



1470-1474 Highbury Avenue Transportation Impact Assessment

Paradigm Transportation Solutions Limited

May 2019
Project: 190137



Project Number
190137

1470-1474 Highbury Avenue
Transportation Impact Assessment

May 2019

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to carry out this Transportation Impact Assessment (TIA) for residential development comprising of three high-rise apartment buildings located at 1470 and 1474 Highbury Avenue North in London, Ontario.

The study includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts, and recommendations to address potential future traffic impacts, as well as TDM strategies to reduce dependency on single occupancy vehicle travel at the subject development.

Development Concept

The subject site is located at 1470-1474 Highbury Avenue North in the City of London. The development will include three high-rise apartment buildings: a 16-storey “Building A”, an 18-storey “Building B” and a 15-storey “Building C”. The three buildings will combine for a total of 400 apartment units and a total of 410 parking spaces will be provided.

Vehicular access for the subject site is proposed via one full-movement access to Highbury Avenue North, located to the south of Kilally Road.

The development is anticipated to be completed by 2022 subject market conditions.

Conclusions

The main findings and conclusions of this study on the transportation impact assessment for the proposed development are as follows:

- ▶ **Description of Development:** Three high-rise apartment buildings, comprising 400 apartments, are proposed to be developed at 1470-1474 Highbury Avenue North.
- ▶ **Vehicular Access:** A full-movement driveway is proposed for the development on Highbury Avenue North, south of Kilally Road.
- ▶ **Horizon Years:** Intersection operational analysis was undertaken for the following traffic conditions:
 - Existing (2019) Traffic Conditions
 - 2024 Background and Total Traffic Conditions
- ▶ **Other Area Developments:** A total of approximately 22.5 hectares of developable lands with a potential yield of about 1000 residential units were included as ‘other area development’ for background traffic estimates. It is likely that the main access to these areas will be



provided on Highbury Avenue North at the existing intersection at Edgevalley Road.

▶ **Existing Traffic Conditions:**

The study area intersections are operating at acceptable Levels of Service overall. North-south traffic on Highbury Avenue North and east-west traffic on Fanshawe Park Road East operate at acceptable Levels of Service.

Critical turning movements are noted at Highbury Avenue North and Killarney Road during both peak hours, and at Highbury Avenue North and Killaly Road during the PM peak hour.

In addition, 95th percentile queue lengths for mostly left-turn movements on the east-west roadways are exceeding available storage at all the four study area intersections

- ▶ **Development Traffic:** The subject site will generate approximately 125 AM peak hour trips and approximately 145 PM peak hour trips.
- ▶ **2024 Background Traffic Conditions:** Study area intersections overall operations are forecast to operate at generally acceptable Levels of Service during the weekday AM and PM peak hours. However, the intersections of Highbury Avenue North and Killarney Road along with Highbury Avenue North and Huron Street are both forecast to operate with Levels of Service E.
- ▶ **2024 Total Traffic Conditions:** All Study area intersection operations including critical movements are forecast to be similar to those under 2024 background traffic conditions, indicating that the traffic impacts of the proposed developments are minimal on the study area road system and intersections.
- ▶ **New Road Connection:** It is also noted that with a potential new road connection at the intersection of Highbury Avenue and Edgevalley Boulevard, there will be redistribution of the turning movements at the Killaly Road intersection, thereby improving road and intersection traffic operations.
- ▶ **Site Driveway:** The proposed site driveway on Highbury Avenue for the subject site is projected to operate with acceptable Levels of Service, although in the PM peak hour delays are projected for westbound traffic, i.e. outbound traffic leaving the site, but with moderate v/c ratios. A southbound left-turn lane on Highbury Avenue is not warranted at the driveway, although the existing pavement can accommodate a SB left-turn lane with 15 metre storage.
- ▶ **Remedial Measures:** The critical movements mostly involve left-turn and right-turn queue lengths exceeding existing storage lengths. Accordingly, the identified remedial measures also include auxiliary lane storage extensions where feasible. Additionally, the signal timing and cycle lengths could be optimized along with the implementation of protected left-turn phasing, at the intersections of Highbury Avenue



North and Killarney Road and Highbury Avenue North and Huron Street.

- ▶ **Transportation Demand Management:** The TDM measures outlined Section 6 should be considered for implementation as appropriate to the subject development.

Recommendations

Based on the findings of this study, it is recommended that the City consider:

- ▶ Approval of the subject development, as proposed; and
- ▶ Implementing the remedial measures as identified in this study and within the timeframe as analysed in the study.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to carry out this Transportation Impact Assessment (TIA) for a residential development comprising of three high-rise apartment buildings located at 1470 and 1474 Highbury Avenue North in London, Ontario. **Figure 1.1** details the location of the subject site.

The subject site is located at 1470-1474 Highbury Avenue North in the City of London. The site will include three high-rise apartment buildings: a 16-storey “Building A”, an 18-storey “Building B” and a 15-storey “Building C”. The three buildings will combine for a total of 400 apartment units and a total of 410 parking spaces will be provided.

The development is anticipated to be completed by 2022, subject to market conditions.

Vehicular access for the subject site will be provided via one full-movement access to Highbury Avenue North, south of Kilally Road.

1.2 Purpose and Scope

The purpose of this report is to identify and address the potential traffic impacts resulting from the proposed development. The scope of the study, developed in consultation with the City of London, includes:

- ▶ Assessment of the current traffic and site conditions within the study area;
- ▶ Estimates of background traffic growth to 2024 horizon year, including development traffic generated by other developments anticipated in the study area;
- ▶ Estimates of additional traffic generated by the subject site;
- ▶ Analyses of the impact of the future traffic on the surrounding road network;
- ▶ Recommendations to mitigate the site generated traffic in a satisfactory manner, as required; and
- ▶ Identification and recommendation of Transportation Demand Management (TDM) measures specific to this site;

The following intersections were identified for investigation in this study:

