TRAFFIC IMPACT STUDY

5160-5170 NINTH LINE
RESIDENTIAL DEVELOPMENT
CITY OF MISSISSAUGA,
REGIONAL MUNICIPALITY OF PEEL

PREPARED FOR:
BRANTHAVEN NINTH LINE INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
211 YONGE STREET, SUITE 301
TORONTO, ON
M5B 1M4

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CROZIER
CONSULTING ENGINEERS

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Rev. 1	December 2021	Issued for 1st Submission

1.0 Executive Summary

Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Branthaven Developments to prepare a Traffic Impact Study (TIS) in support of the development application for the proposed residential development located at 5160-5170 Ninth Line in the City of Mississauga, Regional Municipality of Peel. The site is bound by a woodlot to the north, Ninth Line to the east, two low-rise detached buildings to the south and vacant lands to the west.

The purpose of the study is to evaluate the transportation-related impacts of the proposed development on the boundary road network and to recommend any required mitigation measures, if warranted. Given the expected two-way trip generation during peak hours is less than 100 trips, the Ministry of Transportation (MTO) noted that a separate Traffic Letter highlighting the immaterial impact of the proposed development on the nearest Highway ramps is adequate and was provided to the MTO accordingly.

Per the Site Plan by ZO1 Architects (dated November 5, 2021), the development scope consists of a 6-storey apartment building with a total of 198 residential dwelling units. A total of 228 parking spaces are proposed, including 2 accessible parking spaces. The proposed bicycle parking supply consists of 119 long-term and 10 short-term spaces. **Table E1** summarizes the proposed development statistics.

Table E1: Development Proposal

Apartment Building Statistics			
Building Storey	One Bedroom Units	Two Bedroom Units	**Total**
Level 1	10	11	21
Level 2	21	14	35
Level 3	25	10	35
Level 4	28	9	37
Level 5	26	9	35
Level 6	26	9	35
Total	**136**	**62**	**198**
Parking Supply			
	Resident Spaces	**Visitor Spaces**	**Total**
Vehicle Parking	198	30	**228**
	Long-Term Bicycle Parking Spaces	**Short-Term Bicycle Parking Spaces**	**Total**
Bicycle Parking	119	10	**129**

The study has been completed in accordance with the City of Mississauga Traffic Impact Study Guidelines. The study has also been completed in accordance with Terms of Reference established with City of Mississauga staff.

Further, previously conducted studies were reviewed and incorporated into the analysis herein. The studies include: the Ninth Line Environmental Study Report (HDR, June 2021), the Ninth Line Corridor Study Transportation Assessment (MMM Group, July 2017), the 5080, 5054, and 5034 Ninth Line Traffic Impact Study (C.F. Crozier & Associates, October 2021), the 5150 Ninth Line Traffic Impact Study (C.F. Crozier & Associates, February 2021) and the 407 Transitway – West of Brant Street to West of Hurontario Street Environmental Project Report (Parsons, August 2020).

The TIS analyzed the following study intersections:

- Ninth Line and Eglinton Avenue West / East Lower Base Line
- Ninth Line and Skyview Street / Street B
- Ninth Line and Candlelight Drive
- Ninth Line and Erin Centre Boulevard
- Ninth Line and Street A

Existing Conditions

The boundary road network is operating at a LOS "E" or better at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line, and LOS "D" or better at all other study intersections during the weekday a.m. and p.m. peak hours.

The Ninth Line and Eglinton Avenue West / East Lower Base Line intersection operations are attributed to several movements operating near capacity. The southbound and eastbound through movements experience high volumes in the a.m. peak hour, while the northbound and westbound through movements experience high volumes in the p.m. peak hour. These findings within the existing conditions traffic analysis support the need for roadway expansion on Ninth Line, as recommended in the Ninth Line EA.

A few movements at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line are operating at or above capacity under the existing conditions scenario. This is not typically expected for existing conditions analysis. However, the approach to arrive at existing conditions traffic volumes used for analysis employed growth rates to adjust 2019 traffic data to 2021 levels. The results show that the volumes used for the existing conditions analysis herein are higher than practically possible under the existing configuration as operations can only be at or near capacity under existing conditions, but not above.

Future Background Conditions

As confirmed in the Terms of Reference, a horizon year five years from the study date (ie. 2026) was used for the purposes of analysis.

Growth rates provided by the City of Mississauga were applied at the study intersections for through movements, while local roads were assigned a growth rate of 0.5%. Further, the following background developments were identified and are accounted for under future background conditions:

  - Erin Mills Development
  - 407 Transitway
  - Emerging Land Use Concept on Ninth Line
  - 5080, 5054, and 5034 Ninth Line
  - 5150 Ninth Line

Roadway improvements per the Ninth Line Environmental Study Report were incorporated into the future background analysis.

Under the 2026 future background conditions, which incorporates roadway improvements outlined in the Ninth Line EA:

- The signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours.

- The turn queues are forecast to occasionally exceed the turn storage lanes at the intersection during the peak hours as identified by the MMM Group and the Ninth Line EA Studies. These queues may occasionally obstruct some movements at adjacent intersections during the peak hours. These operations are however typical for high traffic arterial intersections during the peak hours and operations are expected to return to acceptable levels during the off-peaks.

- The remaining study intersections are expected to operate efficiently at a LOS "C" or better during the weekday peak hours.

Site Generated Traffic

The proposed development is expected to generate a total of 76 and 78 total two-way trips during the weekday a.m. and p.m. peak hours, respectively. The proposed development trips were assigned to the boundary road network using a combination of 2016 Transportation Tomorrow Survey (TTS) data, existing travel patterns and convenience with regards to ingress/ egress at the accesses.

Future Total Conditions

Under the 2026 future total conditions, the study intersections are forecast to operate at similar levels of services with minor changes.

- The signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours, respectively. Compared to 2026 future background conditions, there is a control delay increase of 0.8 and 4.3 seconds in the a.m. and p.m. peak hours, respectively; therefore, operational issues are largely background related as highlighted in the future background section. Considering several other planned roadway improvements on adjacent roadways as well as future transit intensification on the Ninth Line corridor, forecasted operational issues may be overstated herein.

- The remaining study intersections are expected to continue to operate efficiently at a LOS "D" or better. A maximum control delay increment of 6.4 seconds and volume-to-capacity ratio increase of 0.01 is forecast.

- Signal Warrants were evaluated at the intersection of Ninth Line and Street A. Signalization was not found to be warranted. This finding is consistent with prior analysis undertaken in the Ninth Line Environmental Project Report.

- Left-turn warrants were evaluated for the northbound left-turn movement at the intersection of Ninth Line and Street A. A left-turn storage lane of length 25m is warranted for the aforementioned movement. This finding is consistent with previous studies.

- Given the above results of the traffic analysis, the proposed development can be supported from a traffic operations perspective.

Safety Review

A safety review regarding the proposed Street A and Street B was conducted as required by the City of Mississauga's guidelines. Based on the safety review:

- The available sight distance at the site access connections exceeds the minimum sight distance requirements set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017.

- The site satisfies the minimum corner clearance and access spacing requirements per the TAC-GDGCR

- There are no expected maneuverability constraints for waste collection.

Therefore, the access connection and the ultimate connections from the lands to Ninth Line is expected to operate safely and functionally serve the site.

Proposed Parking Supply Review

The proposed Parking supply is deficient of the City's Zoning By-law No. 0225-2007; however, the parking supply is forecast to accommodate peak parking demands at the site based on ITE and surrogate site parking data. Given the location of the site and development proposal, the supply is largely consistent with the WSP Parking Regulation Study. Several City of Mississauga zoning by-law exceptions from similar developments further supports the proposed visitor parking supply. The proposed parking supply aligns with the City's findings regarding decreasing vehicle ownership (per City's PMPIS) as well as the City's desire of influencing commuter transportation choices through parking policy and parking supply; with a shift towards more sustainable modes of transportation. Additionally, the site provides the required barrier free accessible parking spaces and bicycle parking spaces.

Recommendations

The findings arising from the analysis have resulted in the following recommendations:

- It is recommended that the signal timing plans at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line be revised as needed to optimize future intersection performance.

- Should adequate right-of-way exist, it is recommended that the City investigate potential dual-left turn lanes for the southbound left-turn movement at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line as part of the Ninth Line EA roadway improvements or in the future. The movement has peak hour volumes in excess of 300, a threshold identified to warrant dual left turn lanes per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR).

- It is recommended that consideration be given to providing a continuous two-way left turn (TWLT) median lane between Street A and Street B to provide left turn opportunities for the closely spaced connections on the segment. This is aligned with the Ninth Line EA, as a TWLT lane is expected along most of the Ninth Line corridor.

- It is recommended that the Street A connection to Ninth Line include a northbound left-turn lane with a minimum storage length of 25m.

Conclusion

The analysis contained within this report was prepared using the Site Plan prepared by ZO1 Architects (dated November 5, 2021). Any minor revisions to the development concept are not expected to affect the conclusions contained with this report. In conclusion, the proposed development can be supported from a transportation operations and safety perspective.

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2.0 Introduction

2.1 Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Branthaven Developments to prepare a Traffic Impact Study (TIS) in support of the development application for the proposed residential development located at 5160-5170 Ninth Line in the City of Mississauga, Regional Municipality of Peel. The site is bound by a woodlot to the north, Ninth Line to the east, two low-rise detached buildings to the south and vacant lands to the west.

2.2 Development Proposal

Per the Site Plan by ZO1 Architects (dated November 5, 2021, provided within **Appendix A**), the development scope consists of a 6-storey apartment building with a total of 198 residential dwelling units. A total of 228 parking spaces are proposed, including 2 accessible parking spaces. The site is proposed to be serviced by two full-move accesses connecting to CEC Road "F" as indicated in the site plan provided in **Appendix A**. The site connects ultimately to the external roadway via Street A and Street B at Ninth Line as illustrated in the composite plan provided in **Appendix A**. **Table 1** outlines the proposed development statistics.

Table 1: Development Proposal

Apartment Building Statistics			
Building Storey	One Bedroom Units	Two Bedroom Units	**Total**
Level 1	10	11	21
Level 2	21	14	35
Level 3	25	10	35
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Level 5	26	9	35
Level 6	26	9	35
Total	**136**	**62**	**198**
Parking Supply			
	Resident Spaces	**Visitor Spaces**	**Total**
Vehicle Parking	198	30	**228**
	Long-Term Bicycle Parking Spaces	**Short-Term Bicycle Parking Spaces**	**Total**
Bicycle Parking	119	10	**129**

2.3 Purpose and Scope

The purpose of the study is to evaluate the transportation-related impacts of the proposed development on the boundary road network and to recommend any required mitigation measures, if warranted.

The study reviews the following main aspects of the proposed development from a transportation engineering perspective:

- Existing, future background, and future total traffic operations on the boundary road network during the weekday a.m. and p.m. peak hours
- Forecasted trip generation and distribution of the proposed development
- Mitigation measures to support the proposed development, if required
- Transportation safety components, including: sight distance requirements at the site accesses, access spacing and restrictions, and general safety issues pertaining to road users

The study has been completed in accordance with the City of Mississauga Traffic Impact Study Guidelines. The study has also been completed in accordance with Terms of Reference established with City of Mississauga staff. Per correspondence with the MTO, a separate traffic brief focusing on MTO requirements was requested and has been submitted under a separate cover. **Appendix B** contains the correspondence outlining the approved terms of reference.

The following previously conducted studies were reviewed and incorporated into the analysis herein:

- Ninth Line Environmental Study Report (HDR, June 2021, herein referred to as the "Ninth Line EA")
- Ninth Line Corridor Study Transportation Assessment (MMM Group, July 2017, herein referred to as the "MMM study")
- 5080, 5054, and 5034 Ninth Line Traffic Impact Study (C.F. Crozier & Associates, October 2021, herein referred to as the "5080 Ninth Line TIS")
- 5150 Ninth Line Traffic Impact Study (C.F. Crozier & Associates, February 2021, herein referred to as the "5150 Ninth Line TIS")
- 407 Transitway – West of Brant Street to West of Hurontario Street Environmental Project Report (Parsons, August 2020)

Further, a comprehensive Transportation Demand Management (TDM) Plan has been prepared and submitted separately to support the development application. The TDM Plan analyzes existing and future TDM opportunities to reduce single-occupant vehicle (SOV) trips to and from the site and promote alternative non-auto modes of transportation.

3.0 Existing Conditions

3.1 Development Lands

The subject property forms part of the Ninth Line composite lands located north of Eglinton Avenue. The site is located in a primarily residential area and is bound by a woodlot to the north, Ninth Line to the east, two low-rise detached buildings to the south and vacant lands to the west. The development lands include the following property parcels, with their respective existing conditions outlined:

- 5160 Ninth Line, a 0.295 ha property that currently consists of a single-storey animal hospital
- 0 Ninth Line (located between the 5160 and 5170 Ninth Line parcels), a 0.137 ha property that currently consists of a laneway
- 5170 Ninth Line, a 0.295 ha property that currently consists of a two-storey detached dwelling

Refer to **Appendix A** for City of Mississauga property reports. See **Figure 1** for the site location.

3.2 Study Intersections

The TIS analyzes the following intersections, as confirmed through the Terms of Reference correspondence (provided in **Appendix B**):

- Ninth Line and Eglinton Avenue West / East Lower Base Line
- Ninth Line and Skyview Street / Street B
- Ninth Line and Candlelight Drive
- Ninth Line and Erin Centre Boulevard
- Ninth Line and Street A

The weekday a.m. and p.m. peak hours were analyzed for the study intersections above.

3.3 Boundary Road Network

The boundary road network within the study area is described in **Table 2**.

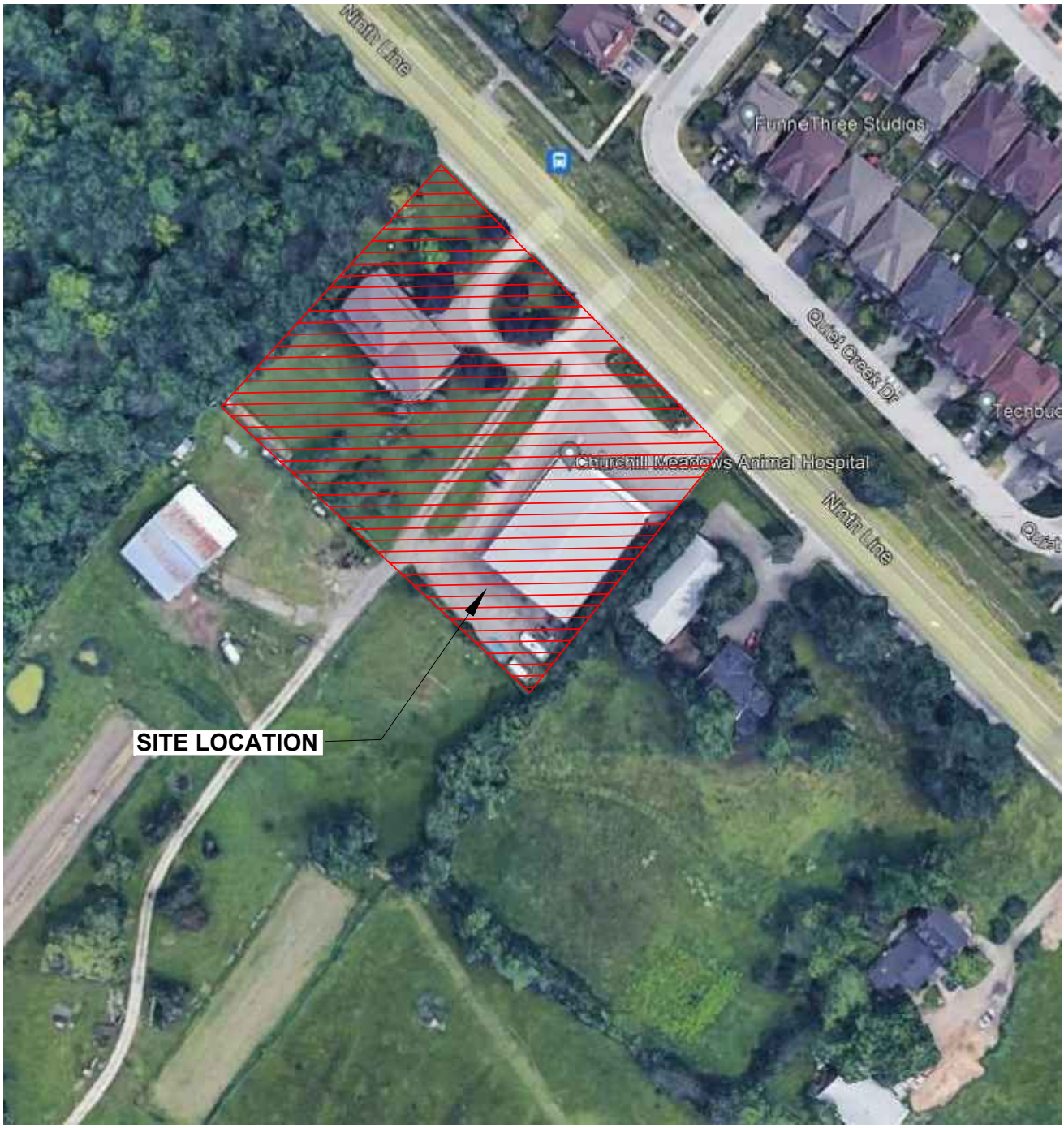


Figure 1: Site Location

Table 2: Boundary Road Network

Feature	Roadways					
	Ninth Line	**Eglinton Avenue West**	**East Lower Base Line**	**Skyview Street**	**Candlelight Drive**	**Erin Centre Boulevard**
Direction	Two-way (North-South)	Two-way (East-West)	Two-way (East-West)	Two-way (East-West)	Two-way (East-West)	Two-way (East-West)
Classification	Arterial	Arterial	Arterial	Local	Local	Minor Collector – west of Tenth Line Major Collector – East of Tenth Line
Jurisdiction	City of Mississauga – North of Dundas Street Town of Oakville – South of Dundas Street	City of Mississauga	City of Mississauga – Highway 407 to Ninth Line Town of Milton – West of Highway 407	City of Mississauga	City of Mississauga	City of Mississauga
Surrounding Uses	Residential	Residential	Rural	Residential	Residential	Residential and commercial
Speed Limit	70 km/h (north of Hwy 403/407 interchange bridge) 60 km/h (south of Hwy 403/407 interchange bridge)	60 km/h	60 km/h	50 km/h[1]	50 km/h[1]	50 km/h[1]
Number of travel lanes	Two	Four	Two	Two	Two	Two
Median type	Two-way left-turn lane	None	None	None	None	None

Note 1: A jurisdictional speed limit of 50 km/h is assumed on the roadways with no posted speed limit.

