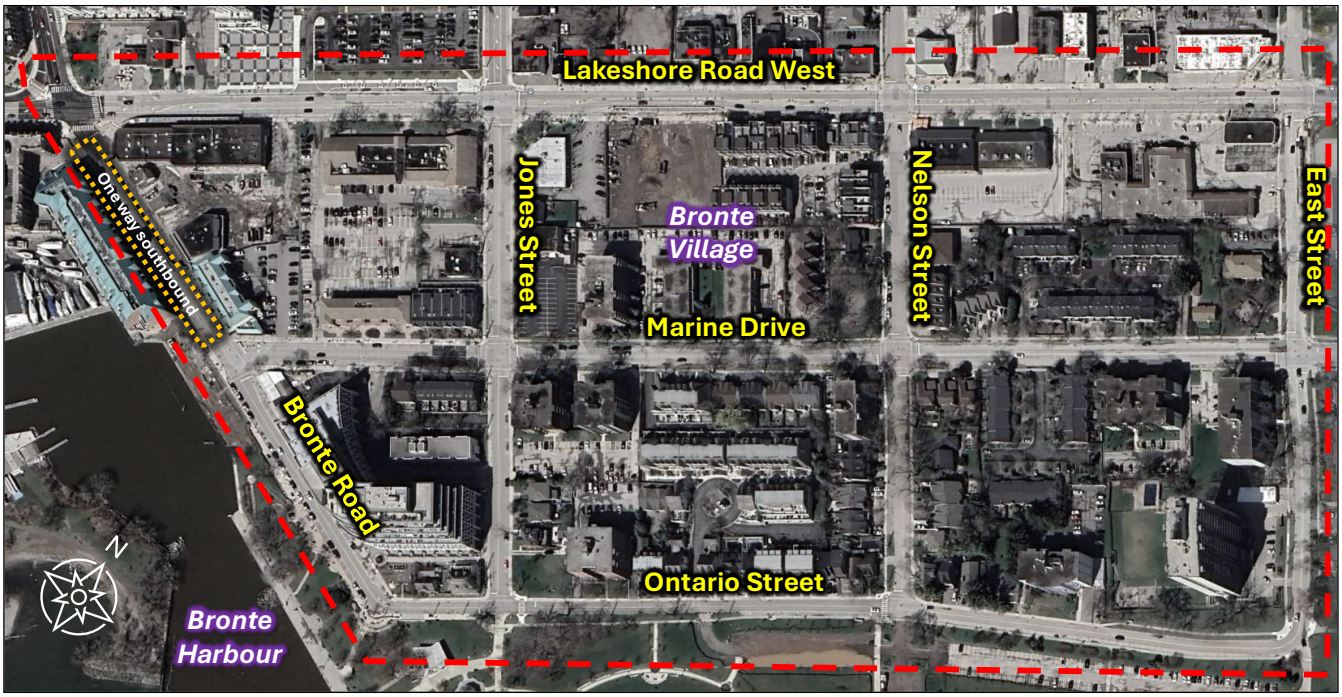

Figure 1: Study Area

1.2 Scope of Work

In view of the above, the following major tasks were identified for this project:

- Assemble and review all pertinent background, traffic and collision data within the study area
- Evaluate traffic operations within the study area under the following scenarios and identify critical movements and the need (if any) for changes to traffic control and/or lane configuration and storage:
  - Pre-closure period (two-way operation)
  - Closure period (one-way operation)
  - Post-closure period with development traffic (revert to two-way operation)
  - Post-closure period with development traffic (keep as one-way operation)
- Conduct a safety review of historical collision information, particularly of Bronte Road between Lakeshore Road West and Marine Drive
- Conduct a site visit to identify opportunities to improve safety, focussing on Bronte Road between Lakeshore Road West and Marine Drive, but more broadly reviewing the entire study area
- Evaluate whether Bronte Road should continue under one-way operation or revert to two-way operation along with any mitigating measures to address any associated issues.

1.3 Data Collection

The following information was obtained from the TES data base, where available, and used to support this study:

- Turning Movement Counts (TMC)
- Historical collision data
- Speed data

Signal timing plans and Traffic Impact Study (TIS) reports for planned developments within the study area were provided by the Town.

For locations where no recent data was available, CIMA+ scheduled the collection of TMCs and speed data. The data was collected on March 19, 2025, at the following locations:

- TMC at Bronte Road & Ontario Street
- TMC at Ontario Street & East Street
- Speed data along Bronte Road between Lakeshore Road West and Marine Drive

Collected data is provided in **Appendix D.**

2. Office Review

The following section outlines the findings of the office review, specifically the following items:

- Land use
- Planned development
- Streetscaping study
- Traffic analysis
- Collision analysis

2.1 Land Use

Land use (based on zoning) within the study area is shown in **Figure 2**. The areas bounded by Bronte Road and Lakeshore Road West are classified as 'Urban Core' and 'Main Street' and are characterised as mixed high density residential and commercial land uses. Areas closer to Lake Ontario are classified as residential medium and high density, consisting of low- and high-rise apartment buildings.

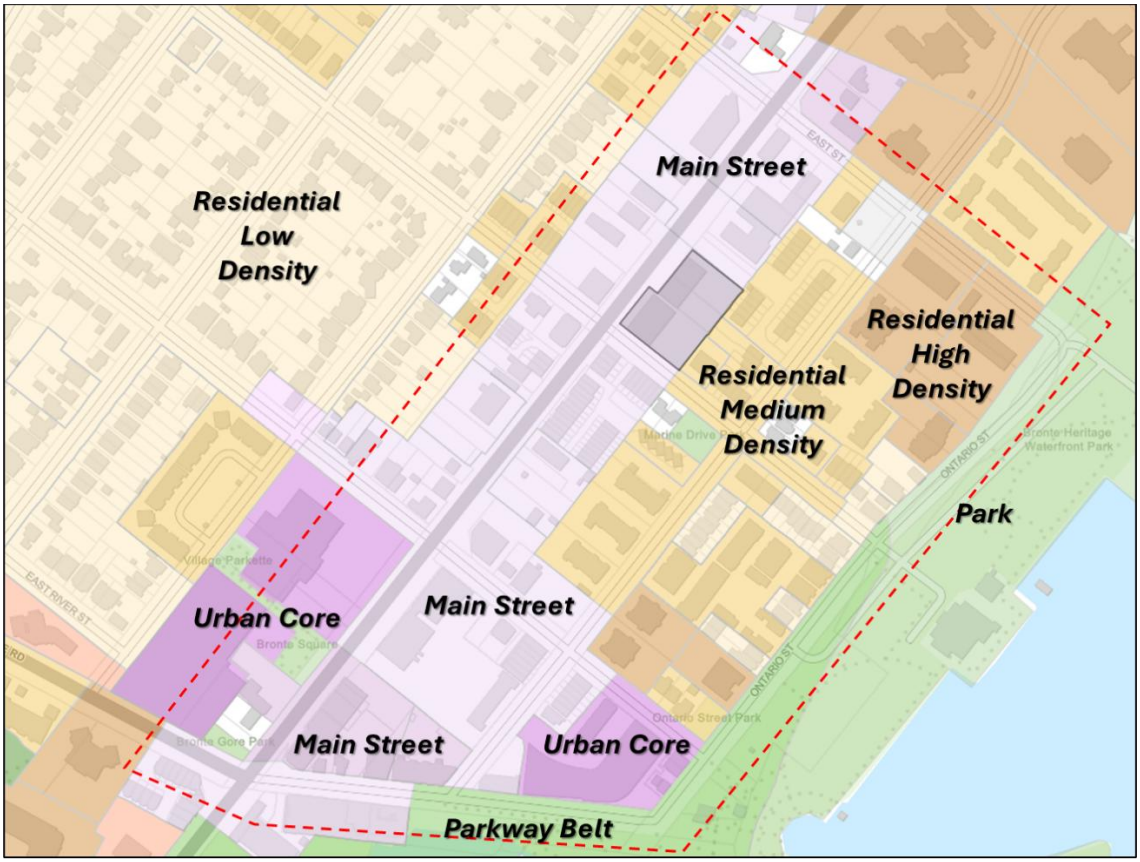

Figure 2: Land use in study area

2.2 Planned Development

The following section identifies developments that are currently under construction or approved to be constructed within the study area that will impact traffic within the study area. The location of the developments is shown in **Figure 3,** labelled 'A', 'B', 'C' and 'D' as discussed further below. Traffic Impact Studies provided by the Town can be found in **Appendix B**.

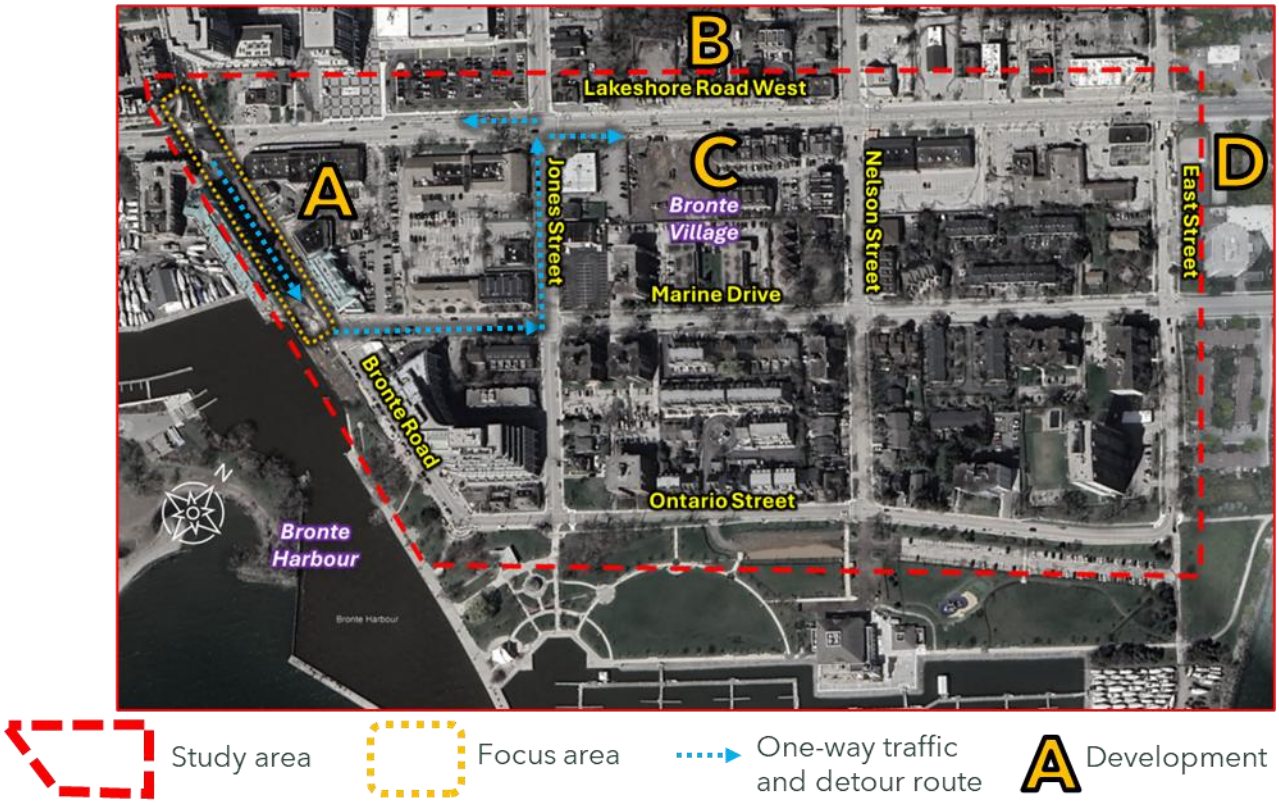

Figure 3: Map of Proposed Developments

Development A: 2432 to 2455 Lakeshore Road West and 87 to 99 Bronte Road

According to the traffic impact study, the Residences at Bronte Lakeside, currently under construction, is to be a 6-storey building with 187 residential units and approximately (2142 square metres (21054 square feet) of retail space at-grade. One full movement access has been proposed along Bronte Road, south of Lakeshore Road West. The traffic impact study evaluated traffic operations at two intersections (Bronte Road at Lakeshore Road and Lakeshore Road at Jones Street) along with the new access on Bronte Road for weekday AM and PM traffic conditions. The new access has been proposed to be 65 metres south of Lakeshore Road West and meets the minimum requirements set out in the 2017 Transportation Association of Canada's *Geometric Design Guide for Canadian Roads*, Figure 8.8.2. In addition, the new access meets intersection sight distance requirements for left and right turns out of the planned development, according to the 2017 Transportation Association of Canada's *Geometric Design Guide for Canadian Roads*, Table 9.9.3.

The traffic impact study indicates a total of 78 new trips in the AM peak period and 166 new trips in the PM peak period as a result of the development and assumed that all trips would be coming from east, west or north. No trips were assumed as coming from/going to the south.

The study concluded that both the intersections included as part of the study (Lakeshore Road West at Bronte Road and at Jones Street) and the access would operate well below capacity during both peak periods in the post-development period (2026).

Development B: 2365-2377 Lakeshore Road West

This TIS was completed for a mixed-use residential development with a ground-floor retail situated at 2365-2377 Lakeshore Road West. The development is planned to be a 7-storey building consisting of 157 units with 618 m^2 of ground floor retail. The site plan indicates that a full-moves access will be provided on Lakeshore Road West. The proposed site is expected to generate a total of 74 and 95 new trips in the AM and PM weekday peak hour, respectively.

Based on the traffic analysis completed, the intersection of Bronte Road at Lakeshore Road is expected to operate below capacity during the five-year horizon from build-out scenario (2030). However, operational issues were identified along Lakeshore Road at the intersections of Jones Street and Nelson Street. For this, the TIS recommends signal optimization to alleviate critical movements. The TIS indicates that this development is expected to be completed by 2025; however, updated online information mentions that occupancy is planned for 2028.

Development C: 2380 Lakeshore Road West

The proposed development includes a 6-storey retirement residence with 411 m^2 of gross floor area ground floor commercial space. The development is expected to generate a total of 78 and 89 trips in the AM and PM weekday peak hour, respectively. The main access to the site will be on the south side of Lakeshore Road between Jones Street and Nelson Street. The development is planned to be completed by 2027 and based on the traffic impact study completed, the intersections within the study area are expected to operate with acceptable levels of service.

Development D: 77 East Street

A TIS was completed for a mixed-use 10-storey residential development with a ground floor retail located on the southeast corner of the intersection of Lakeshore Road West and East Street. The development is expected to generate 89 and 116 vehicles trips during the AM and PM peak hour, respectively. The main access to the building will be located along East Street. Based on the traffic operation analysis completed for the full build-out future conditions, the intersections within the study area are expected to operate below capacity. The development is expected to be completed by 2027.

2.3 Construction and Traffic Management Plan

According to the construction and traffic management plan for Residences at Bronte Lakeside, Bronte Road has been closed to northbound traffic between Lakeshore Road West and Marine Drive with a concrete barrier being erected in the northbound lane. All northbound traffic on Bronte Road has been detoured east on Marine Drive, north on Jones Street and west on Lakeshore Road West.

2.4 Streetscaping Study

A streetscaping study is currently underway for the Bronte Village, which encompasses Lakeshore Road West between West River Street and East Street. The purpose of the study is to develop concept plans to enhance the physical environment of pedestrians, patrons, cyclists and motorists in the main shopping area of Bronte Village. The recommendations from the study are expected to be presented to the public in June 2025.

2.5 Traffic Analysis

A capacity analysis of the study intersections was undertaken using the Synchro/SimTraffic software. This software package follows the Highway Capacity Manual (HCM) approach to evaluate the operational performance of signalized and un-signalized intersections.

To determine the performance of an intersection, five performance measures were identified: (1) delay, (2) 95th percentile queue lengths, (3) volume to capacity (v/c), (4) level of service (LOS) and (5) average queue lengths. Intersection LOS is an indication of the acceptability of delay levels to motorists. Theoretically, a V/C ratio above 1.0 indicates that the examined intersection or turning movement is over saturated. The 95th percentile queue is the queue length that has only a 5% probability of being exceeded during the analysis period. It is common industry practice to use the 95th percentile queue length for design and operational analysis purposes.

The following intersections were included in the traffic analysis:

- Lakeshore Road West and Bronte Road

- Lakeshore Road West and Jones Street
- Lakeshore Road West and Nelson Street
- Lakeshore Road West and East Street
- Bronte Road and Marine Drive
- Bronte Road and Ontario Street
- Ontario Street and Jones Street
- Ontario Street and Nelson Street
- Ontario Street and East Street
- Marine Drive and Jones Street
- Marine Drive and Nelson Street
- Marine Drive and East Street

Four scenarios were evaluated in order to compare existing to expected future traffic operations within the study area under Bronte Road operating as either a one-way southbound operation or two-way operation:

- **Scenario 1** – Pre-closure period (two-way operation)
- **Scenario 2** – Closure period (one-way operation)
- **Scenario 3** – Future post-closure period (2028) with development traffic (two-way operation)
- **Scenario 4** – Future post-closure period (2028) with development traffic (one-way operation)

The following sub-sections provide a summary of the results for each scenario.

2.5.1 Scenario 1 – Pre-closure period (two-way operation)

Weekday turning movement counts collected in October and November 2023 were used for this scenario as during this period Bronte Road was operating as a two-way road between Lakeshore Road East and Marine Drive. This scenario was completed to set a comparison baseline between the existing (2023) and future operations of Bronte Road as a two-way road. Once all the 2023 counts were entered in Synchro, the next step completed was the balancing of the volumes across the study area to ensure that the simulation completed reflects the traffic observed during the field investigation. For intersections where 2023 counts were not available, volumes were estimated using volume balancing between the adjacent intersections. **Figure 4** summarizes the volumes used and **Figure 5** summarizes levels of service, volume over capacity ratio, and queues that exceed storage for the AM, PM and off-peak hours while **Table 1** provides a summary of the traffic operations for this scenario. Full Synchro/SimTraffic reports are provided in **Appendix A**.

As it can be seen from the results presented below, there are no movements operating at or above capacity or any 95th percentile queues exceeding the available storage lengths. The northbound and southbound movements at the intersection of Lakeshore Road West and Bronte Road present a Level of Service D and E, potentially attributed to the delay for the left-turning vehicles to find a safe gap during the green interval due to the northbound traffic or the pedestrians crossing Lakeshore Road West.

