415-421 Boler Road, London

Transportation Impact Assessment

Paradigm Transportation Solutions Limited

2024-12
240655

ptsl.com

Project Summary

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Transportation Impact Assessment

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Executive Summary

Content

Paradigm Transportation Solutions Limited has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed residential development located at 415-421 Boler Road in the City of London.

This TIA includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from development completion (2032), assessment of traffic impacts with recommendations to accommodate the proposed development as appropriate, and transportation demand management strategies.

Development Concept

The subject site is located on the northwest corner of Boler Road and Byron Baseline Road and includes three existing single-family residential properties with driveways on Boler Road. The assembled lands have a frontage of approximately 78 metres on Boler Road and 57 metres on Baseline Road.

The proposed development involves the removal of the existing dwellings and construction of a six-storey, 62-unit apartment building.

Vehicular access to the site will replace the existing all-moves driveways on Boler Road with a single full-moves access located approximately 83 metres (centreline to centreline) from Byron Baseline Road. A second full-moves access is proposed on Byron Baseline Road approximately 55 metres (centreline to centreline) from Boler Road.

The development is anticipated to be completed by 2027.

TIA Scope

The scope of the TIA for the proposed development includes:

- **Study Area intersections:**
  - Boler Road and Byron Baseline Road (signalized);
  - Boler Road and Commissioners Road West (signalized);
  - Access intersections on Boler Road and on Byron Baseline Road.
- **Analysis Periods:** Weekday AM and PM peak hours.

- **Traffic Conditions:** Base year (2024) and five years from development completion (2032).
- Transportation Demand Management (TDM) measures appropriate to the subject development.

Conclusions

Based on the investigations carried out, it is concluded that:

- **Existing Traffic Conditions:** The study area intersections are operating with acceptable levels of service, except for the following critical movements at the intersection of Boler Road and Commissioners Road West:
  - The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour;
  - The westbound right-turn movement is operating with 95th percentile queues exceeding the available storage of 25 metres during the AM and PM peak hours; and
  - The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 50 metres during the PM peak hour.

  Additionally, Simtraffic queueing analysis indicates that 95th percentile queues are exceeding the available storage for the following movements:
  - Boler Road and Byron Baseline Road: eastbound left-turn movement (AM peak hour) and southbound left-turn movement (PM peak hour).
  - Boler Road and Commissioners Road West: eastbound, northbound and southbound left-turn and westbound right-turn (AM and PM peak hours).
- **Development Trip Generation:** The development is forecast to generate 16 and 25 trips during the AM and PM peak hours, respectively.

  The development is not a significant trip generator and will add less than 1.0% of the future road traffic volumes on Boler Road and less than 1.5% of the future road traffic volumes on Byron Baseline Road.
- **Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under existing traffic conditions, with the addition of the following critical movements:

- Boler Road and Byron Baseline Road: The eastbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95th percentile queues exceeding the available storage of 45 metres during the PM peak hour.
- Boler Road and Commissioners Road West: The eastbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 40 metres during the PM peak hour;

  The northbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 25 metres during the PM peak hour; and

  The southbound left-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

Simtraffic queueing analysis indicates that the 95th percentile queues at the study area intersections are forecast to be similar as under existing traffic conditions, with the addition of the northbound left-turn lane at Boler Road and Byron Baseline Road during the AM peak hour.

- **Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under background traffic conditions. The proposed development is forecast to have negligible impacts on the surrounding road network as the site generated trips are forecast to impact the intersection operations by less than two seconds of delay and less than 0.02 for the v/c ratio.
- **Site Access:**
  - Left-Turn Lanes:
    - An eastbound left-turn lane is not warranted at the proposed site access on Byron Baseline Road under forecast total traffic conditions.
    - A northbound left-turn lane is not warranted at the proposed site access on Boler Road under forecast total traffic conditions.
  - Queueing: The site access points are forecast to operate with LOS C or better during the AM and PM peak hours. Eastbound and southbound 95th percentile queues at Boler Road and Byron Baseline Road are forecast to extend intermittently beyond the site access points during the AM and PM peak hours.

In addition, the site access points are forecast to operate with queues no greater than one vehicle into the site for outbound traffic.

- Location: A clear line of sight is available in either direction at both site access points.

  The proposed site access on Boler Road meets the City's minimum corner clearance requirement of 75 metres.

  The proposed site access on Bryon Baseline Road does not meet the minimum corner clearance requirement. Given the limited frontage along Byron Baseline Road, it would not be possible to obtain the minimum corner clearance. In addition, the subject development is a low trip generator with minimal trips assigned to both driveways. Based on the intersection operations and queueing analyses, the impact to the intersection of Boler Road and Byron Baseline Road and the queueing into the site are considered minimal.

- **Boler Road Improvements:** The capacity issues identified at the study area intersections are independent of the proposed development. The following improvements could be considered as part of future road construction.

  - Byron Baseline Road Intersection: Under existing conditions, the intersection does not operate with a left-turn advance phase. Introducing an eastbound left-turn advance phase would increase the capacity of the movement.
  - Commissioners Road West Intersection: Additional capacity does not appear to be available through signal timing changes. Although the southbound left-turn forecasts are approaching the minimum threshold for dual left-turn lanes, the north approach appears to be constrained.

- **Transportation Demand Management:** The following TDM measures are proposed at the development:

  - Internal sidewalks with connections to the existing municipal network;
  - 79 long-term bicycle parking spaces on-site;
  - Access to multiple bus transit routes that provide good connectivity to the broader network and access to major destinations; and
  - Parking unbundled from the sale/rent agreement of each unit.

Recommendations

Based on the findings of this study, it is recommended that the development be considered for approval as proposed.

Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed residential development located at 415-421 Boler Road in the City of London. **Figure 1.1** illustrates the subject development location.

The subject site is located on the northwest corner of Boler Road and Byron Baseline Road and includes three existing single-family residential properties with driveways on Boler Road. The assembled lands have a frontage of approximately 78 metres on Boler Road and 57 metres on Baseline Road.

The proposed development involves the removal of the existing dwellings and construction of a six-storey, 62-unit apartment building.

Vehicular access to the site will replace the existing all-moves driveways on Boler Road with a single full-moves access located approximately 83 metres (centreline to centreline) from Byron Baseline Road. A second full-moves access is proposed on Byron Baseline Road approximately 55 metres (centreline to centreline) from Boler Road.

The development is anticipated to be completed by 2027.

1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with City of London staff via e-mail in November 2024, includes:

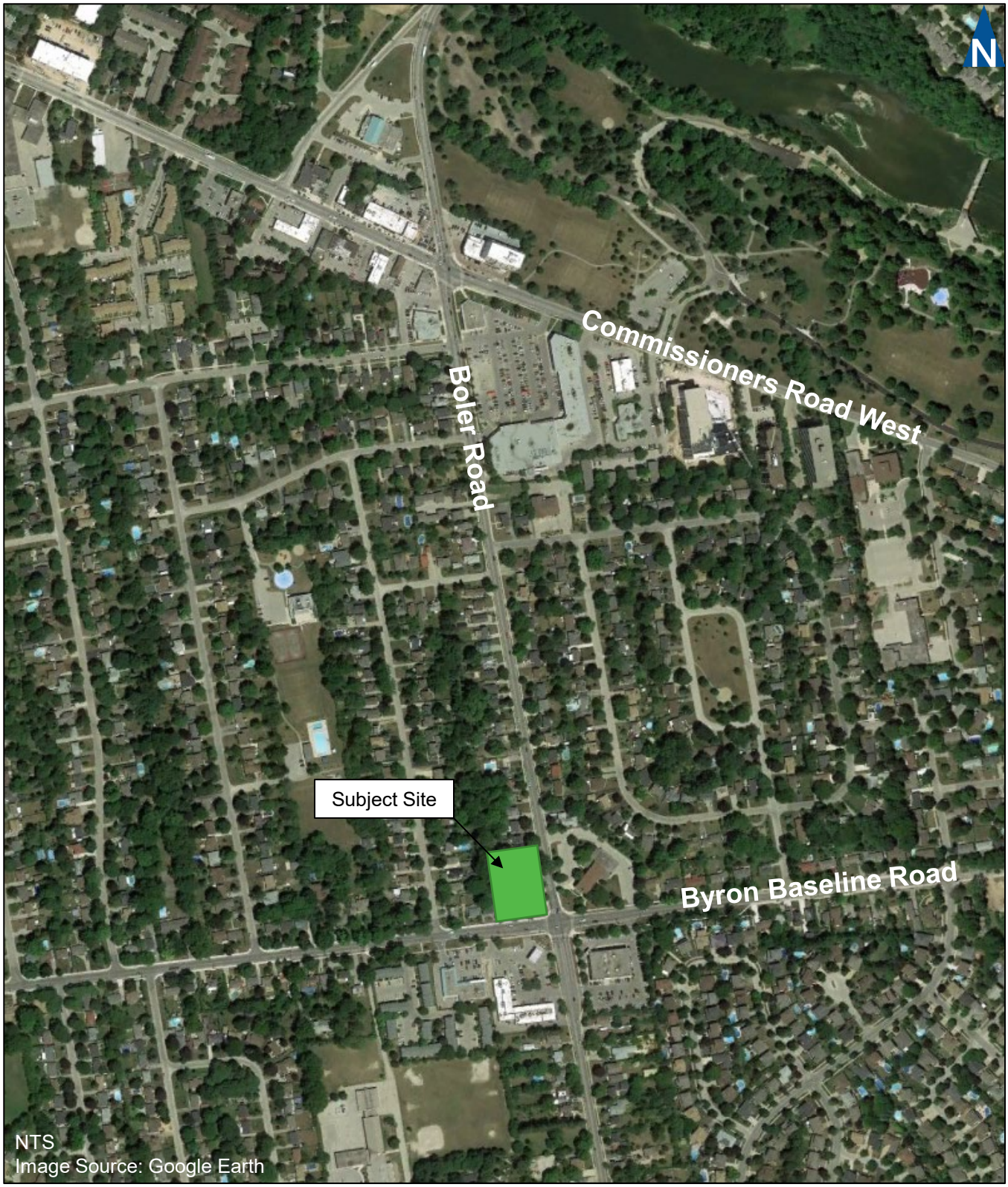
- Assessment of the current traffic and site conditions within the study area;
- Estimates of background traffic growth for five years from development completion (2032);
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of future traffic on the surrounding road network, including the following study area intersections:
  - Boler Road and Byron Baseline Road (signalized);
  - Boler Road and Commissioners Road West (signalized);