Table 3 outlines the existing traffic control, configurations, and pedestrian crossing provisions at the study intersections on the boundary road network.

Table 3: Existing Boundary Road Network – Study Intersections

Intersection	Control	App.[1]	Major Street	Lane Configurations	Pedestrian Crossing
Ninth Line and Eglinton Avenue West / East Lower Base Line	Signal Semi-Actuated	4	Eglinton Avenue West	EBL; EBTR WBL; WBT; WBR NBL; NBT; NBR; SBL; SBTR	Marked crosswalks – all approaches
Ninth Line and Erin Centre Boulevard	Signal Semi-Actuated	3	Ninth Line	WBL; WBR; NBT; SBL; SBT	Marked crosswalks, north & east approaches
Ninth Line and Candlelight Drive	Stop (Minor Street)	3	Ninth Line	WBL[2]; WBR[2]; NBT; SBL; SBT	East approach (not marked)
Ninth Line and Skyview Street	Stop (Minor Street)	3	Ninth Line	WBLTR; NBT: SBL; SBT	None

Note 1: Column refers to number of approaches at the intersection.
Note 2: Although not delineated, the width of Candlelight Drive allows for simultaneous westbound left-turns and right-turns.

Figure 2 illustrates the existing boundary road network, including lane configurations, storage lengths, and intersection control.

3.4 Existing Transit Operations

There are several MiWay Transit and GO Transit bus routes in proximity of the proposed development. **Tables 4 and 5** outline the existing transit routes, direction, days of operation, peak hour headways, and the location of bus stops near the proposed development. The transit services described in **Table 5** outline the MiWay service pattern as of September 6, 2021. Local and express bus routes that possess stops within 400m and 800m walking distance of the site, respectively, are included as per the MTO's Transit Supportive Guidelines (2012). Although further than typical walking distances for transit access, bus routes at Winston Churchill Transitway Station were included within existing transit services. This was due to the station possessing high accessibility for bicycle and vehicle transportation with a carpool parking lot and a covered bicycle lock-up area.

Table 4: Existing GO Transit Services

Route	Start and End Points	Times of Operation	Peak Hour Headways (min)	Direction 1 Transit Stop[1]	Direction 2 Transit Stop[1]
25 GO Transit Waterloo / Mississauga	University of Waterloo to Square One	Monday – Sunday	~60 min	Winston Churchill Station (~3.5km ; ~15min by bike)	Winston Churchill Station (~3.5km ; ~15min by bike)
29 GO Transit Guelph / Mississauga	Guelph Central to Square One	Monday – Sunday	~60 min	Winston Churchill Station (~3.5km ; ~15min by bike)	Winston Churchill Station (~3.5km ; ~15min by bike)

Note1: The calculated walking distance to each transit stop was determined from a baseline origin/destination point at the current 5170 Ninth Line driveway connection to Ninth Line. A 1.2m/s average walking speed as outlined in the City of Mississauga TIS guidelines was used. An average speed of 4.0m/s was assumed for biking.

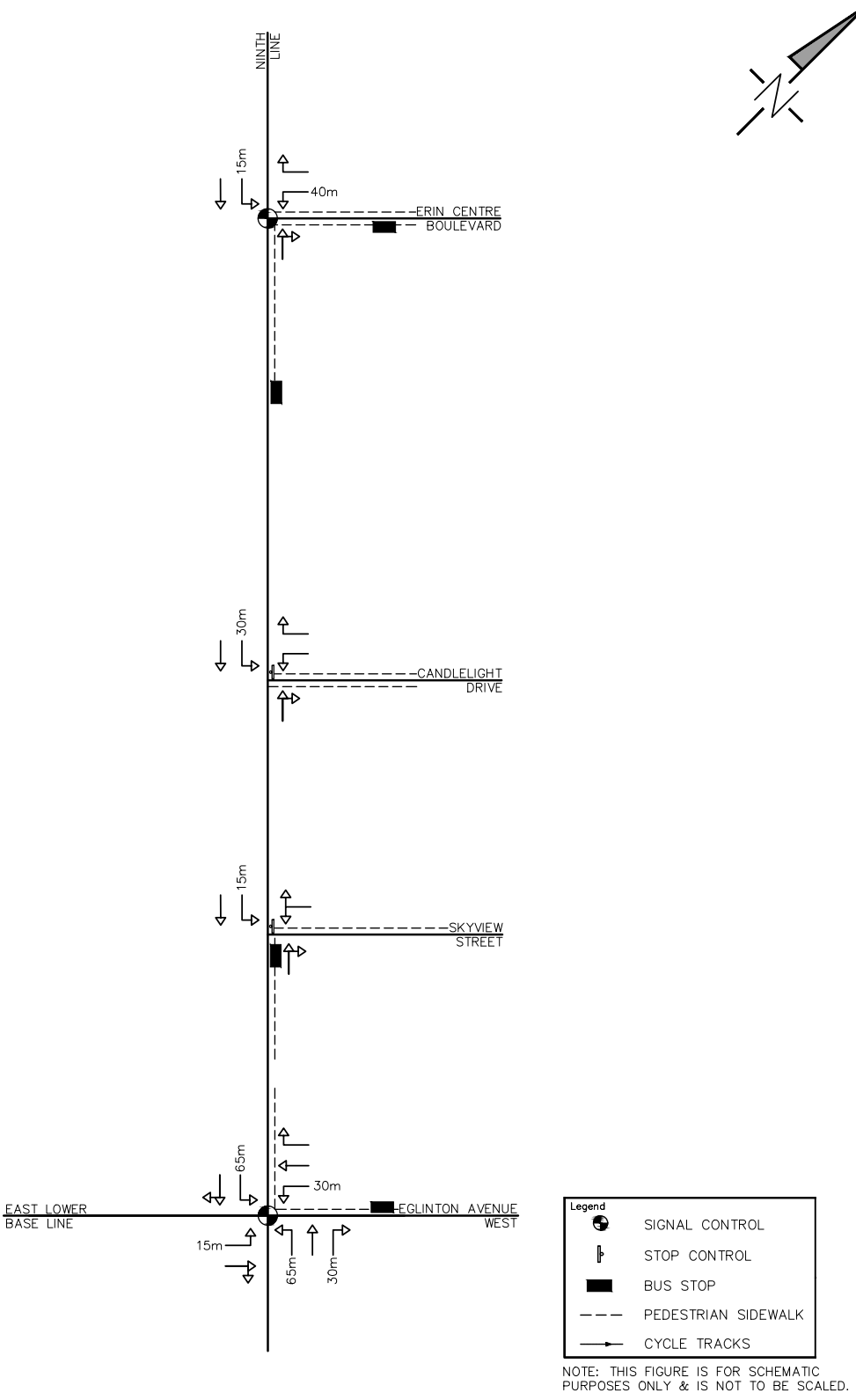


Figure 2: Existing Boundary Road Network

Table 5: Existing MiWay Transit Services

Route	Start and End Points	Times of Operation	Peak Hour Headways (min)	Direction 1 Transit Stop[1]	Direction 2 Transit Stop[1]
9 Rathburn – Thomas	City Centre Transit Terminal to Churchill Meadows Community Centre	Monday - Sunday	~20 min	Erin Centre Boulevard at Longford Drive (400m; ~5.5min walk)	Erin Centre Boulevard at Longford Drive (450m; 6min walk)
35 Eglinton-Ninth Line	Kipling Bus Terminal to Churchill Meadows Community Centre	Monday - Sunday	8-10 min	Ninth Line at Skyview Street (80m ; <2min walk)	N/A
36 Colonial-Ridgeway	Winston Churchill Station to South Common Centre	Monday - Sunday	~30 min	Winston Churchill Station (~3.5km ; ~15min by bike)	N/A
45 Winston Churchill	Meadowvale Town Centre to Clarkson GO Station	Monday - Sunday	~15 min	Winston Churchill Station (~3.5km ; ~15min by bike)	Winston Churchill Station (~3.5km ; ~15min by bike)
109 Meadowvale Express	Meadowvale Town Centre to Kipling Station	Monday – Sunday	10-15 min	Winston Churchill Station (~3.5km ; ~15min by bike)	Winston Churchill Station (~3.5km ; ~15min by bike)

Note1: The calculated walking distance to each transit stop was determined from a baseline origin/destination point at the current 5170 Ninth Line driveway connection to Ninth Line. A 1.2m/s average walking speed as outlined in the City of Mississauga TIS guidelines was used. An average speed of 4.0m/s was assumed for biking.

The two local routes within walking distance from the subject site offers good transit access to local destinations such as Erin Mills Town Centre, Mississauga City Centre, along with Middle and High schools in proximity to the subject site. Route 35 is a major crosstown route that connects with plenty of north-south bus routes. Further, MiWay route 9 provides connectivity to GO Transit at Streetsville GO along the Milton GO line.

Further, the Winston Churchill Station is an excellent transit attractor due to its location along the Mississauga Transitway. The route provides express service to several major destinations within Mississauga. Additionally, the station includes North-South transit service that connects with the Lakeshore GO line. This allows for good transit access both into Toronto to the east and towards Halton Region and Hamilton to the west.

Therefore, the existing transit services in the study area are sufficient to promote transit as a viable mode of transportation.

The boundary road network in **Figure 2** illustrates the existing bus stop locations in the study area. **Appendix C** contains relevant transit information.

3.5 Active Transportation Network

The existing active transportation facilities on the boundary road network are described in **Table 6**. The boundary road network in **Figure 2** illustrates the existing pedestrian and cycling facilities in the study area.

Table 6: Existing Active Transportation Network

Roadway	Pedestrian Facilities	Separation from Roadway	Cycling Facilities	Separation from Roadway
Ninth Line	1.5 metre concrete sidewalk (east side from Eglinton Avenue West to Skyview Street) Asphalt sidewalk (east side from bus stop north of Candlelight Drive to Erin Centre Boulevard)	Grass boulevard	None	N/A
Eglinton Avenue West	1.5 metre concrete sidewalk (north side)	Grass boulevard and Parking Lay-By	None	N/A
E. Lower Base Line	None	N/A	None	N/A
Erin Centre Boulevard	1.5 metre concrete sidewalk (both sides)	Grass boulevard	Bike Lane (both sides)	None
Candlelight Drive	1.5 metre concrete sidewalk (both sides)	Grass boulevard	None	N/A
Skyview Street	1.5 metre concrete sidewalk (north side)	Grass boulevard	None	N/A

3.6 Traffic Data

Turning movement counts were conducted by Spectrum Traffic Data Inc. staff at the study intersections on Tuesday July 16, 2019, between 6:00 a.m. – 10:00 a.m. and 3:00 p.m. – 7:00 p.m.

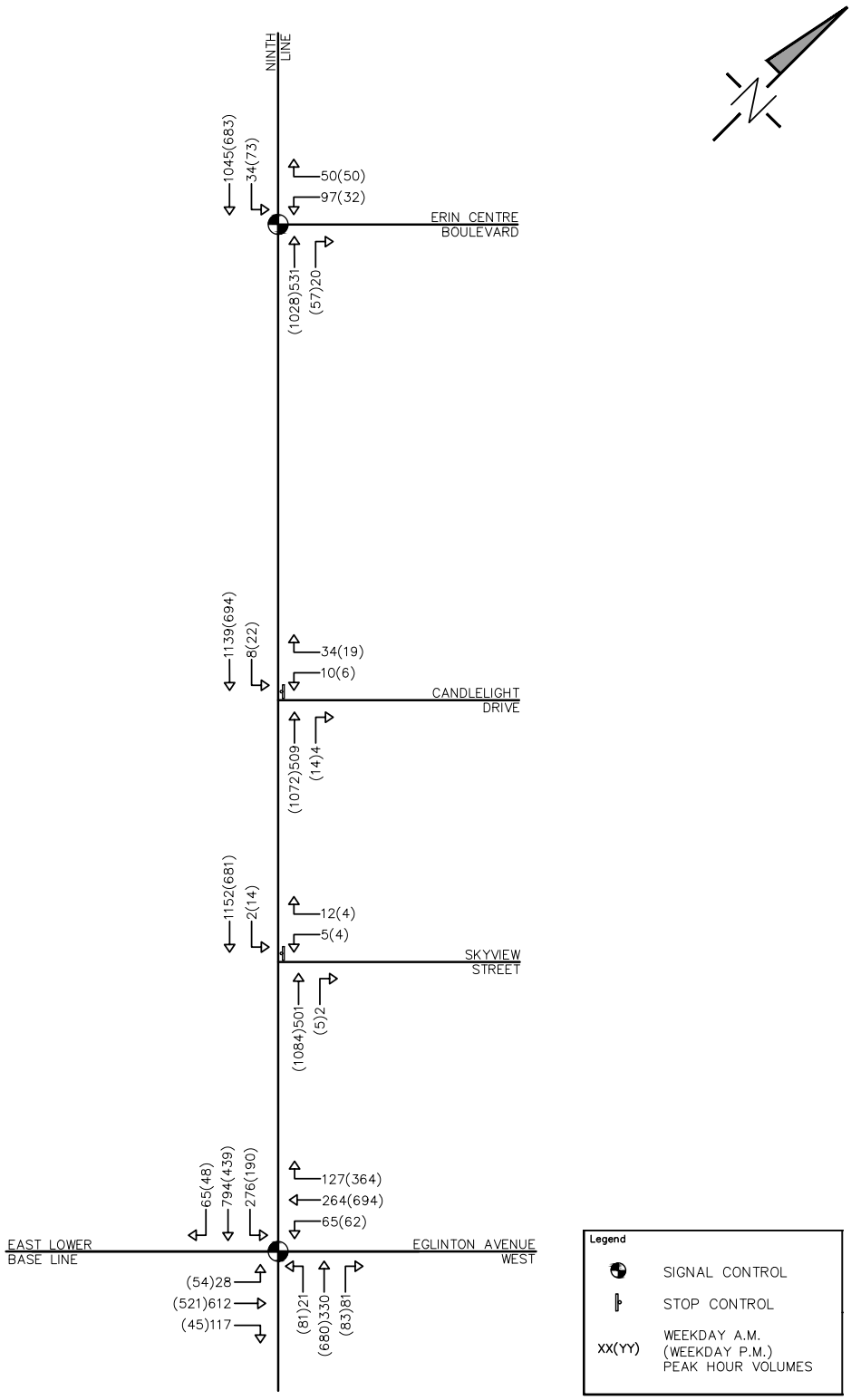
These time periods are reflective of commuter peak hours and thus were considered appropriate for traffic analysis of the proposed development.

Intersection analysis was conducted utilizing peak hour factors (PHFs) as calculated for each intersection from the collected traffic data during each time period. **Table 7** outlines the calculated peak hour factors at each intersection during each peak hour.

Table 7: Intersection Count Peak Hour Factors

Intersection	Count Date	Peak Hour	Peak Hour Factor
Ninth Line and Eglinton Avenue West / East Lower Base Line	Tuesday July 16, 2019	Weekday A.M. 7:45 a.m. – 8:45 a.m.	0.99
		Weekday P.M. 5:00 p.m. – 6:00 p.m.	0.96
Ninth Line and Skyview Street	Tuesday July 16, 2019	Weekday A.M. 7:45 a.m. – 8:45 a.m.	0.99
		Weekday P.M. 5:00 p.m. – 6:00 p.m.	0.96
Ninth Line and Candlelight Drive	Tuesday July 16, 2019	Weekday A.M. 7:45 a.m. – 8:45 a.m.	0.97
		Weekday P.M. 5:00 p.m. – 6:00 p.m.	0.94
Ninth Line and Erin Centre Boulevard	Tuesday July 16, 2019	Weekday A.M. 7:45 a.m. – 8:45 a.m.	0.98
		Weekday P.M. 5:00 p.m. – 6:00 p.m.	0.96

The traffic count data are contained in **Appendix D**. **Figure 3** illustrates the 2019 traffic volumes recorded by Spectrum Traffic.