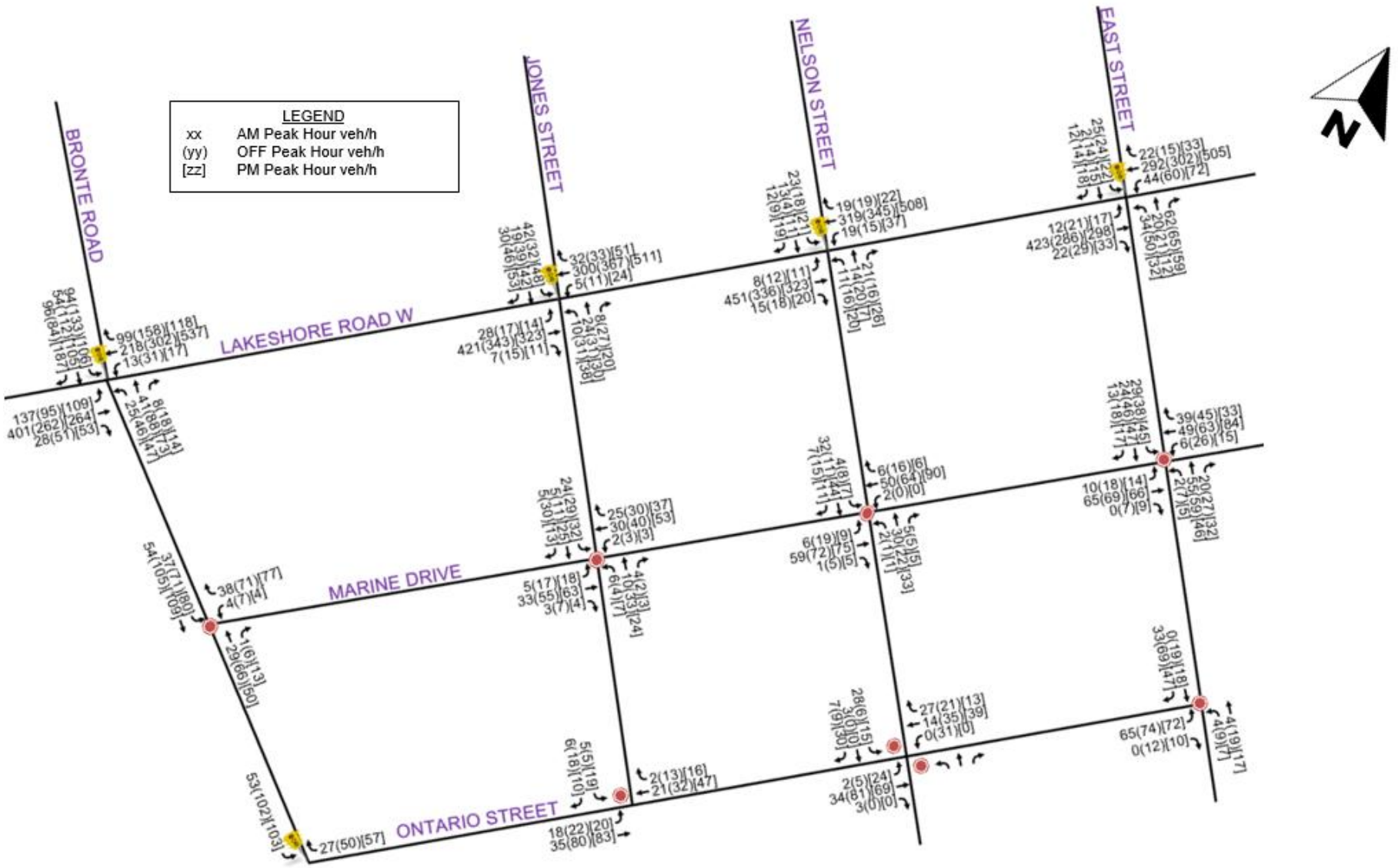

Figure 4: Scenario 1 - Pre-Closure Period (Two-Way Operation) Volumes

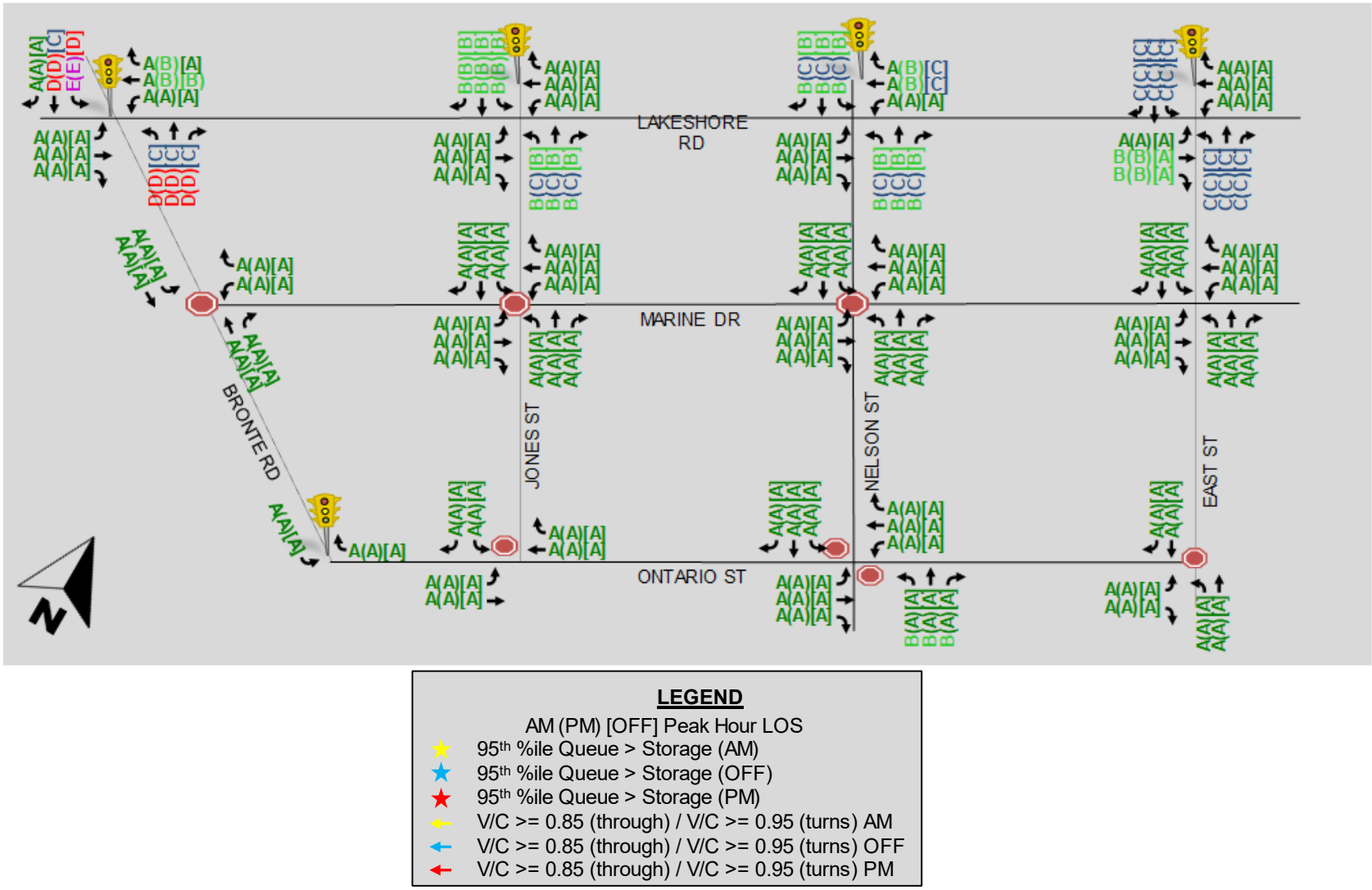

Figure 5: Scenario 1 - Pre-Closure Period (Two-Way Operation) Level of Service, V/C ratio, and Queues Exceeding Storage

Table 1: Scenario 1 - Traffic Operation Results (Two-Way Operation)

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Bronte Road & Lakeshore Road West (Signalized)																
EBL	-	0.19	4	A	10	20	0.17	6	A	10	25	0.24	7	A	15	30
EBT/R	-	0.37	6	A	25	50	0.30	7	A	20	35	0.28	6	A	20	40
WBL	30	0.03	8	A	5	10	0.06	10	A	5	15	0.03	10	A	5	15
WBT	-	0.23	9	A	15	35	0.34	12	B	20	45	0.56	16	B	60	110
WBR	45	0.08	8	A	5	15	0.13	10	A	10	25	0.12	10	B	15	45
NBL	20	0.18	40	D	5	15	0.23	33	C	10	20	0.29	46	D	10	20
NBT/R	-	0.20	40	D	10	20	0.35	34	C	15	30	0.33	46	D	10	30
SBL	105	0.72	60	E	25	45	0.73	49	D	30	50	0.66	58	E	20	40
SBT	-	0.27	40	D	10	25	0.39	34	C	20	35	0.42	47	D	20	40
SBR	-	0.10	5	A	5	5	0.10	7	A	5	5	0.20	7	A	5	5
Overall		**0.44**	**14**	**B**			**0.43**	**18**	**B**			**0.56**	**19**	**B**		
Jones Street & Lakeshore Road West (Signalized)																
EBL	35	0.06	5	A	5	15	0.05	6	A	5	10	0.04	6	A	5	10
EBT/R	-	0.50	7	A	30	60	0.46	8	A	30	50	0.35	7	A	25	50
WBL	35	0.01	5	A	5	5	0.03	6	A	5	15	0.05	6	A	5	25
WBT/R	-	0.40	7	A	25	55	0.52	9	A	30	55	0.59	9	A	45	85
NBL/T/R	-	0.16	15	B	5	20	0.21	14	B	10	25	0.29	21	C	15	25
SBL	40	0.19	16	B	10	20	0.11	14	B	5	15	0.17	20	B	10	20
SBT/R	-	0.09	15	B	10	15	0.15	14	B	10	25	0.17	20	B	10	25
Overall		**0.42**	**8**	**A**			**0.41**	**10**	**A**			**0.50**	**11**	**B**		

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Nelson Street & Lakeshore Road West (Signalized)																
EBL	35	0.02	4	A	5	10	0.03	5	A	5	10	0.03	4	A	5	10
EBT/R	-	0.54	7	A	25	60	0.53	8	A	20	50	0.35	5	A	20	40
WBL	35	0.06	6	A	5	15	0.05	7	A	5	10	0.08	5	A	10	20
WBT/R	-	0.56	9	A	20	45	0.84	24	C	20	45	0.68	11	B	35	65
NBL/T/R	-	0.18	16	B	5	15	0.21	12	B	10	15	0.19	21	C	10	15
SBL/T/R	-	0.27	17	B	10	20	0.11	11	B	5	15	0.22	21	C	10	20
Overall		**0.57**	**9**	**A**			**0.64**	**15**	**B**			**0.59**	**10**	**A**		
East Street & Lakeshore Road West (Signalized)																
EBL	35	0.02	7	A	5	15	0.04	8	A	5	20	0.05	8	A	5	15
EBT/R	-	0.51	11	B	40	70	0.34	9	A	30	55	0.42	11	B	30	65
WBL	60	0.09	5	A	5	15	0.10	5	A	10	20	0.13	5	A	10	20
WBT/R	-	0.29	5	A	20	35	0.28	5	A	20	45	0.51	6	A	35	65
NBL/T/R	-	0.33	27	C	15	25	0.44	28	C	15	30	0.31	28	C	15	25
SBL/T/R	-	0.16	25	C	5	15	0.19	25	C	10	20	0.22	27	C	10	20
Overall		**0.45**	**11**	**B**			**0.35**	**11**	**B**			**0.50**	**11**	**B**		
Bronte Road & Marine Drive (Unsignalized)																
WBL	-	0.01	7	A	5	5	0.01	8	A	5	5	0.01	8	A	5	5
WBR	45	0.07	6	A	5	5	0.11	7	A	5	5	0.11	7	A	5	5
NBT/R	-	0.05	7	A	5	15	0.10	8	A	10	15	0.08	8	A	10	15
SBL/T	-	0.15	8	A	10	15	0.25	9	A	15	25	0.26	9	A	15	25
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
Jones Street & Marine Drive (Unsignalized)																

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
EBL/T/R	-	0.05	7	A	5	15	0.11	8	A	10	15	0.12	8	A	10	15
WBL/T/R	-	0.07	7	A	10	15	0.09	7	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.03	7	A	5	15	0.05	8	A	5	15	0.05	8	A	5	15
SBL/T/R	-	0.05	8	A	10	20	0.09	8	A	10	15	0.10	8	A	10	15
Overall			**7**	**A**				**8**	**A**				**8**	**A**		
Nelson Street & Marine Drive (Unsignalized)																
EBL/T/R	-	0.12	8	A	10	20	0.12	8	A	10	15	0.12	8	A	10	10
WBL/T/R	-	0.10	8	A	10	15	0.10	8	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.06	8	A	5	15	0.04	8	A	5	15	0.05	8	A	5	15
SBL/T/R	-	0.08	8	A	5	15	0.04	8	A	5	15	0.08	8	A	10	15
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
East Street & Marine Drive (Unsignalized)																
EBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15	0.13	8	A	10	15
WBL/T/R	-	0.12	8	A	10	15	0.18	8	A	10	20	0.18	8	A	10	20
NBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15	0.11	8	A	10	15
SBL/T/R	-	0.09	8	A	10	15	0.15	8	A	10	15	0.15	8	A	10	15
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
Bronte Road & Ontario Street (Signalized)																
WBR	-	0.02	2	A	5	5	0.04	2	A	5	10	0.05	2	A	5	10
SBL	-	0.05	2	A	5	10	0.10	2	A	5	15	0.10	2	A	5	15
Overall		**0.04**	**2**	**A**			**0.09**	**2**	**A**			**0.08**	**2**	**A**		
Ontario Street & Jones Street (Unsignalized)																
EBL/T	-	0.03	3	A	5	5	0.02	2	A	5	5	0.02	2	A	5	5

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
WBT/R	-	0.02	2	A	5	5	0.03	2	A	5	5	0.05	2	A	5	5
SBL/R	-	0.02	9	A	5	10	0.02	9	A	5	10	0.05	10	A	5	15
Overall			**3**	**A**				**2**	**A**				**2**	**A**		
Ontario Street & Nelson Street (Unsignalized)																
EBL/T/R	-	0.00	1	A	5	5	0.00	0	A	5	5	0.02	2	A	5	5
WBL/T/R	-	0.00	2	A	5	5	0.03	3	A	5	5	0.00	2	A	5	5
NBL/T/R	-	0.01	11	B	5	10	0.01	2	A	5	5	0.01	2	A	5	5
SBL/T/R	-	0.06	10	A	5	15	0.03	10	A	5	10	0.07	10	A	10	15
Overall			**4**	**A**				**2**	**A**				**3**	**A**		
Ontario Street & East Street (Unsignalized)																
EBL/R	-	0.10	8	A	10	15	0.12	8	A	10	15	0.10	8	A	10	15
NBL/T	-	0.01	7	A	5	10	0.04	7	A	5	15	0.03	7	A	5	15
SBT/R	-	0.04	7	A	5	15	0.10	7	A	10	10	0.07	7	A	10	10
Overall			**7**	**A**				**8**	**A**				**7**	**A**		

2.5.2 Scenario 2 – Closure period (one-way operation)

The turning movement counts collected in October and November of 2024 were used for this scenario. In this case, there are no northbound volumes present at the intersection of Lakeshore Road West and Bronte Road.

Figure 6 summarizes the volumes used and **Figure 7** summarizes levels of service, volume over capacity ratio, and queues that exceed storage for the AM, PM and OFF-peak hours while **Table 2** provides a summary of the traffic operations for this scenario. Full Synchro/SimTraffic reports are provided in **Appendix A**.

As shown below, the study area is also operating well with low delays, short queues and v/c ratios below 0.85, with the exception of the westbound through movement at the intersection of Lakeshore Road West and Bronte Road, which has a v/c ratio of 0.85 during the PM peak hour. Additionally, the 95th percentile queue for the westbound right-turn movement at the same intersection exceeds the available storage length by 10 meters.