    - Access intersections on Boler Road and on Byron Baseline Road.
- Recommendations necessary to mitigate the site generated traffic in a satisfactory manner; and
- Transportation Demand Management measures.

Appendix A contains the pre-study consultation material and responses from the City of London.

This study has been prepared in accordance with the requirements detailed by the *City of London Transportation Impact Assessment Guidelines*[1].

[1] City of London, *Transportation Impact Assessment Guidelines*, April 2012.



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Location of Subject Site

415-421 Boler Rd, London TIA
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Figure 1.1

2 Existing Conditions

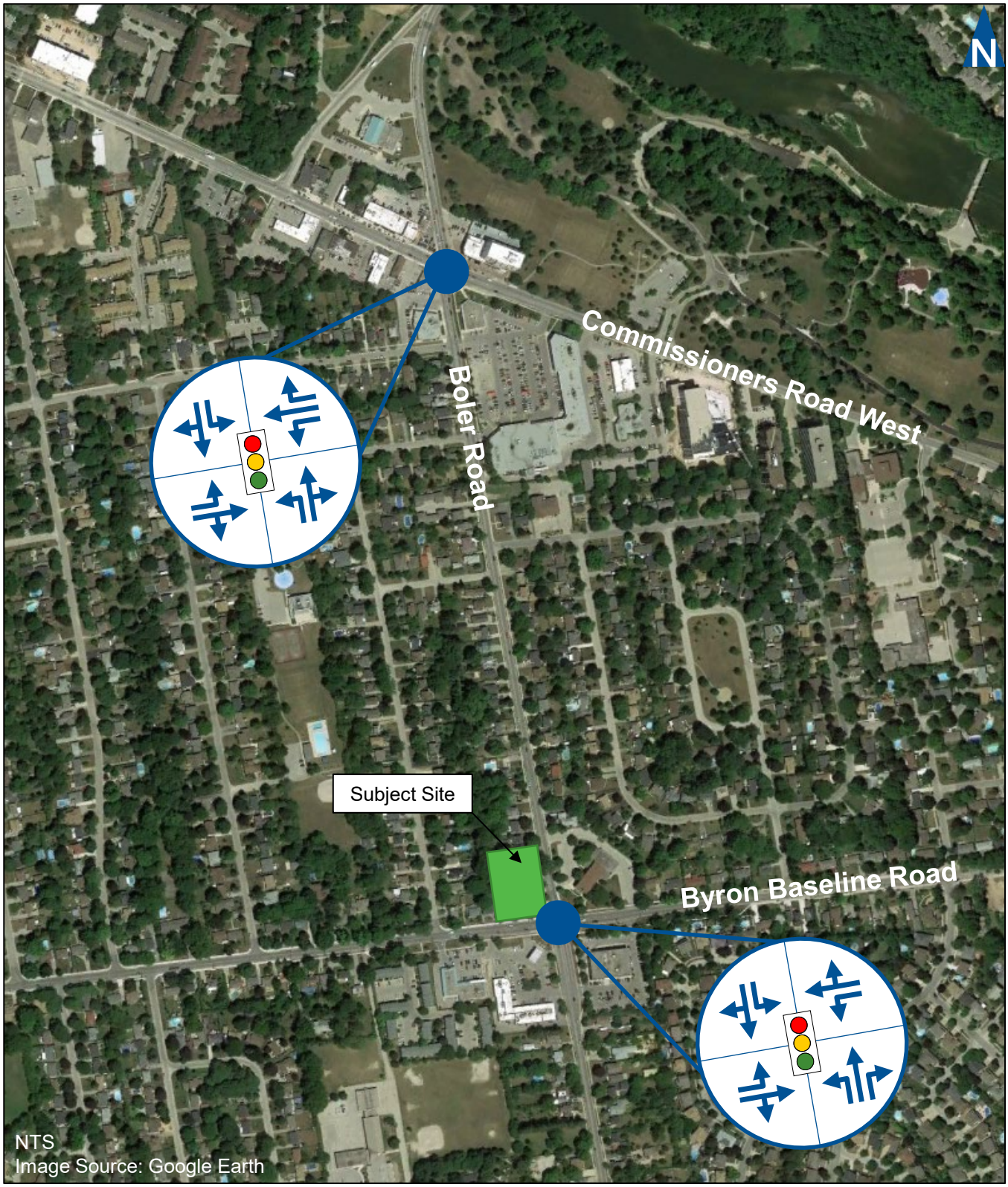
2.1 Existing Roadways

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- **Boler Road** is a north-south civic boulevard[2] with a primarily two-lane cross section and a posted speed limit of 50 km/h. The south leg of the intersection at Commissioners Road West is classified as a main street. Sidewalks are provided on both sides of the roadway south of Commissioners Road West and on the west side to the north.
- **Byron Baseline Road** is an east-west civic boulevard with a two-lane cross section and a posted speed limit of 50 km/h. Sidewalks and bike lanes are provided on both sides of the roadway.
- **Commissioners Road** is an east-west civic boulevard with a primarily two-lane cross section and a posted speed limit of 50 km/h. The east and west legs of the intersection at Boler Road are classified as a main street. Sidewalks are provided on both sides of the roadway west of Boler Road and on the south side to the east.

Figure 2.1 illustrates the existing lane configuration and traffic control at the study area intersections.

[2] City of London, *The London Plan Map 3 – Street Classifications*, May 2022.



Existing Lane Configuration and Traffic Control

415-421 Boler Rd, London TIA
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Figure 2.1

2.2 Transit Service

London Transit operates the following two routes within the study area:

- **Route 5 Byron – Argyle Mall** operates along Boler Road with major stops in Downtown London and at Argyle Mall. This route operates Monday to Sunday and Holidays with 30 to 60-minute headways.
- **Route 17 Byron/Riverbend – Argyle Mall** operates along Boler Road with a major stop at Fanshawe College. This route operates Monday to Sunday and Holidays with 20 to 40-minute headways.

The closest stop for both routes is located on the east side of Boler Road immediately opposite the subject site.