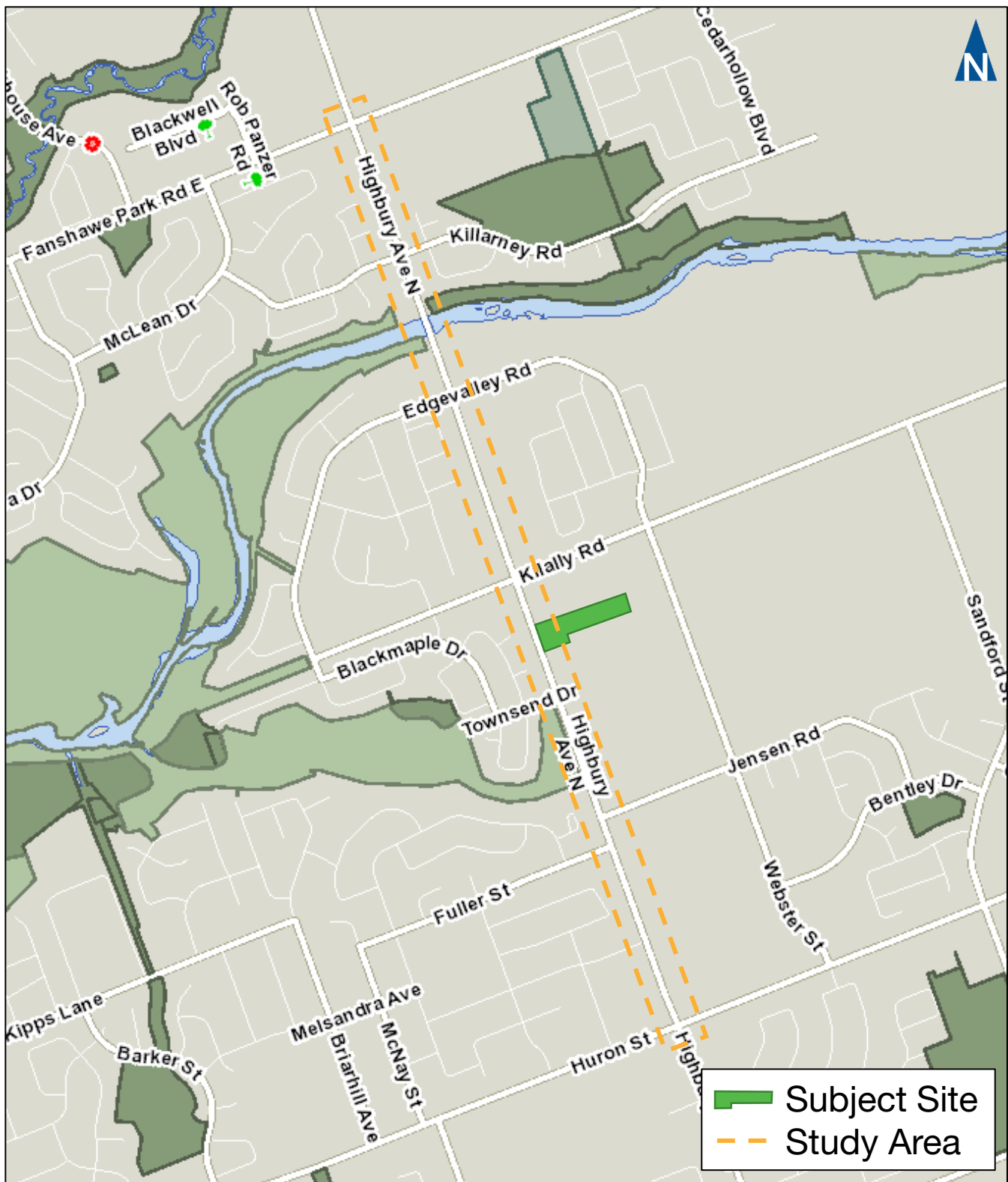
- ▶ Highbury Avenue North and Fanshawe Park East (signalized);
- ▶ Highbury Avenue North and Killarney Road (signalized);
- ▶ Highbury Avenue North and Kilally Road (signalized);



- ▶ Highbury Avenue North and Huron Street (signalized);
- ▶ The proposed site driveway connection to Highbury Avenue North (unsignalized);

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





2 Existing Conditions

2.1 Road Network

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

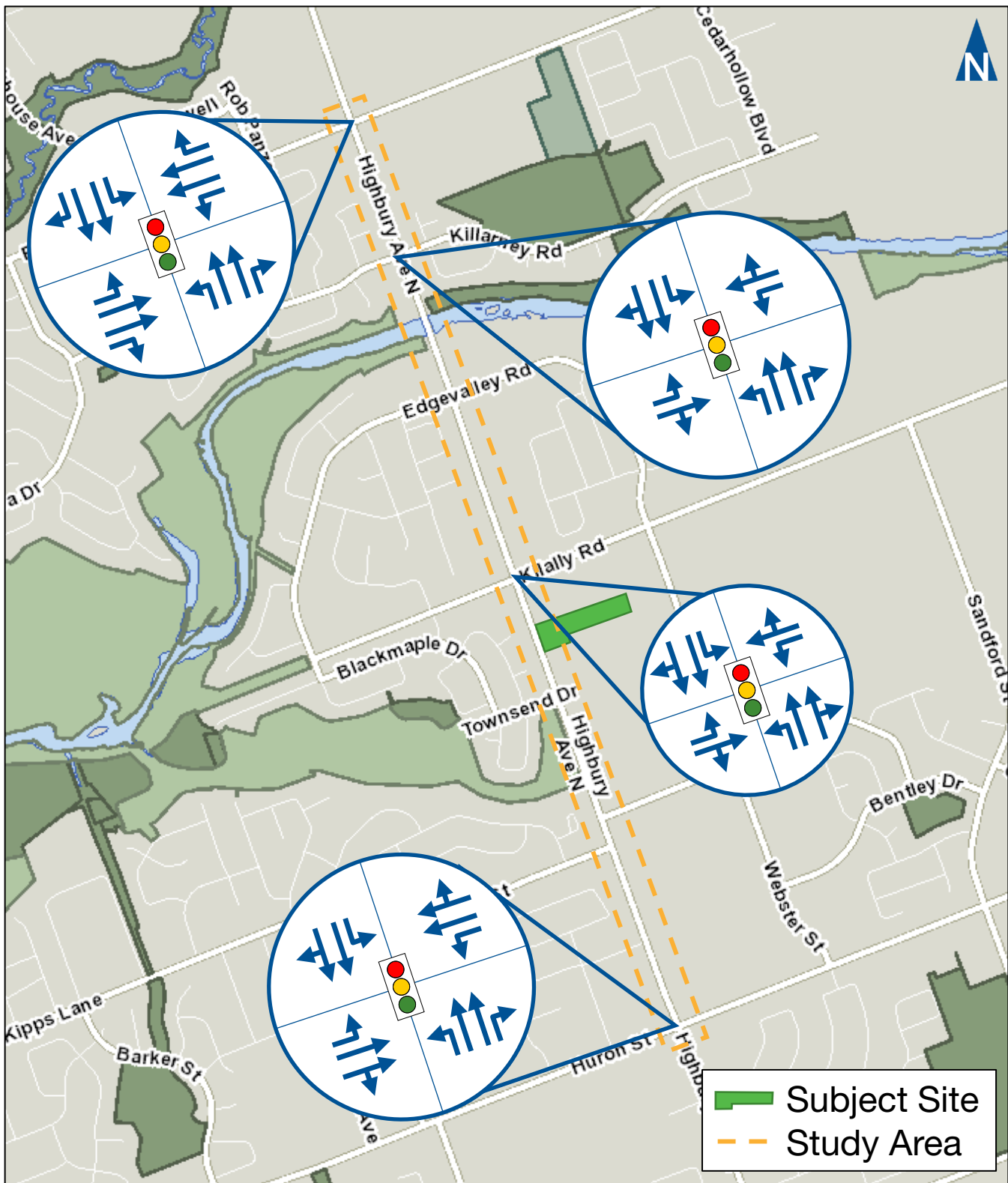
- ▶ **Highbury Avenue North** is a north-south urban thoroughfare¹ with a four-lane urban cross-section with additional left-turn lanes, right-turn lanes and raised medians in multiple sections throughout the study area. The posted speed limit is 60 kilometres per hour near the Huron Street intersection but increases to 70 kilometres per hour approximately 350 metres south of the subject site and continues throughout the remainder of the study area. Sidewalks are provided along both sides of the roadway throughout most of the study area. Exclusive cycling lanes are present along both sides of the roadway, beginning approximately 285 metres south of Killarney Road and continuing north through Fanshawe Park Road East.
- ▶ **Fanshawe Park Road East** is an east-west urban thoroughfare with a two-lane urban cross-section east of Highbury Avenue North and a four-lane urban cross-section west of Highbury Avenue North. The posted speed limit is 60 kilometres per hour. Sidewalks are provided along both sides of the roadway west of Highbury Avenue North and along the southerly side of the roadway east of Highbury Avenue North. The northerly side of the roadway has a sidewalk that terminates approximately 50 metres east of Highbury Avenue North. Exclusive cycling lanes are present along both sides of the roadway.
- ▶ **Killarney Road** is an east-west neighborhood connector with a two-lane cross section. The posted speed limit is 50 kilometres per hour. Sidewalks are provided along both sides of this roadway within the study area.
- ▶ **Kilally Road** is an east-west neighborhood connector/civic boulevard. The roadway has a two-lane cross section and a posted speed limit of 50 kilometres per hour west of Highbury Avenue North. It has a three-lane urban cross section and a posted speed limit of 60 kilometres per hour east of Highbury Avenue North. Sidewalks are provided along both sides of the roadway west of Highbury Avenue North and along the northerly side of the roadway east of Highbury Avenue North.
- ▶ **Huron Street** is an east-west civic boulevard with a four-lane cross-section. The posted speed limit within the study area is 50 kilometres per hour. Sidewalks are provided along the southerly side of this roadway within the study area.