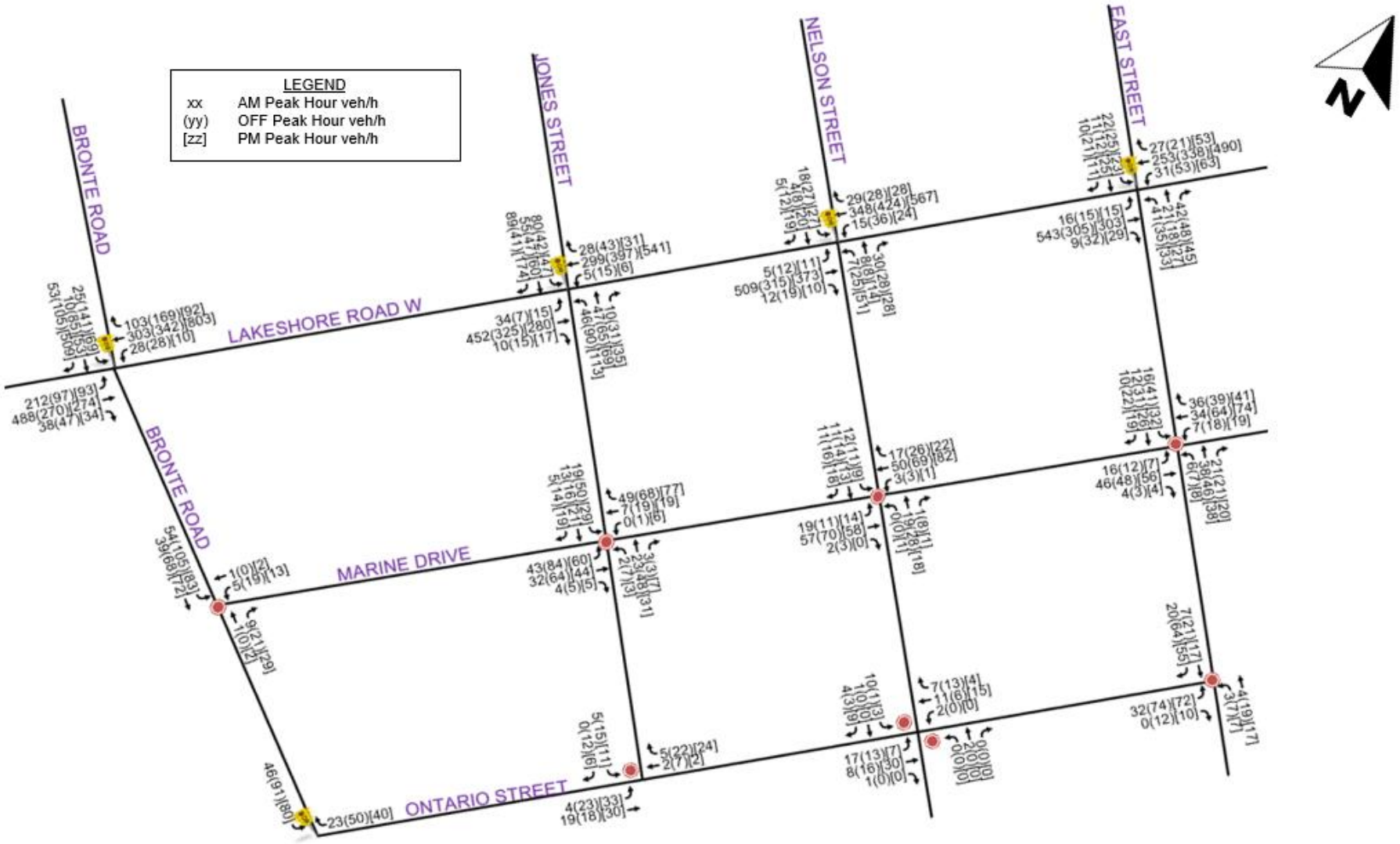

Figure 6: Scenario 2 - Closure Period (One-Way Operation) Volume

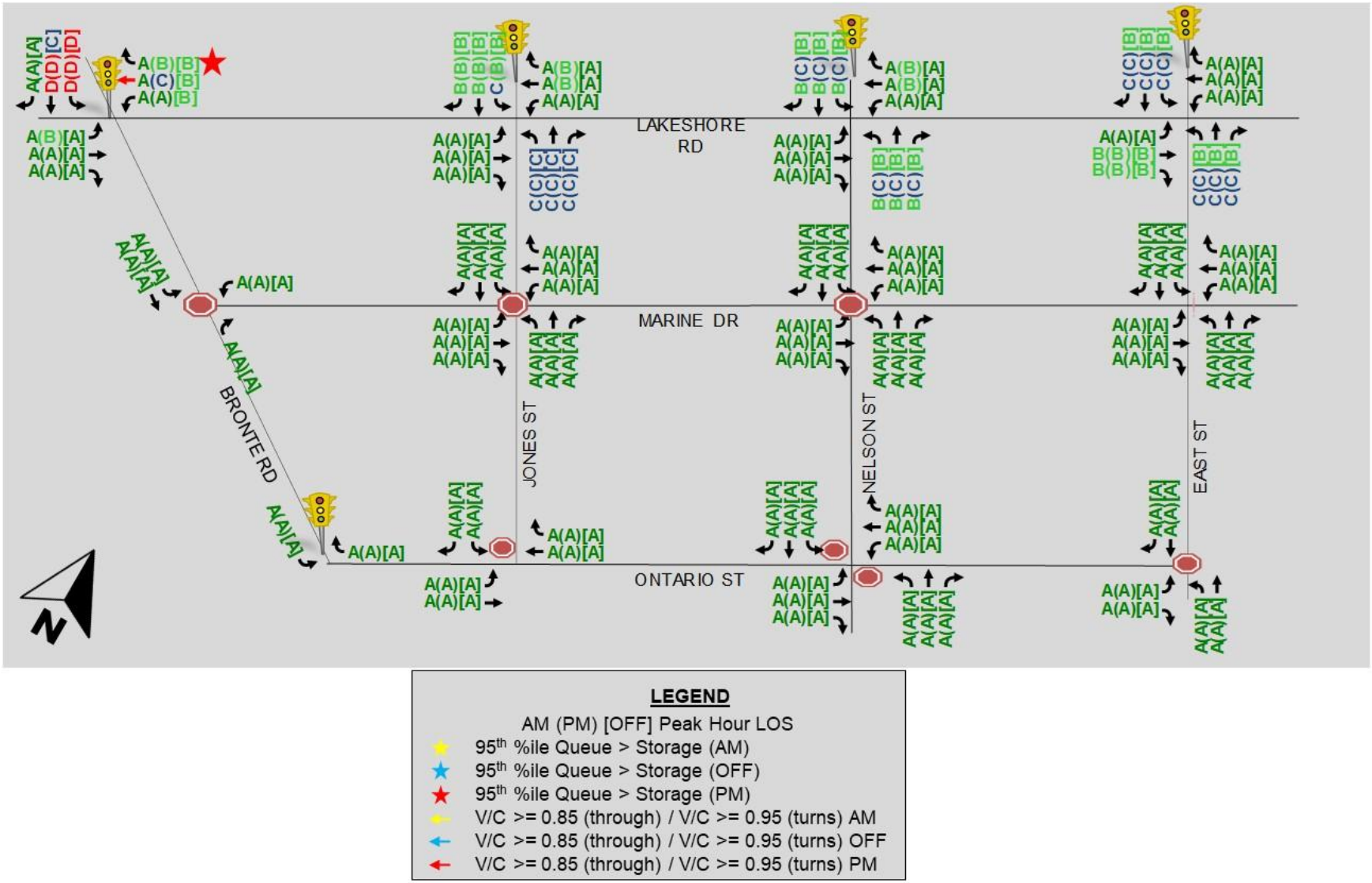

Figure 7: Scenario 2 - Closure Period (One-Way Operation) Level of Service, V/C ratio, and Queues Exceeding Storage

Table 2: Scenario 2 – Traffic Operation Results (One-Way Operation)

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Bronte Road & Lakeshore Road West (Signalized)																
EBL	-	0.29	3	A	20	35	0.17	6	A	10	20	0.26	13	B	15	25
EBT/R	-	0.43	5	A	25	60	0.29	7	A	20	35	0.26	5	A	15	35
WBL	30	0.06	6	A	5	10	0.06	10	B	5	15	0.02	10	A	5	10
WBT	-	0.29	8	A	15	40	0.39	13	B	25	50	**0.85**	29	C	110	180
WBR	45	0.08	6	A	5	15	0.13	11	B	10	30	0.08	11	B	20	**55**
SBL	105	0.30	46	D	5	20	0.71	47	D	30	50	0.53	54	D	15	30
SBT	-	0.22	45	D	5	15	0.32	34	C	15	30	0.49	52	D	20	40
SBR	95	0.05	3	A	5	5	0.12	5	A	5	5	0.51	6	A	5	30
Overall		**0.43**	**7**	**A**			**0.45**	**15**	**B**			**0.76**	**20**	**B**		
Jones Street & Lakeshore Road West (Signalized)																
EBL	35	0.07	6	A	5	15	0.02	7	A	5	10	0.05	8	A	5	15
EBT/R	-	0.49	8	A	40	75	0.40	9	A	30	55	0.32	9	A	25	45
WBL	35	0.01	5	A	5	10	0.03	7	A	5	10	0.01	8	A	5	10
WBT/R	-	0.34	7	A	25	50	0.48	10	A	30	60	0.62	13	B	50	100
NBL/T/R	-	0.38	21	C	15	25	0.50	21	C	20	40	0.66	25	C	30	65
SBL	40	0.30	20	C	10	20	0.14	18	B	10	20	0.15	17	B	10	20
SBT/R	-	0.24	20	B	15	30	0.13	18	B	10	25	0.25	18	B	25	45
Overall		**0.46**	**11**	**B**			**0.48**	**12**	**B**			**0.63**	**15**	**B**		
Nelson Street & Lakeshore Road West (Signalized)																
EBL	35	0.01	4	A	5	10	0.02	4	A	5	10	0.03	5	A	5	10
EBT/R	-	0.54	7	A	25	60	0.38	6	A	20	50	0.36	6	A	30	55
WBL	35	0.05	6	A	5	10	0.08	6	A	5	20	0.05	6	A	5	20
WBT/R	-	0.52	9	A	20	40	0.59	10	A	30	60	0.72	13	B	40	75
NBL/T/R	-	0.15	18	B	10	15	0.22	19	B	10	20	0.33	22	C	15	25
SBL/T/R	-	0.13	18	B	5	15	0.21	19	B	10	20	0.23	21	C	10	20
Overall		**0.51**	**9**	**A**			**0.51**	**9**	**A**			**0.62**	**12**	**B**		
East Street & Lakeshore Road West (Signalized)																
EBL	35	0.03	7	A	5	20	0.05	9	A	5	20	0.05	8	A	5	15
EBT/R	-	0.60	11	B	45	85	0.51	12	B	35	65	0.46	11	B	30	60
WBL	60	0.09	6	A	5	15	0.12	5	A	10	20	0.12	5	A	10	20
WBT/R	-	0.32	6	A	20	40	0.43	7	A	30	50	0.53	7	A	35	60
NBL/T/R	-	0.36	26	C	15	25	0.28	20	B	15	25	0.39	28	C	15	30
SBL/T/R	-	0.16	24	C	10	20	0.18	19	B	10	20	0.25	27	C	10	20
Overall		**0.53**	**11**	**B**			**0.44**	**11**	**B**			**0.53**	**11**	**B**		
Bronte Road & Marine Drive (Unsignalized)																
WBL	-	0.03	7	A	5	5	0.07	8	A	5	10	0.07	8	A	5	10
WBR	-	0.00	7	A	5	5	0.00	7	A	5	5	0.00	7	A	5	5
NBT/R	-	0.03	7	A	5	15	0.03	7	A	5	10	0.04	7	A	5	15

Movement	Effective Storage Length (m)	AM Peak Hour					OFF-Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
SBL/T	-	0.16	8	A	10	15	0.26	9	A	15	25	0.21	8	A	15	30
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
Jones Street & Marine Drive (Unsignalized)																
EBL/T/R	-	0.12	8	A	10	15	0.21	9	A	10	20	0.15	8	A	10	15
WBL/T/R	-	0.06	7	A	5	15	0.11	8	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.04	7	A	5	15	0.08	8	A	10	15	0.09	8	A	10	15
SBL/T/R	-	0.09	8	A	10	15	0.12	8	A	10	15	0.10	8	A	10	15
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
Nelson Street & Marine Drive (Unsignalized)																
EBL/T/R	-	0.11	8	A	10	15	0.15	8	A	10	15	0.09	8	A	10	15
WBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.03	8	A	5	15	0.05	8	A	5	15	0.07	8	A	10	15
SBL/T/R	-	0.05	8	A	10	15	0.08	8	A	10	15	0.06	8	A	10	15
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
East Street & Marine Drive (Unsignalized)																
EBL/T/R	-	0.10	8	A	10	15	0.14	8	A	10	15	0.09	8	A	10	15
WBL/T/R	-	0.13	8	A	10	15	0.16	8	A	10	15	0.18	8	A	10	20
NBL/T/R	-	0.10	8	A	10	15	0.10	8	A	10	15	0.10	8	A	10	15
SBL/T/R	-	0.07	8	A	10	15	0.13	8	A	10	20	0.15	8	A	10	15
Overall			**8**	**A**				**8**	**A**				**8**	**A**		
Bronte Road & Ontario Street (Signalized)																
WBR	-	0.02	2	A	5	5	0.01	2	A	5	5	0.03	2	A	5	10
SBL	-	0.05	2	A	5	5	0.10	2	A	5	15	0.10	2	A	5	15
Overall		**0.04**	**2**	**A**			**0.08**	**2**	**A**			**0.08**	**2**	**A**		
Ontario Street & Jones Street (Unsignalized)																
EBL/T	-	0.01	1	A	5	5	0.02	3	A	5	10	0.05	4	A	5	5
WBT/R	-	0.03	2	A	5	5	0.02	2	A	5	5	0.02	2	A	5	5
SBL/R	-	0.08	9	A	5	15	0.03	9	A	5	15	0.07	9	A	10	20
Overall			**4**	**A**				**3**	**A**				**5**	**A**		
Ontario Street & Nelson Street (Unsignalized)																
EBL/T/R	-	0.02	2	A	5	5	0.01	1	A	5	5	0.01	1	A	5	5
WBL/T/R	-	0.00	1	A	5	5	0.00	2	A	5	5	0.00	2	A	5	5
NBL/T/R	-	0.01	11	B	5	10	0.01	2	A	5	5	0.01	2	A	5	5
SBL/T/R	-	0.02	10	A	5	15	0.06	9	A	5	15	0.03	9	A	5	15
Overall			**3**	**A**				**3**	**A**				**2**	**A**		
Ontario Street & East Street (Unsignalized)																
EBL/R	-	0.09	8	A	10	15	0.09	8	A	10	15	0.07	8	A	5	15
NBL/T	-	0.01	7	A	5	10	0.03	7	A	5	15	0.02	7	A	5	10
SBT/R	-	0.04	7	A	5	15	0.06	7	A	5	15	0.08	7	A	10	15
Overall			**7**	**A**				**7**	**A**				**7**	**A**		

2.5.3 Scenario 3 – Future post-closure period with development traffic (two-way operation)

The same volumes used for Scenario 1 – Pre-closure (two-way) were used as a baseline for the Scenario 3 volumes with the following changes applied:

- Development traffic for all identified developments along Lakeshore Road (see Section 2.2) were added to the model.
- A 2% annual growth rate was applied to the eastbound through and westbound through movements along Lakeshore Road West to estimate the volumes for the 2028 horizon year. The horizon year was selected based on the expected completion dates for the identified developments. The traffic impact studies had also applied a background growth rate of either 1 or 2% to through movements along Lakeshore Road West. To be conservative, a growth rate of 2% was applied.
- Signal timing plans were optimized at all signalized intersections.

Figure 8 provides a summary of the development volumes that were added to the study area, while **Figure 9** summarizes the total 2028 future volumes used and **Figure 10** summarizes levels of service, volume over capacity ratio, and queues that exceed storage for the AM and PM peak hours. **Table 3** provides a summary of the traffic operations for this scenario. The OFF peak period was not modelled for the future scenarios, since the traffic impact studies completed for the planned developments along Lakeshore Road West did not include the estimated number of trips for that peak hour. Full Synchro/SimTraffic reports are provided in **Appendix A.**

As shown below, for the future 2028 horizon year in which Bronte Road operates as a two-way road southbound, all intersections operate with an acceptable v/c ratio and low delays. Queue lengths at the intersection of Lakeshore Road West and Bronte Road for the westbound right-turn and northbound left-turn movements are expected to exceed the available storage length during the PM peak hour by 15 meters and 5 meters, respectively.

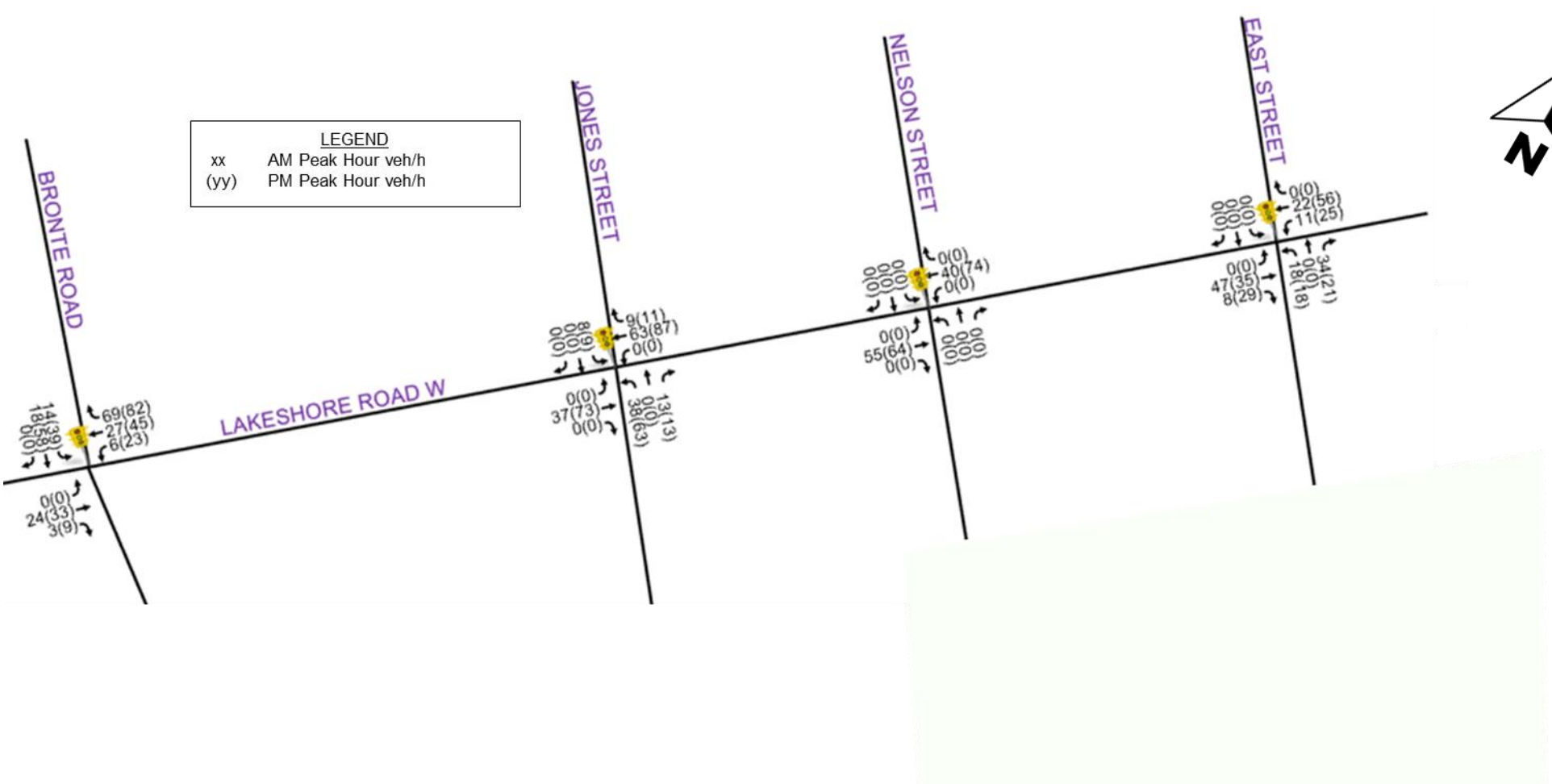

Figure 8: Scenario 3 - Post-Closure Period (Two-Way Operation) Additional Development Volumes