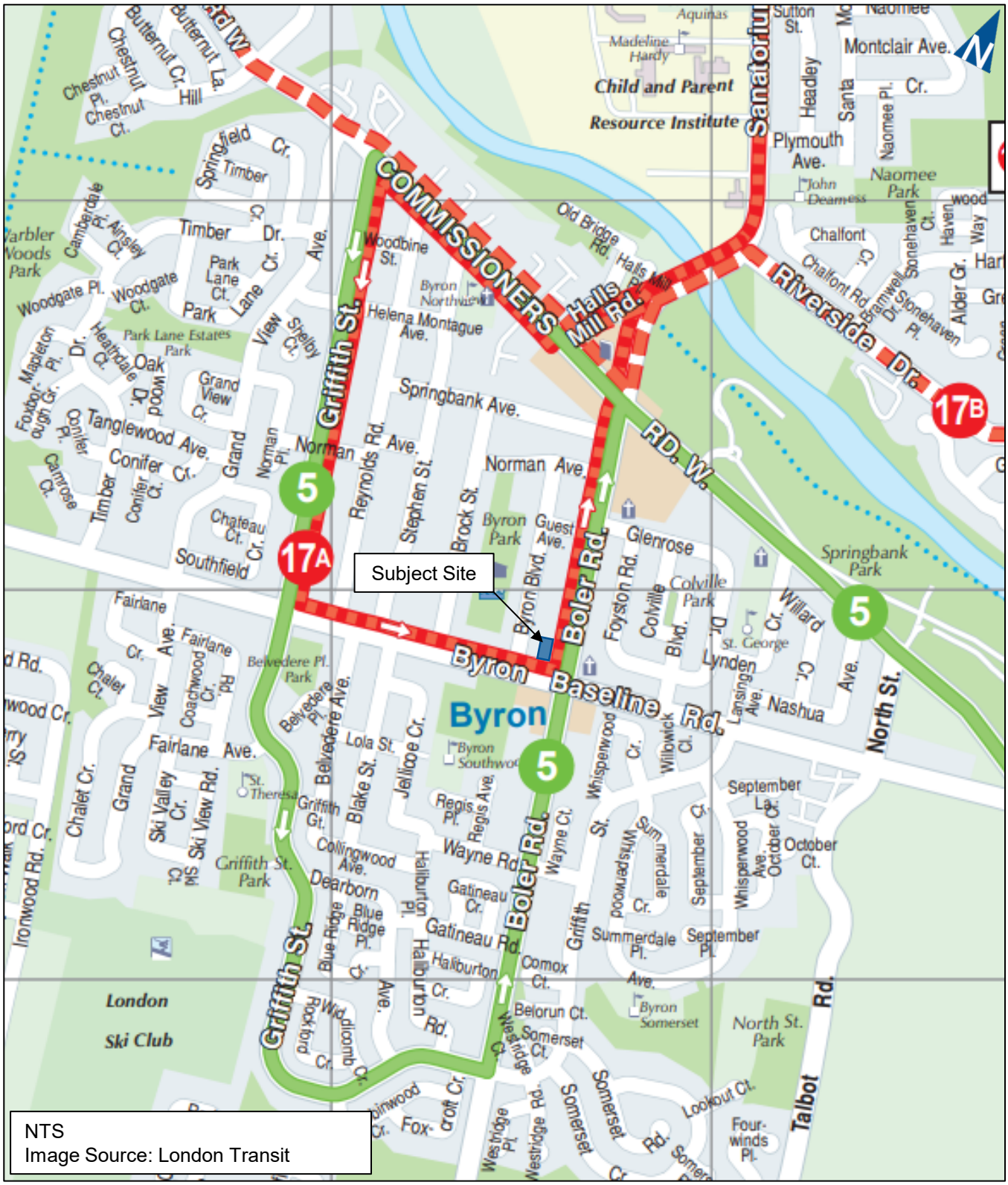
Figure 2.2 illustrates the existing transit service.

2.3 Traffic Volumes

Turning movement counts from March 2024 were provided by the City.

Figure 2.3 illustrates the existing (2024) AM and PM weekday peak hour traffic volumes.

Appendix B contains the detailed traffic counts and signal timings for the study area intersections.



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Existing Transit Network

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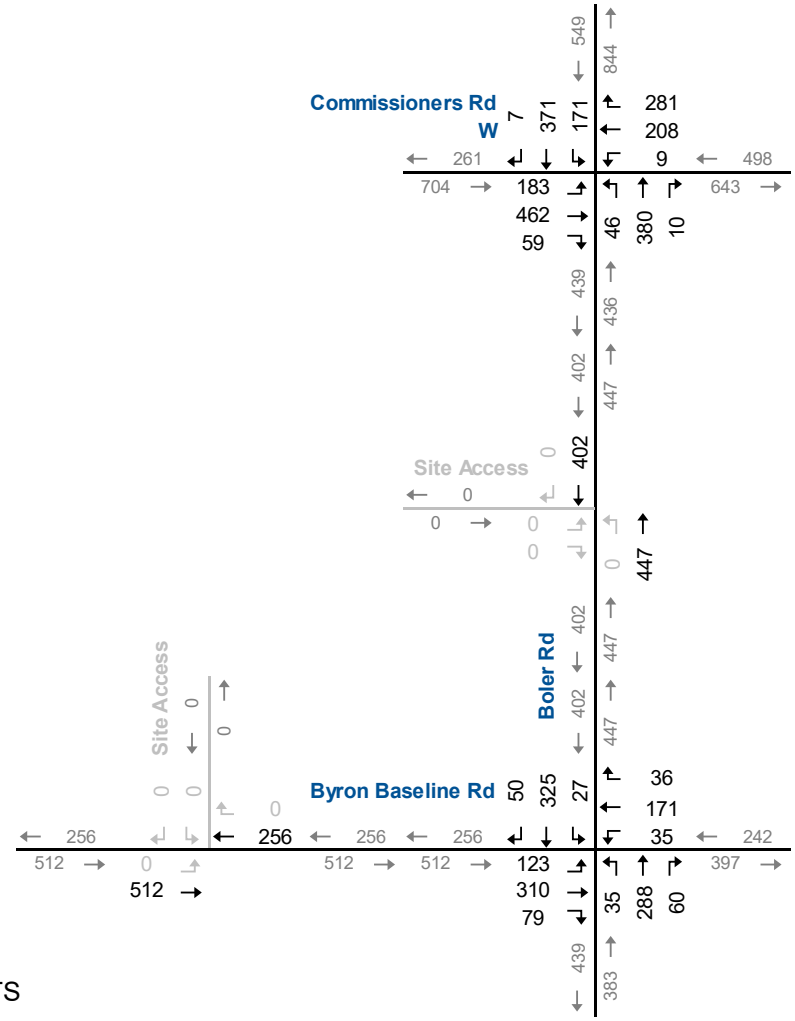
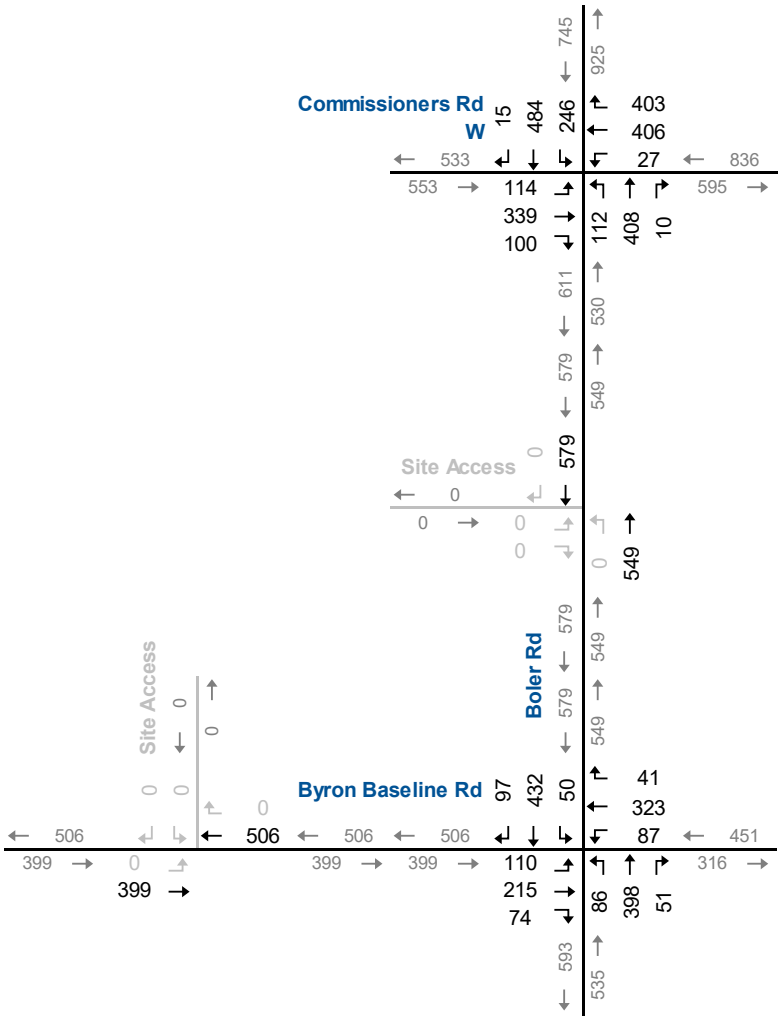
Figure 2.2

AM Peak Hour



PM Peak Hour



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Existing Traffic Volumes

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Figure 2.3

2.4 Traffic Operations

2.4.1 Synchro Analysis

The level of service conditions at the study area intersections have been assessed using Synchro 11. Movements are considered critical under the following conditions:

- volume/capacity (v/c) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above and level of service (LOS) 'E' or worse;
- v/c ratios for dedicated turning movements increased to 0.90 or above and LOS 'E' or worse; or
- 95th percentile queue lengths for individual movements exceeds available lane storage.

Intersection LOS is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

Table 2.1 summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour LOS, v/c ratios, and 95th percentile queues.

The results indicate that the study area intersections are operating with acceptable levels of service, except for the following critical movements at the intersection of Boler Road and Commissioners Road West:

- The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour;
- The westbound right-turn movement is operating with 95th percentile queues exceeding the available storage of 25 metres during the AM and PM peak hours; and
- The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 50 metres during the PM peak hour.

Appendix C contains the detailed Synchro 11 reports.