¹ The London Plan, City of London, January 2019



Figure 2.1 details the existing lane configurations and traffic controls at the study area intersections.





2.2 Existing Transit Service

London Transit operates three routes near the subject site along Highbury Avenue North:

- ▶ **Route 25 Fanshawe College – Masonville Place** operates along Highbury Avenue North near the subject site and travels along the outer limits of the downtown core of the City of London. The route operates Monday to Friday (5:55AM-12:29AM) with headways of approximately 30-60 minutes. This route also provides Saturday service (6:00AM-12:31AM) with headways of approximately 30-60 minutes, as well as Sunday service (8:27AM-11:32PM) with headways of approximately 60 minutes.
- ▶ **Route 32 Alumni Hall – Huron & Highbury** operates along Huron Street and Highbury Avenue North south of the subject site and travels along the northern edge of the City of London. The route operates Monday to Friday (6:12AM-11:11PM) with headways of approximately 30-60 minutes. This route also provides Saturday service (8:45AM-11:10PM) with headways of approximately 30-60 minutes, as well as Sunday service (8:32AM-8:13PM) with headways of approximately 60 minutes.
- ▶ **Route 14 White Oaks Mall – Barker & Huron** operates along Highbury Avenue North south of the subject site and travels to the southerly side of the City of London. The route operates Monday to Friday (5:46AM-12:39AM) with headways of approximately 20-30 minutes. This route also provides Saturday service (6:14AM-12:36AM) with headways of approximately 30 minutes, as well as Sunday service (6:27AM-12:19AM) with headways of approximately 30 minutes.

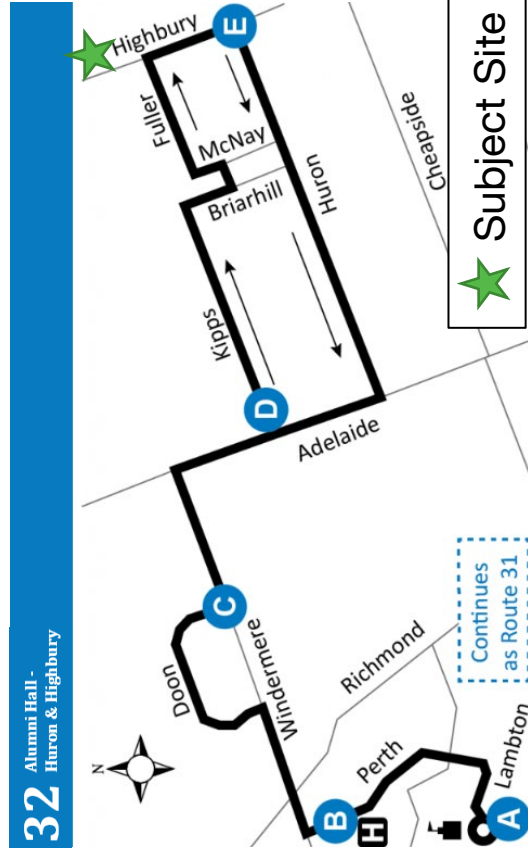
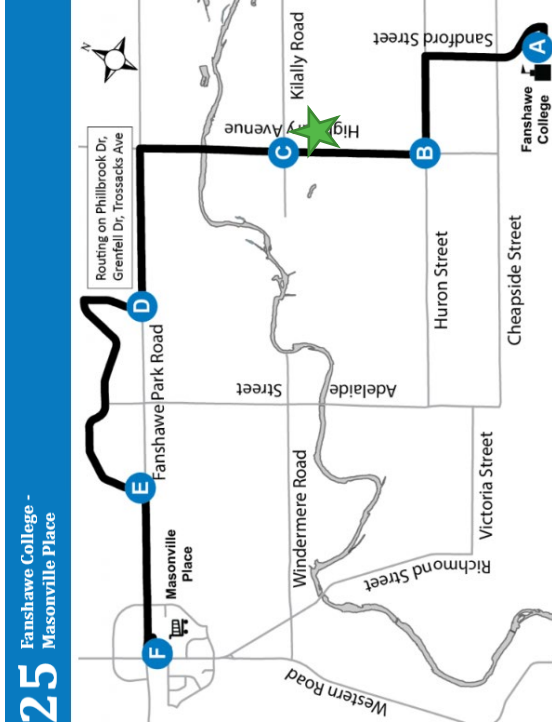
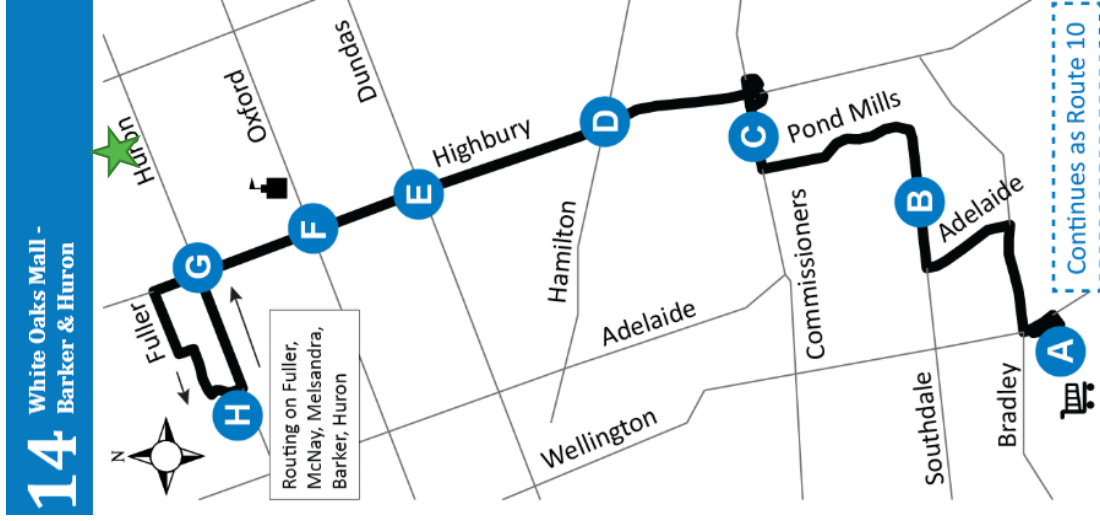
One northbound Route 25 stop is currently provided approximately 90 metres north of the subject site midblock along Highbury Avenue North. One southbound Route 25 stop is currently provided approximately 90 metres south of the subject site midblock along Highbury Avenue North. The southbound stop currently has adequate seating and lighting. The northbound stop does not have any amenities as it is on a site that has ongoing construction.