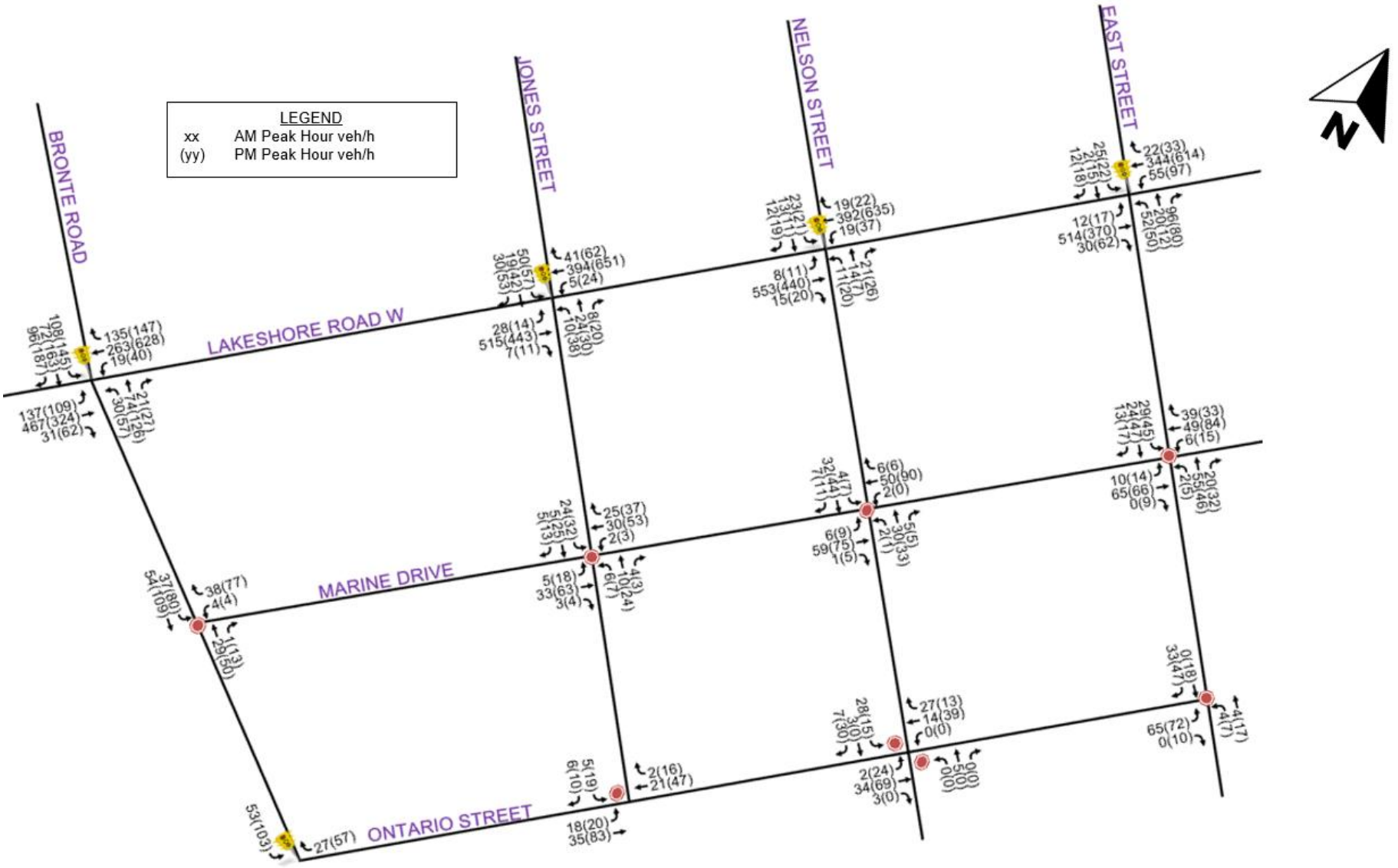

Figure 9: Scenario 3 - Post-Closure Period (Two-Way Operation) Volumes

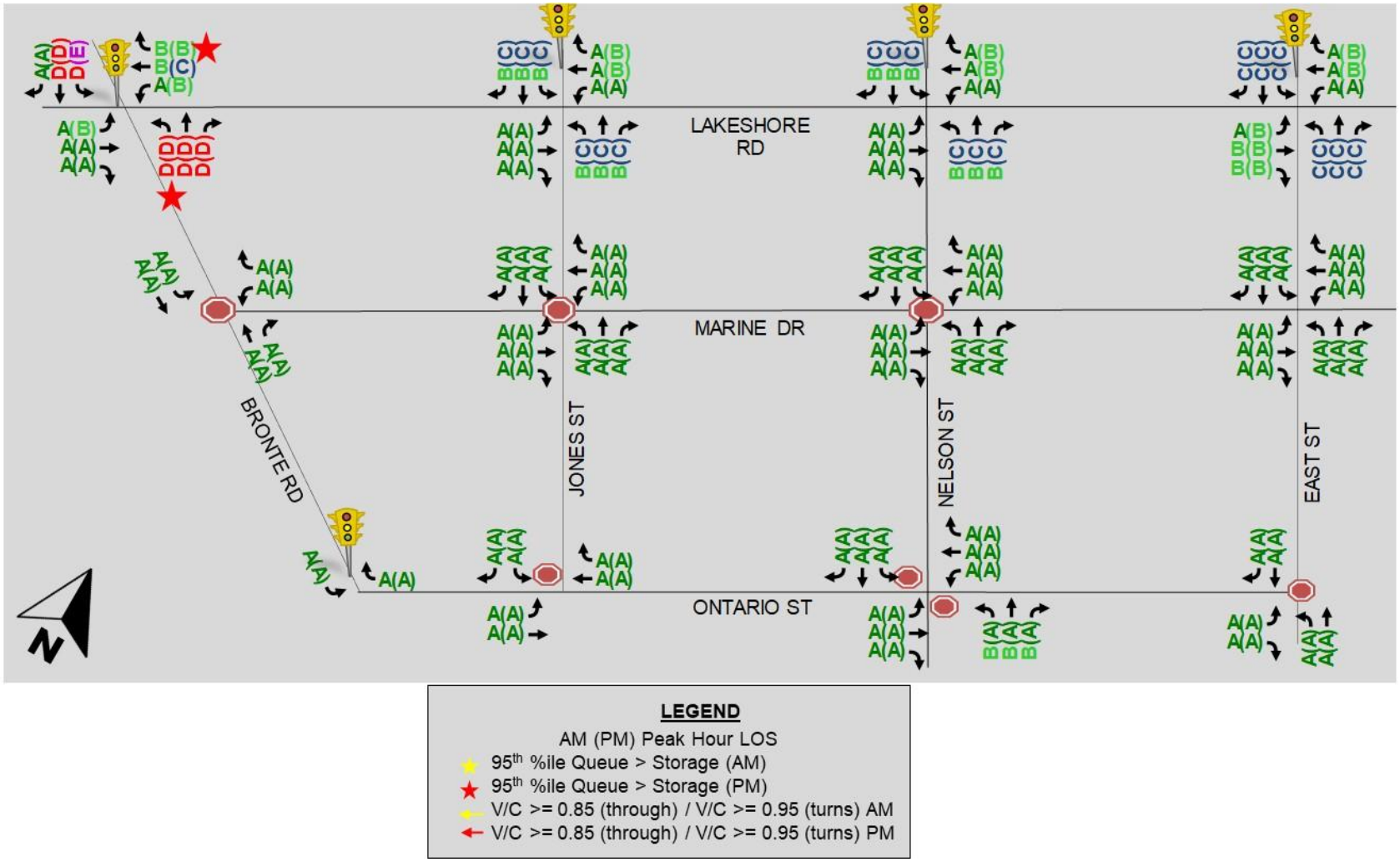

Figure 10: Scenario 3 - Post-Closure Period (Two-Way Operation) Level of Service, V/C ratio, and Queues Exceeding Storage

Table 3: Scenario 3 – Traffic Operation Results (Two-Way Operation)

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Bronte Road & Lakeshore Road West (Signalized)											
EBL	-	0.21	6	A	15	30	0.32	11	B	15	35
EBT/R	-	0.46	9	A	30	55	0.37	9	A	30	50
WBL	30	0.05	10	A	5	10	0.08	11	B	10	25
WBT	-	0.30	12	B	20	45	0.69	22	C	75	125
WBR	45	0.11	10	B	10	25	0.15	12	B	25	**60**
NBL	20	0.16	36	D	5	15	0.33	42	D	10	**25**
NBT/R	-	0.31	37	D	15	30	0.46	43	D	30	55
SBL	105	0.63	47	D	25	40	0.85	76	E	40	70
SBT	-	0.27	37	D	15	25	0.49	43	D	30	65
SBR	-	0.10	5	A	5	5	0.21	8	A	5	5
Overall		**0.52**	**16**	**B**			**0.71**	**24**	**C**		
Jones Street & Lakeshore Road West (Signalized)											
EBL	35	0.07	5	A	5	20	0.06	5	A	5	20
EBT/R	-	0.60	8	A	35	60	0.46	7	A	40	65
WBL	35	0.01	5	A	5	10	0.05	5	A	5	20
WBT/R	-	0.52	7	A	35	65	0.73	12	B	65	125
NBL/T/R	-	0.16	16	B	5	15	0.30	22	C	15	30
SBL	40	0.23	16	B	10	20	0.21	21	C	10	20
SBT/R	-	0.09	15	B	10	15	0.18	21	C	15	25
Overall		**0.50**	**9**	**A**			**0.61**	**12**	**B**		
Nelson Street & Lakeshore Road West (Signalized)											
EBL	35	0.02	4	A	5	10	0.03	4	A	5	15
EBT/R	-	0.59	7	A	35	70	0.44	5	A	25	60
WBL	35	0.06	6	A	5	15	0.09	5	A	10	25
WBT/R	-	0.57	9	A	25	60	0.78	13	B	40	80
NBL/T/R	-	0.15	19	B	5	15	0.20	24	C	10	15
SBL/T/R	-	0.22	19	B	10	20	0.23	24	C	10	20
Overall		**0.56**	**9**	**A**			**0.68**	**11**	**B**		
East Street & Lakeshore Road West (Signalized)											
EBL	35	0.03	9	A	5	10	0.06	10	B	5	20
EBT/R	-	0.68	16	B	55	100	0.60	16	B	40	75
WBL	60	0.16	8	A	10	20	0.22	7	A	15	40
WBT/R	-	0.37	7	A	25	45	0.65	10	B	50	90
NBL/T/R	-	0.43	26	C	20	35	0.39	27	C	20	35
SBL/T/R	-	0.12	23	C	10	20	0.17	24	C	10	20

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Overall		**0.58**	**15**	**B**			**0.62**	**14**	**B**		
Bronte Road & Marine Drive (Unsignalized)											
WBL	-	0.01	7	A	5	5	0.01	8	A	5	5
WBR	45	0.07	6	A	5	5	0.11	7	A	5	5
NBT/R	-	0.05	7	A	5	15	0.08	8	A	10	15
SBL/T	-	0.15	8	A	10	15	0.26	9	A	15	25
Overall			**8**	**A**				**8**	**A**		
Jones Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.05	7	A	5	15	0.12	8	A	10	15
WBL/T/R	-	0.07	7	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.03	7	A	5	15	0.05	8	A	5	15
SBL/T/R	-	0.05	8	A	10	15	0.10	8	A	10	15
Overall			**7**	**A**				**8**	**A**		
Nelson Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.12	8	A	10	20	0.12	8	A	10	10
WBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.06	8	A	5	15	0.05	8	A	5	15
SBL/T/R	-	0.08	8	A	10	15	0.08	8	A	10	15
Overall			**8**	**A**				**8**	**A**		
East Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15
WBL/T/R	-	0.12	8	A	10	15	0.18	8	A	10	20
NBL/T/R	-	0.10	8	A	10	15	0.11	8	A	10	15
SBL/T/R	-	0.09	8	A	10	15	0.15	8	A	10	15
Overall			**8**	**A**				**8**	**A**		
Bronte Road & Ontario Street (Signalized)											
WBR	-	0.02	2	A	5	5	0.05	2	A	5	10
SBL	-	0.05	2	A	5	5	0.10	2	A	5	15
Overall		**0.04**	**2**	**A**			**0.08**	**2**	**A**		
Ontario Street & Jones Street (Unsignalized)											
EBL/T	-	0.03	3	A	5	5	0.02	2	A	5	5
WBT/R	-	0.02	2	A	5	5	0.05	2	A	5	5
SBL/R	-	0.02	9	A	5	10	0.05	10	A	5	15
Overall			**3**	**A**				**2**	**A**		
Ontario Street & Nelson Street (Unsignalized)											
EBL/T/R	-	0.00	1	A	5	5	0.02	2	A	5	5
WBL/T/R	-	0.00	2	A	5	5	0.00	2	A	5	5

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
NBL/T/R	-	0.01	11	B	5	15	0.01	2	A	5	5
SBL/T/R	-	0.06	10	A	10	20	0.07	10	A	5	15
Overall			**4**	**A**				**3**	**A**		
Ontario Street & East Street (Unsignalized)											
EBL/R	-	0.10	8	A	10	15	0.10	8	A	10	15
NBL/T	-	0.01	7	A	5	10	0.03	7	A	5	15
SBT/R	-	0.04	7	A	5	15	0.07	7	A	10	10
Overall			**7**	**A**				**7**	**A**		

2.5.4 Scenario 4 – Future post-closure period with development traffic (one-way operation)

For this scenario, the same volumes used for Scenario 2 – Closure Period (One-Way Operation) were used as a baseline with the following changes applied:

- Development traffic for all identified developments along Lakeshore Road (see Section 2.2) were added to the model.
- Development traffic was detoured in the same manner as the one-way operation on Bronte Road is detoured: southbound on Bronte Road, eastbound on Marine Drive, northbound on Jones Street and eastbound/westbound on Lakeshore Road West.
- A 2% annual growth rate was applied to the eastbound through and westbound through movements along Lakeshore Road West to estimate the volumes for the 2028 horizon year as with Scenario 3. The horizon year was selected based on the expected completion dates for the identified developments.
- Signal timing plans were optimized at all signalized intersections.

Figure 11 provides a summary of the development volumes that were added to the study area, while **Figure 12** summarizes the total 2028 future volumes used and **Figure 13** summarizes levels of service, volume over capacity ratio, and queues that exceed storage for the AM and PM peak hours.

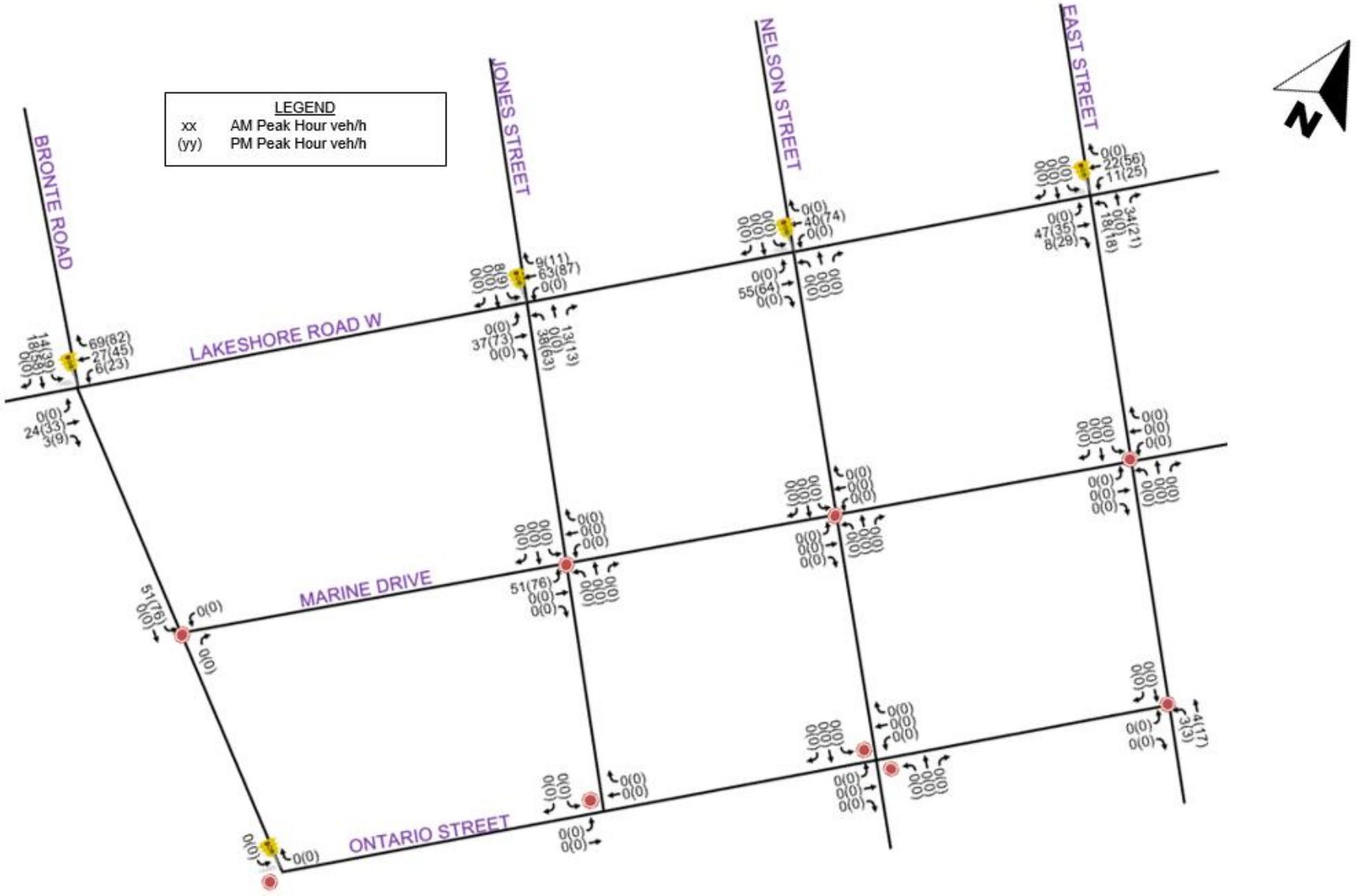

Figure 11: Scenario 4 – Post-Closure Period (One-Way Operation) Additional Development