TABLE 2.1: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	C	C	>	C	C	C	>	C	B	B	A	B	B	B	>	B	B
			Delay	25	33	>	31	23	21	>	21	11	12	4	10	10	12	>	12	19
			V/C	0.44	0.78	>		0.26	0.42	>		0.08	0.31	0.08		0.05	0.42	>		
			Q	30	83	>		12	41	>		9	51	6		7	68	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	15	-	>		33	-	>		41	-	64		33	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	C	C	>	C	C	C	B	C	B	D	>	D	C	C	>	C	C
			Delay	21	30	>	28	32	35	13	22	17	51	>	47	24	33	>	30	31
			V/C	0.39	0.69	>		0.05	0.41	0.49		0.15	0.84	>		0.57	0.63	>		
			Q	50	167	>		7	73	44		12	124	>		38	107	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	-10	-	>		78	-	-19		13	-	>		12	-	>		
PM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	E	C	>	C	C	C	>	C	B	B	A	B	A	B	>	B	C
			Delay	56	25	>	34	27	32	>	31	12	12	3	11	10	14	>	13	21
			V/C	0.78	0.60	>		0.43	0.75	>		0.26	0.41	0.06		0.11	0.56	>		
			Q	39	58	>		24	77	>		19	66	5		11	96	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	6	-	>		21	-	>		31	-	65		29	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	C	C	>	C	C	D	C	C	C	D	>	D	D	D	>	D	D
			Delay	26	30	>	29	30	41	26	34	25	54	>	48	36	40	>	39	37
			V/C	0.45	0.61	>		0.11	0.70	0.69		0.52	0.86	>		0.79	0.80	>		
			Q	34	135	>		13	144	102		25	138	>		65	147	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	6	-	>		72	-	-77		0	-	>		-15	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
< / > - Shared with through movement

2.4.2 Queuing Analysis

A SimTraffic queuing analysis has also been completed to measure the full impact of queueing and blocking. SimTraffic is a microscopic model that individually tracks each vehicle in the system and collects comprehensive operational measures of effectiveness for every vehicle during the simulation. The analysis consisted of five iterations of 60-minute simulations during the AM and PM peak hours.

Table 2.2 summarizes the 95th percentile queues under existing traffic conditions and indicates that the following movements are operating with 95th percentile queues exceeding the existing storage:

Boler Road and Byron Baseline Road

- Eastbound left-turn (AM peak hour); and
- Southbound left-turn (PM peak hour).

Boler Road and Commissioners Road West

- Eastbound left-turn (AM and PM peak hours);
- Westbound right-turn (AM and PM peak hours);
- Northbound left-turn (AM and PM peak hours); and
- Southbound left-turn (AM and PM peak hours).

Appendix C contains the SimTraffic reports.

TABLE 2.2: EXISTING TRAFFIC QUEUEING SUMMARY

Intersection	Scenario	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Boler Rd & Byron Baseline Rd	AM Queues	46	73	>	17	46	>	16	46	16	24	78	>
	PM Queues	37	54	>	26	63	>	40	63	13	43	107	>
	Ex Storage	45	-	-	45	-	-	50	-	70	40	-	-
Boler Rd & Commissioners Rd W	AM Queues	58	105	>	7	60	44	33	104	>	51	84	>
	PM Queues	57	103	>	20	121	86	50	155	>	93	115	>
	Ex Storage	40	-	-	85	-	25	25	-	-	50	-	-

3 Development Concept

3.1 Development Description

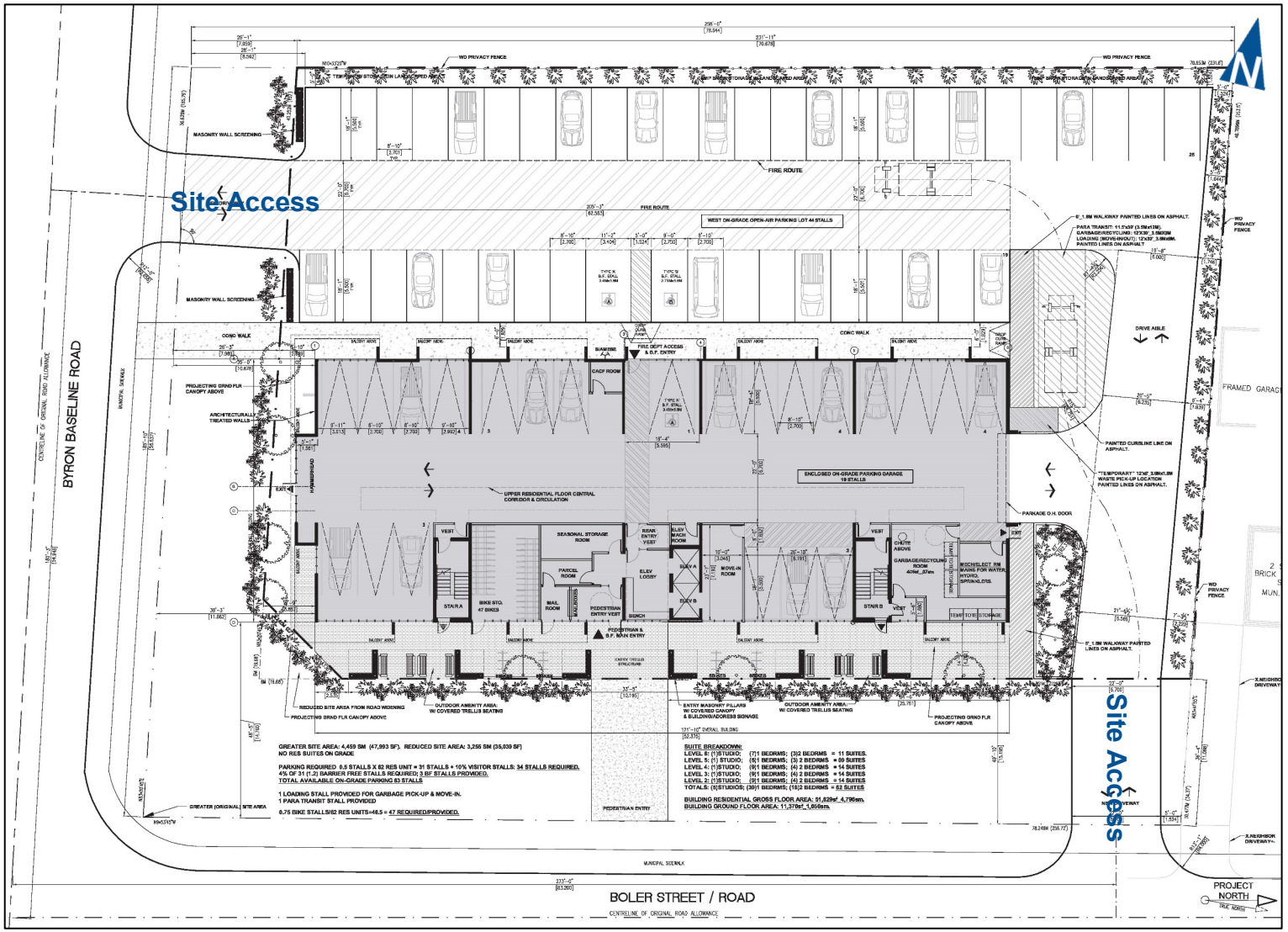
The subject site is located on the northwest corner of Boler Road and Byron Baseline Road and includes three existing single-family residential properties with driveways on Boler Road. The assembled lands have a frontage of approximately 78 metres on Boler Road and 57 metres on Baseline Road.

The proposed development involves the removal of the existing dwellings and construction of a six-storey, 62-unit apartment building.

Vehicular access to the site will replace the existing all-moves driveways on Boler Road with a single full-moves access located approximately 83 metres (centreline to centreline) from Byron Baseline Road. A second full-moves access is proposed on Byron Baseline Road approximately 55 metres (centreline to centreline) from Boler Road.

The development is anticipated to be completed by 2027.

Figure 3.1 shows the development concept.



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Proposed Site Plan

415-421 Boler Rd, London TIA
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Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual[3] equations for Land Use Code (LUC) 221 Multifamily Housing (Mid-Rise) have been used to estimate the peak hour traffic volumes generated by the proposed development.

Table 3.1 summarizes the forecast number of net new trips generated by the proposed development.

TABLE 3.1: TRIP GENERATION

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 221 - Multifamily Housing (Mid-Rise)	62	Eq	4	12	**16**	Eq	15	10	**25**
Total Trip Generation			**4**	**12**	**16**		**15**	**10**	**25**

AM: T = 0.44(X) - 11.61 | PM: T = 0.39(X) + 0.34

3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing travel patterns within the study area. **Table 3.2** displays the breakdown of trip distributions used in this study.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