The nearest Route 32 stop is located on Fuller Street approximately 600 metres south of the subject site near a Route 25 stop. The stop has adequate lighting but no seating or protection from harsh weather.

The nearest Route 14 stop is located nearly 700 metres south of the subject site along Highbury Avenue North. The stop has seating and an enclosure around the seating to protect the transit users from harsh weather elements.

Figure 2.2 details the existing transit routes.





Existing Transit Routes City of London

Figure 2.2

2.3 Active Transportation

2.3.1 Walkability

Sidewalks are provided along both sides of the roadways throughout majority of the study area. Crosswalks, pedestrian push buttons and indicators are provided for all approaches at both signalized intersections within the study area.

The subject site is located within walking distance of significant recreational opportunities, including Kilally Valley Park and Huronview Park.

2.3.2 Cycling

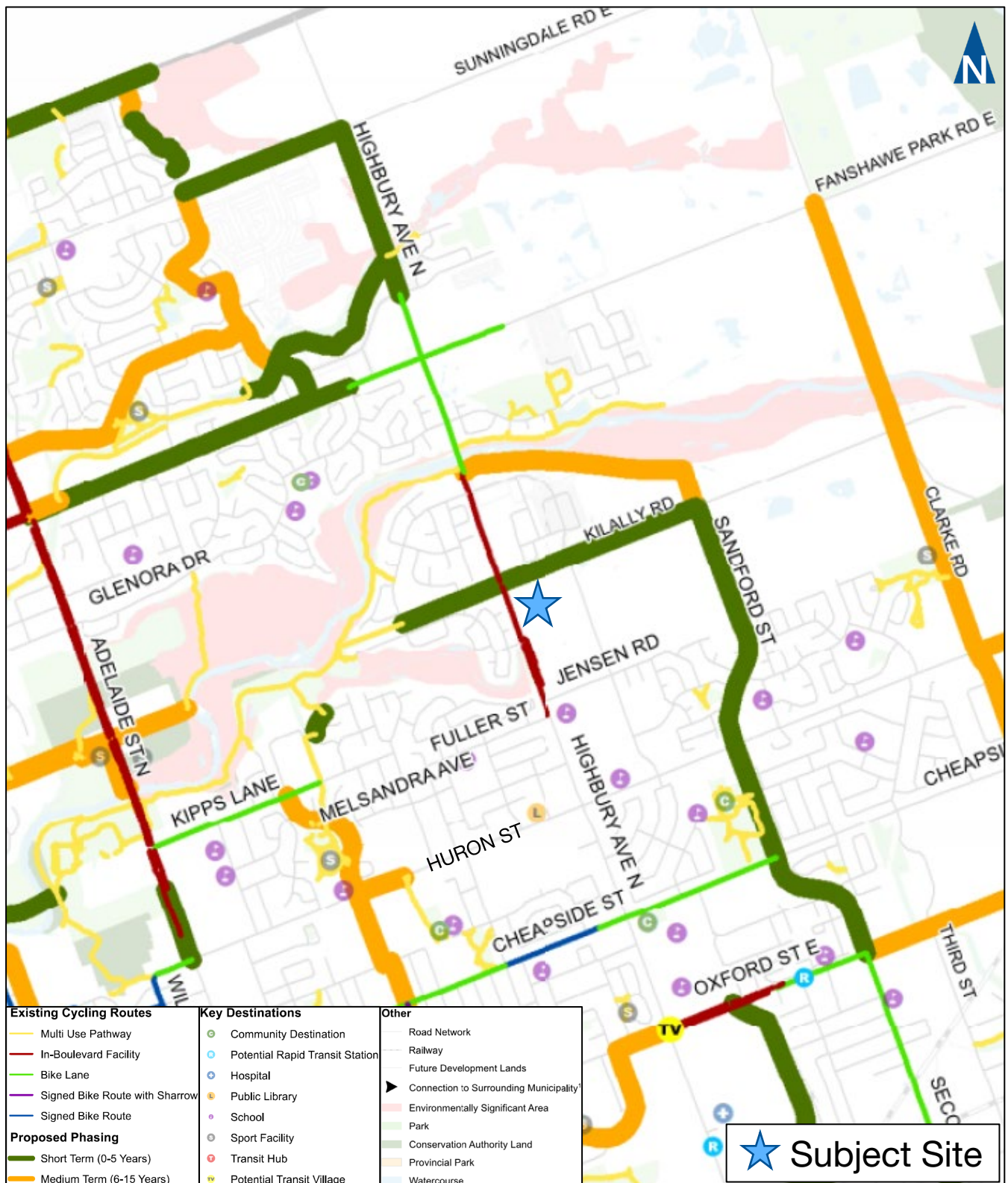
The City's cycling infrastructure consists of on-street and off-street facilities. On-street facilities comprise bicycle lanes, signed bicycle routes, and in-boulevard facilities. Off-street facilities are in the form multi-use pathways or informal trails.

The City's Cycling Map² identifies existing and proposed cycling facilities on and near the study area roadways. Highbury Avenue North currently operates with on-road bicycle lanes and in-boulevard facilities throughout the study area. Fanshawe Park Road East also currently operates with on-road bicycle lanes. Furthermore, Kilally Road is identified as a future cycling facility in the short-term (0-5 years). Several multi-use pathways are also identified within the study area branching off from Highbury Avenue North.

Figure 2.3 illustrates the existing cycling network within the study area.

² City of London Cycling Master Plan Update, September 2016.