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Figure 3: 2019 Spectrum Traffic Volumes

3.7 Collision Analysis

To understand existing collision patterns near the subject site, historical collision data was obtained from the City for the Ninth Line segment between Stardust Drive and Candlelight Drive for the most recent available five year period (i.e., from 2015-2019). A collision analysis was conducted to identify any existing collision trends in the area. The collision data is included in **Appendix E**. **Table 8** outlines the collision frequency by type, severity and weather conditions.

Table 8: Collision History

Intersection	Collision Type	Severity	Environment
Ninth Line at Stardust Drive	Rear End – 1	P.D. Only – 1	Clear – 1
Ninth Line at Skyview Street	SMV Other – 1	P.D. Only – 1	Snow – 1
Ninth Line at Candlelight Drive	Turning Movement – 1	P.D. Only – 1	Clear – 1

As shown in **Table 8**, there does not appear to be a pattern of collisions at any of the intersections near the subject site. Therefore, collisions are not expected to be a significant issue for the proposed development.

3.8 Traffic Modelling

3.8.1. Synchro Modelling Guidelines

The boundary road network was modelled in Synchro 11 in conformance with the modelling guidelines per the City of Mississauga's "Traffic Impact Study Guidelines." **Table 9** summarizes the Synchro modelling parameters set out by the City's guidelines. These modelling parameters were applied to all study intersections.

Table 9: City of Mississauga Synchro Modelling Parameters

Parameter	Value
Ideal (base) saturation flow rate	Protected left-turn: 1,860 veh/hr/lane Exclusive through: 1,900 veh/hr/lane Exclusive right-turn: 1,640 veh/hr/lane
Lost Time [1]	Protected left-turn: 1.0 s Back-to-back left-turns: 1.0 s Main Phase: 5.0 s
Peak Hour Factor	As calculated, presented in **Table 7**
Lane widths	Per the Ninth Line EA (June 2021), or as measured

Note 1: Lost time refers to the total lost time for the respective phase (intergreen minus lost time adjustment). Lost time adjustments were calculated so that the total lost time for the respective phases are equal to the values set out in the City's guidelines.

3.8.2. Signal Timing Plans

Signal Timings Plans were obtained from the City of Mississauga for the following intersections:

- Ninth Line and Eglinton Avenue / East Lower Base Line
- Ninth Line and Erin Centre Boulevard

As the intersection of Ninth Line and Eglinton Avenue / East Lower Base Line is operating near capacity under the 2021 existing conditions scenario, while the signal timing cycle length was maintained, the timing splits were optimized for scenario volumes. For all remaining intersections, the existing conditions scenario maintained the existing signal timing plans for analysis.

For future background and future total scenarios, signal timings along Ninth Line that were used for study intersections within the Ninth Line EA Transportation Report were adapted for traffic modelling use (excerpts provided in **Appendix F**). This includes the intersection of Ninth Line and Skyview Street / Street B, which is signalized during all future scenarios. The signal timing cycle lengths were maintained for the intersections, with splits being optimized.

Existing timing plans are included within **Appendix D.** Timing plans used for traffic modelling within this study are included within the detailed capacity analysis Synchro worksheets, provided as **Appendix G**.

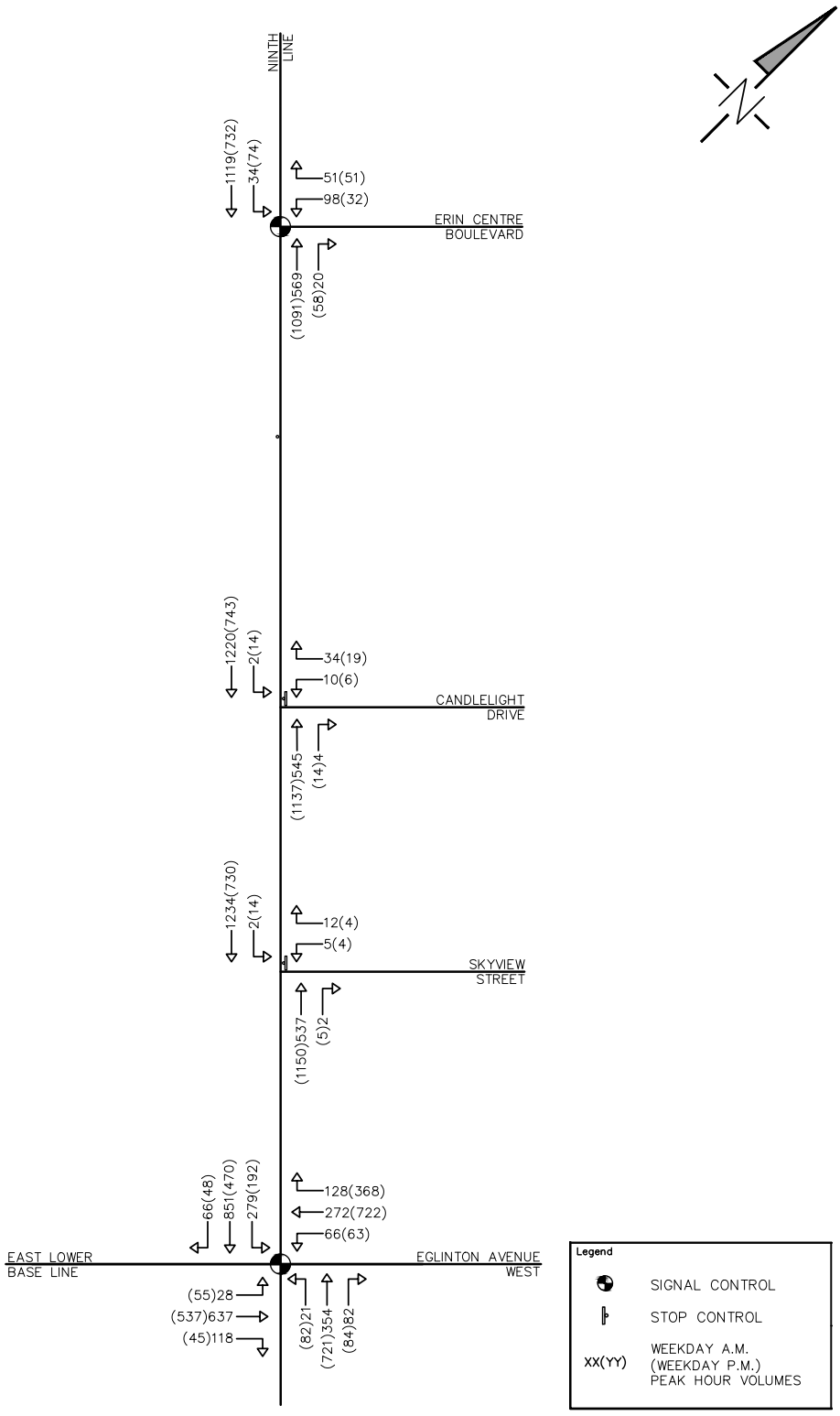
3.8.3. Critical Volume-To-Capacity Thresholds

The City of Mississauga considers a movement to be critical when the volume-to-capacity exceeds 0.85 for through movements or shared through/turning movements, and 0.90 for exclusive movements. Therefore, in the traffic operations analysis, the maximum volume-to-capacity ratio along with the ratios which exceed the critical thresholds identified herein

3.9 Intersection Operations

The existing intersection operations at the study intersections were analyzed using the 2021 existing traffic volumes illustrated in **Figure 4.** As the TMC traffic data was obtained in 2019, growth rates were applied to all traffic movements at the study intersections as outlined in **Section 4.3.** Detailed capacity analysis worksheets are included in **Appendix G**. Level of Service Definitions are provided within **Appendix H**.

Table 10 outlines the 2021 existing traffic operations. Volume-to-capacity ratios which exceeded the critical thresholds outlined in **Section 3.8.3** are bolded within the table.



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Figure 4: 2021 Existing Traffic Volumes

Table 10: 2021 Existing Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]	95th Percentile Queue Length > Storage Length [3]
Ninth Line and Eglinton Avenue West / East Lower Base Line	Signal	A.M.	E	68.3s	**1.08 (SBT)** **1.05 (EBT)**	30.7m > 15.0m (EBL) 34.6m > 30.0m (WBL) 54.5m > 30.0m (NBR) 100.1m > 65.0m (SBL)
		P.M.	E	56.1s	**1.04 (NBT)** **1.03 (SBL)** **0.91 (WBT)** **0.86 (EBL)**	55.1m > 15.0m (EBL) 73.2m > 30.0m (WBL) 81.1m > 65.0m (NBL) 54.4m > 30.0m (NBR) 97.0m > 65.0m (SBL)
Ninth Line and Erin Centre Boulevard	Signal	A.M.	B	13.5s	0.80 (SBT)	31.9m > 15.0m (SBL)
		P.M.	B	18.0s	**0.90 (NBT)**	29.3m > 15.0m (SBL)
Ninth Line and Candlelight Drive	Stop (Minor)	A.M.	C	16.7s	0.74 (SBT)	None
		P.M.	D	27.6s	0.72 (NBT)	None
Ninth Line and Skyview Street	Stop (Minor)	A.M.	B	14.1s	0.73 (SBT)	None
		P.M.	D	26.7s	0.71 (NBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection where the maximum v/c ratio does not exceed the critical thresholds. All v/c ratios that exceed the critical thresholds outlined in Section 3.8.3 are bolded.

Note 3: The 95th percentile queue lengths were derived from Sim-Traffic reports using 15-minute seeding, 60-minute simulation and an average of five runs. The 95th percentile queue lengths which are accommodated by the storage or a centre turn lane are not documented in this table.

The signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is currently operating at a LOS "E" during the weekday a.m. and p.m. peak hours. The intersection has a maximum control delay of 68.3s and volume-to-capacity ratio of 1.08 in the critical a.m. peak hour. Several movements, including all through movement lanes, are operating near or at capacity with volume-to-capacity ratios above one in the p.m. peak hour. These findings support the need for roadway expansion as recommended in the Ninth Line EA. The v/c ratios greater than 1.00 is not practical, but this can be expected as the 2021 existing traffic volumes were forecasted herein from 2019 data and was based on the City supplied growth rates (as outlined in **Section 4.3**) which accounts for the future Ninth Line widening. The results show that the volumes used for the existing conditions analysis herein are higher than practically possible under the existing configuration.

The signalized intersection of Ninth Line and Erin Centre Boulevard is operating at a LOS "B" or better with a maximum control delay of 18.0s and volume-to-capacity ratio of 0.90 during the p.m. peak hour. The southbound-left movement has queue lengths occasionally exceeding the storage length of the lane onto the two-way left turn median lane.

The stop controlled minor connection of Candlelight Drive at Ninth Line is operating at a LOS "D" or better with a maximum control delay of 27.6s and volume-to-capacity ratio of 0.74. Similarly, the stop controlled minor connection of Skyview Street at Ninth Line is operating at a LOS "D" or better with a maximum control delay of 26.7s and volume-to-capacity ratio of 0.71.

4.0 Future Background Conditions

4.1 Horizon Year and Time Periods

Per the City of Mississauga's guidelines, the horizon year of analysis is typically five years from the date of study. Therefore, the 2026 horizon year was used for this study. This approach was confirmed through Terms of Reference correspondence with the City.

4.2 Roadway Improvements

In June 2021, a Class Environment Assessment study was completed by the City of Mississauga concerning the Ninth Line corridor between Eglinton Avenue West and Derry Road West. The study identified roadway improvements to Ninth Line to accommodate future developmental growth on lands adjacent to Ninth Line. The roadway improvements, which included lane configurations and signalization, were identified in the supporting Transportation Report of the Environmental Study Report (Appendix D, section 4.5 "Preferred Alternative"). The improvements are expected to be implemented in 2023 and/or 2024 (per the Ninth Line EA, section 12.3 "Timing of Improvements"). Therefore, the future background and future total analysis herein assumes that the roadway improvements recommended in the study will be implemented by the 2026 horizon year.

Provided in **Figure 5** are the forecasted future lane configurations at the study intersections herein. **Table 11** presents the forecasted roadway improvements at the study intersections.

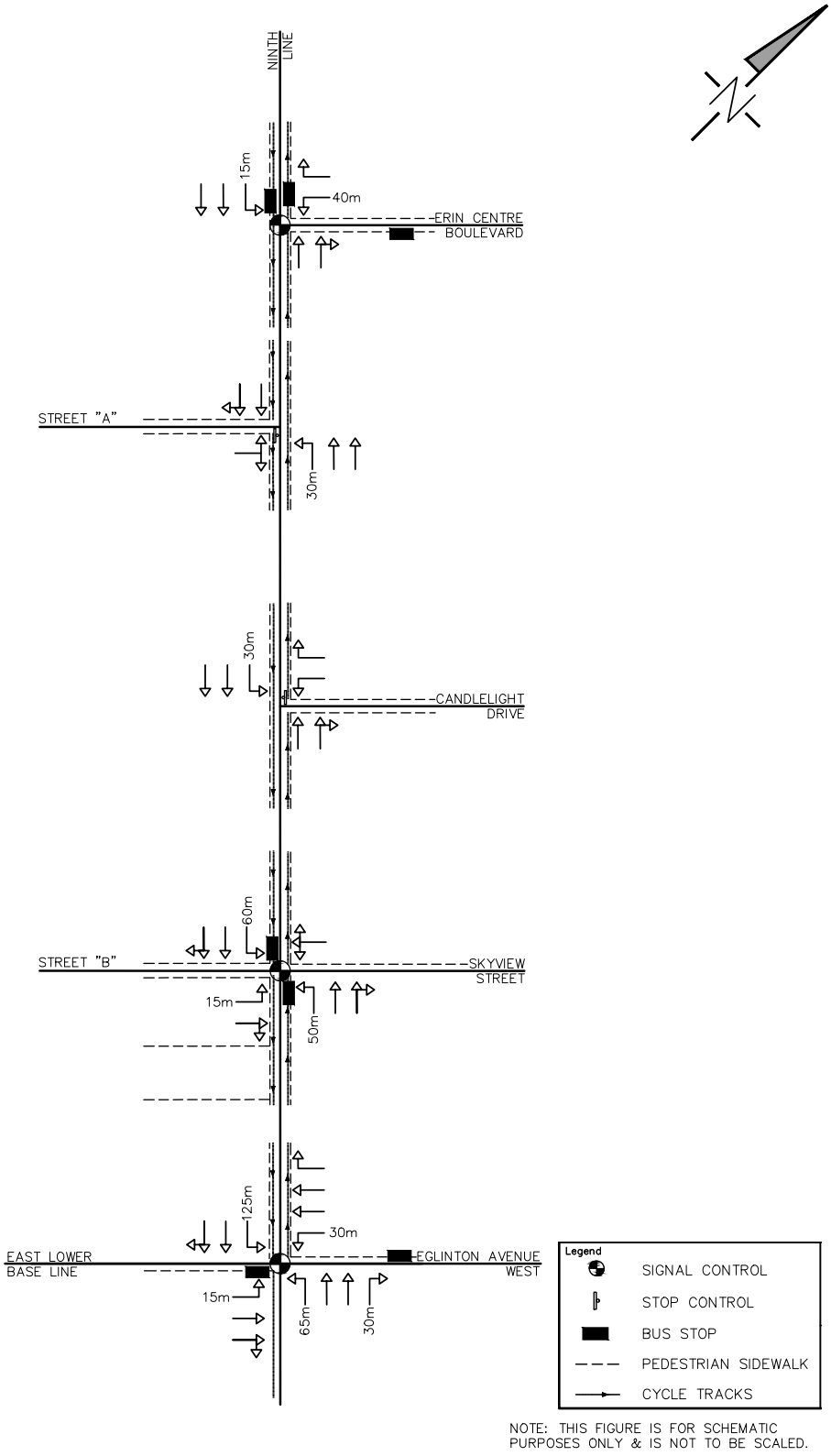


Figure 5: Future Boundary Road Network

Table 11: Boundary Road Network – Improvements at Study Intersections

Intersection/ Roadway	Future Roadway Improvements to Existing	Source
Ninth Line Corridor Widening	One additional NBT and SBT lane	Ninth Line EA / City of Mississauga[1]
Ninth Line and Eglinton Avenue West / East Lower Base Line	Ninth Line widening, and revising the current EBR lane to an EBTR.	Ninth Line EA / City of Mississauga[1]
Ninth Line and Skyview Street/Street B (New approach)	Ninth Line widening, along with new NBL, EBL, and EBTR lanes for the new Street B connection to Ninth Line	Ninth Line EA / City of Mississauga[1]
Ninth Line and Street A (New intersection)	Ninth Line widening, along with new NBL and EBLTR lanes for the new Street A connection to Ninth Line	Ninth Line EA / City of Mississauga[1]

Note 1: Confirmed through correspondence with City of Mississauga Traffic Modelling Department.

Refer to **Appendix F** for Ninth Line EA excerpts.