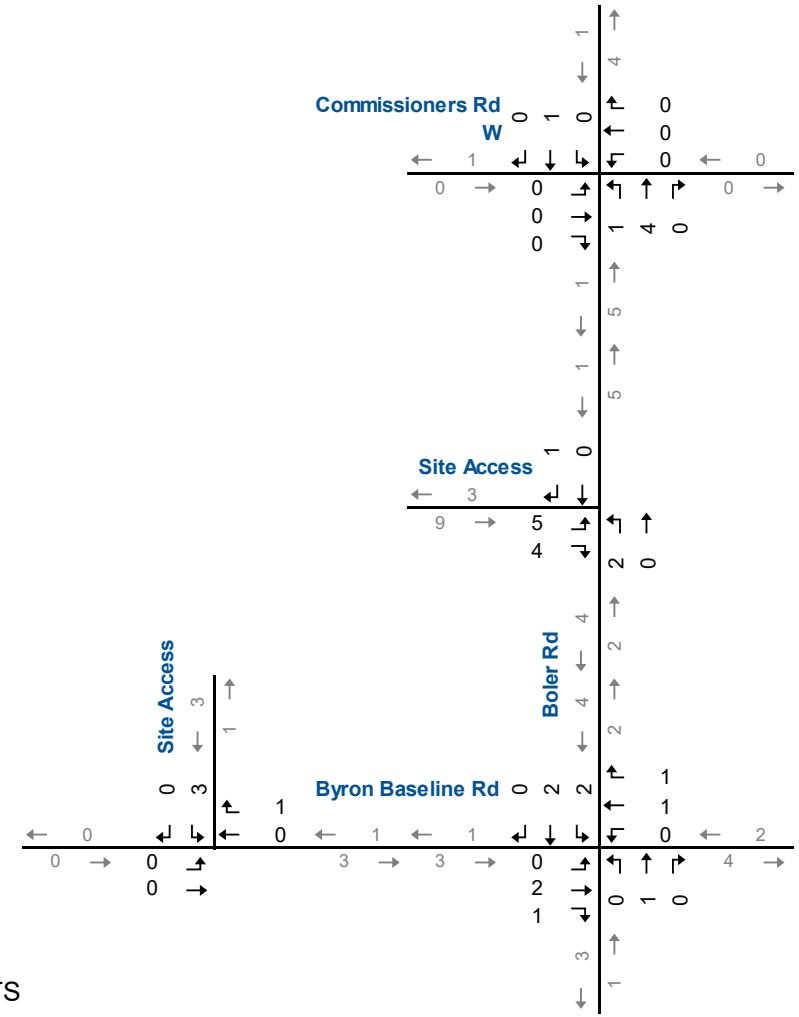
Origin/Destination	Percentage
North via Boler Rd	30%
South via Boler Rd	25%
East via Byron Baseline Rd	35%
West via Byron Baseline Rd	5%
West via Commissioners Rd W	5%
Total	**100%**

Figure 3.2 illustrates the site-generated traffic volumes for the AM and PM peak hours.

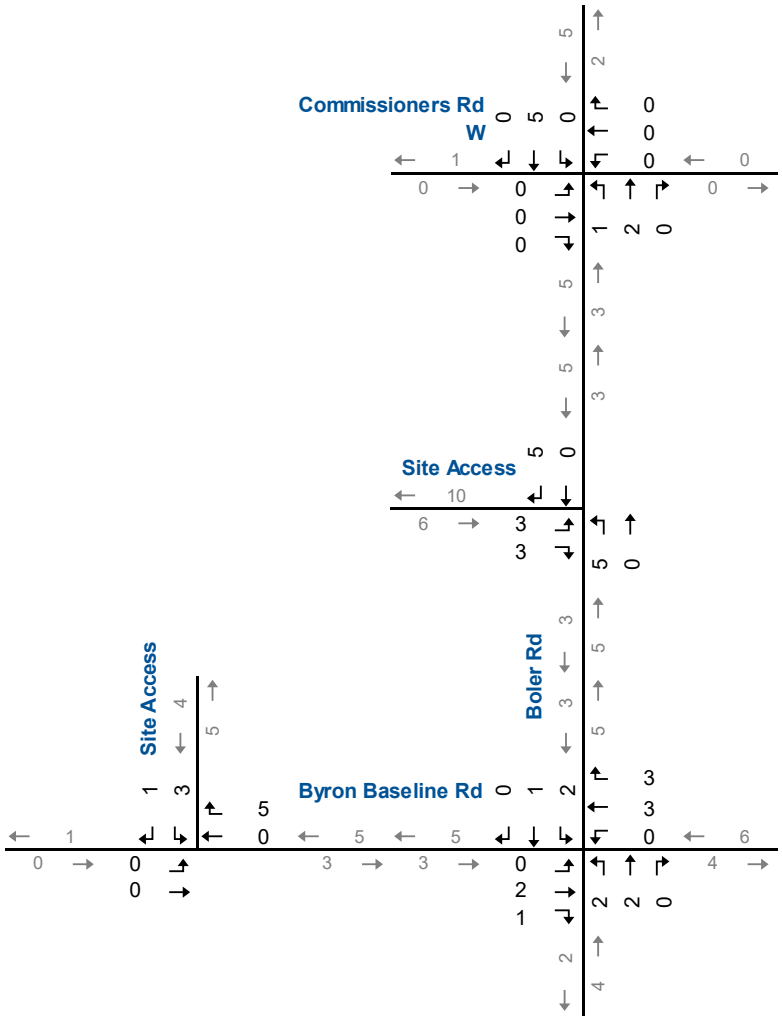
The proposed development is not a significant trip generator, with 16 vehicles per hour (vph) generated during the AM peak hour and 25 vph during the PM peak hour.

[3] Institute of Transportation Engineers, *Trip Generation Manual,* 11th ed., (Washington, DC: ITE, 2021).

AM Peak Hour



PM Peak Hour



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Site Generated Traffic Volumes

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Figure 3.2

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions in this section includes estimates of future background and total traffic volumes, and the analyses for the 2032 horizon.

4.1 General Traffic Growth

To derive the 2032 generalized background traffic volumes, a growth rate of 1.5% was applied to the existing roadway traffic volumes. This growth rate was confirmed with City staff during pre-study consultation.

4.2 Background Traffic

4.2.1 Synchro Analysis

Figure 4.1 illustrates the 2032 background traffic volumes, including road traffic growth.

The 2032 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

Table 4.1 summarizes the results of the 2032 background traffic operations. The results indicate that the study area intersections are forecast to operate with similar levels of service as under existing traffic conditions, with the addition of the following critical movements:

Boler Road and Byron Baseline Road

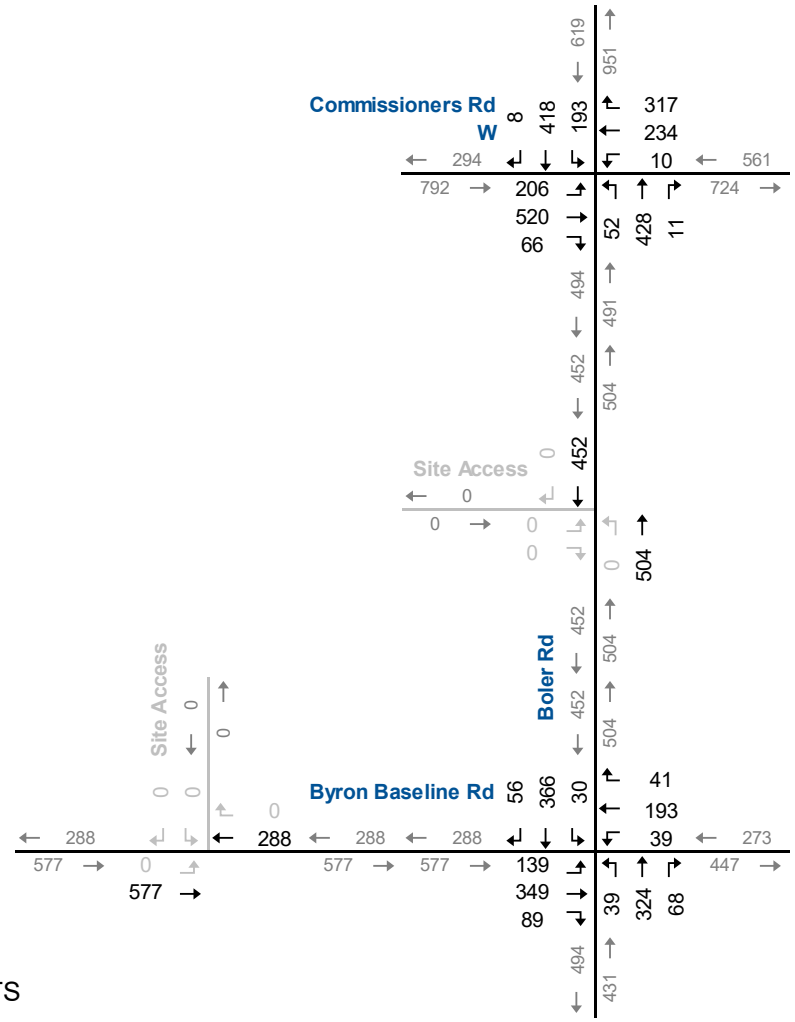
- The eastbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95th percentile queues exceeding the available storage of 45 metres during the PM peak hour.