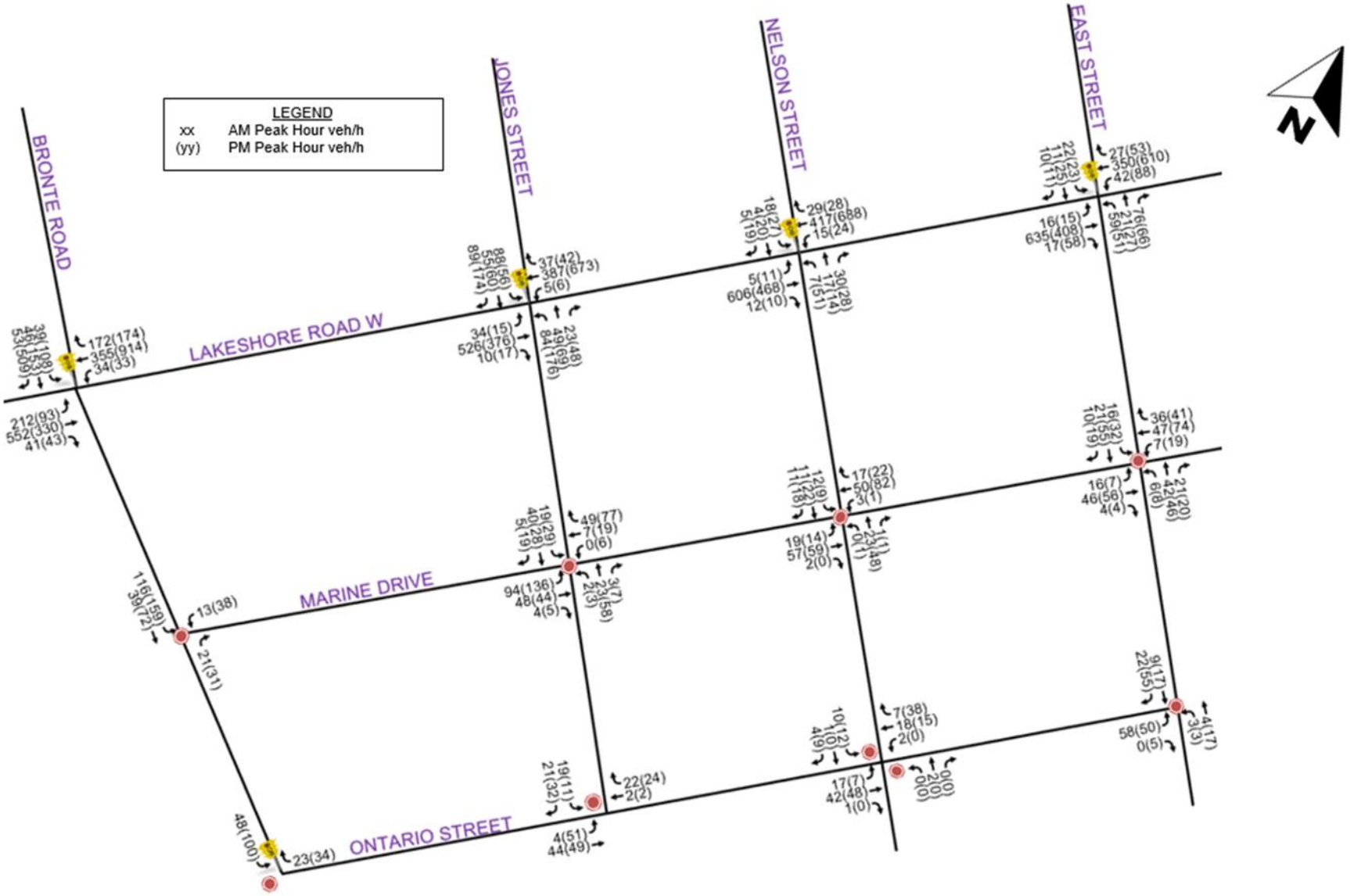

Figure 12: Scenario 4 - Post-Closure Period (One-Way Operation) Volume

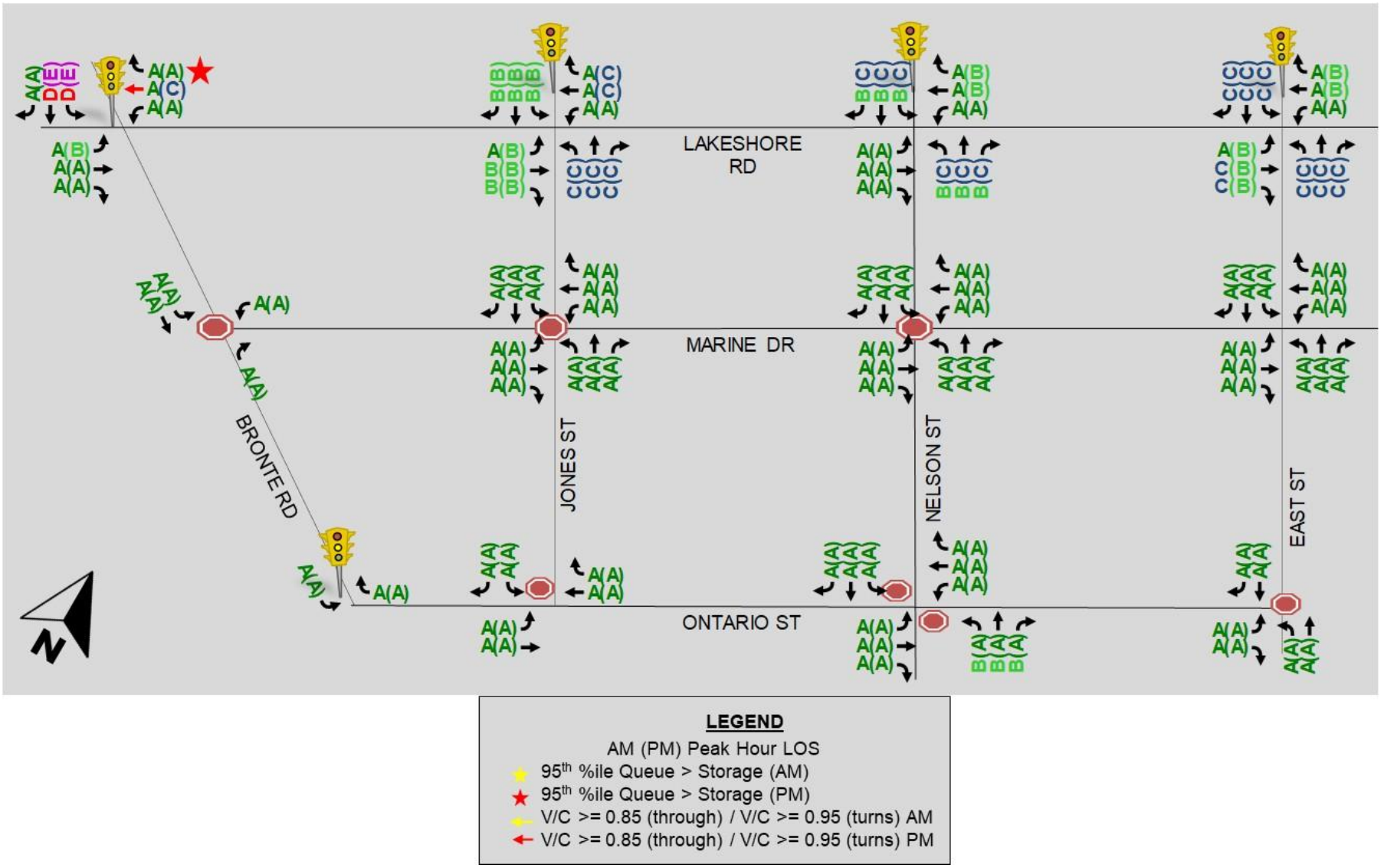

Figure 13: Scenario 4 - Post-Closure Period (One-Way Operation) Levels of Service, v/c ratio and Queues Exceeding Storage

Table 4 provides a summary of the traffic operations for this scenario. OFF peak period was not modelled for the future scenarios, since the traffic impact studies completed for the planned developments along Lakeshore Road West did not include the estimated number of trips for that peak hour. Full Synchro/SimTraffic reports are provided in **Appendix A**.

As seen below, the intersections within the study area are expected to operate at acceptable levels of service under Scenario 4. The westbound through movement at the intersection of Lakeshore Road West and Bronte Road is expected to operate with a v/c ratio of 0.90 during the PM peak hour, which is close to capacity. Additionally, the 95th percentile queue during the PM peak hour for the westbound right-turn movement for the same intersection is expected to exceed the available storage length by approximately 20 metres.

Table 4: Scenario 4 - Traffic Operation Results

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Bronte Road & Lakeshore Road West (Signalized)											
EBL	-	0.32	4	A	20	35	0.39	17	B	15	30
EBT/R	-	0.49	6	A	30	60	0.32	6	A	20	45
WBL	30	0.08	8	A	5	15	0.07	8	A	5	25
WBT	-	0.36	10	A	25	50	**0.90**	30	C	110	180
WBR	45	0.13	8	A	10	30	0.17	9	A	25	**65**
SBL	105	0.36	45	D	10	25	0.73	67	E	30	45
SBT	-	0.28	43	D	10	25	0.71	60	E	35	60
SBR	95	0.05	3	A	5	5	0.52	7	A	5	25
Overall		**0.50**	**9**	**A**			**0.84**	**22**	**C**		
Jones Street & Lakeshore Road West (Signalized)											
EBL	35	0.09	7	A	10	25	0.10	10	B	5	20
EBT/R	-	0.61	11	B	40	75	0.46	13	B	35	65
WBL	35	0.02	7	A	5	10	0.01	10	A	5	10
WBT/R	-	0.48	10	A	35	65	0.83	23	C	85	140
NBL/T/R	-	0.48	21	C	20	35	0.80	34	C	45	70
SBL	40	0.30	19	B	15	25	0.16	17	B	10	25
SBT/R	-	0.20	18	B	15	25	0.23	17	B	25	45
Overall		**0.56**	**13**	**B**			**0.81**	**21**	**C**		
Nelson Street & Lakeshore Road West (Signalized)											
EBL	35	0.01	4	A	5	10	0.03	5	A	5	10
EBT/R	-	0.62	8	A	40	75	0.44	7	A	35	70
WBL	35	0.05	5	A	5	10	0.06	6	A	5	20
WBT/R	-	0.59	9	A	25	55	0.83	18	B	55	100
NBL/T/R	-	0.15	20	B	10	20	0.35	24	C	15	25
SBL/T/R	-	0.14	20	B	5	15	0.23	23	C	10	20
Overall		**0.58**	**9**	**A**			**0.72**	**14**	**B**		
East Street & Lakeshore Road West (Signalized)											
EBL	35	0.04	9	A	5	20	0.06	11	B	5	20
EBT/R	-	0.79	20	C	65	125	0.64	17	B	45	85
WBL	60	0.15	9	A	5	15	0.21	7	A	10	25
WBT/R	-	0.38	7	A	25	50	0.66	11	B	40	75
NBL/T/R	-	0.44	26	C	20	35	0.44	27	C	20	35
SBL/T/R	-	0.12	23	C	10	20	0.19	24	C	10	20
Overall		**0.65**	**17**	**B**			**0.64**	**15**	**B**		
Bronte Road & Marine Drive (Unsignalized)											

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
WBL	-	0.03	8	A	5	5	0.07	8	A	5	10
WBR	-	0.00	7	A	5	5	0.00	7	A	5	5
NBT/R	-	0.03	7	A	5	15	0.04	7	A	5	15
SBL/T	-	0.24	9	A	10	20	0.31	9	A	20	35
Overall			**8**	**A**				**9**	**A**		
Jones Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.19	8	A	10	15	0.26	9	A	10	20
WBL/T/R	-	0.07	7	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.04	8	A	5	15	0.10	8	A	10	15
SBL/T/R	-	0.09	8	A	10	15	0.11	8	A	10	15
Overall			**8**	**A**				**9**	**A**		
Nelson Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.11	8	A	10	15	0.09	8	A	10	15
WBL/T/R	-	0.10	8	A	10	15	0.13	8	A	10	15
NBL/T/R	-	0.03	8	A	5	15	0.07	8	A	5	15
SBL/T/R	-	0.05	8	A	5	20	0.06	8	A	10	15
Overall			**8**	**A**				**8**	**A**		
East Street & Marine Drive (Unsignalized)											
EBL/T/R	-	0.10	8	A	10	15	0.09	8	A	10	15
WBL/T/R	-	0.13	8	A	10	15	0.18	8	A	10	20
NBL/T/R	-	0.10	8	A	10	15	0.10	8	A	10	15
SBL/T/R	-	0.07	8	A	5	15	0.15	8	A	10	15
Overall			**8**	**A**				**8**	**A**		
Bronte Road & Ontario Street (Signalized)											
WBR	-	0.02	2	A	5	5	0.03	2	A	5	10
SBL	-	0.05	2	A	5	5	0.10	2	A	5	15
Overall		**0.04**	**2**	**A**			**0.08**	**2**	**A**		
Ontario Street & Jones Street (Unsignalized)											
EBL/T	-	0.01	1	A	5	5	0.05	4	A	5	5
WBT/R	-	0.03	2	A	5	5	0.02	2	A	5	5
SBL/R	-	0.08	9	A	5	15	0.07	9	A	10	20
Overall			**4**	**A**				**5**	**A**		
Ontario Street & Nelson Street (Unsignalized)											
EBL/T/R	-	0.02	2	A	5	5	0.01	1	A	5	5
WBL/T/R	-	0.00	1	A	5	5	0.00	2	A	5	5
NBL/T/R	-	0.01	11	B	5	5	0.01	2	A	5	5
SBL/T/R	-	0.02	10	A	5	10	0.03	9	A	5	15

Movement	Effective Storage Length (m)	AM Peak Hour					PM Peak Hour				
		v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)	v/c	Delay (s)	LOS	Average Queue (m)	95th %ile Queue (m)
Overall			**3**	**A**				**2**	**A**		
Ontario Street & East Street (Unsignalized)											
EBL/R	-	0.09	8	A	10	15	0.07	8	A	10	15
NBL/T	-	0.01	7	A	5	5	0.02	7	A	5	15
SBT/R	-	0.04	7	A	5	15	0.08	7	A	10	15
Overall			**7**	**A**				**7**	**A**		

2.5.5 Sensitivity Analysis

The majority of turning movement counts utilized were collected in the months of October and November. As a sensitivity analysis, CIMA reviewed summer weekday (June) counts at the intersection of Lakeshore Road West and Bronte Road to check whether the October and November counts used were representative of a typical weekday in the area. The comparison showed that the full 8-hour counts for October were approximately 1200 more vehicles than the June counts. Pedestrian counts were also comparable between the two months. Therefore, October and November counts used were deemed a good representation of typical traffic conditions.

2.6 Vehicular Speed and Volumes

Speed information was obtained from TES for the road segments within the study area. Data available ranged between 2018 and 2024. Overall, low operating speeds are present along Bronte Road, Nelson Street and East Street. One segment on Ontario Street between Nelson Street and East Street presented moderate speeding with an excess speed of 9 km/h over the posted speed limit.

Similarly, volume information was obtained from TES for the road segments within the study area. As shown in **Figure 14**, Lakeshore Road West carries the highest volumes within the study area with approximately 9,319 annual average daily traffic.

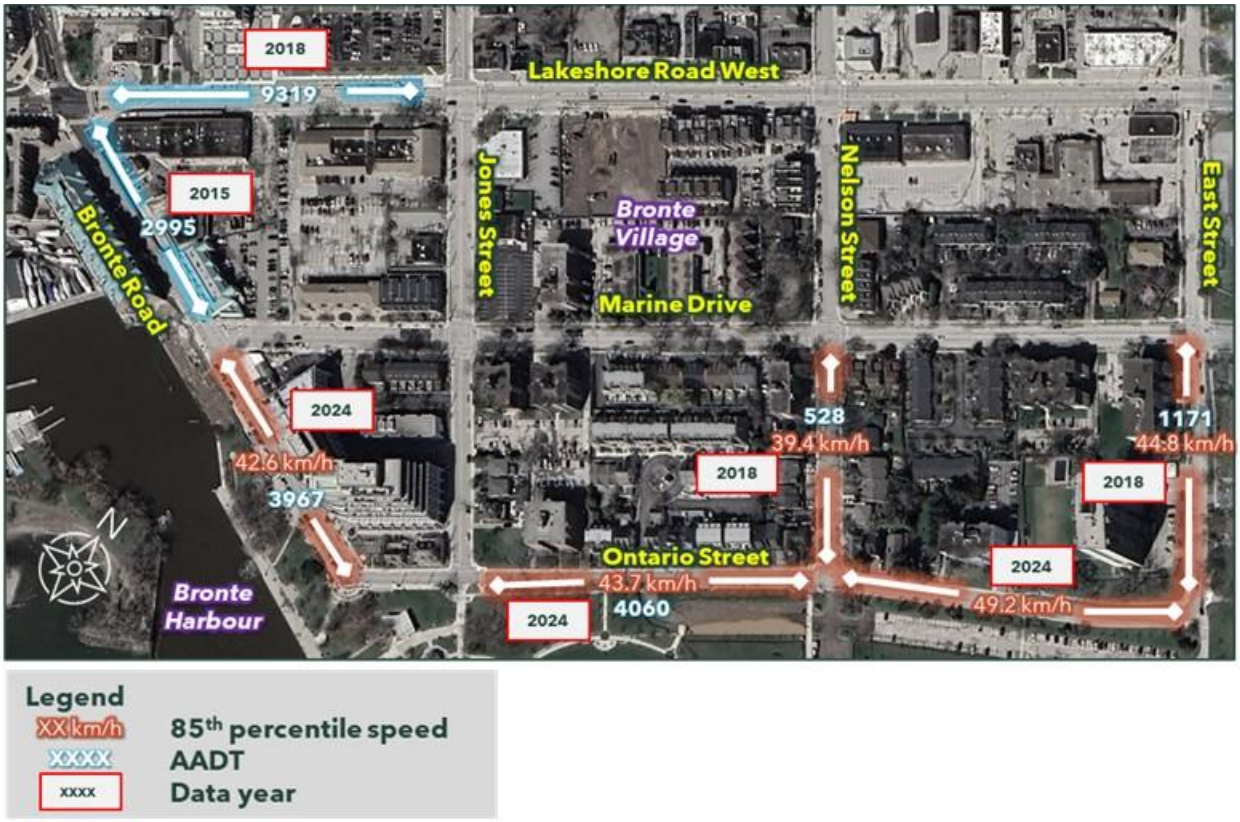

Figure 14: Speed and Volume Summary

2.7 Collision Analysis

CIMA+ reviewed and assessed the collision history in the study area to determine trends and/or patterns that might provide insight into potential contributing factors to the collisions. Historical collision data from 2019 to 2024 obtained from the TES database was used to support this study.

On March 17, 2020, the Government of Ontario declared a state of emergency due to the COVID-19 pandemic and ordered the gradual closure of businesses and facilities. As a result of the state of emergency and subsequent stay-at-home orders from the Province, Town of Oakville (similar to other jurisdictions in Ontario) experienced a reduction in vehicular traffic volumes, resulting in a reduction in the number of collisions. The COVID-19 pandemic restrictions were in place until July 2021. As a result, there is likely an underrepresentation of collision frequency in 2020 and 2021.

2.7.1 Overall Collision Trends

During the study period from 2019 to 2024, a total of 144 collisions were reported within the study area. Of the 144 collisions, 132 (92%) were property damage only (PDO) collisions, and 12 (8%) was a non-fatal injury collision.

Figure 15 and **Figure 16** provide a breakdown of the reported collisions by year, severity, impact type, environment, road surface, light, season, day of the week and time of day. This breakdown is completed in order to identify any collision patterns.

The following temporal trends were noted:

- No particular trend in the yearly frequency of collisions
- June experienced the highest number of collisions (24 in all)
- A higher frequency mid-week (Tuesday, Wednesday and Thursdays)
- A higher frequency in the late afternoon
- A majority of collisions occurred in clear, dry and daylight conditions.

Additional details to the collision summary include:

- Four pedestrian collisions were reported at the following locations:
  - Lakeshore Road West and East Street
  - Lakeshore Road West and Jones Street
  - Lakeshore Road West and Nelson Street
  - Lakeshore Road West between Jones Street and Nelson Street
- Three of the pedestrian collisions involved drivers failing to yield the right-of-way
- A total of 106 collisions were reported at intersections
- A total of 38 collisions were reported at road segments
- Improper turn was reported as the driver action with the highest frequency within the study area (33%)
- The majority of collisions took place along Lakeshore Road West