Existing Cycling Facilities

Figure 2.3

2.4 Existing Traffic Volumes

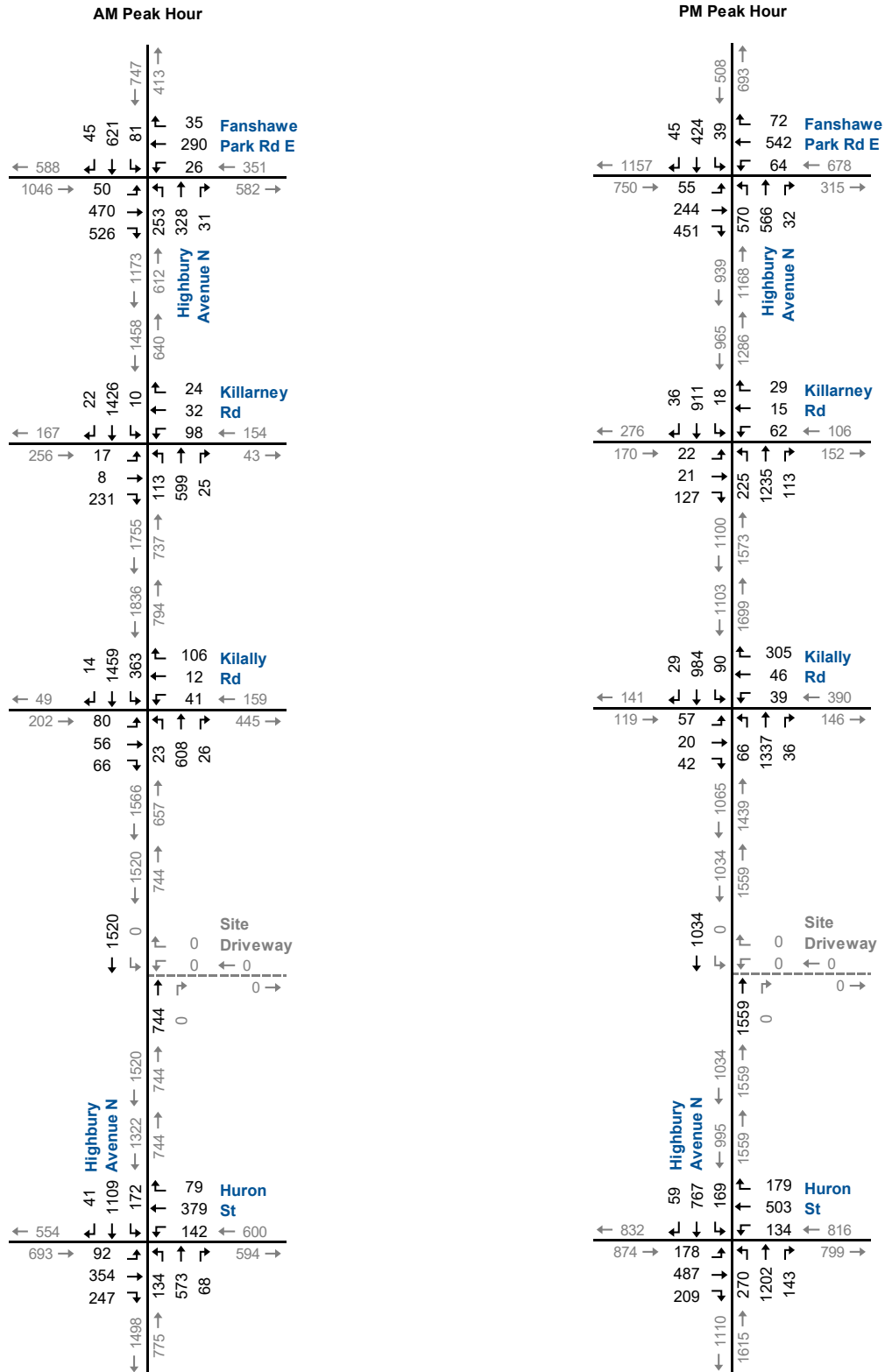
To assess intersection operations, turning movement counts are used to quantify the movement of vehicles through the intersections. Existing traffic data at an intersection or on a road section forms the foundation for traffic analyses undertaken in a TIA.

Most intersection turning movement count data were received from the City. Remaining counts were collected at the study area intersections in March 2019 by Paradigm using Miovision Scout Unit technology.

Figure 2.4 details the existing weekday AM and PM peak hour traffic volumes at the study area intersections.

Appendix B includes the detailed existing count data.





Existing (2019) Traffic AM and PM Peak Hour

Figure 2.4

2.5 Existing Traffic Operations

The operations of the study area intersections were evaluated using the existing lane configurations, traffic controls and the existing traffic peak volumes.

The Level of Service conditions on the existing road network have been assessed using Synchro 9 with HCM 2000 procedures, while the 95th percentile queue lengths were calculated using SimTraffic. Movements are considered critical under the following conditions³:

- ▶ Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above for and Level of Service “E” or worse;
- ▶ V/C ratios for dedicated turning movements that will exceed 0.90 and Level of Service “E” or worse; and
- ▶ 95th percentile queue lengths for individual movements exceeds available lane storage. Queue lengths estimated using Synchro 9.

Intersection Level of Service is a recognized method of quantifying the delay experienced by drivers at intersections. The term “Level of Service” denotes how well a traffic movement operates under given traffic demands, lane arrangements, and traffic controls. Each level is determined by the average amount of control delay per vehicle. Control delay is the total delay associated with stopping for a signal or stop sign, and includes four components: deceleration delay, stopped delay, queue move up time and final acceleration delay.

Table 2.1 contains the level of service criteria for signalized and stop-controlled intersections. As shown, Level of Service A indicates small average control delays (less than 10 second per vehicle) whereas Level of Service F indicates intersection failure, which could result in extensive vehicular queues and long delays (over 50 seconds per vehicle at an unsignalized intersection, and over 80 seconds per vehicle at a signalized intersection).

³ City of London Traffic Impact Assessment Guidelines, April 2012



TABLE 2.1: VEHICLE LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersections Average Total Delay (sec/veh)	Unsignalized Intersections Average Total Delay (sec/veh)
A	< = 10	< = 10
B	> 10 & < = 20	> 10 & < = 15
C	> 20 & < = 35	> 15 & < = 25
D	> 35 & < = 55	> 25 & < = 35
E	> 55 & < = 80	> 35 & < = 80
F	> 80	> 50

Table 2.2 details the existing Level of Service conditions at the study area intersections. The study area intersections are operating at acceptable levels of service overall. North-south traffic on Highbury Avenue North and east-west traffic on Fanshawe Park Road east operate at acceptable levels of service.

The following critical turning movements are noted at Highbury Avenue North and Killarney Road during both peak hours, and at Highbury Avenue North and Kilally Road during the PM peak hour:

Highbury Avenue North and Killarney Road

▶ AM Peak Hour

- Westbound left-turn operates with a Level of Service F. The queue length extends beyond the current available storage.
- Northbound left-turn operates with a v/c ratio greater than 2.00 and a Level of Service F.

▶ PM Peak Hour

- Eastbound through movement operates with a Level of Service E.
- Westbound left-turn operates with a v/c ratio greater than 0.90 and a Level of Service F. The queue length extends beyond the current available storage.
- Northbound left-turn operates with a v/c ratio greater than 1.00 and a Level of Service E.