Boler Road and Commissioners Road West

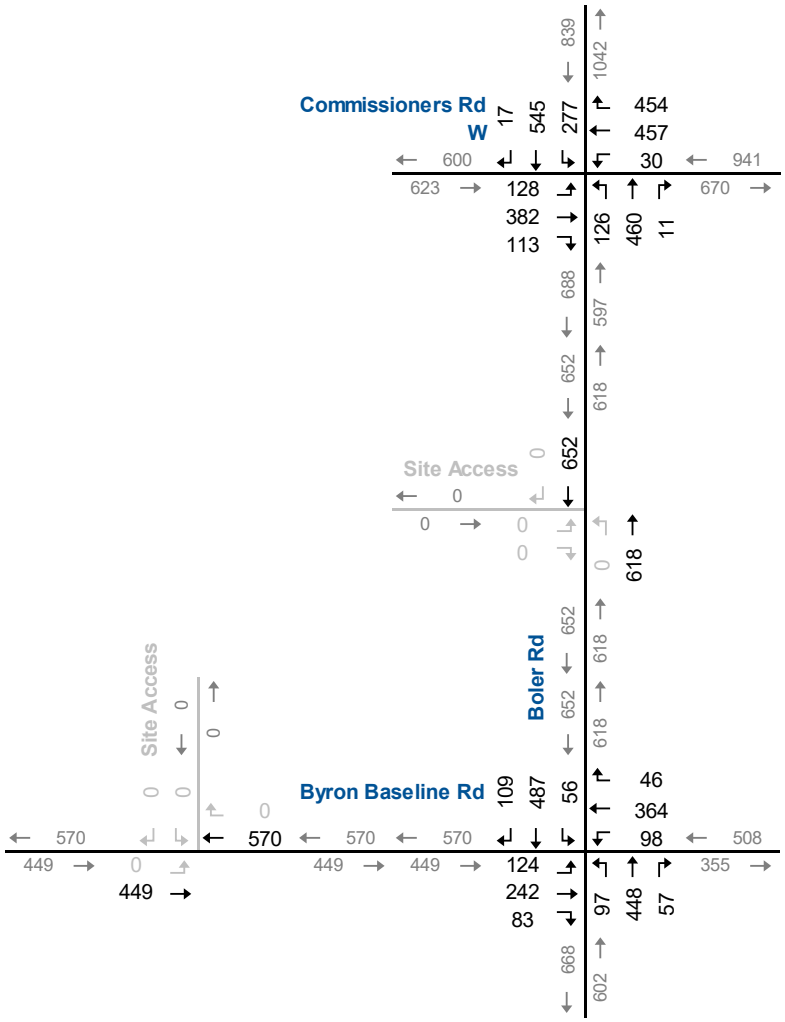
- The eastbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 40 metres during the PM peak hour;
- The northbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 25 metres during the PM peak hour; and
- The southbound left-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

Appendix D contains the supporting detailed Synchro 11 reports.

AM Peak Hour



PM Peak Hour



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Background Traffic Volumes

415-421 Boler Rd, London TIA
240655

Figure 4.1

TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	C	C	>	C	C	C	>	C	B	B	A	B	B	B	>	B	C
			Delay	25	34	>	32	24	21	>	21	13	14	4	12	12	15	>	15	21
			V/C	0.48	0.81	>		0.30	0.44	>		0.11	0.37	0.09		0.07	0.49	>		
			Q	34	96	>		13	46	>		11	64	8		9	87	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	11	-	>		32	-	>		39	-	62		31	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	C	D	>	C	C	D	B	C	B	D	>	D	C	C	>	C	C
			Delay	25	38	>	35	35	38	17	26	17	53	>	50	28	34	>	32	35
			V/C	0.49	0.81	>		0.08	0.49	0.57		0.18	0.87	>		0.68	0.67	>		
			Q	57	218	>		8	83	58		14	143	>		42	123	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	-17	-	>		77	-	-33		11	-	>		8	-	>		
PM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	F	C	>	D	C	C	>	C	B	B	A	B	B	B	>	B	C
			Delay	89	25	>	43	29	33	>	32	17	14	4	14	12	17	>	17	25
			V/C	0.94	0.62	>		0.49	0.78	>		0.37	0.48	0.07		0.15	0.65	>		
			Q	50	65	>		27	88	>		27	87	6		14	129	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	-5	-	>		18	-	>		23	-	64		26	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	D	D	>	D	C	D	D	D	C	E	>	D	E	D	>	D	D
			Delay	42	36	>	37	34	51	35	43	32	58	>	52	59	42	>	47	45
			V/C	0.69	0.72	>		0.18	0.83	0.81		0.64	0.90	>		0.91	0.83	>		
			Q	46	159	>		16	179	139		28	170	>		102	174	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	-6	-	>		69	-	-114		-3	-	>		-52	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
< / > - Shared with through movement

4.2.2 Queueing Analysis

A SimTraffic analysis has been completed for 2032 background traffic conditions following the same methodology as under existing traffic conditions.

Table 4.2 summarizes the 95th percentile queues under background traffic conditions and indicates that the same movements are forecast to operate with queueing issues as under existing traffic conditions, with the addition of the northbound left-turn lane at Boler Road and Byron Baseline Road during the AM peak hour.

Appendix D contains the SimTraffic reports.

TABLE 4.2: BACKGROUND TRAFFIC QUEUEING SUMMARY

Intersection	Scenario	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Boler Rd & Byron Baseline Rd	AM Queues	54	91	>	19	45	>	17	55	15	35	91	>
	PM Queues	42	60	>	31	65	>	58	88	23	53	132	>
	Ex Storage	45	-	-	45	-	-	50	-	70	35	-	-
Boler Rd & Commissioners Rd W	AM Queues	87	203	>	7	66	57	39	130	>	68	97	>
	PM Queues	83	188	>	45	207	111	50	556	>	115	127	>
	Ex Storage	40	-	-	85	-	25	25	-	-	60	-	-

4.3 Total Traffic

4.3.1 Synchro Analysis

Figure 4.2 illustrates the 2032 total traffic volumes, including trips generated by the proposed development.

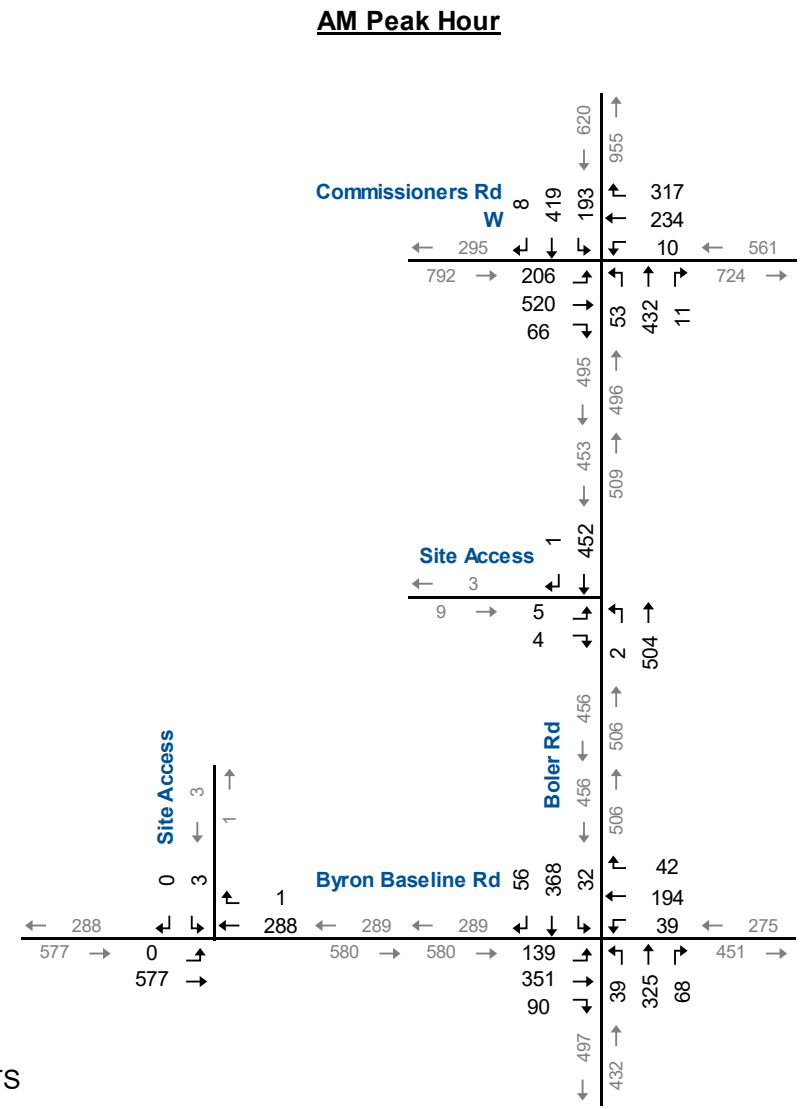
The 2032 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