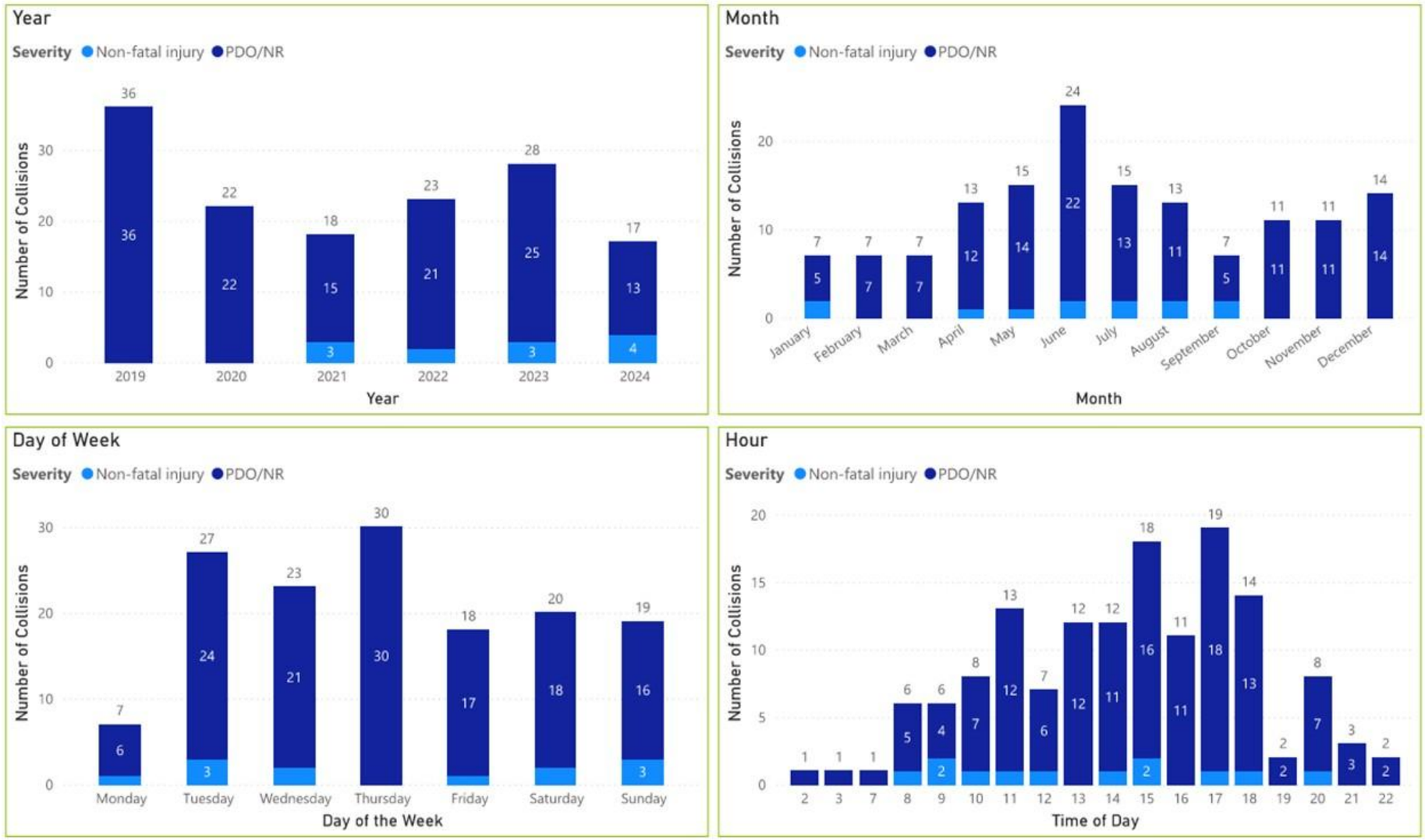

Figure 15: Collision Summary

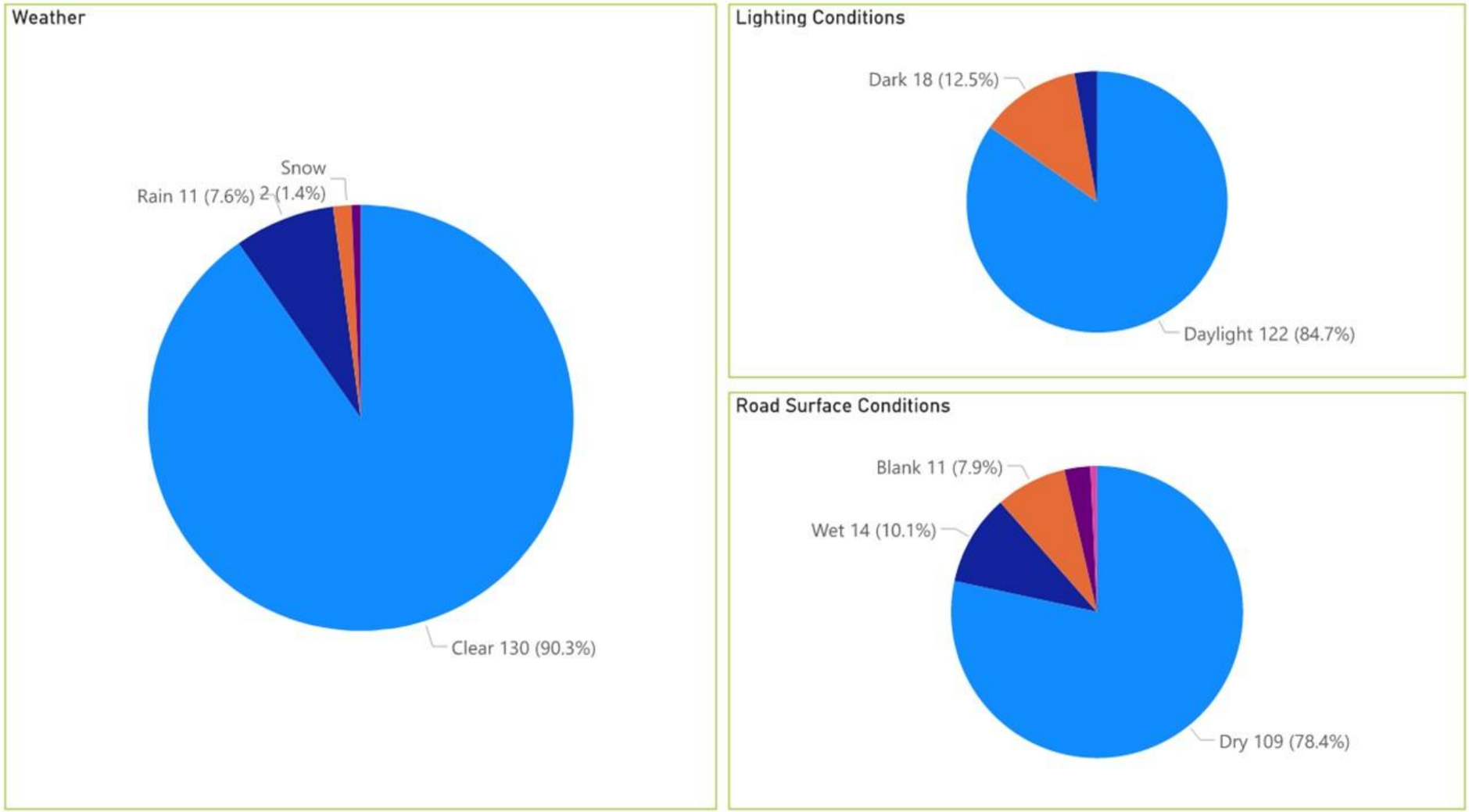

Figure 16: Collision Summary - Weather, Lighting and Road Surface Conditions

Intersection Collisions

Figure 17 and **Figure 18** shows the distribution of collisions by severity and impact type at intersections within the study area. The following observations were made:

- The intersection with the highest collisions is Lakeshore Road West and Bronte Road
  - During the pre-closure period two-way operation (2019 to March 8, 2024), there were 36 total collisions: rear end (50%), angle (28%), turning movement (11%), sideswipe (5.5%) and single motor vehicle (5.5%) collisions reported
    - Out of the 18 rear end collisions, 8 involved a southbound vehicle, 7 a westbound vehicle, 2 an eastbound vehicle and 1 a northbound vehicle
    - The following directions were identified for the reported 11 angle collisions:
      - NB vs. EB: 3 collisions
      - SB vs. WB: 3 collisions
      - SB vs. EB: 3 collisions
      - NB vs. WB: 2 collisions
    - The following directions were identified for the reported 5 turning movement collisions:
      - EBL vs. WBT: 1 collision
      - WBL vs. EBT: 1 collision
      - Others: 3 collisions
    - 2 Sideswipe and 2 single motor vehicle collisions were reported.
  - Two collisions were reported after March 8, 2024 for the remainder of the year (post-closure one-way operation)
    - One involving a southbound through and southbound left-turn vehicles (turning movement collision)
    - One involving an eastbound left-turn and a southbound through vehicles (angle collision)
- The highest frequency of impact type is rear end collisions, which is typical of signalized intersections
- A low number of collisions were reported at the unsignalized intersections

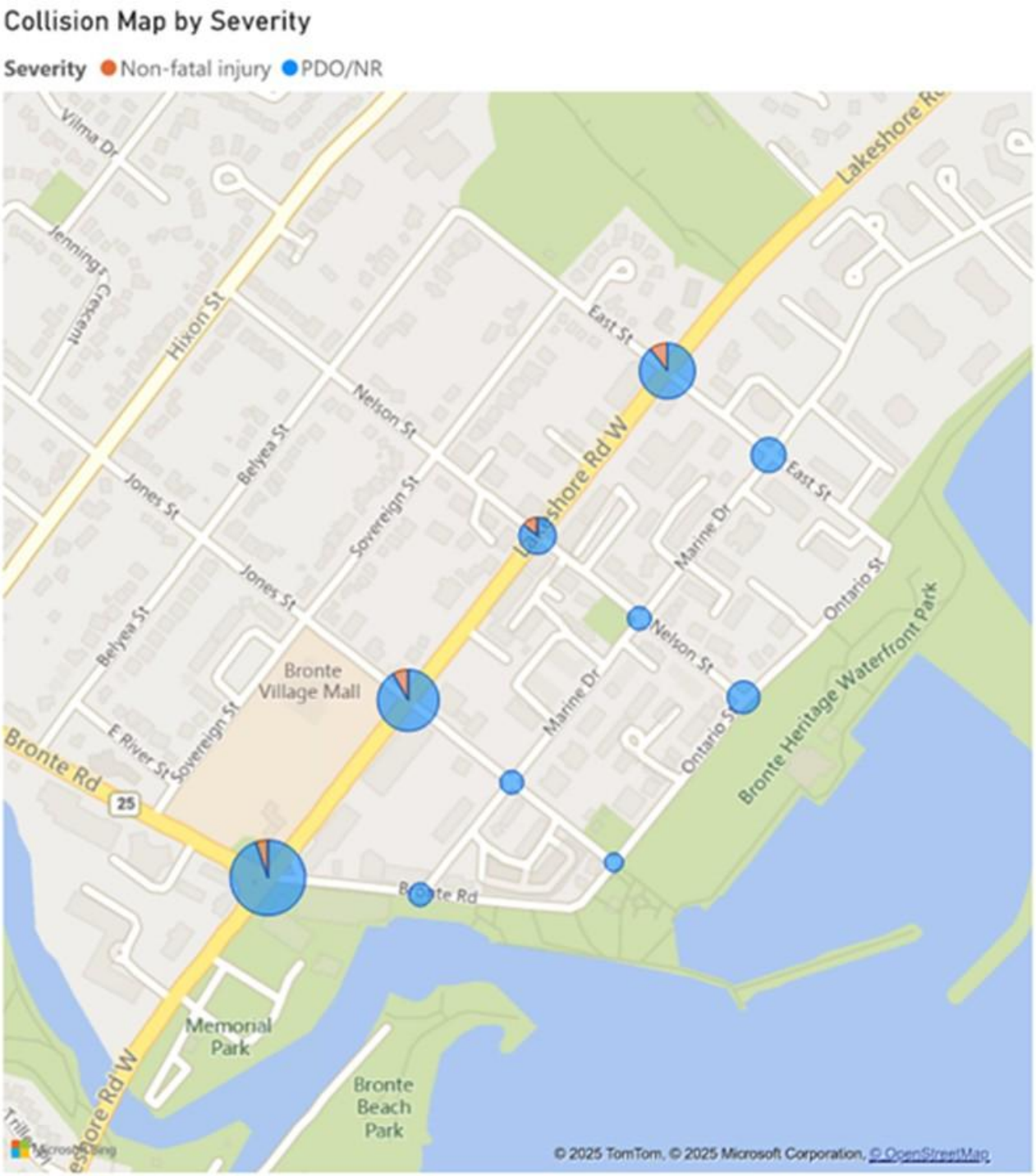

Figure 17: Collision Distribution at Intersections – by Severity

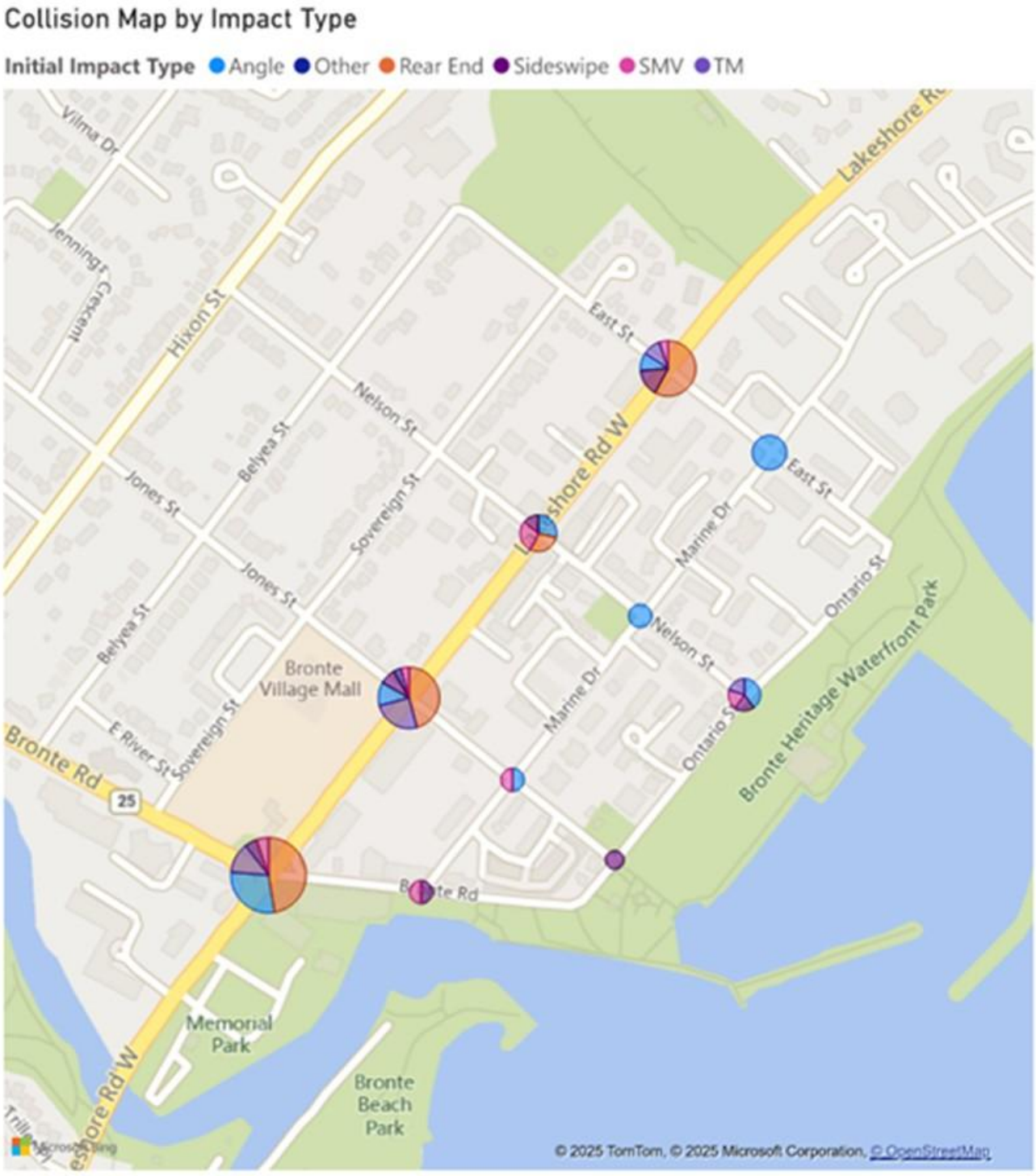

Figure 18: Collision Distribution at Intersections – by Impact Type

Road Segment Collisions

Figure 19 and **Figure 20** shows the distribution of collisions by severity and impact type at road segments within the study area.

The following observations were made:

- The highest frequency of collisions was reported along Lakeshore Road West
- Four collisions were reported along East Street (property damage only)
- One collision was reported along Bronte Road between Lakeshore Road West and Marine Drive: it involved a southbound vehicle which ran-off the road and hit a utility pole in 2019