Highbury Avenue North and Kilally Road

▶ PM Peak Hour

- Eastbound left-turn queue length extends beyond the current available storage.
- Westbound through movement operates with a v/c ratio greater than 0.90 and a Level of Service E.



- Northbound left-turn queue length extends beyond the current available storage.
- Southbound left-turn operates with a v/c ratio greater than 1.00 and a Level of Service F.
- In addition, 95th percentile queue lengths for mostly left-turn movements on the side streets are exceeding available storage at all the four study area intersections.

Appendix C contains the supporting detailed Synchro reports.



TABLE 2.2: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	C	D	D	D	C	D	C	D	B	B	D	B	B	B	B	C	
			Delay	34	38	44	41	34	36	32	35	17	17	37	18	16	17	14	17	29
			V/C	0.24	0.61	0.69		0.21	0.41	0.03		0.31	0.18	0.02		0.18	0.38	0.03		0.47
			95th	27	65	87		20	51	11		39	43	10		26	73	9		
Highbury Ave N & Killarney Rd	TCS	TCS	LOS	C	D	>	D	F	C	>	E	F	A	A	F	A	B	>	B	D
			Delay	33	52	>	51	84	33	>	65	618	10	7	103	6	18	>	18	48
			V/C	0.07	0.81	>		0.89	0.12	>		2.23	0.38	0.02		0.04	0.84	>		1.85
			95th	19	58	>		34	30	>		72	50	7		9	61	>		
Highbury Ave N & Kilally Rd	TCS	TCS	LOS	D	D	>	D	D	>	D	A	A	>	A	C	A	>	B	B	
			Delay	51	44	>	47	41	39	>	39	9	8	>	8	29	8	>	12	15
			V/C	0.65	0.57	>		0.34	0.15	>		0.22	0.32	>		0.87	0.69	>		0.84
			95th	33	40	>		22	26	>		16	31	>		77	136	>		
Highbury Ave N & Huron St	TCS	TCS	LOS	C	D	>	D	D	>	D	B	C	B	B	A	C	>	C	C	
			Delay	31	40	>	39	50	37	>	40	19	21	17	20	9	26	>	24	29
			V/C	0.43	0.70	>		0.79	0.63	>		0.55	0.41	0.05		0.37	0.78	>		0.76
			95th	31	75	>		37	54	>		43	71	16		104	180	>		
PM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	D	D	D	D	D	D	D	B	B	C	B	B	B	B	B	C	
			Delay	50	38	38	39	39	49	36	46	15	15	22	15	18	19	16	18	28
			V/C	0.59	0.32	0.31		0.31	0.79	0.05		0.53	0.30	0.03		0.12	0.27	0.03		0.61
			95th	36	46	65		37	84	18		68	64	9		17	63	11		
Highbury Ave N & Killarney Rd	TCS	TCS	LOS	D	E	>	D	F	D	>	F	E	A	A	B	A	A	>	B	
			Delay	48	55	>	54	126	47	>	93	73	8	4	17	4	5	>	5	18
			V/C	0.18	0.61	>		0.93	0.15	>		1.02	0.65	0.10		0.15	0.46	>		1.01
			95th	17	43	>		28	22	>		81	92	20		16	33	>		
Highbury Ave N & Kilally Rd	TCS	TCS	LOS	D	C	>	D	C	E	>	E	B	C	>	C	F	B	>	C	
			Delay	54	28	>	40	28	69	>	65	17	20	>	20	185	13	>	27	29
			V/C	0.70	0.09	>		0.13	0.96	>		0.42	0.84	>		1.22	0.58	>		1.14
			95th	26	24	>		40	103	>		49	102	>		42	62	>		
Highbury Ave N & Huron St	TCS	TCS	LOS	E	D	>	D	D	>	D	C	D	C	D	C	D	>	D	D	
			Delay	58	42	>	45	37	45	>	43	30	47	21	42	35	36	>	36	41
			V/C	0.86	0.77	>		0.67	0.81	>		0.78	0.94	0.10		0.74	0.72	>		0.92
			95th	70	85	>		53	91	>		199	335	227		93	121	>		

MOE - Measure of Effectiveness
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 LOS - Level of Service

V/C - Volume to Capacity Ratio
 95th - 95th Percentile Queue Length
 Storage - Existing Storage (m)

> - Shared Right-Turn Lane
 < - Shared Left-Turn Lane
 Avail. - Available Storage (m)