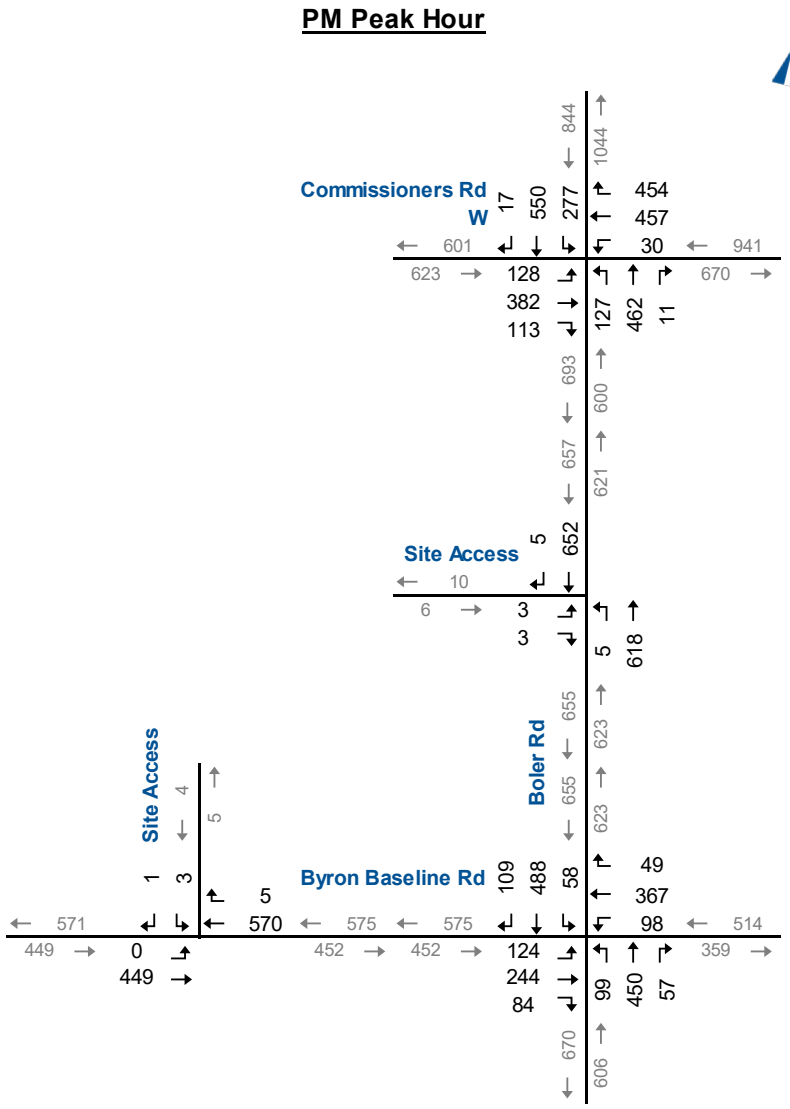
Table 4.3 summarizes the results of the 2032 total traffic operations. The results indicate that the study area intersections are forecast to operate with similar levels of service as under background traffic conditions.

The site access points are forecast to operate with LOS C or better during the AM and PM peak hours. Eastbound and southbound queues at Boler Road and Byron Baseline Road are forecast to extend beyond the site access points during the AM and PM peak hours.

The proposed development is forecast to have negligible impacts on the surrounding road network as the site generated trips are forecast to impact the intersection operations by less than two seconds of delay and less than 0.02 for the v/c ratio.

Appendix E contains the supporting detailed Synchro 11 reports.





NTS

Total Traffic Volumes

415-421 Boler Rd, London TIA
240655

Figure 4.2

TABLE 4.3: TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	C	C	>	C	C	C	>	C	B	B	A	B	B	B	>	B	C
			Delay	25	34	>	32	24	20	>	21	13	14	4	12	12	16	>	15	21
			V/C	0.48	0.81	>		0.30	0.44	>		0.11	0.37	0.09		0.07	0.49	>		
			Q	34	97	>		13	46	>		11	64	7		9	88	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	11	-	>		32	-	>		39	-	63		31	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	C	D	>	C	C	D	B	C	B	D	>	D	C	C	>	C	D
			Delay	25	39	>	35	35	38	17	26	17	54	>	50	28	34	>	32	35
			V/C	0.49	0.81	>		0.08	0.49	0.57		0.18	0.88	>		0.68	0.67	>		
			Q	57	218	>		8	83	58		14	145	>		42	123	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	-17	-	>		77	-	-33		11	-	>		8	-	>		
	Boler Rd & Site Access	TWSC	LOS	C		>	C					<	A		A		A	>	A	
			Delay	16		>	16					<	8		0		0	>	0	
			V/C	0.03		>						<	0.00				0.00	>		
			Q	1		>						<	0				0	>		
	Byron Baseline Rd & Site Access	TWSC	LOS	<	A		A		A	>	A					C		>	C	
			Delay	<	0		0		0	>	0					17		>	17	
			V/C	<	0.00				0.00	>						0.01		>		
			Q	<	0				0	>						0		>		
PM Peak Hour	Boler Rd & Byron Baseline Rd	TCS	LOS	F	C	>	D	C	C	>	C	B	B	A	B	B	B	>	B	C
			Delay	89	25	>	42	28	33	>	32	18	14	4	14	12	18	>	17	25
			V/C	0.94	0.62	>		0.49	0.78	>		0.39	0.48	0.07		0.16	0.66	>		
			Q	50	65	>		27	89	>		28	88	6		14	132	>		
			Stor.	45	-	>		45	-	>		50	-	70		40	-	>		
			Avail.	-5	-	>		18	-	>		22	-	64		26	-	>		
	Boler Rd & Commissioners Rd W	TCS	LOS	D	D	>	D	C	D	D	D	C	E	>	D	E	D	>	D	D
			Delay	42	36	>	37	34	51	35	43	34	58	>	53	60	42	>	48	45
			V/C	0.69	0.72	>		0.18	0.83	0.81		0.66	0.90	>		0.92	0.84	>		
			Q	46	159	>		16	179	139		29	172	>		103	176	>		
			Stor.	40	-	>		85	-	25		25	-	>		50	-	>		
			Avail.	-6	-	>		69	-	-114		-4	-	>		-53	-	>		
	Boler Rd & Site Access	TWSC	LOS	C		>	C					<	A		A		A	>	A	
			Delay	21		>	21					<	9		0		0	>	0	
			V/C	0.03		>						<	0.01				0.00	>		
			Q	1		>						<	0				0	>		
	Byron Baseline Rd & Site Access	TWSC	LOS	<	A		A		A	>	A					C		>	C	
			Delay	<	0		0		0	>	0					19		>	19	
			V/C	<	0.00				0.00	>						0.02		>		
			Q	<	0				0	>						0		>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
Q - 95th Percentile Queue Length (m)
Stor. - Existing Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
< / > - Shared with through movement

4.3.2 Queueing Analysis

A SimTraffic analysis has been completed for 2032 total traffic conditions following the same methodology as under existing and background traffic conditions.

Table 4.4 summarizes the 95th percentile queues under total traffic conditions and indicates that the same movements are forecast to operate with queueing issues as under background traffic conditions.

Unlike Synchro, SimTraffic measures the full impact of queueing and blocking; therefore, the queuing results under total traffic conditions may not align with background traffic conditions due to the introduction of the site access points. As a result, the eastbound and southbound through queues at Boler Road and Byron Baseline Road reflect the queues up to the site access points. Queueing beyond the site access points is reflected in the site access queues.

Appendix E contains the SimTraffic reports.

TABLE 4.4: TOTAL TRAFFIC QUEUEING SUMMARY

Intersection	Scenario	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Boler Rd & Byron Baseline Rd	AM Queues	37	42	>	18	50	>	16	57	18	22	65	>
	PM Queues	36	44	>	40	73	>	52	79	14	41	66	>
	Ex Storage	45	-	-	45	-	-	50	-	70	35	-	-
Boler Rd & Commissioners Rd W	AM Queues	80	160	>	10	57	47	38	137	>	67	95	>
	PM Queues	80	183	>	56	220	109	51	450	>	113	125	>
	Ex Storage	40	-	-	85	-	25	25	-	-	60	-	-
Boler Rd & Site Access	AM Queues	8		>				<	5			48	>
	PM Queues	8		>				<	17			89	>
Byron Baseline Rd & Site Access	AM Queues	<	89			0	>				6		>
	PM Queues	<	50			0	>				7		>

5 Remedial Measures

5.1 Site Access

5.1.1 Left-Turn Lanes

The Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads[4] provides guidance on the assessment and/or need for auxiliary left-turn lanes.

The warrant nomograph is used to determine if a left-turn lane is needed based on criteria such as design speed, advancing volume, opposing volume and percentage of advancing vehicles performing a left-turn maneuver. A minimum threshold of 2.5% of advancing vehicles making a left-turn maneuver is used in assessing the requirement of a left-turn lane.

Based on this criterion, left-turn lanes at the site access points on both Boler Road and Byron Baseline Road are not warranted under 2032 total traffic conditions.

5.1.2 Queueing

As discussed in **Section 4.3.2**, eastbound and southbound queues at the intersection of Boler Road and Byron Baseline Road are forecast to extend intermittently beyond the site access points during the AM and PM peak hours under total traffic conditions. Similar queuing is currently occurring under existing conditions and is also forecast to occur under background traffic conditions.

As outlined in **Section 4.3**, the site access points are forecast to operate with LOS C or better and queues no greater than 8 metres into the site (one vehicle) for outbound traffic.

5.1.3 Location

Both Boler Road and Byron Baseline Road are relatively flat in the area surrounding the subject site. A clear line of sight is available in either direction at both site access points.

As discussed, the proposed site access on Boler Road is located approximately 83 metres (centreline to centreline) from Byron Baseline

[4] Ontario Ministry of Transportation, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, (Toronto: Queen's Printer for Ontario, 2020).

Road and the proposed site access on Byron Baseline Road is located approximately 55 metres (centreline to centreline) from Boler Road.

The *City's Access Management Guidelines*[5] (AMG) indicate that for minor driveways at a signal-controlled intersection, a minimum corner clearance of 75 metres should be provided from centreline of an arterial road to the centreline of a proposed driveway.