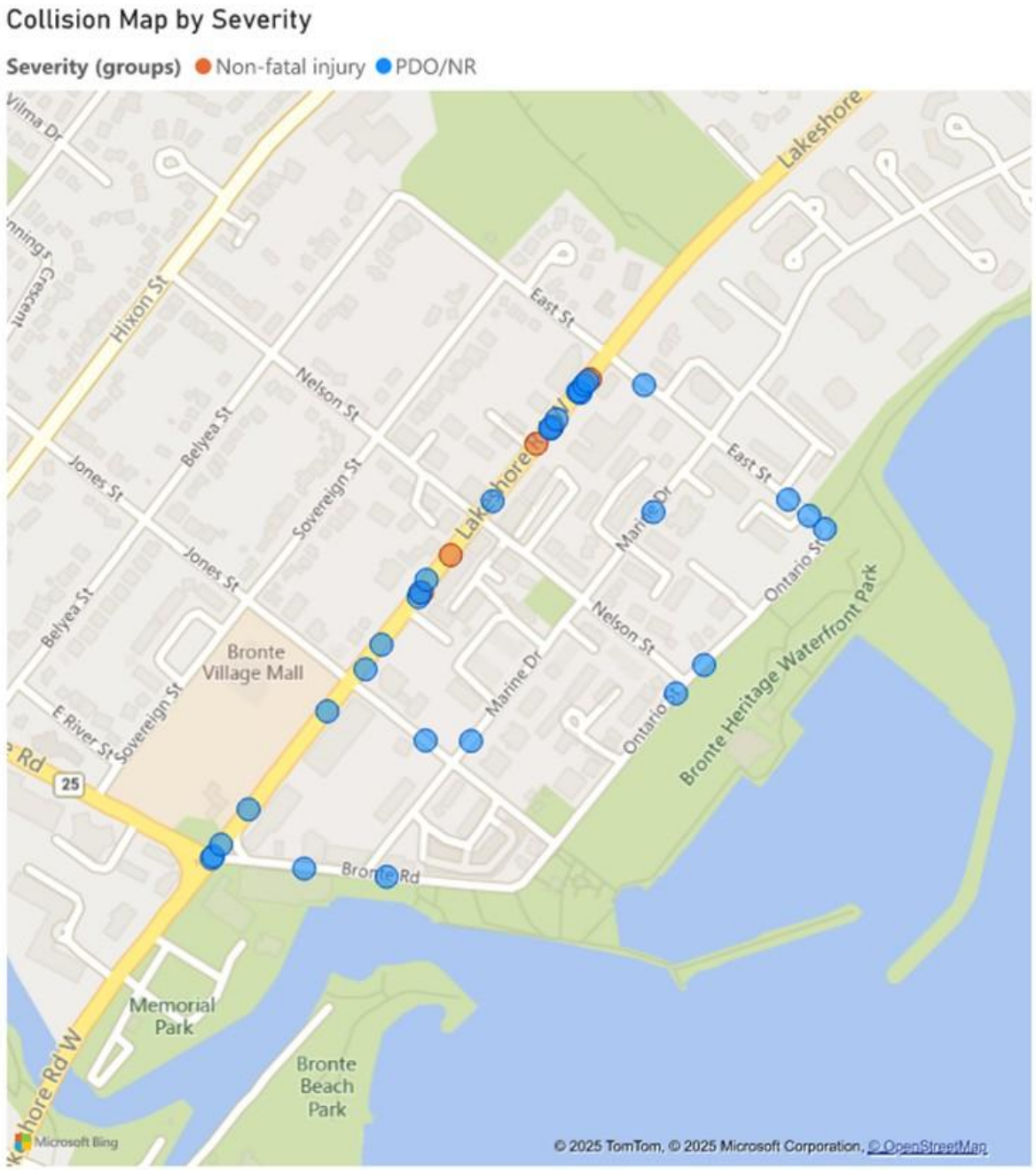

Figure 19: Collision Distribution along Road Segments – by Severity

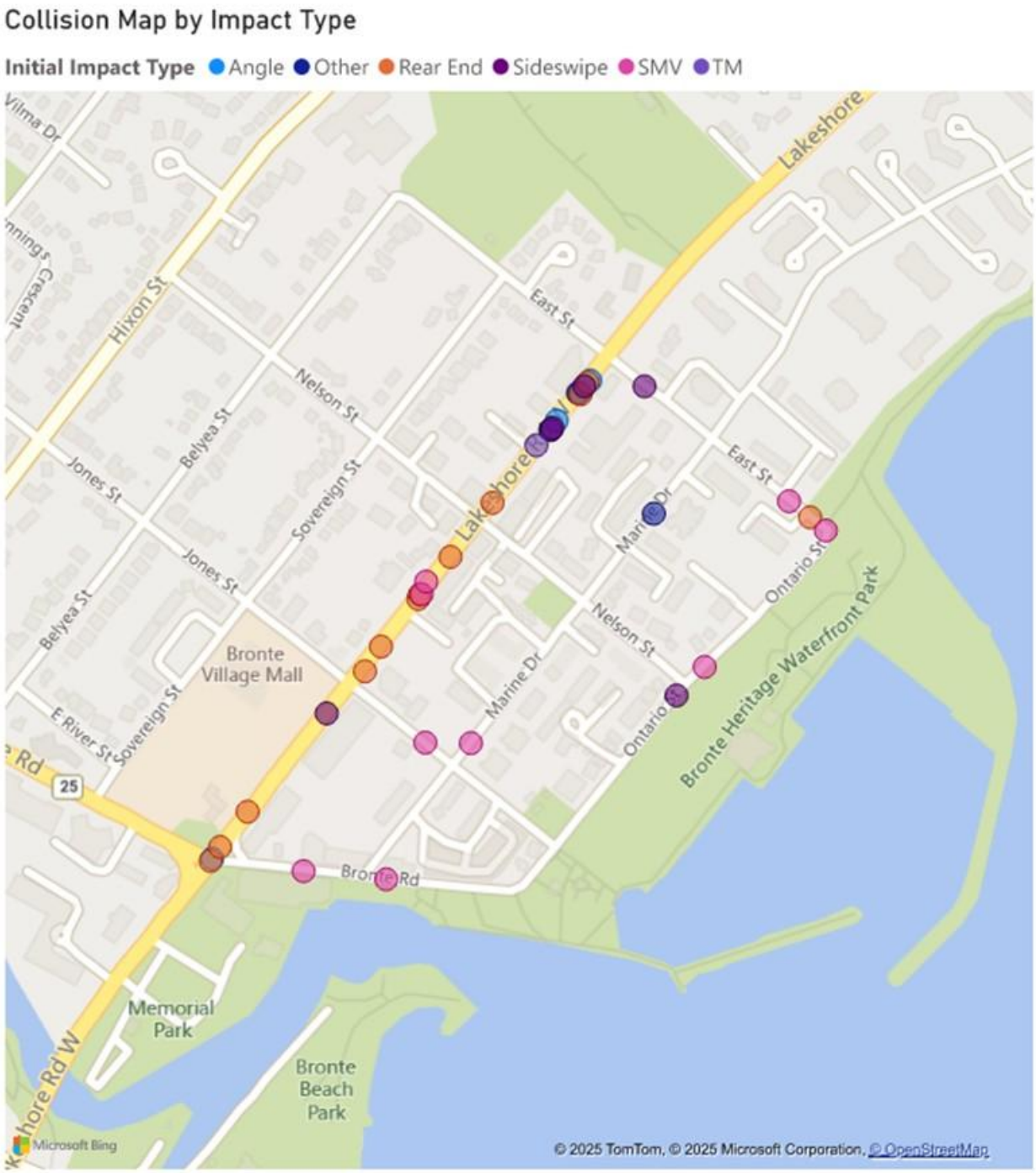

Figure 20: Collision Distribution along Road Segments – by Impact Type

2.8 Cycling Facilities

Currently there are cycling facilities provided along Lakeshore Road West in the form of conventional bicycle lanes designated by pavement markings and signage and separated from the traffic by a solid white painted line.

3. Field Investigation

Three site visits were conducted on Tuesday March 10 between 10 AM and 3 PM, Saturday March 15 between 3 PM and 4 PM and Tuesday March 18 for AM peak hour (7:30 AM – 9:30 AM) and PM peak hour (3:45 PM – 4:45 PM). The first site visit consisted of a comprehensive review of the study area, examining roadway geometry, cross sections, traffic control, access management, pedestrian and cyclist facilities, illumination and potential points of conflict. This site visit was completed during off-peak hours.

The second site visit was completed to review overall operations of the study area during a weekend. The third site visit consisted of reviewing traffic operations (queueing, vehicle/pedestrian/cyclist conflicts, driver behaviour, etc.) during AM and PM peak hours within the study area.

3.1 Geometry

The lane widths on Lakeshore Road West are approximately between 3 m and 4 m wide. Bicycle lanes are provided on both sides of Lakeshore Road West which are approximately between 1.5 m and 1.7 m wide. Overall, the lane widths within the study area are in line with the recommended widths in the TAC *Geometric Design Guidelines for Canadian Roads* for urban roadways. For a roadway with a design speed of 60 km/h or less, the recommended practical lower limit is 2.7 m while the recommended lower and upper limits are 3.5 m and 3.7 m[1], respectively. TAC also indicates that on roads where buses or larger trucks are expected to regularly use these lanes, a minimum lane width of 3.3 m is recommended.

The intersection of Lakeshore Road West and Bronte Road presents a misalignment between the north and south leg, as shown in **Figure 21**. Additionally, the northbound and southbound left-turning lanes present a negative offset which limits the visibility of approaching vehicles proceeding through the intersection for the left-turning vehicles on the opposite approach.

The southbound channelized right turn at the same intersection was also observed to have a wide turning radii with a lane width of approximately 8 m. A wide turning radius may encourage drivers to travel along the channel at higher speeds. However, it was noted that this movement is currently fully signalized with a NO RIGHT TURN ON RED prohibition and that the pedestrian crossing has its own designated pedestrian signal heads.

[1] 2017 TAC Geometric Design Guide for Canadian Roads, Table 4.2.3: Through Lane Widths – Urban Roadways

Figure 21: Misalignment at the north and south legs of Lakeshore Road West and Bronte Road

3.2 Pavement Markings and Signage

Pavement Markings

Faded pavement markings were observed at the following intersections:

- Lakeshore Road West and East Street:
  - South, west and east legs (undergoing construction)
- Lakeshore Road West and Nelson Street:
  - South and East legs (undergoing construction)
- Bronte Road and Marine Drive:
  - North and south legs (near construction area)

Figure 22: Faded Pavement Markings at Lakeshore Road West and Nelson Street

The signalized intersections along Lakeshore Road West have single line crosswalks at all approaches, with the exception of Lakeshore Road West and Bronte Road, which has ladder crosswalks for all approaches, including the channelized southbound right-turn movement. Similarly, the unsignalized intersections within the study area also have single line crosswalks on all approaches, with the exception of Bronte Road and Marine Drive.

Figure 23: Single Line Crosswalks at Lakeshore Road West and Jones Street

The intersection pedestrian signal at Bronte Road and Ontario Street and the two pedestrian crossovers (PXOs) along Ontario Street and Jones Street and Nelson Street have a ladder crosswalk implemented.

Signage

Posted speed limit signs are not consistently displayed within the study area, with the following streets not having any posted speeds:

- East Street
- Nelson Street
- Jones Street
- Marine Drive

Left side STOP signs are provided at all all-way stop controlled unsignalized intersections with the exception of:

- Bronte Road and Marine Drive: south leg
- Marine Drive and Jones Street: north and south legs
- Marine Drive and Nelson Street: north and south legs

3.3 Parking

On-street parking is permitted along multiple roads within the study area. A higher utilization of on-street parking was observed during the weekend site visit along Bronte Road between Lakeshore Road and Ontario Street. **Figure 24** shows the locations where on-street parking is allowed. As it can be seen, some streets allow on-street parking along the entire road. This may create visibility issues for vehicles approaching an intersection as the STOP sign may not be visible or the parked vehicles may restrict the sight line of other incoming vehicles.

Figure 24: On-Street Parking Map

During the site visit it was also observed that when a large vehicle was parked on the permitted area on the west side of the north leg of the intersection of Nelson Street and Marine Drive, the STOP sign would be obstructed by the parked vehicle, as shown in **Figure 25.** While not observed elsewhere, there is a likelihood that legally parked vehicles could be blocking visibility of STOP signs at other locations in Bronte Village.

Figure 25: STOP sign obstructed by parked vehicle

Parking facilities are present on the west side of Bronte Road between Lakeshore Road West and Marine Drive. During the site visit, it was observed that parked vehicles limit the visibility of approaching vehicles travelling southbound on Bronte Road to drivers exiting the parking facilities (**Figure 26**).

Figure 26: Looking left from 100 Bronte Road parking lot exit

3.4 Illumination

Illumination poles / light standards are provided within the study area as follows:

- Lakeshore Road West: illumination poles on both sides
- Bronte Road: light standards on both sides
- Ontario Street: illumination poles on the south side only, approximately 35 m apart
- East Street: illumination poles on the west side only, approximately 35 m apart
- Marine Drive: illumination poles on the north side only, approximately 50 m apart
- Jones Street: illumination poles on the west side only, approximately 30 m apart
- Nelson Street: illumination poles on the west side only, approximately 30 m apart

No issues were found with the existing illumination poles / light standards within the study area.

3.5 Traffic Control

During the site visit it was observed that the intersection of East Street and Ontario Street was converted to an all-way stop-controlled intersection. This change was completed by the Town in June 2024.

Additionally, it was noted that the north-south movements at the signalized intersections along Lakeshore Road West had Leading Pedestrian Interval (LPI) installed. This feature provides the pedestrians with a 5 second head start over vehicles turning at the intersection. This feature was installed by the Town in 2023.

3.6 Access Management

Currently there are two accesses near the intersection of Lakeshore Road West and Bronte Road. One access is the gas station located on the NE corner of the intersection at approximately 13 m east of Bronte Road. This gas station only has two access points fronting Lakeshore Road West and vehicles wanting to head southbound on Bronte Road or eastbound on Lakeshore Road West could potentially conflict with vehicles travelling westbound along Lakeshore Road West. These potential conflicts were not observed during the field investigation.

The second access is the entrance to 2464 Lakeshore Road West complex, located in the SW corner of the intersection at approximately 15 m south Lakeshore Road West. During the field investigation it was observed that a few vehicles would suddenly stop to enter this access, which would potentially cause a rear-end collisions between the vehicle entering the access and the vehicle following, as shown in **Figure 27**.

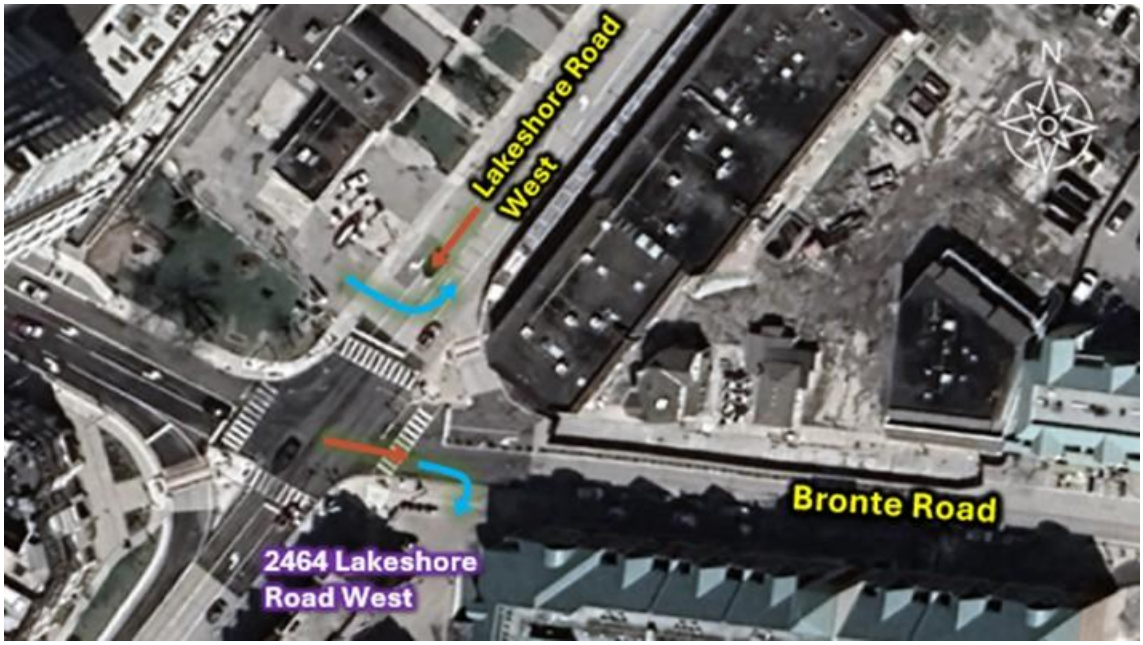

Figure 27: Conflict points from accesses near Lakeshore Road West and Bronte Road

3.7 AODA Compliance

Elements within the study area were reviewed for compliance with the Accessibility for Ontarians with Disabilities Act (AODA)[2]. It was noted that the majority of pushbuttons at signalized intersections were equipped with Accessible Pedestrian Signals (APS) and an arrow pointing in the direction of travel (**Figure 28**). However, some of the pushbuttons at the intersection of Lakeshore Road West and East Street did not have a directional tactile arrow (**Figure 29**).

Additionally, it was noted that the following intersections did not have tactile walking surface indicators:

- Lakeshore Road West and Jones Street: SW and SE corners
- Lakeshore Road West and Nelson Street: all corners
- Lakeshore Road West and East Street: all corners
- East Street and Marine Drive: all corners
- Nelson Street and Marine Drive: all corners
- Jones Street and Marine Drive: all corners
- Marine Drive and Bronte Road: all corners

[2] O. Reg. 191/11: INTEGRATED ACCESSIBILITY STANDARDS. https://www.ontario.ca/laws/regulation/110191

Figure 28: AODA compliant pushbutton

Figure 29: Pushbutton Missing Tactile Directional Arrow

It was also observed that the crosswalk on the south leg of Bronte Road and Marine Drive does not have a curb ramp on the west side of Bronte Road, as shown in **Figure 30**.

Figure 30: Crosswalk with curb ramp missing

3.8 Traffic Operations and Site User Interactions

Traffic operations were observed during the third site visit between the AM peak hour (7:30 AM – 9:30 AM) and PM peak hour (3:45 PM – 4:45 PM).

Higher volumes were observed during the PM peak hour, especially along Lakeshore Road West. Queue build-up was observed in the westbound direction along Lakeshore Road West on approach to Nelson Street (**Figure 31**). However, the queues were observed to be cleared every cycle.

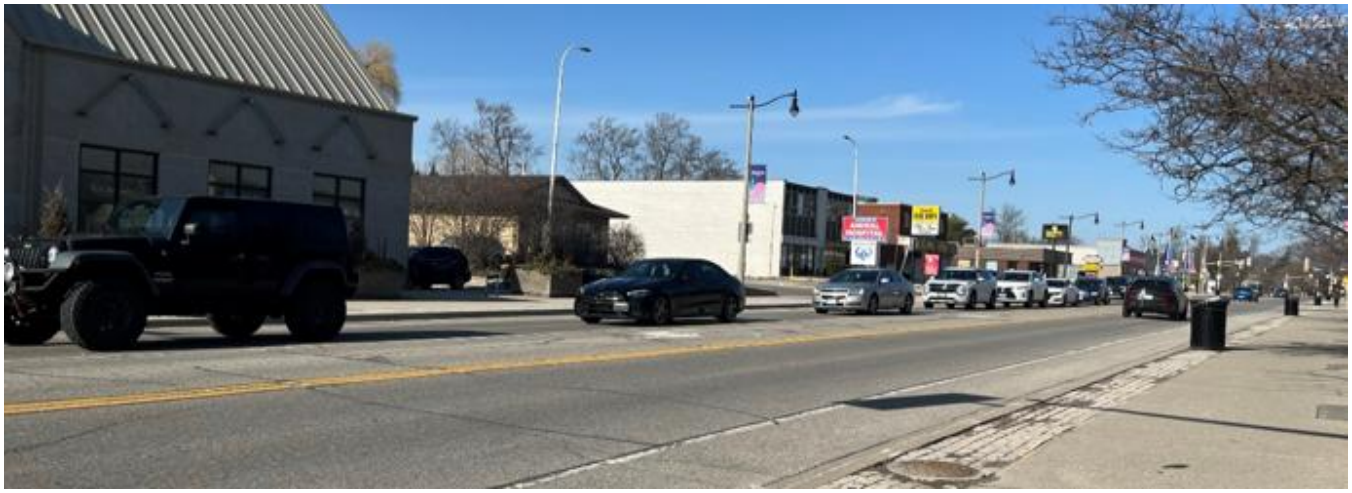

Figure 31: PM Peak queues westbound at Lakeshore Road West and Nelson Street

Another observation made during the first site visit was some impatient drivers travelling westbound on Lakeshore Road West on the approach to Nelson Street were using the left-turning lane to pass a stopped bus.

3.9 Swept Path Analysis for Truck Movements on Bronte Road at Marine Drive

With the one-way closure in place, trucks heading north on Bronte Road are required to make a northbound right turn movement at Marine Drive. As this movement is occurring at a skewed intersection, the Town directed CIMA to evaluate the swept path of trucks making this movement. It was determined that heavy single unit trucks (HSU) and WB-20 trucks would be unable to complete this movement without tracking over the stop bar on the east approach. While not desirable, this was considered to be acceptable in the context of a constrained urban environment with low-volumes and lower operating speeds. Town staff also indicated that WB-20 trucks rarely operate along Bronte Road. A copy of the swept path analysis is provided in **Appendix C**.

3.10 Other Observations

Signs for future implementation of Automated Speed Enforcement (ASE) cameras were seen along Ontario Street. Town Staff confirmed that the speed cameras would be implemented around the end of May 2025 and remain in place for 4 months.

4. Findings and Recommendations

This section summarizes our findings, potential treatments, recommended improvements, and other corrective actions for the study area based on the office and field reviews undertaken. The findings and recommendations are presented individually for the intersections of Bronte Road at Lakeshore Road and at Marine Drive, as well as for the road segment along Bronte Road between Lakeshore Road West and Marine Drive. A separate section labelled Remaining Study Area provides findings and recommendations for the other intersections and road segments within the study area not included above.

4.1 Summary of Study Findings

4.1.1 Lakeshore Road West and Bronte Road

Below is a summary of findings specific to the intersection of Lakeshore Road West and Bronte Road:

- High frequency of angle collisions reported during the pre-closure two-operation period (28%):
  - 6 out 11 collisions involving a NB vehicle
- Conflict points present near the intersection due to accesses within 15 meters or less of the intersection
  - Gas station on the NE corner
  - Plaza / building complex on the SW corner
- Misalignment on north-south legs, limiting visibility of incoming through traffic to northbound/southbound left-turning vehicles
- Queues spilling back to adjacent intersections were observed for the westbound direction on Lakeshore Road during PM peak
- Wide southbound right-turn channel
- Traffic analysis results indicated that:
  - For the proposed Scenario 3 – Post Closure Period (Two-Way Operations), the intersection is expected to have two queue lengths exceeding the available storage length (WBR and NBL in the PM peak hour) and some movements with Level of Service D and E (SBT, SBL, NBL, NBT and NBR).
  - For the proposed Scenario 4 – Post Closure Period (One-Way Operations), the intersection is expected to have one queue length exceeding the available storage length (WBR in the PM peak hour) and some movements with Level of Service D and E (SBT and SBL).

4.1.2 Bronte Road between Lakeshore Road and Marine Drive

For this road segment, it was noted that there is limited visibility of incoming vehicles for drivers exiting the parking facilities on Bronte Road. The obstruction was observed to be caused by the vehicles parked on the street.

4.1.3 Bronte Road and Marine Drive

For the intersection of Bronte Road and Marine Drive, the following was noted:

- Faded ladder crosswalks potentially due to the ongoing construction
- Lack of curb cut on the west side of south leg crosswalk
- No operational issues were identified due to the closure
- Under one-way operation, larger trucks (HSU and WB-20) would be required to track over the stop bar on the east approach to the intersection, although this is considered acceptable in the context of a constrained low volume low speed urban environment

4.1.4 Remaining Study Area

The following presents a summary of the main findings noted in the remainder of the study area.