4.3 Growth Rates

To estimate future traffic on the boundary road network, growth rates were applied to existing traffic movements to account for future traffic growth passing through the boundary road network. Growth rates were applied separately for Arterial Roads, Local and Collector Roads. All growth rates discussed herein refer to the annual growth rate. Each growth rate is compounded annually to account for year over year background traffic growth. The growth rates herein were additionally applied to the 2019 traffic data to arrive at the 2021 existing conditions scenario.

4.3.1. Arterial Roads

As discussed in the Terms of Reference correspondence (refer to **Appendix B**), the City provided through movement growth rates for Ninth Line, Eglinton Avenue West and Winston Churchill Boulevard within the study area. The growth rates that were recommended for Ninth Line through movements between 2021 and 2031 assume lane widening occurring in the near future. As discussed in **Section 4.2,** this study incorporates lane widening for Ninth Line within the future background and future total analysis scenarios. Therefore, growth rates used in this study are expected to be reflective of traffic volume increases as a result of roadway widening.

Furthermore, to maintain consistency with **Section 4.3.2**, a 0.5% growth rate was applied to arterial road turning movements. It is expected that most of the turning movement traffic growth will be captured by the traffic projected from the background developments in **Section 4.4**.

Table 12 outlines the growth rates on the boundary road network for the 2021 to 2026 period.

Table 12: Boundary Road Network Growth Rates from 2021-2026

Street	Ninth Line	
Direction	**Northbound**	**Southbound**
A.M. Peak Hour	3.50% [1]	3.50% [1]
P.M. Peak Hour	3.00% [1]	3.50% [1]
Street	**Eglinton Avenue West**	
Direction	**Eastbound**	**Westbound**
A.M. Peak Hour	2.00%	1.50%
P.M. Peak Hour	1.50%	2.00%

Note 1: A growth rate of 0.5% compounded annually was applied to movements entering and exiting Skyview Street, Candlelight Drive and Erin Centre Boulevard (see Section 4.3.2).

4.3.2. Local and Collector Roads

At the Ninth Line intersections of Skyview Street, Candlelight Drive and Erin Centre Boulevard, the growth rates for Ninth Line outlined in **Table 12** were applied to through movements only. A growth rate of 0.5% compounded annually was applied to movements entering and exiting the local roads, as the surrounding residential neighbourhood east of Ninth Line is fully built-out and thus would not be expected to experience significant background traffic growth.

4.4 Background Developments

Background developments were confirmed through Terms of Reference correspondence with City staff. These background developments were accounted for under future background conditions. The developments are outlined in **Table 13.**

Table 13: Background Developments

Development	Location	Development Proposal	Statistics
Erin Mills Development[1]	North-east quadrant of Highway 403 and Highway 407	Industrial Park including retail and office uses	112,630 sq. m of industrial park 6,762 sq. m of retail 8,074 sq. m of office
407 Transitway	Future stations on Ninth Line: Britannia Road and Derry Road Future station on Trafalgar Road	Provincial transit system with exclusive right-of-way parallel to Highway 407; includes running way, stations, platforms, parking, and passenger pick-up and drop-off facilities.	---
Emerging Land Use Concept	Ninth Line (west side) from Highway 403 to Highway 401	Greenfield community consisting of residential, commercial retail, general office and general light industrial uses divided into seven zones along Ninth Line.	3,543 residential units 5,467 sq. ft of retail 40,009 sq. ft of general office 296,191 sq. ft of general light industrial
5150 Ninth Line	5150 Ninth Line (west side of Ninth Line north of Candlelight Drive)	Townhouse greenfield development	169 residential units
5080, 5054, 5034 Ninth Line	5080, 5054, 5034 Ninth Line (west of Ninth Line south of Candlelight Drive)	Residential development including retail uses	1270 residential units 7,000 sq. ft of retail

Note 1: Through Terms of Reference correspondence with City staff, an additional background development was added to the scope, located at the southwest corner of Eglinton Avenue and Ridgeway Drive. The Erin Mills background development includes this background development within its site location, and thus was considered to capture the associated background traffic. Refer to **Appendix B** for Correspondence and **Appendix I** for MMM study excerpts.

Appendix I contains excerpts from the MMM study on the background developments. The composite plan in **Appendix A** demonstrates the proposed development with the adjacent background developments. A proposed private road will connect the nearby 5080 and 5150 Ninth Line properties upon build-out of the proposed development, enabling vehicular access from the proposed development without needing to use Ninth Line. These developments have been accounted for under future background conditions (see **Sections 4.4.4 and 4.4.5**).

4.4.1. Erin Mills Development

According to the MMM study, the Erin Mills Development is an industrial park development located within the area bounded by Eglinton Avenue West to the north, Ridgeway Drive to the east, Highway 403 to the south and Highway 407 to the west. The development statistics are noted in **Table 13.**

The timing of the Erin Mills development is unknown; although a review of the google street view near the background development showed ongoing construction within the site footprint with portions currently built. Therefore, this development was accounted for under future background conditions.

In Terms of Reference correspondence, an additional background development at the southwest corner of Eglinton Avenue West and Ridgeway Drive was added to the TIS scope by City staff. However, the Erin Mills background development includes this background development within its site location, and thus was considered to capture the associated background traffic. Refer to **Appendix B** for correspondence. **Figure 6** illustrates the background traffic associated with the Erin Mills Development.

4.4.2. 407 Transitway

The MTO is planning the construction of an exclusive grade separated bus rapid transit (BRT) corridor, with the potential to be converted to a Light Rail Transit (LRT) corridor. The 407 Transitway will run parallel to Highway 407 and will span from Burlington to Pickering. The 407 Transitway infrastructure will provide infrastructure including an exclusive right-of-way, stations, park and ride, and passenger pick up and drop off services.

Figure 7 illustrates the background traffic associated with the Britannia Road and Derry Road stations of the 407 Transitway initiative. These volumes were added to the future background scenario as confirmed in the terms of reference. **Appendix J** includes Highway 407 Transitway Environmental Assessment excerpts. It is noted that the timing for implementation of the 407 Transitway is unknow, however, the traffic was considered in the 2026 horizon. Therefore, the results herein may be overstated for the 2026 horizon.

4.4.3. Emerging Land Use Concept (MMM Study)

The MMM study forecasted traffic for the Emerging Land Use Concept along the Ninth Line Corridor for various non-auto modal split scenarios: 5%, 10%, 15%, and 20%. For the purposes of conservative analysis, the site traffic volumes for the lowest non-auto modal split scenario (5%) was applied to this analysis. As the emerging land use concept was set for 2041 buildout, and the existing conditions year of the MMM study was 2015, the number of emerging land use background trips for a given scenario was factored proportionally to reflect ongoing development of Ninth Line properties between 2015 and 2041. This amounted to a factor of 0.423 being applied to the 2041 full buildout volumes.

Zone "1" of the Emerging Land Use Concept spans from Erin Centre Boulevard to Eglinton Avenue West and includes the subject property (see **Appendix I** for excerpts from the MMM study). The background site traffic associated with the area of Zone "1" was removed from the boundary road network. Except for a potential future 4087 East Lower Base Line development (discussed in **Section 6.5**), all developments within Zone "1" with the exception site herein are included as background developments.

The sites which encompass Zone "1" include the subject site, the 5080 Ninth Line background development, the 5150 Ninth Line background development, and any future development occurring on the 4087 East Lower Base Line property. Therefore, removing background traffic associated with Zone "1" as per the MMM study from the boundary road network is an appropriate action as a more informed estimate of Zone "1" trips is provided per the site plans of the various developments as captured in this study.

Figure 8 illustrates the 2026 horizon background traffic volumes associated with the Emerging Land Use Concept background developments.