3 Development Concept

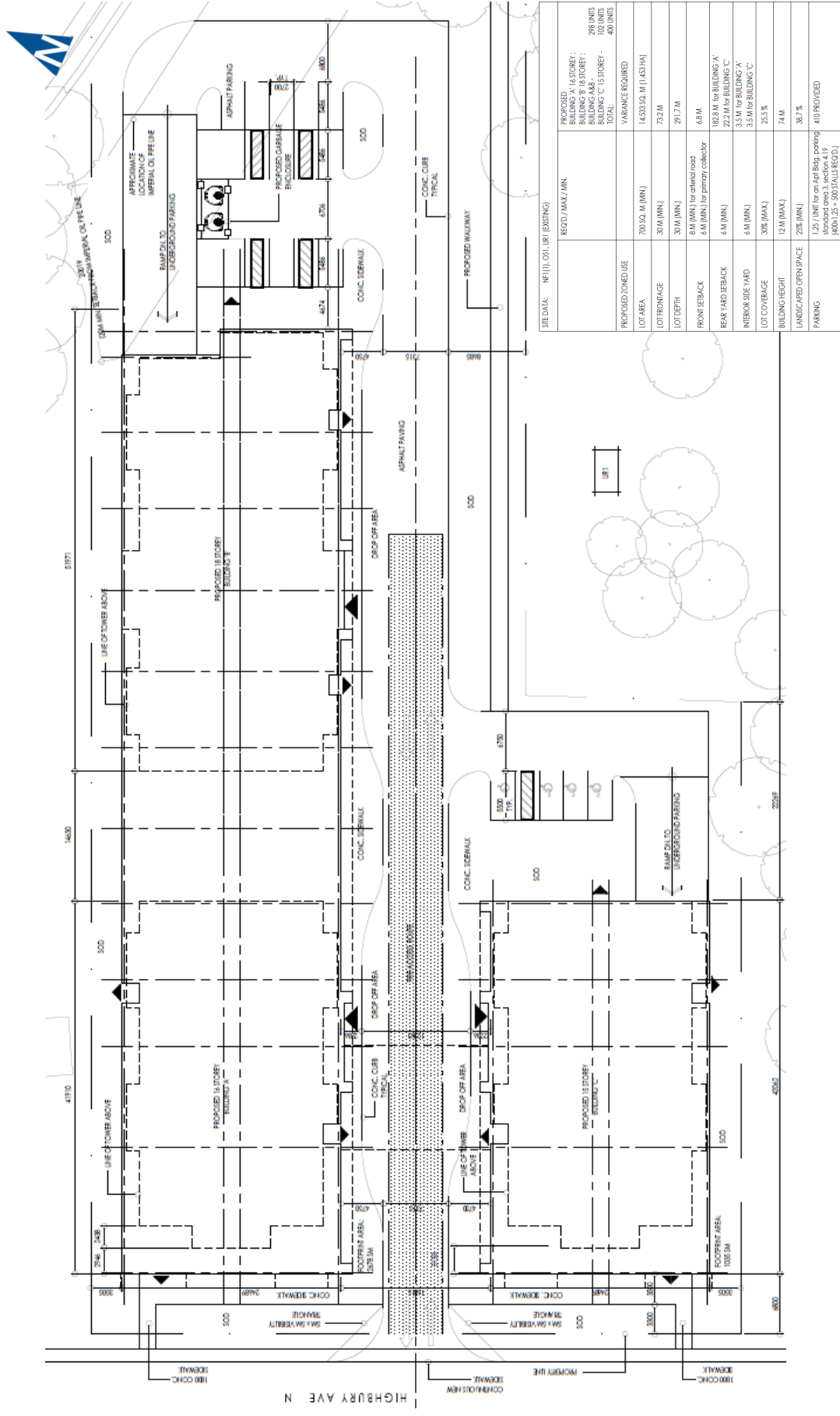
3.1 Site Description

The subject site is located at 1470-1474 Highbury Avenue North in the City of London. The site will include three high-rise apartment buildings: a 16-storey “Building A”, an 18-storey “Building B” and a 15-storey “Building C”. The three buildings will combine for a total of 400 apartment units and a total of 410 parking spaces will be provided.

Vehicular access for the subject site will be provided via one full-movement access to Highbury Avenue North, located to the south of Kilally Road.

Figure 3.1 illustrates the Concept Plan for the proposed development at 1470-1474 Highbury Avenue North.





PROPOSED ZONE/USE	REGD./MAX./MIN.	PROPOSED BUILDING HEIGHTS: BUILDING A - 18 STOREY - BUILDING B - 18 STOREY - BUILDING C - 18 STOREY - TOTAL:
LOT AREA	70.50 M (MIN.) 14,333.50 M ² (431 HA)	298 UNITS
LOT FRONTAGE	30 M (MIN.)	102 UNITS
LOT DEPTH	30 M (MIN.)	40 UNITS
FRONT SETBACK	8 M (MIN.) for arterial road 6 M (MIN.) for primary collector	VARIANCE REQUIRED
REAR YARD SETBACK	4 M (MIN.)	
INTERIOR SIDE YARD	6 M (MIN.)	
LOT COVERAGE	30% (MAX.)	
BUILDING HEIGHT	12 M (MAX.)	
LANDSCAPED OPENS SPACE	25% (MIN.)	
PARKING	1.25 / UNIT for an Ash-Bldg parking standard area 3, section 4.19 (40M ² x 25 = 500 VALLS REGD.)	410 PROVIDED



Site Concept Plan

Figure 3.1

3.2 Site Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation⁴ trip rates for Land Use Codes 222 (Multifamily Housing (High-Rise)) were used to estimate the subject site's trip generation.

Table 3.1 summarizes the base trip generation estimates for the subject site. It is forecast to generate approximately 125 vehicle trips during the AM peak hour and approximately 145 vehicle trips during the PM peak hour on a weekday. No modal share or trip reduction assumptions were applied to the estimated development traffic.

TABLE 3.1: SUBJECT SITE TRIP GENERATION

Land Use	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
Multifamily Housing (High-Rise) - LUC 222	400	Eq ¹	30	95	125	Eq ²	88	57	145
Total Trip Generation			30	95	125		88	57	145

$${}^1T = 0.28(X) + 12.86$$

$${}^2T = 0.34(X) + 8.56$$

⁴ Trip Generation Manual 10th Edition Institute of Transportation Engineers
Washington DC



3.3 Site Trip Distribution

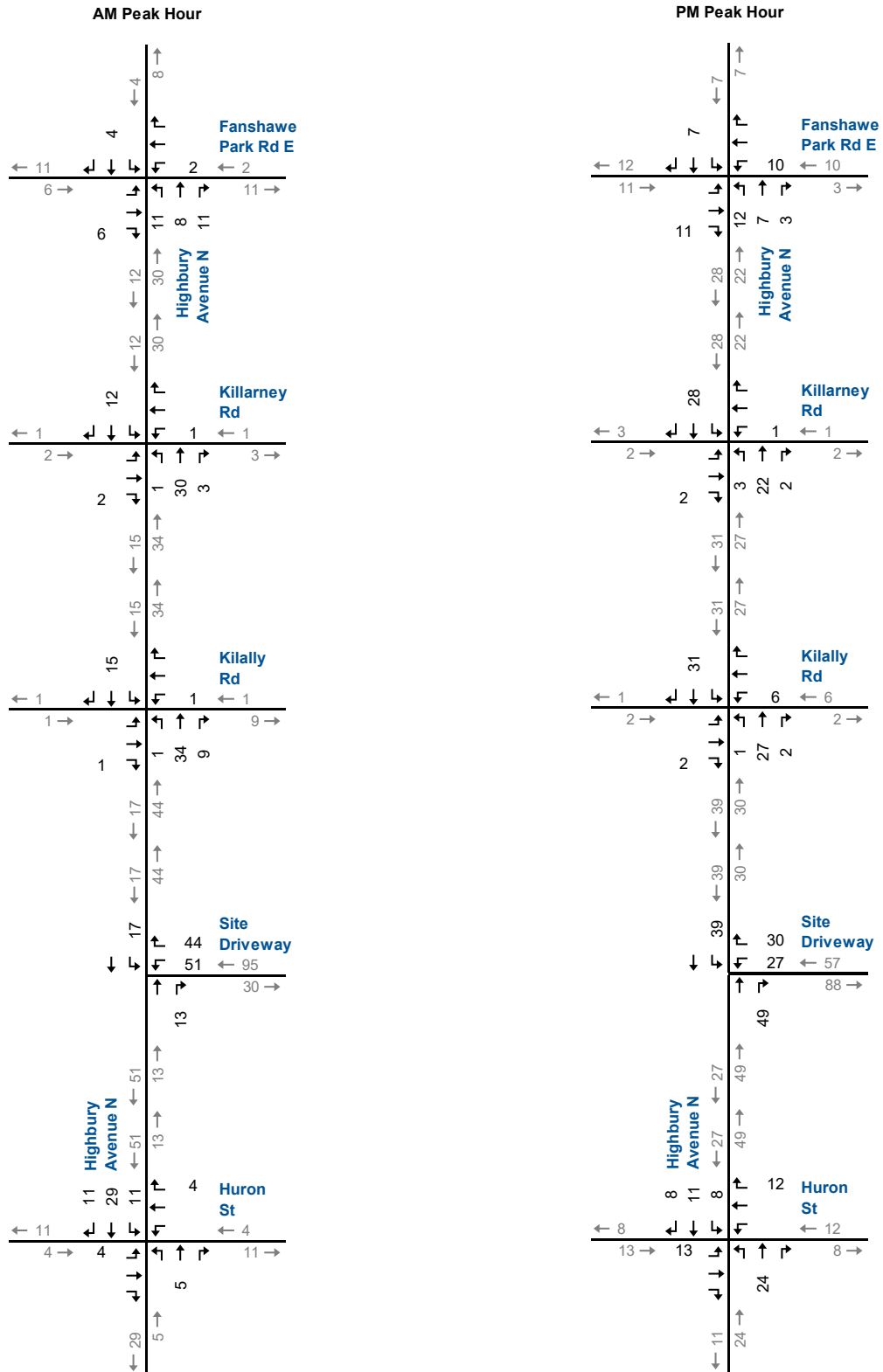
The existing turning movement count data was used to determine the distribution of site traffic on the study area road system. **Table 3.2** summarizes the trip distribution that was applied to site-generated traffic.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Origin/Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
East via Fanshawe Park Rd E	7%	12%	11%	6%
East via Killarney Rd	3%	1%	2%	3%
East via Kilally Rd	3%	9%	6%	3%
East via Huron St	12%	12%	14%	14%
West via Fanshawe Park Rd E	21%	12%	12%	21%
West via Killarney Rd	5%	3%	3%	5%
West via Kilally Rd	4%	1%	2%	3%
West via Huron St	14%	11%	15%	15%
North via Highbury Ave N	15%	8%	8%	12%
South via Highbury Ave N	16%	30%	27%	20%
Total	100%	100%	100%	100%