The proposed site access on Boler Road meets the minimum corner clearance; however, the proposed site access on Bryon Baseline Road does not. The subject site has a frontage of approximately 57 metres along Byron Baseline Road with the proposed site access on Byron Baseline Road located at the westerly property limit. Given the limited frontage along Byron Baseline Road, it would not be possible to obtain a 75-metre corner clearance. In addition, the subject development is forecast to generate less than 25 trips during either peak hour with a maximum of 5 trips entering and 4 trips exiting the Byron Baseline Road access during the PM peak hour. Based on the intersection operations and queueing analyses in **Section 4**, the impact to the intersection of Boler Road and Byron Baseline Road and the queueing into the site are considered minimal.

5.2 Boler Road Traffic

Boler Road is a north-south road extending from Riverside Road to Southdale Road with a crossing over Thames River north of Commissioners Road West. As residential properties are located along many sections of the roadway, Boler Road performs the dual role of providing access to these properties in addition to carrying through traffic.

The additional traffic from the proposed development accounts for less than 1.0% of the future traffic volumes on Boler Road and less than 1.5% on Byron Baseline Road.

The City is proposing cycling improvements along Boler Road between Southdale Road West and Commissioners Road West in the form of a two-way cycle track on the east side of the roadway. No additional improvements have been identified by the City.

5.2.1 Boler Road and Byron Baseline Road

Section 4 indicates that the eastbound left-turn movement at Boler Road and Byron Baseline Road is forecast to operate with LOS F, a

[5] City of London, *Access Management Guidelines*, 2015.

v/c ratio greater than 0.90 and 95th percentile queues exceeding the available storage of 45 metres during the PM peak hour.

Under existing conditions, the intersection does not operate with a left-turn advance phase. Introducing an eastbound left-turn advance phase would increase the capacity of the movement.

5.2.2 Boler Road and Commissioners Road West

Section 4 indicates that multiple movements are forecast to operate with poor levels of service and queueing issues during the AM and PM peak hours under existing, background and total traffic conditions.

The southbound left-turn movement is forecast to operate with poor levels of service and queueing issues under existing, background and total traffic conditions. The *TAC Geometric Design Guide for Canadian Roads*[6] outlines the threshold for dual left-turn lanes which is considered when peak hour left-turn volumes exceed 300 vehicles per hour. The southbound left-turn movement is approaching 300 vehicles per hour during the PM peak hour under background and total traffic conditions.

It does not appear that additional capacity can be achieved from signal timing changes. Although the southbound left-turn forecasts are approaching the minimum threshold for dual left-turn lanes, the north approach appears to be constrained and may not be able to accommodate additional lanes.

Additionally, given that the majority of the auxiliary turn lane queues are forecast to extend beyond the existing storage, the extension of the existing storage should be reviewed by the City.

[6] Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*, (Ottawa: TAC, 2017).

6 Transportation Demand Management

Transportation Demand Management (TDM) refers to ways of making the capacity of roads more efficient by reducing vehicle demand. TDM approaches consider how people's choices of travel mode are affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience, and availability of alternative modes of travel. Various TDM strategies are used to influence those factors so that the alternatives are more competitive with driving alone and potentially reduce reliance on motor vehicles.

The City of London requires TIA submissions to include a suitable TDM plan with strategies to facilitate reduced automobile reliance and promote transit, cycling and walking for trips to/from the site. This requirement is consistent with the goal established by the *2030 Transportation Master Plan*[7] to achieve a mode share target of 35% by 2030.

Potential TDM measures appropriate for the proposed development are included in the following sections.

6.1 Walking

The pedestrian accessibility of a development is essential in helping to ensure that those that can walk, have access to pedestrian connections.

Sidewalks are generally provided on both sides of Boler Road and Byron Baseline Road.

The Site Plan indicates that internal walkways will be provided between main building entrances and the existing municipal sidewalks on both Boler Road and Byron Baseline Road.

6.2 Cycling

Bike lanes are currently provided on both sides of Byron Baseline Road. As discussed in **Section 5.2**, a cycle track is proposed along the east side of Boler Road.

To encourage the use of existing and future cycling facilities, the development is proposing a total of 79 bicycle parking spaces including 47 long-term spaces and 32 short-term spaces.

[7] AECOM, *City of London 2030 Transportation Master Plan: SmartMoves*, January 2013.

6.3 Transit

The availability of convenient and desirable transit options can reduce the number of person automobile trips. As discussed in **Section 2.2**, public transportation is provided via Route 5 and 17.

The closest bus stop is located on the east side of Boler Road immediately opposite the subject site, with shelter and seating available. The municipal sidewalks along Boler Road and Byron Baseline Road provides connections from the subject site to the nearby bus stop. In addition, the intersection of Boler Road and Byron Baseline Road is signalized with crosswalks and pedestrian activated push buttons on each approach, making the nearby bus stop accessible from the subject site.

6.4 Parking Management

To further encourage residents of the development to utilize sustainable travel modes, parking spaces should be sold separately from the cost to rent/purchase a unit. This practice of ‘unbundling’ parking from a unit is also more equitable and efficient since occupants are not forced to pay for parking they do not need.

7 Conclusions and Recommendations

7.1 Conclusions

Based on the investigations carried out, it is concluded that:

- **Existing Traffic Conditions:** The study area intersections are operating with acceptable levels of service, except for the following critical movements at the intersection of Boler Road and Commissioners Road West:
  - The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour;
  - The westbound right-turn movement is operating with 95th percentile queues exceeding the available storage of 25 metres during the AM and PM peak hours; and
  - The southbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 50 metres during the PM peak hour.

  Additionally, Simtraffic queueing analysis indicates that 95th percentile queues are exceeding the available storage for the following movements:
  - Boler Road and Byron Baseline Road: eastbound left-turn movement (AM peak hour) and southbound left-turn movement (PM peak hour).
  - Boler Road and Commissioners Road West: eastbound, northbound and southbound left-turn and westbound right-turn (AM and PM peak hours).
- **Development Trip Generation:** The development is forecast to generate 16 and 25 trips during the AM and PM peak hours, respectively.

  The development is not a significant trip generator and will add less than 1.0% of the future road traffic volumes on Boler Road and less than 1.5% of the future road traffic volumes on Byron Baseline Road.
- **Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under existing traffic conditions, with the addition of the following critical movements:
  - Boler Road and Byron Baseline Road: The eastbound left-turn movement is forecast to operate with LOS F, a v/c ratio

greater than 0.90 and 95th percentile queues exceeding the available storage of 45 metres during the PM peak hour.

- Boler Road and Commissioners Road West: The eastbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 40 metres during the PM peak hour;

  The northbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 25 metres during the PM peak hour; and

  The southbound left-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

Simtraffic queueing analysis indicates that the 95th percentile queues at the study area intersections are forecast to be similar as under existing traffic conditions, with the addition of the northbound left-turn lane at Boler Road and Byron Baseline Road during the AM peak hour.

- **Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under background traffic conditions. The proposed development is forecast to have negligible impacts on the surrounding road network as the site generated trips are forecast to impact the intersection operations by less than two seconds of delay and less than 0.02 for the v/c ratio.
- **Site Access:**
  - Left-Turn Lanes:
    - An eastbound left-turn lane is not warranted at the proposed site access on Byron Baseline Road under forecast total traffic conditions.
    - A northbound left-turn lane is not warranted at the proposed site access on Boler Road under forecast total traffic conditions.
  - Queueing: The site access points are forecast to operate with LOS C or better during the AM and PM peak hours. Eastbound and southbound 95th percentile queues at Boler Road and Byron Baseline Road are forecast to extend intermittently beyond the site access points during the AM and PM peak hours.

    In addition, the site access points are forecast to operate with queues no greater than one vehicle into the site for outbound traffic.

- Location: A clear line of sight is available in either direction at both site access points.

  The proposed site access on Boler Road meets the City's minimum corner clearance requirement of 75 metres.

  The proposed site access on Bryon Baseline Road does not meet the minimum corner clearance requirement. Given the limited frontage along Byron Baseline Road, it would not be possible to obtain the minimum corner clearance. In addition, the subject development is a low trip generator with minimal trips assigned to both driveways. Based on the intersection operations and queueing analyses, the impact to the intersection of Boler Road and Byron Baseline Road and the queueing into the site are considered minimal.

- **Boler Road Improvements:** The capacity issues identified at the study area intersections are independent of the proposed development. The following improvements could be considered as part of future road construction.
  - Byron Baseline Road Intersection: Under existing conditions, the intersection does not operate with a left-turn advance phase. Introducing an eastbound left-turn advance phase would increase the capacity of the movement.
  - Commissioners Road West Intersection: Additional capacity does not appear to be available through signal timing changes. Although the southbound left-turn forecasts are approaching the minimum threshold for dual left-turn lanes, the north approach appears to be constrained.
- **Transportation Demand Management:** The following TDM measures are proposed at the development:
  - Internal sidewalks with connections to the existing municipal network;
  - 79 long-term bicycle parking spaces on-site;
  - Access to multiple bus transit routes that provide good connectivity to the broader network and access to major destinations; and
  - Parking unbundled from the sale/rent agreement of each unit.

7.2 Recommendations

Based on the findings of this study, it is recommended that the development be considered for approval as proposed.

Appendix A

Pre-Study Consultation

Appendix B

Existing Traffic Data

Appendix C

Existing Traffic Operations Reports

Appendix D

Background Traffic Operations Reports

Appendix E

Total Traffic Operations Reports