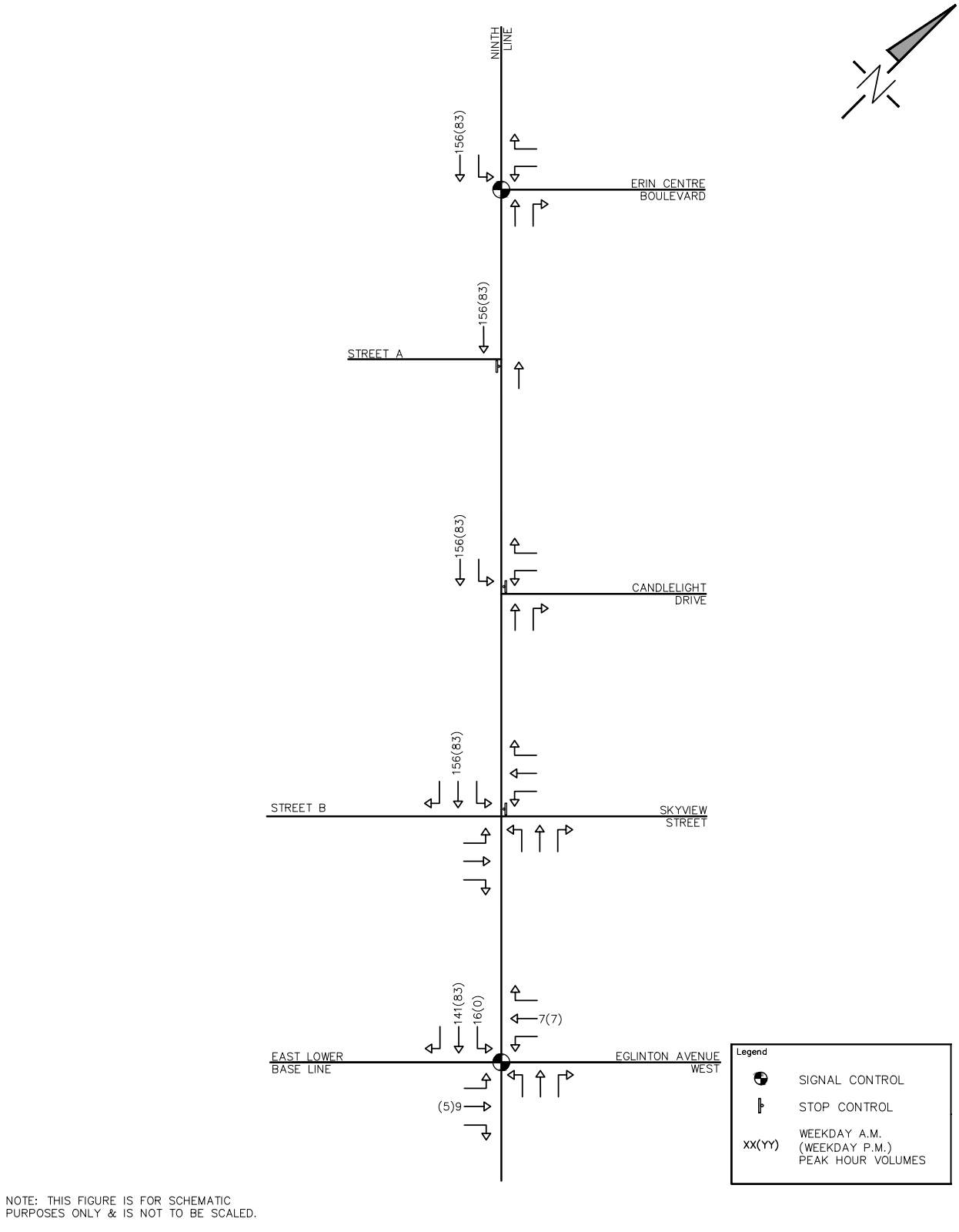


Figure 6: Background Traffic – Erin Mills Industrial Development Volumes

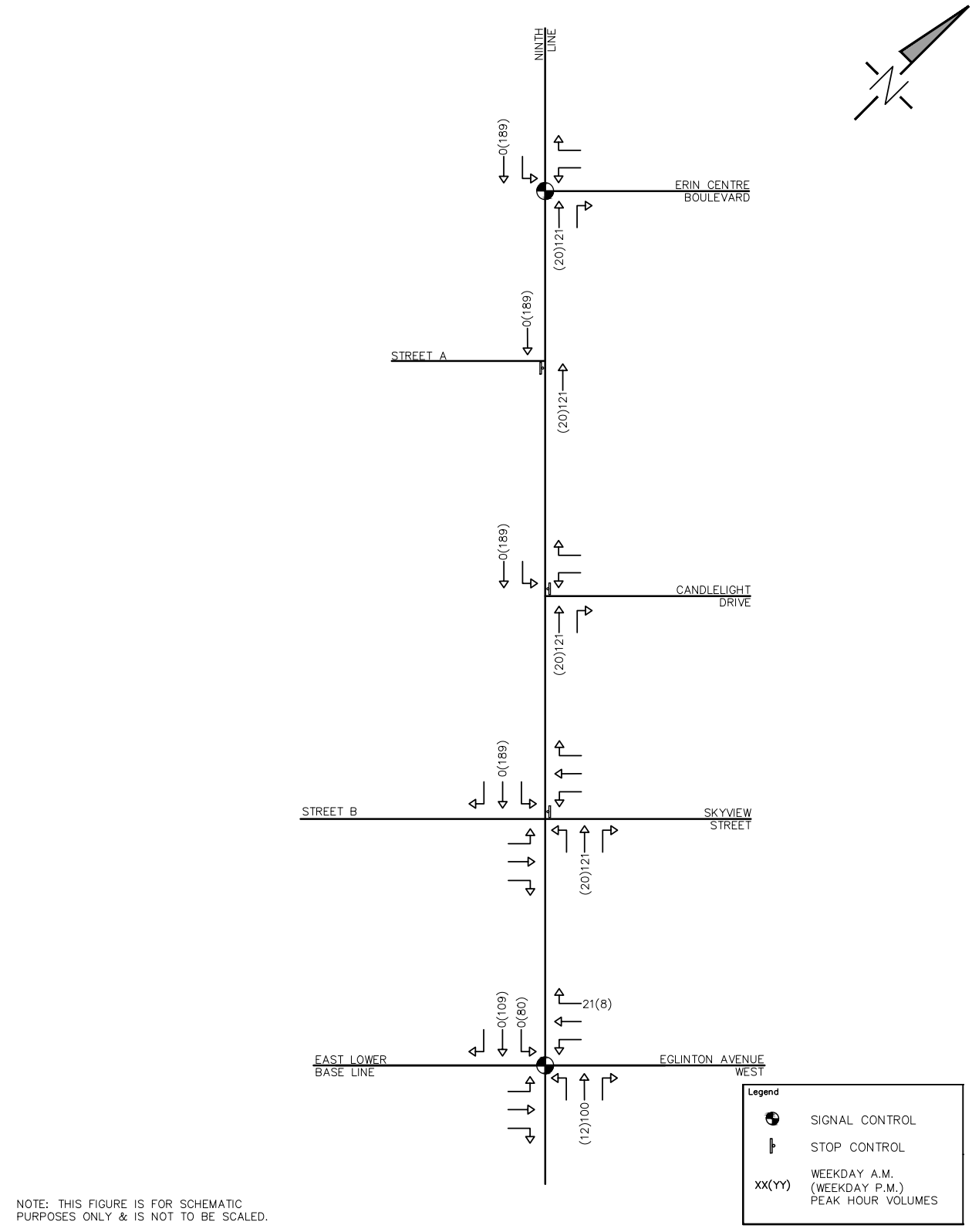


Figure 7: Background Traffic – 407 Transitway Volumes

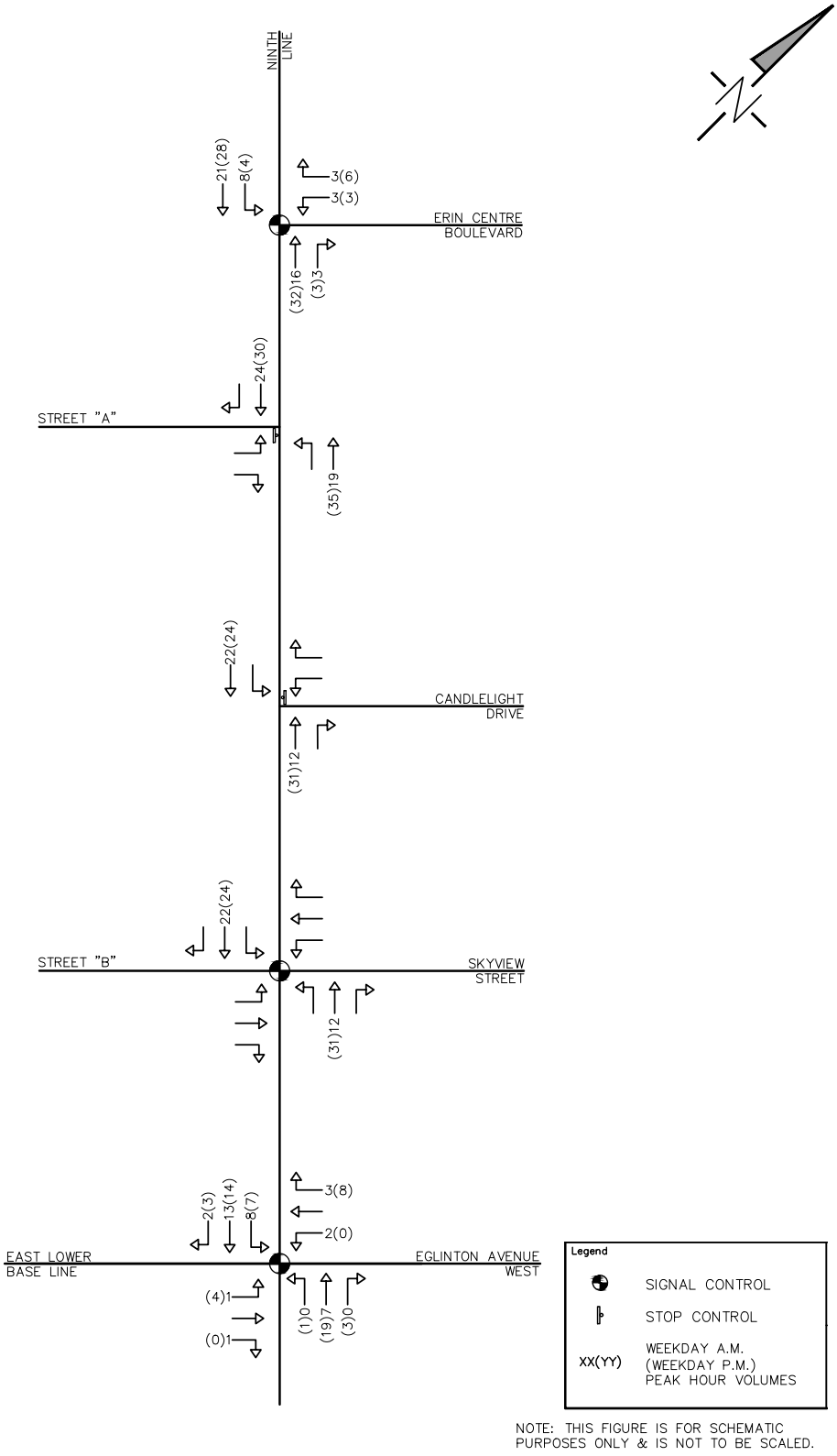


Figure 8: Background Traffic – 2026 Emerging Land Use Concept Volumes

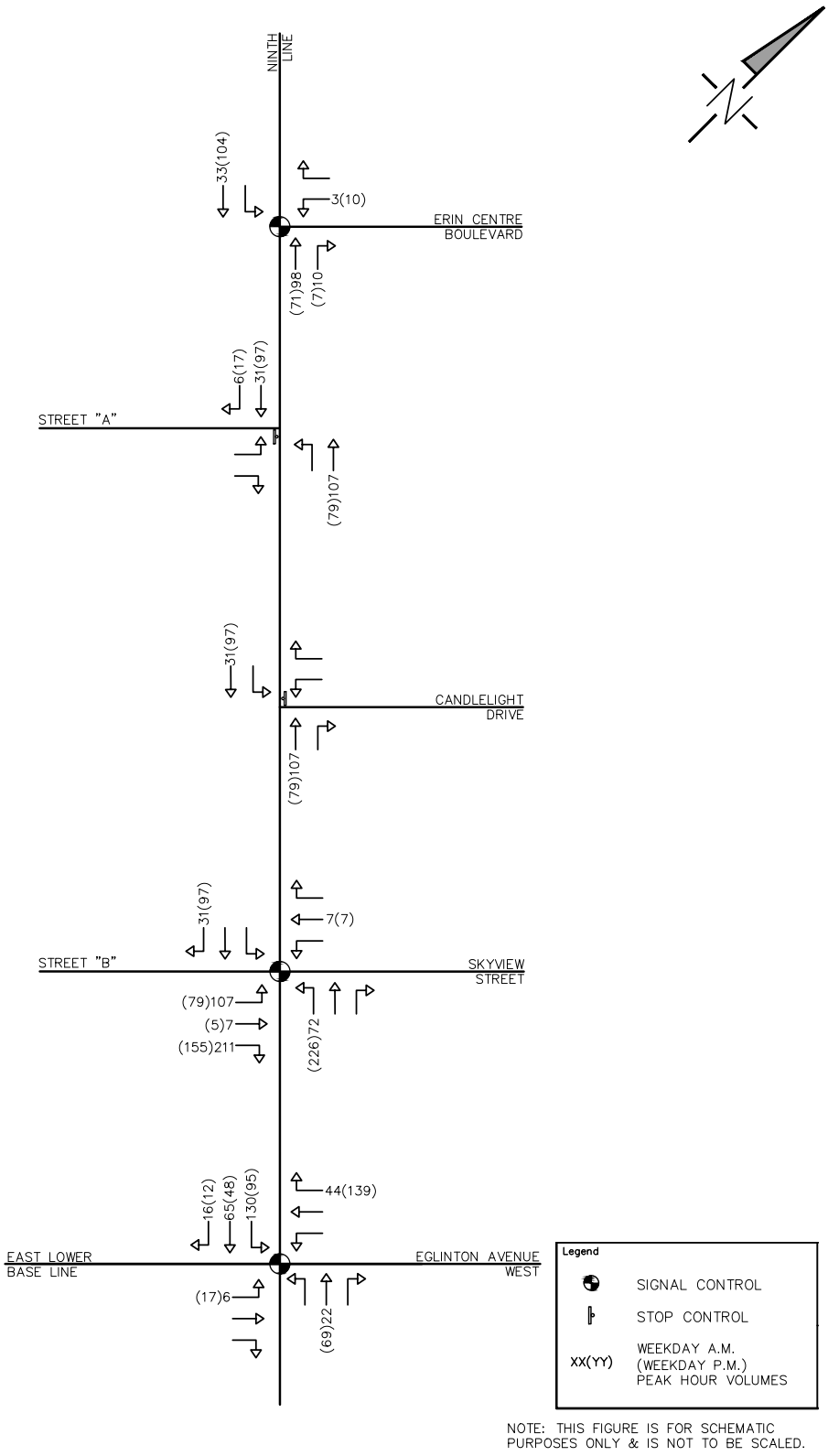


Figure 9: 5080 Ninth Line Volumes

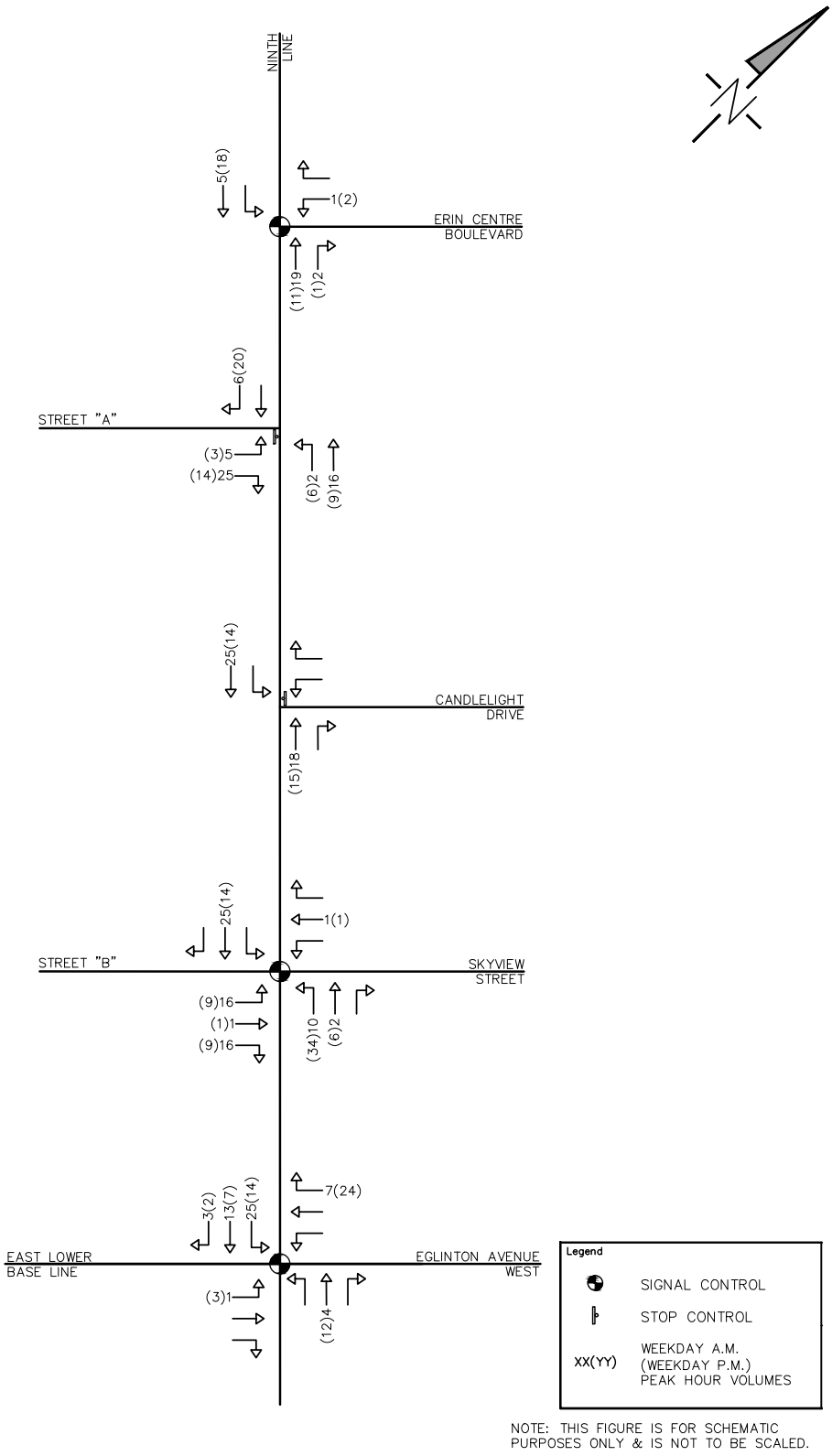


Figure 10: 5150 Ninth Line Volumes

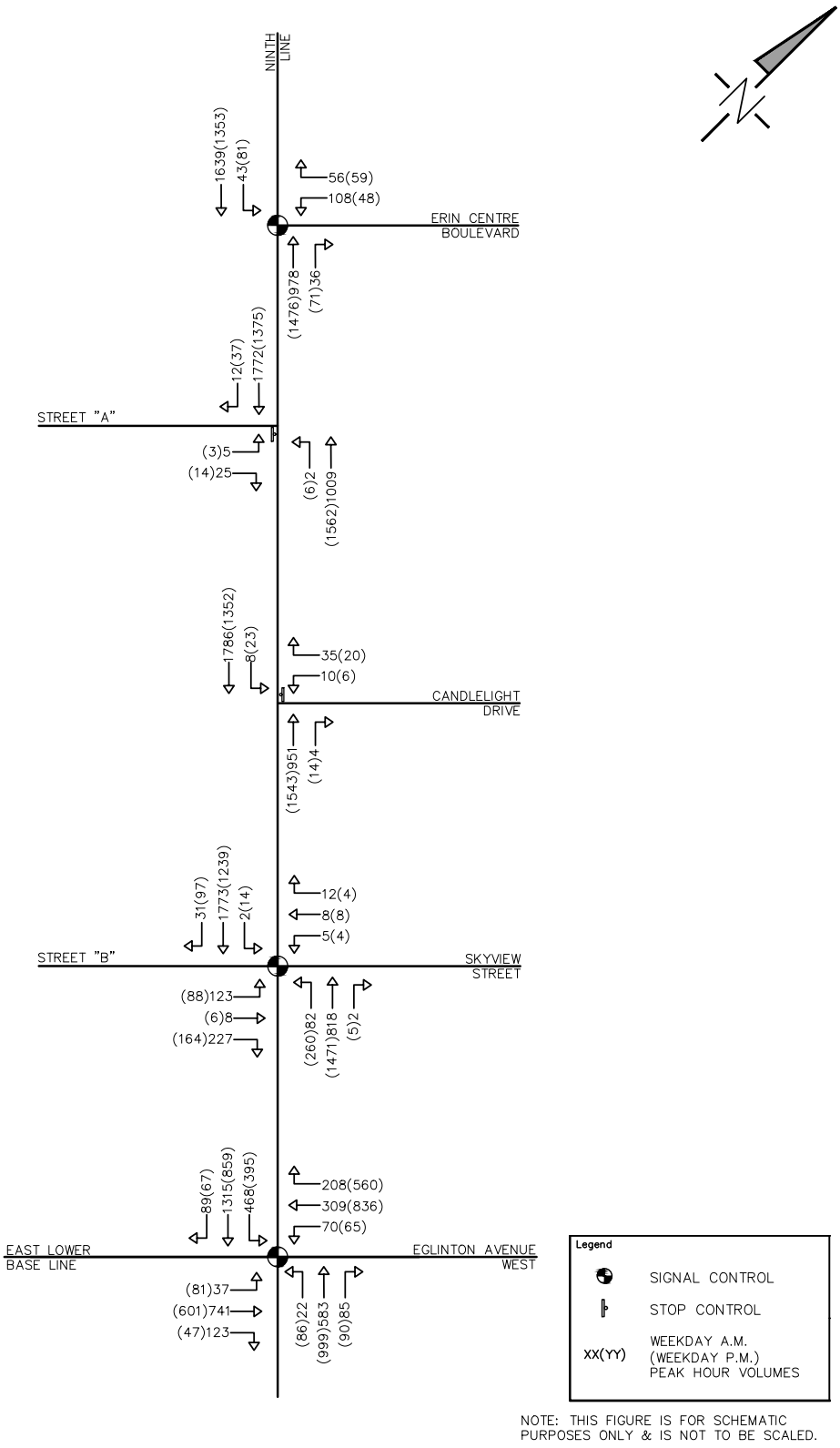


Figure 11: 2026 Future Background Traffic Volumes

4.4.4. 5080, 5054, and 5034 Ninth Line Development

Your Home Developments is proposing a residential development on the 5080, 5054, and 5034 Ninth Line parcels, as shown on the Composite plan in **Figure 2**. The development proposes a total of 1270 residential dwelling units and 7000 square feet of retail. Crozier prepared a Traffic Impact Study in support of the 5080, 5054, and 5034 Ninth Line development that was submitted to the City in October 2021.

Trip Generation and Trip Distribution for 5080, 5054, and 5034 Ninth Line were taken directly from the 5080 Ninth Line TIS. The 5080 Ninth Line TIS trip distribution accounted for demand induced travel patterns within the area that include the 5080, 5150, and 5160-70 developments. The distribution was based upon Transportation Tomorrow Survey Data, existing travel patterns and expected catchment areas.

Figure 9 outlines the traffic volumes from this background development. Excerpts from the 5080 Ninth Line TIS are provided in **Appendix K**.

4.4.5. 5150 Ninth Line Development

Mattamy Homes is proposing a residential development at the adjacent 5150 Ninth Line property as shown in the composite plan in **Appendix A**. The development proposes a total of 169 residential townhouse dwelling units to be constructed in two phases: Phase 1 (with an anticipated build-out of 2021) and Phase 2 (with an anticipated build-out of 2022). Crozier prepared a Traffic Impact Study in support of the 5150 Ninth Line development that was submitted to the City in February 2021.

Trip Generation for 5150 Ninth Line were taken directly from the 5150 Ninth Line TIS (excerpts provided within **Appendix L**). Trips were distributed to the boundary road network using the same trip distribution outlined for the proposed development in **Sections 5.2 and 5.3**. **Figure 10** outlines the traffic volumes from this background development.

4.5 Intersection Operations

Table 14 outlines the 2026 future background traffic operations at the study intersections. The future background intersection operations at the study intersections were analyzed using the 2026 future background traffic volumes illustrated in **Figure 11**. Level of Service Definitions are provided in **Appendix H**. Detailed capacity analysis worksheets are included in **Appendix G**.

Table 14: 2026 Future Background Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]	95th Percentile Queue Length > Storage Length [3]
Ninth Line and Eglinton Avenue West / East Lower Base Line	Signal	A.M.	D	38.6s	**0.89 (SBL)** **0.89 (SBT)**	37.6m > 15.0m (EBL) 30.3m > 30.0m (WBL) 45.0m > 30.0m (NBR)
		P.M.	E	70.1s	**1.21 (SBL)** **1.12 (NBT)** **1.05 (WBT)**	50.0m > 15.0m (EBL) 69.3m > 30.0m (WBL) 102.6m > 65.0m (NBL) 58.6m > 30.0m (NBR) 208.1m > 125.0m (SBL)
Ninth Line and Erin Centre Boulevard	Signal	A.M.	B	10.6s	0.66 (SBT)	24.7m > 15.0m (SBL)
		P.M.	B	11.4s	0.73 (NBT)	36.8m > 15.0m (SBL)
Ninth Line and Candlelight Drive	Stop (Minor)	A.M.	B	14.7s	0.54 (SBT)	None
		P.M.	C	18.1s	0.64 (NBT)	44.6m > 30.0m (SBL)
Ninth Line and Skyview Street / Street B	Signal	A.M.	B	16.8s	0.76 (SBT)	21.3m > 15.0m (EBL)
		P.M.	B	11.9s	0.74 (SBT)	21.9m > 15.0m (EBL) 50.6m > 50.0m (NBL)
Ninth Line and Street A	Stop (Minor)	A.M.	C	23.8s	0.76 (SBT)	None
		P.M.	B	14.2s	0.59 (SBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection where the maximum v/c ratio does not exceed the critical thresholds. All v/c ratios that exceed the critical thresholds outlined in Section 3.8.3 are bolded.