- On-street parking is permitted too close to the stop bar at several unsignalized intersections. This may potentially reduce the visibility of vehicles or pedestrians approaching the intersections. This finding is applicable to the following locations:
  - Marine Drive and Jones Street: all legs
  - Marine Drive and Nelson Street: south, east and north legs
  - Marine Drive and East Street: west leg
- A large vehicle parked on the street obstructed the STOP sign in the southbound direction at the intersection of Marine Drive and Nelson Street
- Lack of posted speed limit signage on the following roads:
  - East Street
  - Nelson Street
  - Jones Street
  - Marine Drive
- Lack of tactile walking surface indicators at the following locations:
  - Lakeshore Road West and Jones Street: SW and SE corners
  - Lakeshore Road West and Nelson Street: all corners
  - Lakeshore Road West and East Street: all corners

  - East Street and Marine Drive: all corners
  - Nelson Street and Marine Drive: all corners
  - Jones Street and Marine Drive: all corners
  - Marine Drive and Bronte Road: all corners
- Single line crosswalks at the following signalized intersections:
  - Lakeshore Road West and Jones Street
  - Lakeshore Road West and Nelson Street
  - Lakeshore Road West and East Street
- Vehicle operating speeds along Ontario Street present moderate speeding with an excess speed of 9 km/h over the posted speed limit, however this will likely be addressed when the speed camera is installed at this location.

4.2 Recommendations

Through the office review and field investigations, a series of findings/issues and corresponding potential countermeasures identified. Similarly to how the findings were presented in the previous section, the recommendations are presented individually for the intersections of Bronte Road at Lakeshore Road and at Marine Drive, the road segment along Bronte Road between Lakeshore Road West and Marine Drive, and for the other intersections and road segments within the study area not included above.

For identified issues, consideration was given to the implementation timing of the treatment with low-cost treatments being recommended in the short-term (within the next 12 months), medium-cost treatments being recommended within 1 – 5 years, and significant-cost treatments or treatments requiring coordination with other parties being recommended in the long-term (>5 years).

4.2.1 Lakeshore Road West and Bronte Road

It is recommended that the road segment of Bronte Road between Lakeshore Road West and Marine Drive, be maintained as a one-way southbound movement. Benefits of this approach are:

- The intersection would have a reduction in conflict points along Bronte Road and at either intersection and there would be a likely reduction in the potential for angle collisions (as further evidenced by the apparent drop in the frequency of angle collisions in the period following the one-way closure of Bronte Road in March 2024 to the end of the year);
- Through the removal of the northbound lanes, the entire southeast corner of the intersection (taken up by the northbound right turn channel island) can be devoted to streetscaping, providing a larger area for active transportation users; and

- The width of the south leg would be significantly narrowed, reducing the exposure of pedestrians to traffic.

The noted traffic impacts for the 2028 horizon year are considered minimal and can be managed through signal timing adjustments, including the potential for signal coordination along Lakeshore Road.

Other treatments noted for consideration are:

- Review and assess the option of converting the southbound right-turn channel to a 'Smart Channel' to reduce speeds and pedestrian crossing distances;
- Consider implementing guidelines through the intersection to provide additional guidance to southbound through drivers; and
- Install a one-way arrow on Bronte Road opposite the access on the southeast corner of the intersection to further discourage illegal northbound movements.

Figure 32 shows a high-level sketch of the recommendations for the intersection illustrating the above recommendations, grouped into short (0 – 2 years), medium (3 – 5 years) and long-term recommendations (5+ years).

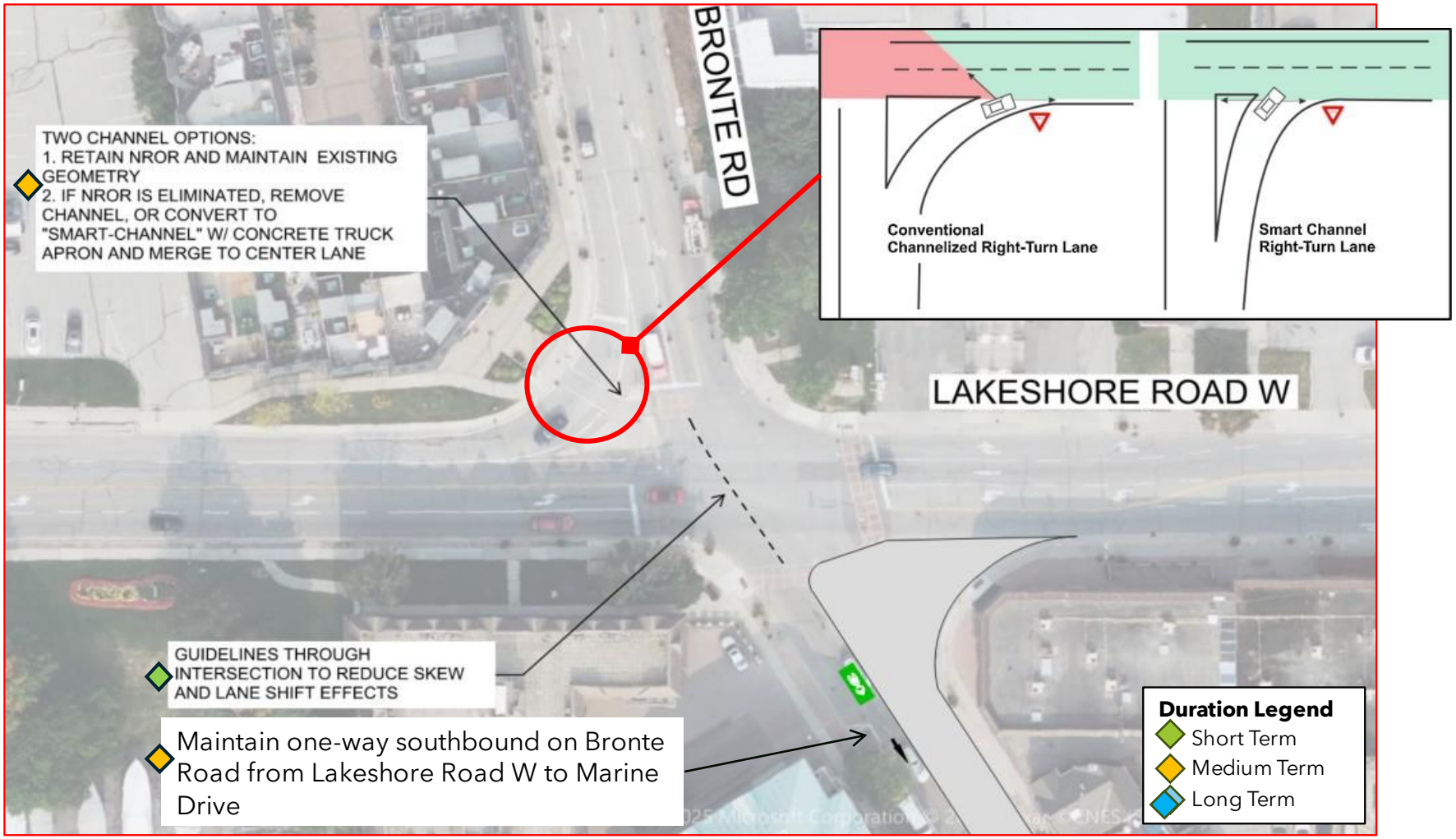

Figure 32: Recommendations for the Intersection of Lakeshore Road West and Bronte Road

4.2.2 Bronte Road between Lakeshore Road and Marine Drive

Along Bronte Road between Lakeshore Road and Marine Drive, consider the removal of 1 – 2 parking spaces near the parking garage entrances to improve visibility of approaching vehicles.

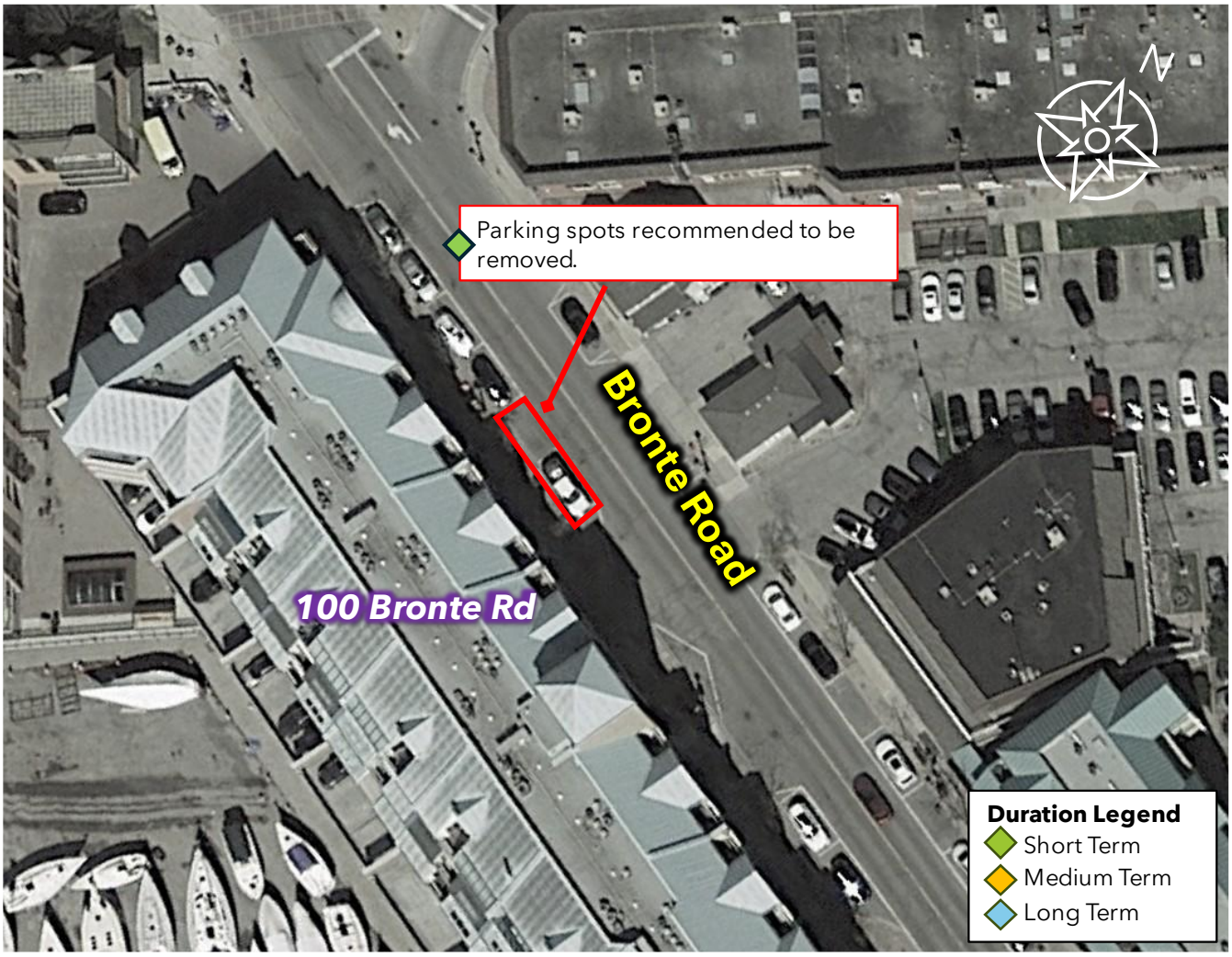

Figure 33: Recommendations for the Road Segment along Bronte Road between Lakeshore Road West and Marine Drive

4.2.3 Bronte Road and Marine Drive

At the intersection of Bronte Road and Marine Drive, the following is recommended:

- Repainting of faded ladder crosswalks

- Construction of curb cut on the west side of south leg crosswalk with tactile surface indicators following OPSD 310.033[3]

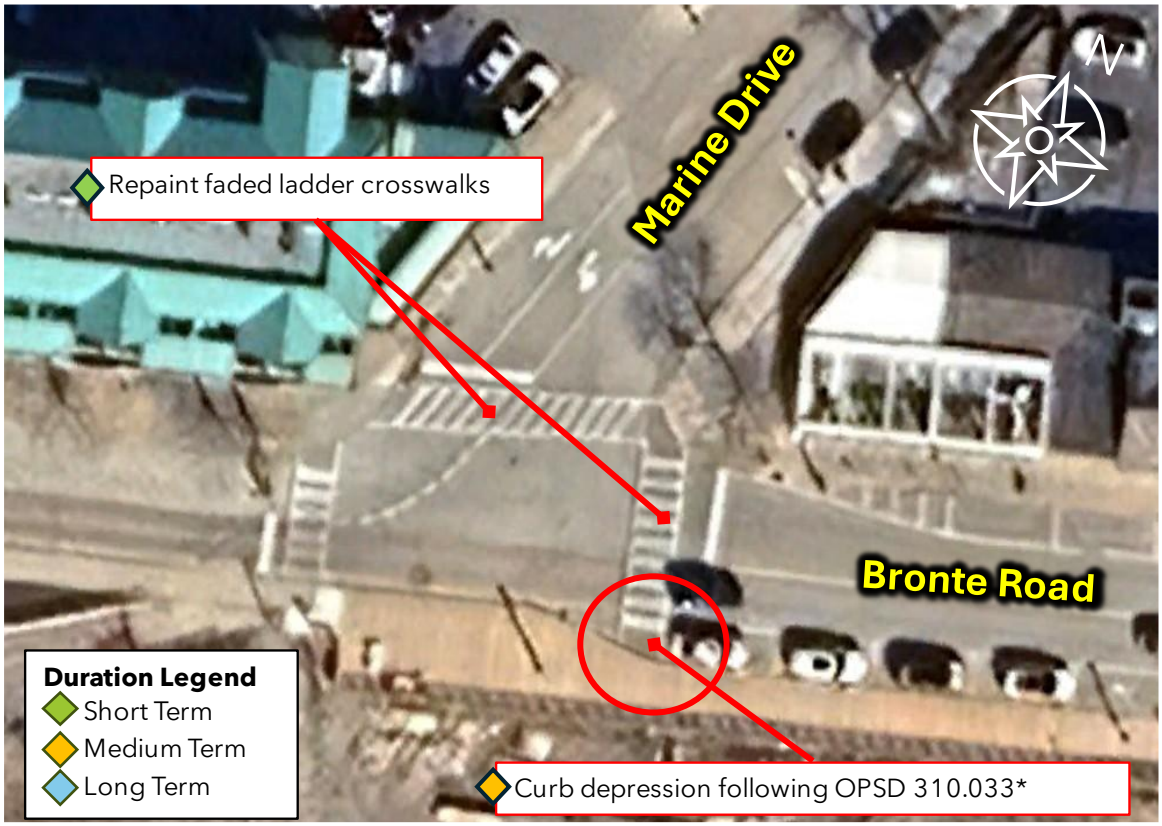

Figure 34: Recommendations for the Intersection of Bronte Road and Marine Drive

4.3 Remaining Study Area

Figure 35 to **Figure 36** show the traffic related and active transportation related recommendations for the remaining of the road segments and the intersections within the study area.

*Ontario Provincial Standard Drawing – OPSD 310.033 Concrete Sidewalk Ramps at Unsignalized Intersections. https://www.roadauthority.com/Standards/Home/FileDownload?standardFileId=b0ade4b8-6053-4896-a310-5d6e77765903

Figure 35: Traffic Related Recommendations - Remaining Study Area - Part 1

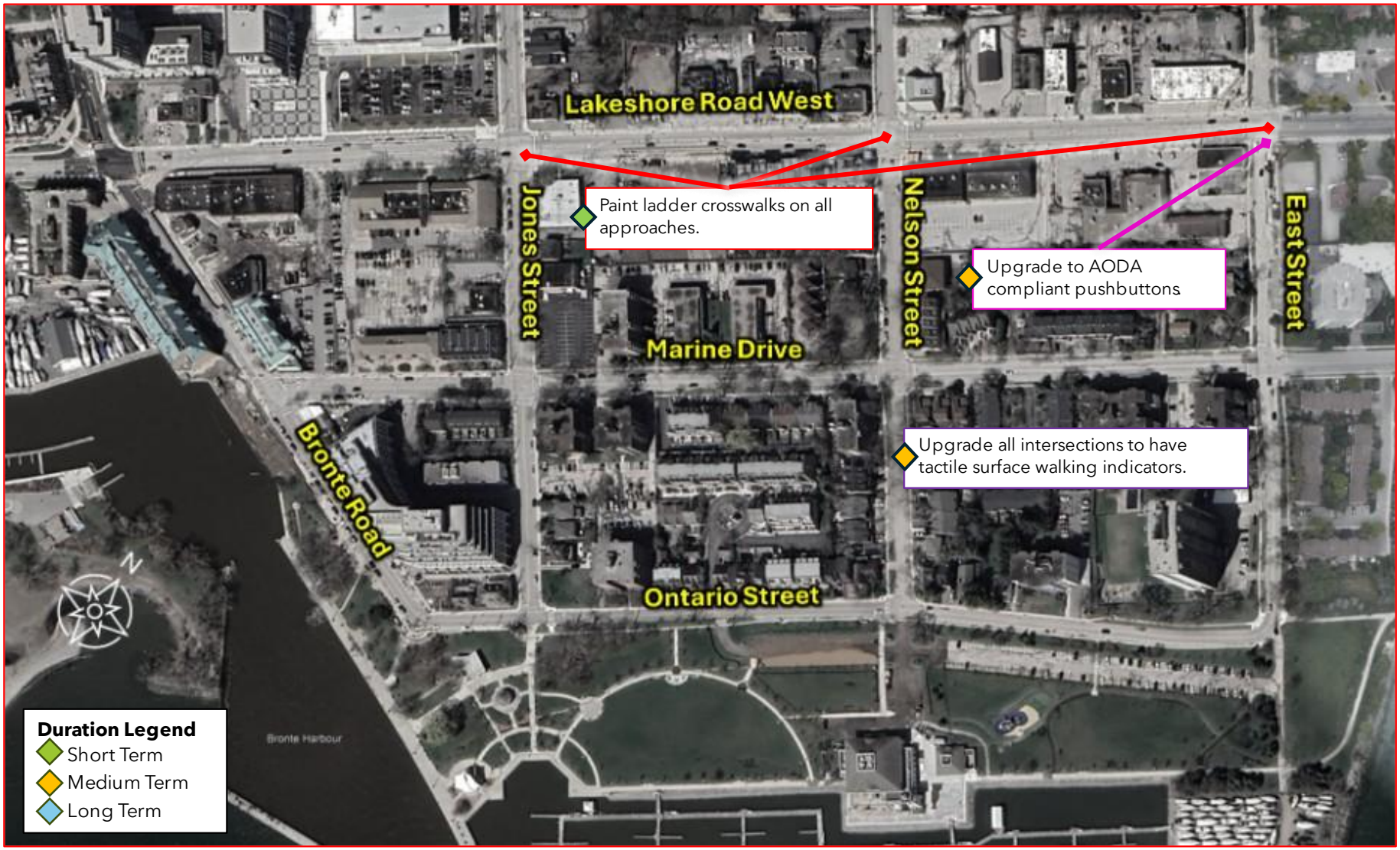

Figure 36: Active Transportation Related Recommendations - Remaining Study Area - Part 2