Note 3: The 95th percentile queue lengths were derived from Sim-Traffic reports using 15-minute seeding, 60-minute simulation and an average of five runs. The 95th percentile queue lengths which are accommodated by the storage or a centre turn lane are not documented in this table.

Under 2026 future background conditions, the signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours. The turn queues are forecast to occasionally exceed the turn storage lanes at the intersection during the peak hours as identified by the MMM study and the Ninth Line EA Studies. These queues may occasionally obstruct some movements at adjacent intersections during the peak hours. These operations are however typical for high traffic arterial intersections during the peak hours and operations are expected to return to acceptable levels during the off-peaks.

The high volumes and associated volume-to-capacity ratio for the southbound left movement is consistent with the MMM and Ninth Line EA Studies. It is recommended that the intersection be monitored by the City and that the signal timing plan be adjusted as needed in future for optimal performance including increasing effective green time for critical movements. Further, it is noted that section 9.17.5 of the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) identifies the warrant for dual left turn lanes at peak hour volumes greater than 300. Given the southbound left turn traffic is forecast to be in excess of 300 trips in both the a.m. and p.m. peak hours dual southbound left turn lanes may be considered as part of the Ninth Line EA roadway improvements or investigated in the future as a long term measure to further improve the intersection operations.

Given several other planned roadway improvements on adjacent roadways as well as future transit intensification on the Ninth Line corridor, the forecasted issues at the intersection of Ninth Line and Eglinton Avenue / East Lower Base Line may be overstated herein.

The signalized intersection of Ninth Line and Erin Centre Boulevard Line is projected to operate at a LOS "B" or better with a maximum control delay of 11.4s and volume-to-capacity ratio of 0.73 during the peak hours. The southbound-left movement queue lengths are expected to occasionally exceed the storage length of the lane onto the two-way left turn median lane.

The stop controlled minor connection of Candlelight Drive at Ninth Line is projected to operate at a LOC "C" or better with a maximum control delay of 18.1s and volume-to-capacity ratio of 0.64.

The signalized intersection of Ninth Line and Skyview Street / Street B Line is projected to operate at a LOS "B" with a maximum control delay of 16.8s and volume-to-capacity ratio of 0.76.

The stop controlled minor connection of Street A at Ninth Line is projected to operate at a LOS "C" or better in the peak hours, with a maximum control delay of 23.8s. The maximum volume-to-capacity ratio is expected to be 0.76.

The forecasted future background operations herein at the study intersections are consistent with the findings of the MMM study and the Ninth Line EA Study. Further, the boundary road network is projected to operate effectively under the 2026 future background conditions with implementation of the roadway improvements outlined in this section, supported by the Ninth Line EA and the MMM study.

5.0 Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network that would otherwise not exist. The proposed development will also result in additional turning movements at the study intersections. This section outlines these additional vehicular movements.

5.1 Trip Generation

Trip generation for the proposed development was forecasted using published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry-wide as a source for trip generation forecasts.

Per the site plan, the proposed residential development includes a total of 198 residential units. Multifamily Housing (Mid-Rise) was applied to the proposed development as outlined in **Table 15** below. The greater trip generation estimate of the fitted curve equation and the rate equation was used.

Table 15: Site Trip Generation

Units	Land Use	Peak Hour	Trips Generated		
			Inbound	Outbound	Total
198 Units	LUC 221 "Multifamily Housing (Mid-Rise)"	A.M.	17	59	76
		P.M.	47	31	78

The full build-out of the proposed development is expected to generate a total of 76 and 78 total two-way vehicle trips during the weekday a.m. and p.m. peak hours, respectively.

5.2 Boundary Road Network Trip Distribution

The trips generated by the proposed development were distributed to the boundary road network using a similar methodology employed in the 5150 Ninth Line TIS. Excerpts from this report have been provided in **Appendix L**.

The trip distribution was determined based on 2016 Transportation Tomorrow Survey (TTS) data. TTS is a comprehensive survey of transportation characteristics of households in the Greater Toronto Area (GTA) and surrounding areas.

For the proposed development, TTS results were filtered to auto trips exiting 2006 GTA Zones 3615, 3616, 3809, 3810 and 3811 during the weekday a.m. peak period. These zones consist of the residential zones along the Ninth Line corridor, and thus were considered to be appropriate for trip distribution analysis. The row variable was set to "Planning District of Destination" and the column variable was set to "Use of 407" to quantify the number of trips travelling to each destination that use Highway 407 ETR.

From this query, trip destinations were determined, and percentage of trips assigned to each destination was accounted for. Trips were assumed to travel to and from their destination points based on the most convenient route, considering trips using Highway 407 ETR and trips not using Highway 407 ETR.

It was determined that approximately 65% of the total outbound trips exiting the study area during the weekday a.m. peak period are internal to Mississauga. Accordingly, trip distribution internal to Mississauga was determined using a combination of existing travel patterns, expected destinations, and TTS results for trips travelling within Planning District "Mississauga."

The resultant boundary road network trip distribution is outlined in **Table 16.**

Table 16: Boundary Road Network Trip Distribution

Arriving From / Departing To	Greater Toronto Area (GTA) Trip Locations	Total Percentage
Ninth Line (north)	Northern Mississauga, Brampton, Vaughan, Markham, Milton, etc.	**30%**
Ninth Line (south)	*Hamilton, Oakville, Burlington, Downtown Toronto, etc.*	**20%**
Eglinton Avenue West (east)	*Southern and Eastern Mississauga, Midtown Toronto*	**40%**
***Erin Centre Boulevard* (east)**	*Local Destinations*	**3%**
***Skyview Street* (east)**	*Local Destinations*	**2%**
East Lower Base Line (west)	Brantford, Niagara, etc.	**5%**
Total		**100%**

Trips arriving from and departing to the north via Ninth Line include trips using Highway 407 ETR (east), trips to and from areas internal to northern Mississauga (e.g., Meadowvale) and trips using Highway 401 west toward Milton and greater Waterloo. Trips arriving from and departing to the south via Ninth Line include trips using Highway 403 (west), the Queen Elizabeth Way (QEW), and trips to and from areas internal to Mississauga (e.g., Port Credit).

Trips arriving from and departing to the east via Eglinton Avenue West include trips using Highway 403 (east) via Winston Churchill Boulevard, and trips to and from areas internal to Mississauga along Eglinton Avenue West and Winston Churchill Boulevard. Trips arriving from and departing to the west via East Lower Base Line include trips using Highway 407 ETR (west) via Trafalgar Road.

Appendix M contains the TTS data.

5.3 Access Trip Distribution

Due to the subject site sharing an internal private roadway with the nearby 5080 and 5150 Ninth Line residential developments, it is expected that site traffic will access the site via both the Street B and Street A access connections, similar to the adjacent composite lands.

The site trip distribution (for traffic both entering or exiting the site) is based on the ease of ingress and egress at the two accesses considering traffic from the adjacent lands. For example, given Street B is signalized, it is expected that more outbound left turn movements will favour using this access due to the resulting shorter expected delays. This was incorporated into the access trip distribution. which is presented in **Table 17**.

Table 17: Access Trip Distribution

Ninth Line Access	Roadway Arriving from / Leaving to	Inbound Trip Distribution	Outbound Trip Distribution
Street A	Ninth Line (north)	**33%**	**8%**
Street A	Ninth Line (south)	**10%**	**40%**
Street B	Ninth Line (north)	**0%**	**25%**
Street B	Skyview Street (east)	**2%**	**2%**
Street B	Ninth Line (south)	**55%**	**25%**

Figure 12 outlines the trip distribution for the proposed development.

5.4 Trip Assignment

The trip distribution outlined in **Section 5.2** and **Section 5.3** was applied to the site trip generation to calculate the trip assignment for the proposed development. Trips were assumed to travel to and from their destination points based on the most convenient route. **Figure 13** outlines the trip assignment for the proposed development.

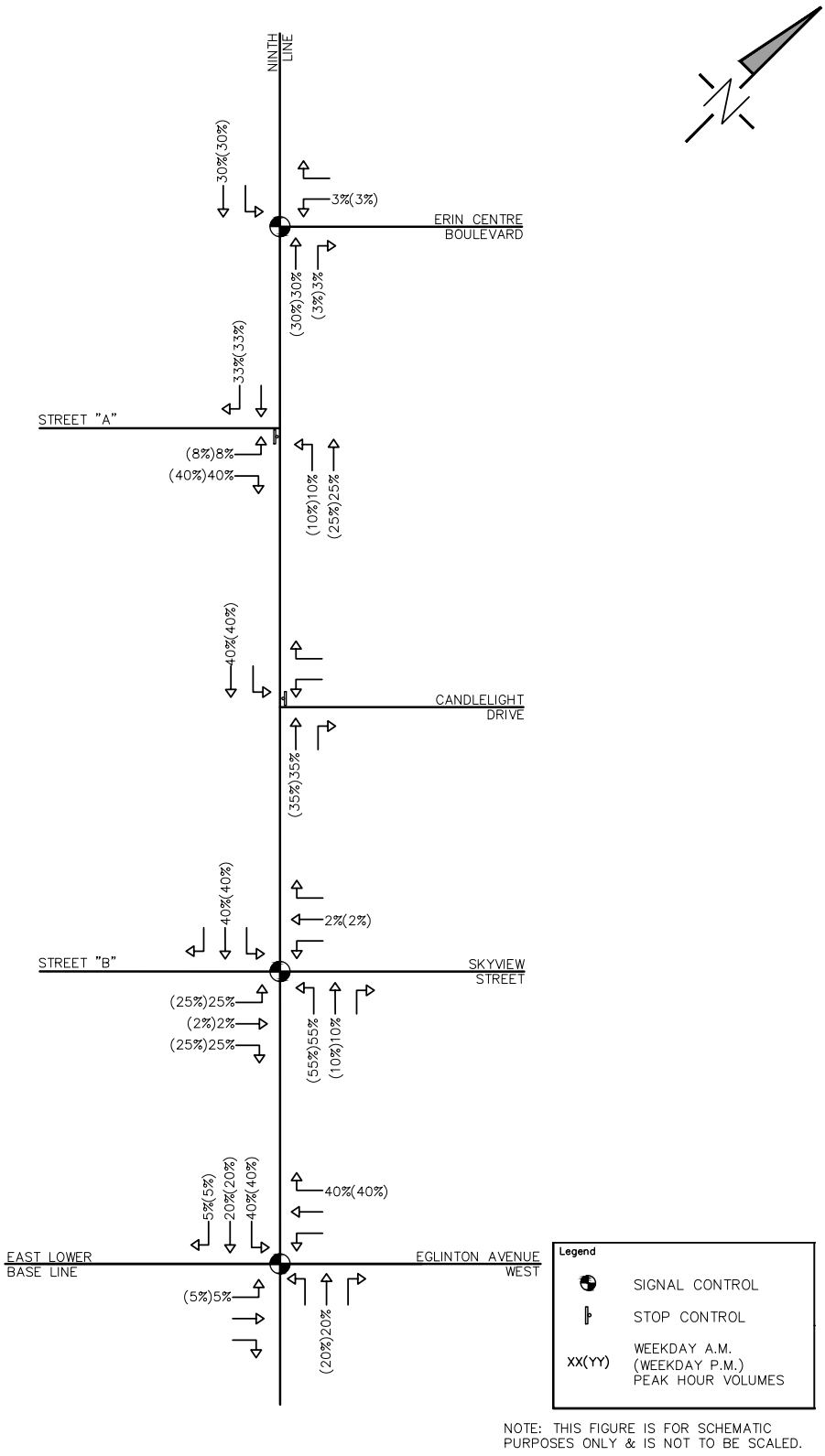


Figure 12: Site Trip Distribution

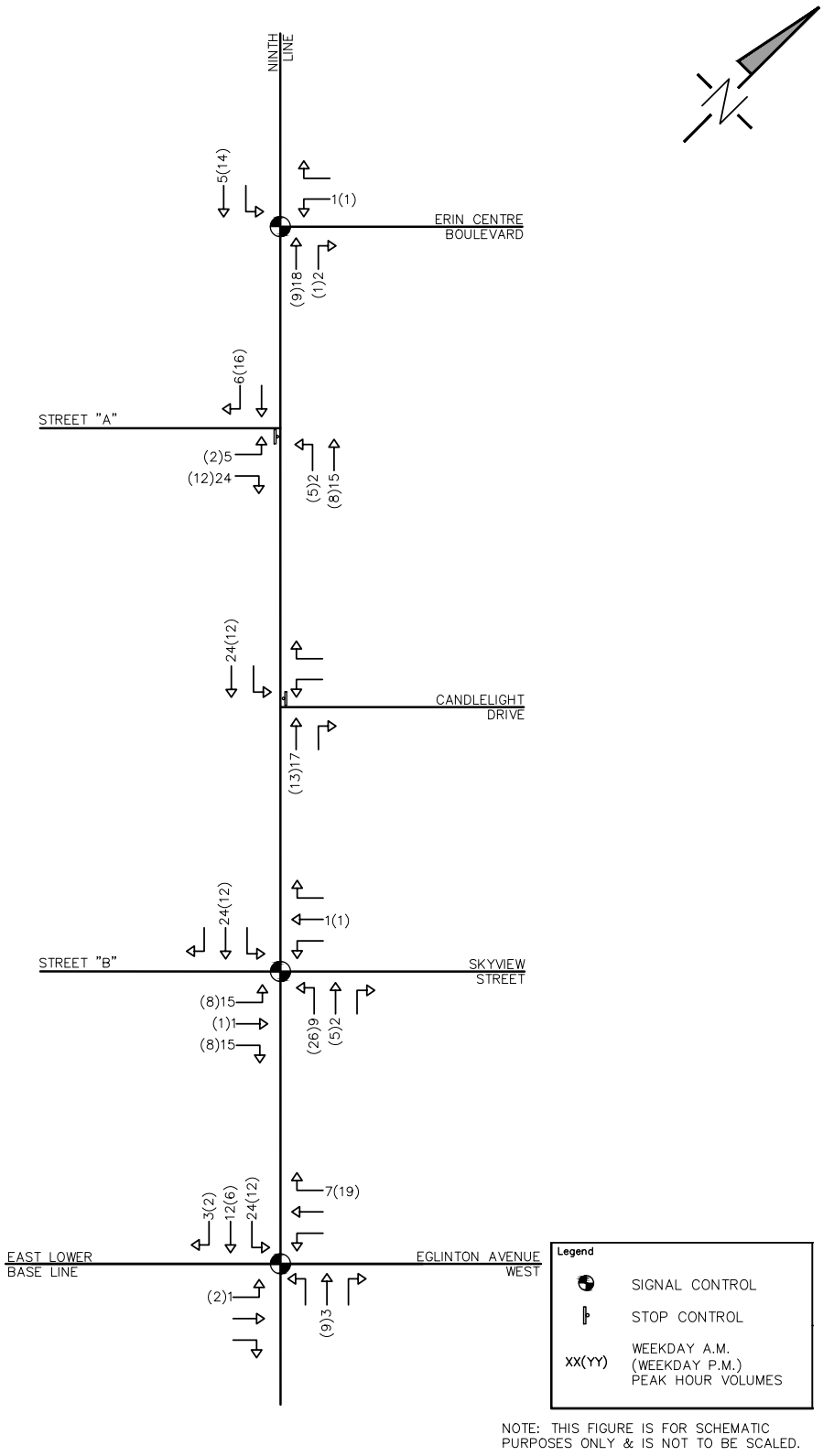


Figure 13: Site Trip Assignment

6.0 Future Total Conditions

6.1 Signal Warrant Analysis

A signal warrant analysis was conducted for the following cases:

- Ninth Line and Street A – 2026 Future Total

The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justifications 1 (Minimum Vehicular Volume), 2 (Delay to Cross Traffic), 3 (Combination of Justifications 1 and 2), and 4 (4-Hour Volume) were selected as the most appropriate warrants with which to assess the site connections.

The average hour volume was determined using the following formula from OTM Book 12:

AHV = (amPHV + pmPHV) / 4

Where;
AHV = average hour volume
PHV = peak hour volume

Despite the existing speed limit of 70 km/h on Ninth Line being considered "free flow" in the signal warrant analysis, an "urban" operating environment was applied to the signal warrant analysis to reflect the urbanization of the Ninth Line corridor. **Table 18** outlines the results of the signal warrant analysis.

Table 18: Signal Warrant Analysis Results

Location	Operating Environment	Horizon Year	Number of lanes on major road	Traffic Signals Warranted?
Ninth Line and Street A	Urban	2026 Future Total	Two	No

The results of the signal warrant analysis indicate that traffic signals are not warranted, at the intersection of Ninth Line and Street A. This conclusion reflects the assessment within Section 4.2 of the Traffic Analysis undertaken by HDR in support of the Ninth Line EA (excerpts are provided in **Appendix F**) and the 5080 Ninth Line TIS which recommends stop-control at the Ninth Line and Street A intersection through the 2035 horizon year.

Within this analysis, traffic signals were assumed to be implemented at the intersection of Ninth Line and Street B during the 2026 horizon year. It is noted that signal warrants were undertaken in the 5080 Ninth Line TIS in the 2025 future total scenario, which concluded that signals are warranted at the noted study intersection. Further, the Ninth Line EA and 5080 Ninth Line TIS performed traffic analysis with signals at the noted study intersection. Therefore, it is reasonable to assume that signals will be implemented at the intersection of Ninth Line and Skyview Street / Street B in the 2026 horizon year.

Appendix N contains the signal warrant sheets.

6.2 Left-Turn Lane Analysis

A left-turn warrant analysis was conducted for the northbound left movement at Ninth Line and Street A under 2026 Future Total conditions. This was performed in order to compare the results with

the 5150 Ninth Line TIS and the 5080 Ninth Line TIS and recommend improvements as needed.

The analysis was conducted using the Ministry of Transportation (MTO)'s "Design Supplement for TAC Geometric Design Guide for Canadian Roads – June 2017." (TAC-GDGCR). The analysis was conducted using the warrant for "Left Turn Storage Lanes for Four-Lane Undivided Highways Unsignalized." As Street A will be located on the west side Ninth Line, the northbound left-turn movement was analyzed for left-turn lane requirements. **Table 19** outlines the results of the left-turn lane warrant analysis.

Table 19: Left-Turn Lane Warrant Analysis Results

Location	Movement	Horizon Year	Number of lanes on major road	Left-Turn Lane Storage Requirement?
Ninth Line and Street A	NBL	2026 Future Total	Four	Yes – 25m storage length

The results of the left-turn lane analysis indicate that an auxiliary northbound left-turn lane is warranted at the intersection under 2026 future total conditions, with a storage length of 25m. This is the same conclusion to what was identified in the 5150 Ninth Line TIS under 2024 Future Total conditions, and the 5080 Ninth Line TIS under full buildout conditions. For Synchro modelling purposes, a 30m storage length for the northbound left movement was used to maintain consistency with the aforementioned traffic impact studies. Given the proposed southbound left-turn storage lane for the Ninth Line and Candlelight Drive intersection per the Ninth Line EA design drawings (provided within **Appendix F**), it is recommended the approximately 100m distance between the two intersections be distributed at 25m per left turn and the remaining length be a shared two-way taper; alternatively, as is expected for most of the Ninth Line corridor, a two-way left turn lane median marking may be implemented along the segment from Street A to Street B to provide left turning storage opportunities in both directions at the intersections involved.

Appendix O contains the Left-turn Warrants.

6.3 Right-Turn Lane Warrant Analysis

Per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GFGCR), June 2017, a right-turn auxiliary lane on an urban or rural road should be implemented at unsignalized intersections when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard. Similarly, consideration for a right turn storage is typically expected for a signalized intersection when there are operational issues and where repurposing a shared lane is expected to greatly improve operations at the intersection. It is also common practise in traffic engineering that an auxiliary right-turn lane be considered where right-turn volumes exceed 60 vehicles per hour.

Per the 5080 Ninth Line TIS findings, no auxiliary right-turn lanes are warrant on Ninth Line at the proposed Street A and Street B connections to Ninth Line all through to the 2035 future horizon. Accordingly, no auxiliary right-turn lanes are projected at full buildout or the 2026 horizon of the development herein.

6.4 Intersection Operations

The future total intersection operations at the study intersections were analyzed using the 2026 future total traffic volumes illustrated in **Figure 14**, and revised signal timings as outlined in **Section 3.8.2**. Detailed capacity analysis worksheets are included in **Appendix G** and Level of Service definitions are provided in **Appendix H**. **Table 20** outlines the 2026, future total traffic operations for the study intersections.

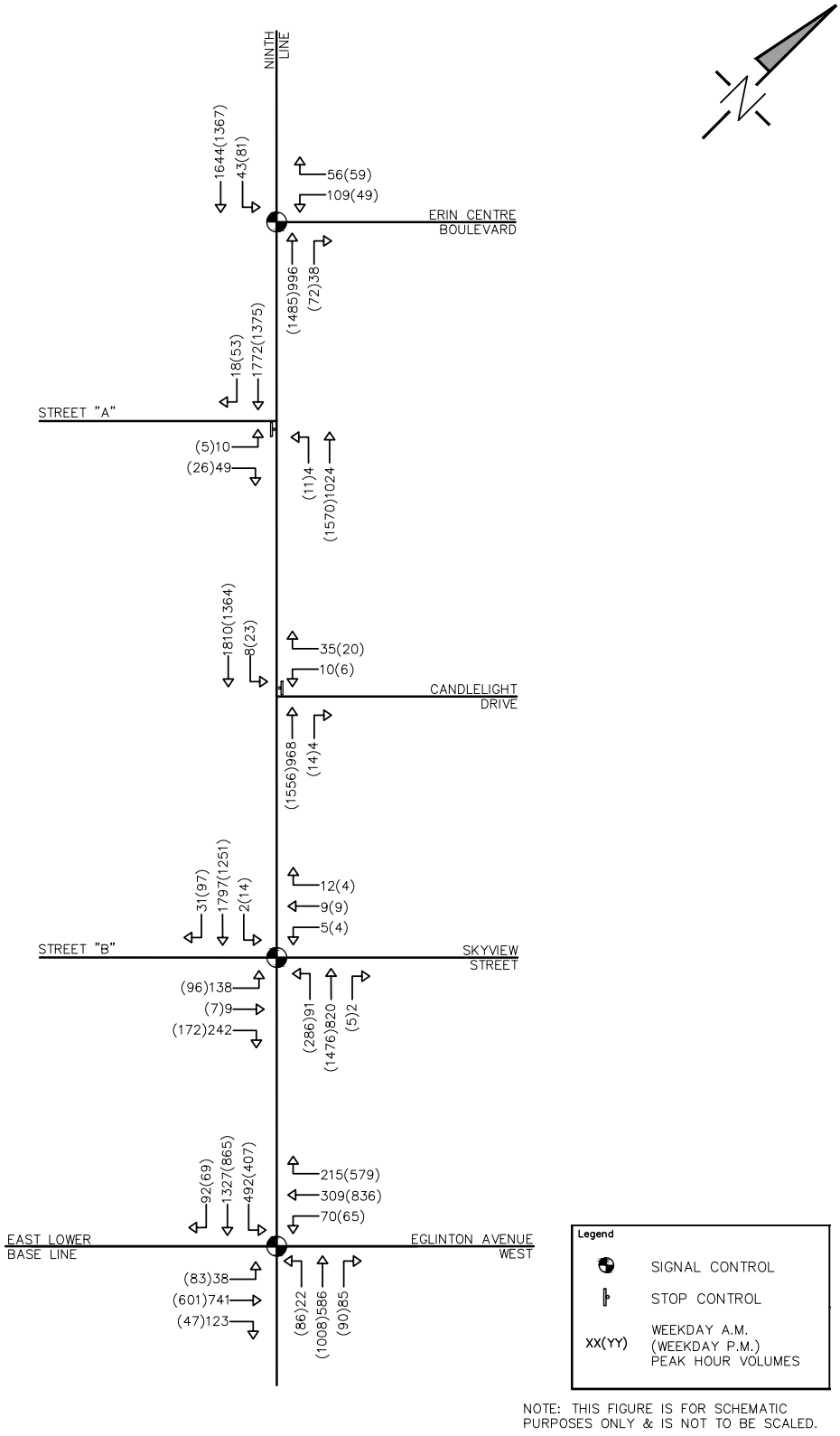


Figure 14: 2026 Future Total Traffic Volumes

Table 20: 2026 Future Total Traffic Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical v/c ratio [2]	95th Percentile Queue Length > Storage Length [3]
Ninth Line and Eglinton Avenue West / East Lower Base Line	Signal	A.M.	D	39.4s	**0.90 (SBL)** **0.89 (SBT)**	41.9m > 15.0m (EBL) 43.2m > 30.0m (WBL) 49.4m > 30.0m (NBR) 169.3m > 125.0m (SBL)
		P.M.	E	74,4s	**1.24 (SBL)** **1.17 (NBT)** **1.03 (WBT)**	51.5m > 15.0m (EBL) 69.4m > 30.0m (WBL) 101.9m > 65.0m (NBL) 58.0m > 30.0m (NBR) 198.6m > 125.0m (SBL)
Ninth Line and Erin Centre Boulevard	Signal	A.M.	B	10.7s	0.67 (SBT)	24.2m > 15.0m (SBL)
		P.M.	B	11.4s	0.73 (NBT)	42.5m > 15.0m (SBL)
Ninth Line and Candlelight Drive	Stop (Minor)	A.M.	B	14.9s	0.55 (SBT)	None
		P.M.	C	18.4s	0.65 (NBT)	54.3m > 30.0m (SBL)
Ninth Line and Skyview Street / Street "B"	Signal	A.M.	B	18.2s	0.78 (SBT)	22.9m > 15.0m (EBL)
		P.M.	B	13.2s	0.80 (SBT)	22.2m > 15.0m (EBL) 55.5m > 50.0m (NBL)
Ninth Line and Street "A"	Stop (Minor)	A.M.	D	29.9s	0.76 (SBT)	None
		P.M.	B	14.2s	0.59 (SBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection where the maximum v/c ratio does not exceed the critical thresholds. All v/c ratios that exceed the critical thresholds outlined in Section 3.8.3 are bolded.

Note 3: The 95th percentile queue lengths were derived from Sim-Traffic reports using 15-minute seeding, 60-minute simulation and an average of five runs. The 95th percentile queue lengths which are accommodated by the storage or a centre turn lane are not documented in this table.

Under the 2026 future total conditions, the signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours, respectively. Compared to 2026 future background conditions, the control delay increment is expected to be 0.8 and 4.3 seconds in the a.m. and p.m. peak hours, respectively; therefore, operational issues are largely background related. Similar to the future background conditions, the turn queues are forecast to occasionally exceed the turn storage lanes at the intersection during the peak hours as identified by the MMM Group and the Ninth Line EA Studies. Considering several other planned roadway improvements on adjacent roadways as well as future transit intensification on the Ninth Line corridor, these forecasted issues may be overstated herein. Nonetheless, it is recommended that the signal timing plans at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line be revised as needed to optimize future intersection performance.

Should adequate right-of-way exist, it is recommended that the City investigate potential dual-left turn lanes for the southbound left-turn movement at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line as part of the Ninth Line EA roadway improvements or in future. The movement has peak hour volumes in excess of 300, a threshold identified to warrant dual left turn lanes per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR).

The signalized intersection of Ninth Line and Erin Centre Boulevard Line is projected to operate at a LOS "B" or better with a maximum control delay of 11.4s seconds and volume-to-capacity ratio of 0.79 during the a.m. peak hour. A control delay increment of 0.1 seconds and volume-to-capacity ratio increase of 0.01 is expected. The southbound-left movement queue lengths are expected to occasionally exceed the storage length of the lane onto the two-way left turn median lane.

The stop controlled minor connection of Candlelight Drive at Ninth Line is projected to operate at a LOC "B" or better with a maximum control delay of 18.4s and volume-to-capacity ratio of 0.65. The southbound-left movement queue lengths are expected to occasionally exceed the storage length of the lane in the p.m. peak hour.

The signalized intersection of Street B / Skyview Street at Ninth Line is projected to operate at a LOS "B" or better with a maximum control delay of 18.2 seconds and volume-to-capacity ratio of 0.80.

The stop controlled minor connection of Street A at Ninth Line is projected to operate below capacity at a LOS "D" and "B" in the a.m. and p.m. peak hours, with a maximum control delay of 29.9 seconds in the a.m. peak hour. This represent a control delay increment of 6.1 seconds and no maximum volume-to-capacity ratio increase compared to future background conditions.

The study intersections operations are similar to the future background and consistent with the findings of the MMM study and the Ninth Line EA study. The proposed development does not materially impact traffic operations within the boundary road network and therefore can be supported from a traffic operations perspective.

7.0 Safety Review

Per the City of Mississauga's guidelines, a safety review of the proposed development is required. The purpose of the safety review is to identify any safety deficiencies for auto drivers, pedestrians and cyclists for the proposed development, and to identify how the development proposes to maximize safety for all road users.

7.1 Sight Distance Analysis

The available sightlines at the proposed CEC Road "F" connections were measured and compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR). Sight distance was measured from the proposed site accesses using the following assumptions:

- A standard driver eye height of 1.08 metres for a passenger car, and
- A 4.4 metre setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the site.

Intersection sight distance is calculated using equation 9.9.1 from the GDGCR as outlined below:

*ISD = 0.278 * V major * tg*

Where;
ISD = Intersection Sight Distance
V major = design speed of roadway (km/h)
tg = assumed time gap for vehicles to turn from stop onto roadway (s)

The CEC Road "F" is a local roadway and is assumed to have a design speed of 50km/h for the sight distance analysis. The connection at CEC Road "G" and the outbound only access were evaluated. Furthermore, the main ingress/egress points to Ninth Line at Street A and Street B also underwent sight distance analysis.

Table 21 outlines the sight distance analysis for the proposed CEC Road "F" connections.

Table 21: Sight Distance Analysis

Feature	Site Accesses at "CEC Road F"	Street A connection to Ninth Line	Street B connection to Ninth Line
Access Type	Full-Moves	Full-Moves	Full-Moves
Intersection Control	Stop (Minor Street)	Stop (Minor Street)	Signalized
Assumed Speed Limit of Roadway	40 km/h	70 km/h	70 km/h
Assumed Design Speed	50 km/h	90 km/h	90 km/h
Base Time Gap	7.5 s [1]	7.5 s [1]	7.5 s [1]
Additional Time Gap	N/A	1.0 s (time to cross additional through lane and centre turn lane)	1.0 s (time to cross additional through lane and centre turn lane)
Grade of Roadway	Less than 3%	Less than 3%	Less than 3%
Horizontal Alignment of Roadway	Straight	Straight	Straight
Sight Distance Required	105m [2]	215 m [2]	215 m [2]
Measured Sight Distance	Entire "CEC Road F" visible	>400m (to north and south)	>300m (to north and south)
Minimum Sight Distance Satisfied?	Yes	Yes	Yes

Note 1: Time gap for left-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the GDGCR.
Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

As outlined in **Table 21**, minimum sight distance requirements are satisfied at the proposed site accesses and at the Ninth Line connections. Therefore, the proposed development is supportable from a sight distance perspective.

7.2 Access Spacing and Corner Clearance

The TAC GDGCR was used to review access spacing for the proposed site accesses along CEC Road "F". The site access spacing requirements and proposed spacing are presented in **Table 22**.

Table 22: Access Spacing Review

Site Access	Available Spacing	Minimum Spacing and Corner Clearance Requirements	Evaluation	Source
Southern two-way access	>40m (to the north and south)[1]	15m corner clearance (from stop intersection	Satisfied	TAC-GDGCR Figure 8.8.2
		Minimum of 1 m spacing between driveways	Satisfied	TAC-GDGCR Figure 8.9.2
Northern one-way access	>20m (to the north) >50m (to the south)[1]	15m corner clearance(from stop intersection	Satisfied	TAC-GDGCR Figure 8.8.2
		Minimum of 1 m spacing between driveways	Satisfied	TAC-GDGCR Figure 8.9.2
Street A	>80m (to the north and south)	15m corner clearance (from stop intersection	Satisfied	TAC-GDGCR Figure 8.8.2
Street B	>60m (to the north and south)	15m corner clearance (from stop intersection	Satisfied	TAC-GDGCR Figure 8.8.2

Note 1: Assumes the intersection of CEC Road "F" and CEC Road "G" is stop controlled on the minor approaches only (ie. CEC Road "G" and the southern two-way access).

As presented in **Table 22**, the minimum spacing and corner clearance requirements have been satisfied. No operational safety issues are forecasted.

7.3 Internal Site Circulation

Detailed vehicle turning diagrams using vehicle turning analysis have been provided to illustrate internal site circulation. The most constrained vehicle profile expected to navigate the site was analyzed, which is a Peel front load garbage truck.

The vehicle turning diagrams indicates that maneuverability for the design vehicle expected within the site is adequate. **Appendix P** contains the vehicle turning diagrams for each vehicle profile.

8.0 Parking Review

This section details the required and provided parking supply for the proposed development. This includes residential parking, visitor parking, accessible parking, bicycle parking, and loading spaces.

8.1 Zoning By-Law Parking Required

The required parking rates for the proposed development were determined using the City of Mississauga's Zoning By-law No. 0225-2007.

Table 23 outlines the required parking spaces at the subject site based on the By-Law. The existing required rates can be found in section 3.1.2.1 of the City of Mississauga Zoning By-law.

Table 23: Required Vehicle Parking

Buildings	Unit Type	Number of Units	Rate	Required Vehicle Parking Spaces		
				Resident	Visitor	Total
6-Storey Mid-Rise Development	One Bedroom	136	1.25 per unit (resident) 0.20 per unit (visitor)	170	27	197
	Two Bedroom	62	1.4 per unit (resident) 0.2 per unit (visitor)	87	13	100
	Total			**257**	**40**	**297**

As presented in **Table 23**, the proposed vehicle parking supply of 228 is short of required supply per the City of Mississauga's Zoning By-law No. 0225-2007. The succeeding sections assesses peak parking demands forecast for the site based on other criteria and consideration is further given to the future transportation commuter choices in the area.

8.2 City of Mississauga Parking Regulation Update - Requirements

The City of Mississauga recognizes that the current Zoning By-law requirements are on a higher side and are in the process of updating the By-Law based on the ongoing Parking Regulation Study; with new updates expected to be implemented in 2022. The new proposed parking rates uses a precinct system to assign minimum parking rates based upon five criteria themes as outlined below:

- Transit access
- Availability of public parking
- Location within an intensification area;
- Land use and density mix; and
- Active Transportation Characteristics

Although the subject site currently qualifies as being situated within Precinct 4, a classification of Precinct 3 is likely supportable at the time of full development buildout. **Table 24** outlines the guidelines necessary for a Precinct 3 classification. Of the guidelines needed for Precinct 3 classification, the proposed development upon buildout as well as the entire Ninth Line corridor is expected to qualify for the Precinct 3 designation.

Table 24: Precinct 3 Guidelines and proposed development evaluation

Criteria Theme	Guideline	Future proposed development context
Transit Access	Rapid Transit Terminal/Station – Lands in Precinct 3 could also be within approximately 800 metres (10-15 minute walk) of a planned or existing rapid transit corridor, terminal, or station (BRT, LRT, GO). However, this is not required where high-frequency bus transit service is planned or available.	As identified in **Section 3.4**, MiWay Transit Route 9 connects to City Centre Transit Terminal. Furthermore, Miway Transit Route 35 connects to Kipling Subway/GO Station. Therefore, this guideline is satisfied.
	High-frequency bus transit service – In Precincts 1, 2, and 3, bus service typically includes connectivity (one bus route) to rapid transit stations and connection with other bus routes.	
Availability of public parking	Public Parking – In Precincts 3 and 4, public parking availability is limited. Most parking is provided in the form of private surface lots and there may or may not be municipal on-street municipal parking available.	Satisfied.
Planning Area	Intensification Area, Mainstreet Commercial and Key Growth Areas – Lands in Precincts 1, 2, and 3 are mostly located in a defined intensification area in the Official Plan or are within a delineated Major Transit Station Area. Lands in Precinct 1 will be included in an Urban Growth Centre, Downtown, or Mobility Hub as stated above. Some lands in Precincts 2 and 3 are not explicitly within a defined intensification area or an MTSA, but the lands may be within a "Mainstreet" commercial area (as evidenced-based on the application of the C4 zone to the lands), or the lands are otherwise considered to be within a key growth area.	The subject site does not fall within a defined intensification area, and instead is described as falling within a designated Greenfield area. However, the proposed development includes significant density that could lead it to being considered as within a key growth area, intensification area, etc.
Land Use and Density	Mix of Uses - Precincts 3 and 4 may consist of a limited range of existing and planned uses within walking distance.	Satisfied.
	High Density uses - In Precinct 3, there may be existing or planned higher-density uses including multi-storey office buildings or multi-unit residential building typologies, but this is not required.	Satisfied.
Active Transportation	Walkability – Precincts 2 and 3 have good pedestrian accessibility, but pedestrian amenities and direct walking routes to adjacent neighbourhoods may be limited compared to Precinct 1.	As identified in the TDMP, the Ninth Line EA and the proposed development propose an expansive network of sidewalk that provides good pedestrian accessibility. Further, the future Churchill Meadows Community Centre will promote walking as an attractive option for pedestrians. Therefore, this guideline is satisfied.
	Cycling Facility – Precinct 3 has or is planned to have, some on- and off-road cycling facilities to facilitate connectivity with cyclists, but facilities may be limited.	The future bicycle tracks along Ninth Line as outlined in the Ninth Line EA satisfies this guideline.
	There is limited opportunity to provide viable bike share opportunities in Precincts 3 and 4.	Satisfied.

Outlined in **Table 25** are the parking requirements for the development based on the Precinct 3 rates presented by the Parking Regulations Study - Public Meeting dated December 6, 2021.

Table 25: Precinct 3 Proposed Vehicle Parking

Buildings	Units or GFA	Rate	Required Vehicle Parking Spaces		
			Resident	Visitor	Total
6-Storey Mid-Rise Development	198	1.00 per unit (resident) 0.20 per unit (visitor)	198	40	238
Total			**198**	**40**	**238**

As shown in **Table 25,** based on the Precinct 3 rates of the Parking Regulations Study, the proposed resident parking supply is in accordance with City requirements. However, the proposed visitor parking supply is deficient per the Precinct 3 requirements by 10 spaces. Relevant proposed parking rate report excerpts have been included for reference in **Appendix Q**. Therefore, a parking justification is provided in the subsequent sections to support the proposed visitor parking supply.

8.3 City of Mississauga Parking Regulation Update - Justification

As previously discussed in **Section 8.2**, the City is undertaking an update of their parking requirements. Although the current recommendation for visitor parking for either the Precinct 3 or Precinct 4 case is 0.20 (per the Parking Regulations Study – Public Meeting, December 6, 2021), this is a change from the initial recommendations within the original Corporate report presented in May 2021. The original study recommended a visitor rate of 0.15 for condominium apartment dwelling units in both Precinct 3 and Precinct 4. This recommendation was based upon benchmarking from various comparable municipalities within Canada. Therefore, the original findings from the WSP Parking Regulations Study support the visitor parking supply of the proposed development.

8.4 ITE Parking Generation

A parking generation forecast was undertaken to estimate the peak parking demand at the proposed development using the Institute of Transportation Engineers (ITE) Parking Generation Manual, 5th Edition. For the condominium dwelling unit forecast, Land Use Category 221 "Multifamily Housing (Mid Rise)" was applied to the residential development. Given the location of the site, a location setting of "General Urban/Suburban (1/2 mile to rail transit)" was applied. The parking demand was forecasted by both the average rate and fitted curve methodologies. As outlined in **Table 26**, the proposed parking supply is forecast to adequately accommodate the forecasted demand per the ITE data.

Table 26: ITE Parking Generation

Land Use	Methodology	Estimated Parking Demand	Provided Parking Spaces	Satisfied?
General Urban/Suburban (1/2 mile to rail transit)	Average Rate	222	228	**Yes**
	Fitted Curve	210		**Yes**

8.5 6719 Glen Erin Drive Surrogate Site Parking Survey

To further support the proposed development parking supply, a parking survey from a surrogate site at 6719 Glen Erin Drive in Mississauga was used. The site is an apartment building with 179 units and a total parking supply of 235 tenant parking spaces as well as 34 visitor parking spaces.

A parking utilization survey was undertaken by Ontario Traffic Inc. on Sunday May 24th, 2020, and Wednesday, May 27th, 2020, between 10:00 p.m. and 2:00 a.m. The dates and time were selected to

survey the peak parking demand at the subject site during the peak parking hours for a residential use.

Using the number of cars parked and the number of dwelling units of the surrogate site, the maximum peak parking demand rates were calculated. The maximum tenant spaces occupied during the survey was 148 spaces, thus a peak demand ratio of 0.83 spaces per unit. The maximum visitor spaces occupied was 26 spaces, thus a peak demand ratio of 0.15 spaces per unit. The parking survey results are provided in **Appendix R**.

Table 27 presents the peak parking demand for the proposed development at based on the surrogate site peak parking demand rates.

Table 27: Peak Demand Forecast Analysis per 6719 Glen Erin Drive Parking Survey Data

Land Use	Peak Parking Rates	Number of Units	Peak Parking Required	Proposed Parking
Proposed Development Resident Parking	0.83 spaces per unit	198 units	165 spaces	228 Spaces **(+33)**
Proposed Development Visitor Parking	0.15 spaces per unit	198 units	30 spaces	
Proposed Development Total Parking		198 units	195 spaces	

As outlined in **Table 27**, based on the surrogate site's parking survey data, the peak parking demand of the proposed development is 165 resident spaces and 30 visitor spaces, totalling 195 parking spaces. Therefore, the proposed total parking supply of 228 spaces results in a surplus of 33 spaces compared to the surrogate site forecasted peak parking demand. Further, both the resident and visitor components of the proposed development parking supply is consistent with the surrogate site parking survey.

8.6 Visitor Parking Zoning By-law Exceptions

Given the City of Mississauga Zoning By-Law requirement of 0.20 spaces per unit for visitor parking, the site requires 40 visitor parking spaces. However, the City has permitted a visitor parking supply of 0.15 visitor spaces per unit for similarly sized developments, thus a proposed development visitor parking supply of 30 spaces is supportable. **Table 28** highlights several similar developments approved by the City of Mississauga with Zoning By-law exceptions to allow for a visitor parking supply of 0.15 spaces per unit. These zoning by-law exceptions support the proposed development visitor parking rate of 0.15 spaces per unit.

Table 28: Visitor Parking Zoning By-law exceptions

By-Law Exception	Development Details	Minimum Visitor Parking Rate
RM8-11	Seven 4-storey townhouse buildings with a maximum total of 144 dwelling units .	0.15 parking spaces per unit
RA5-45	15-storey 69 unit apartment building	0.15 parking spaces per unit
RA4-43	Maximum 500 dwelling units across four buildings with heights up to 18-storeys	0.15 parking spaces per unit
RA1-37	Apartment / Townhouse development with approximately 250 dwelling units	0.15 parking spaces per unit[1]
RM8-4	Townhouse development with a maximum 194 dwelling unit,	0.15 parking spaces per unit[1]

Note 1: These developments include a minimum visitor parking rate of 0.15 and 0.20 for apartment and townhouse dwelling units, respectively.

8.7 Transportation Demand Management

There are a number of existing and proposed Transportation Demand Management (TDM) opportunities in the City of Mississauga that encourages non-auto transportation modes. Such opportunities are identified in the Transportation Demand Management Plan (TDMP) Study submitted under a separated cover. However, a summary of some of the TDM opportunities (i.e., existing and future), that would contribute to a reduced parking demand are summarized below in **Table 29**. These opportunities decrease the dependence on single occupancy vehicle trips at the proposed development, consequently encouraging a reduction in parking demand. Further, as outlined in the TDMP Study, the existing non-auto mode share near the subject site is approximately 38%, which indicates that, near the subject site, a strong willingness exists to use more sustainable transportation modes like transit/ active transportation. These findings further support the proposed parking supply of 228 spaces at the subject site.

Table 29: Summary of Transportation Demand Management Opportunities

Transportation Mode	Transportation Demand Management Opportunities
Walking	• Currently, nearly all roadways within the boundary road network possess sidewalks at least 1.5 meters in width. • Sidewalks of with 2.0 meters on both sides of Ninth Line are included within the Ninth Line EA design, planned to be implemented before the buildout of the proposed development. • The proposed development includes sidewalks on the north, west, and south sides of the apartment building. Further, connections are included between the proposed development and Ninth Line, improving the pedestrian experience within the site
Cycling	• There currently exists bike lanes along Erin Centre Boulevard • New bike routes are expected to be implemented before buildout of the proposed development include routes along Ninth Line and Eglinton Avenue, identified in the Ninth Line EA and the City of Mississauga's Cycling Master Plan, respectively. • A multi-use trail is being implemented on the western side of the nearby 5080 and 5150 Ninth Line developments. This trail will enhance access to nearby destinations such as the Churchill Meadows Community Centre and Sports Park
Transit	• There exists two local MiWay bus routes within walking distance of the subject site. The routes offer good transit access to local destinations such as Erin Mills Town Centre, Mississauga City Centre, along with Middle and High schools in proximity to the subject site • The Winston Churchill transitway station is located approximately 3.5km away from the subject site. The stop connects with three Miway and two GO transit bus routes. The routes provide express service to several major destinations within Mississauga, including a connection to the Lakeshore GO line. • The MTO is planning the construction of the Highway 407 transitway, an exclusive grade separated bus rapid transit corridor. The 407 transitway is planned to run parallel to Highway 407 and will span from Burlington to Pickering.

8.8 Parking Review Summary

The proposed Parking supply is deficient of the City's Zoning By-law No. 0225-2007; however, the parking supply is forecast to accommodate peak parking demands at the site based on ITE and surrogate site data. Given the location of the site and development proposal, the supply is largely consistent with the original WSP Parking Regulation Study along with zoning by-law exceptions from similar developments. The proposed parking supply aligns with the City's findings regarding decreasing vehicle ownership (per City's PMPIS) as well as the City's desire of influencing commuter transportation choices through parking policy and parking supply; with a shift towards more

sustainable modes of transportation.

The site provides the required barrier free accessible parking spaces and bicycle parking spaces for each building. Given the total residential visitor parking requirement is 40; the requirement is 4% of the total (i.e., 40) per Table 3.1.3.1 of the By-Law No. 0225-2007; resulting in 2 accessible parking spaces required. The site proposes 2 accessible parking spaces, satisfying the By-law.

A total bicycle parking supply of 0.6 per unit (long-term) and 0.05 per unit (short-term) for residential is recommended by the City as well as the ongoing Parking Regulations Study. Based on these rates, the site requires a total of 119 long-term spaces and 10 short-term spaces. The site provides 119 long-term and 10 short-term bicycle parking spaces, satisfying the applicable requirements.

9.0 Conclusions

The analysis contained within this report has resulted in the following key findings:

- Under the 2021 existing conditions scenario, the boundary road network is operating at a LOS "E" or better at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line, and LOS "D" or better at all other study intersections during the weekday a.m. and p.m. peak hours.

- Under the 2026 future background conditions:

    - The signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours. The turn queues are forecast to occasionally exceed the turn storage lanes at the intersection during the peak hours as identified by the MMM Group and the Ninth Line EA studies. These queues may occasionally obstruct some movements at adjacent intersections during the peak hours. These operations are however typical for high traffic arterial intersections during the peak hours and operations are expected to return to acceptable levels during the off-peaks.

    - The remaining study intersections are expected to operate efficiently at a LOS "C" or better during the weekday peak hours.

- The proposed development is expected to generate a total of 76 and 78 total two-way trips during the weekday a.m. and p.m. peak hours, respectively.

- Under the 2026 future total conditions, the study intersections are forecast to operate at similar levels of services with minor changes.

    - The signalized intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line is projected to operate at a LOS "D" and "E" during the weekday a.m. and p.m. peak hours, respectively. Compared to 2026 future background conditions, there is a control delay increase of 0.8 and 4.3 seconds in the a.m. and p.m. peak hours, respectively; therefore, operational issues are largely background related as highlighted in the future background section. Considering several other planned roadway improvements on adjacent roadways as well as future transit intensification on the Ninth Line corridor, forecasted operational issues may be overstated herein.

  - The remaining study intersections are expected to continue to operate efficiently at a LOS "D" or better. A maximum control delay increment of 6.4 seconds and volume-to-capacity ratio increase of 0.01 is forecast.

  - Signal Warrants were evaluated at the intersection of Ninth Line and Street A. Signalization was not found to be warranted. This finding is consistent with prior analysis undertaken in the Ninth Line EA.

  - Left-turn warrants were evaluated for the northbound left-turn movement at the intersection of Ninth Line and Street A. A left-turn storage lane of length 25m is warranted for the aforementioned movement. This finding is consistent with previous studies.

- A safety review regarding the proposed Street A and Street B was conducted as required by the City of Mississauga's guidelines. Based on the safety review:

  - The available sight distance at the site access connections exceeds the minimum sight distance requirements set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017.

  - The site satisfies the minimum corner clearance and access spacing requirements per the TAC-GDGCR

  - There are no expected maneuverability constraints within the site for waste collection vehicles.

- The proposed Parking supply is deficient of the City's Zoning By-law No. 0225-2007; however, the parking supply is forecast to accommodate peak parking demands at the site based on ITE and surrogate site parking data. Given the location of the site and development proposal, the supply is largely consistent with the WSP Parking Regulation Study. Several City of Mississauga zoning by-law exceptions from similar developments further supports the proposed visitor parking supply. The proposed parking supply aligns with the City's findings regarding decreasing vehicle ownership (per City's PMPIS) as well as the City's desire of influencing commuter transportation choices through parking policy and parking supply; with a shift towards more sustainable modes of transportation. Furthermore, the site provides the required barrier free accessible parking spaces and bicycle parking spaces.

Additionally, the conclusions arising from the analysis has resulted in the following recommendations as outlined below:

- It is recommended that the signal timing plans at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line be revised as needed to optimize future intersection performance.

- Should adequate right-of-way exist, it is recommended that the City investigate potential dual-left turn lanes for the southbound left-turn movement at the intersection of Ninth Line and Eglinton Avenue West / East Lower Base Line as part of the Ninth Line EA roadway improvements or in future. The movement has peak hour volumes in excess of 300, a threshold identified to warrant dual left turn lanes per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR).

- It is recommended that consideration be given to providing a continuous two-way left turn (TWLT) median lane between Street A and Street B to provide left turn opportunities for the

closely spaced connections on the segment. This is aligned with the Ninth Line EA, as a TWLT lane is expected along most of the Ninth Line corridor.

- It is recommended that the Street A connection to Ninth Line include a northbound left-turn lane with a minimum storage length of 25m.

The analysis contained within this report was prepared using the Site Plan prepared by ZO1 Architects (dated November 5, 2021). Minor revisions to the development concept are not expected to affect the conclusions contained with this report. In conclusion, the proposed development can be supported from a transportation operations and safety perspective.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.

Peter Apasnore, MASc., P.Eng., PTOE
Project Engineer

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