Figure 3.2 details the net AM and PM peak hour site-generated traffic volumes for 1470-1474 Hyde Park Road on the study area road network.





Site-Generated Traffic AM and PM Peak Hour

4 Evaluation of Future Traffic Conditions

The assessment of the future traffic conditions was undertaken for the 2024 horizon year, corresponding to five years after development application.

The background traffic conditions and the total traffic conditions, respectively with and without development traffic, were analyzed at the horizon year.

4.1 Background Traffic Forecasts

The background traffic volumes are based on growth in background road traffic and development traffic generated by other area developments which are assumed to occur within 2024 timeframe.

4.1.1 General Background Growth

The future background traffic volumes within the study area related to general growth have been estimated by applying a growth rate of 1.5%, which was confirmed with City staff during pre-consultation.

4.1.2 Other Area Developments

Based on pre-consultation with City staff, a subdivision currently under development and several medium density blocks were identified as other area developments for estimating background traffic increases.

Figure 4.1 illustrates the location of the other area development lands with respect to the subject site. For the purpose of impact assessment in this study, the development yields for these lands have been derived based on existing Zoning and permissible densities, for a total of 129 single-detached dwelling units and 874 multiple residential units as shown in **Table 4.1**.

ITE's 10th Edition Trip Generation Manual was used for the trip generation estimates for the other area development lands. The estimates are summarized in **Table 4.1**.

TABLE 4.1: OTHER AREA DEVELOPMENTS – TRIP GENERATION

Land Use	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
Single-Family Detached Housing - LUC 210	129	0.74	24	71	95	Eq ¹	82	48	130
Multifamily Housing (Mid-Rise) - LUC 220	874	0.36	82	233	315	0.44	235	150	385
Total Trip Generation			106	304	410		317	198	515

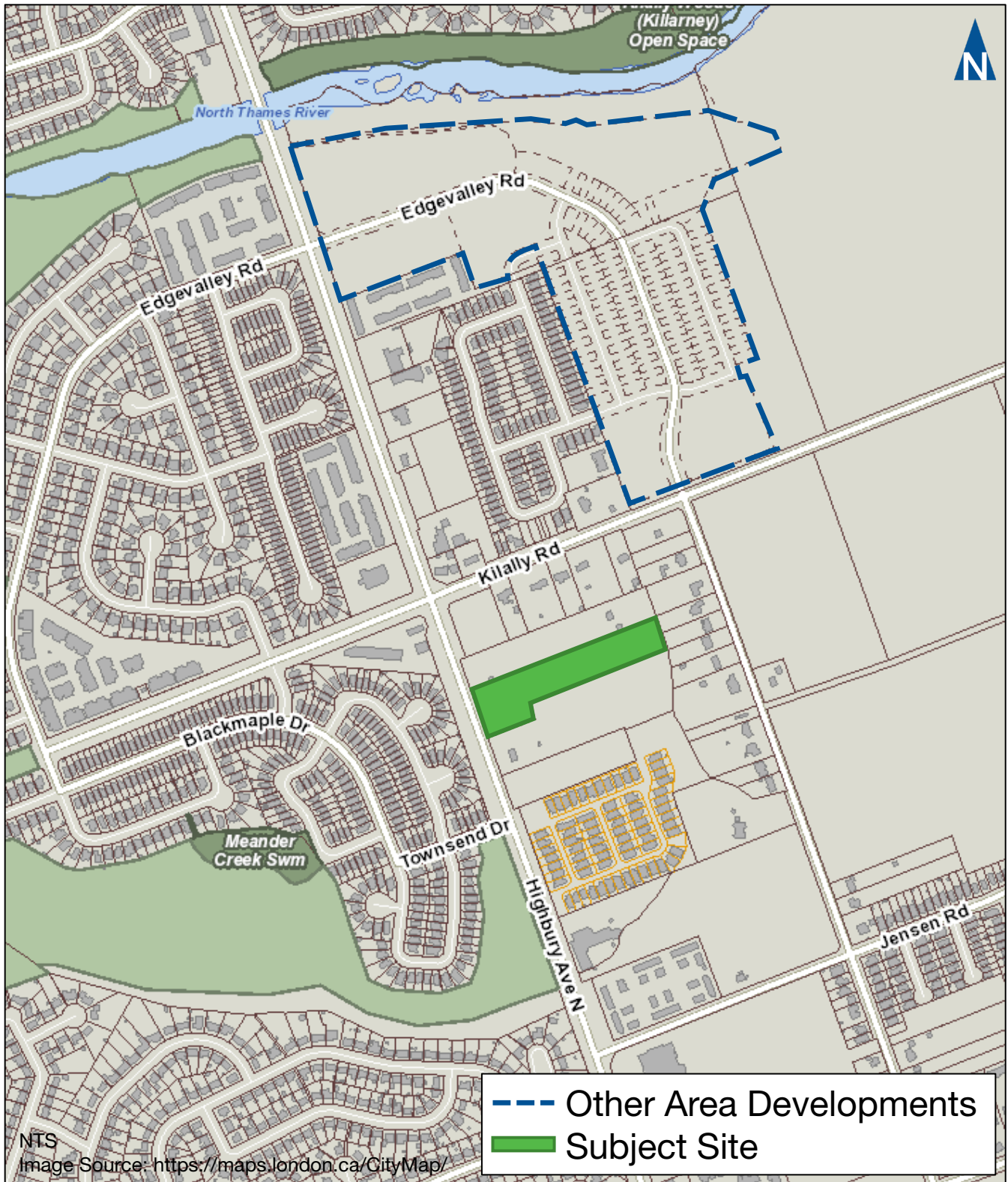
¹Ln(T) = 0.96Ln(X) + 0.20

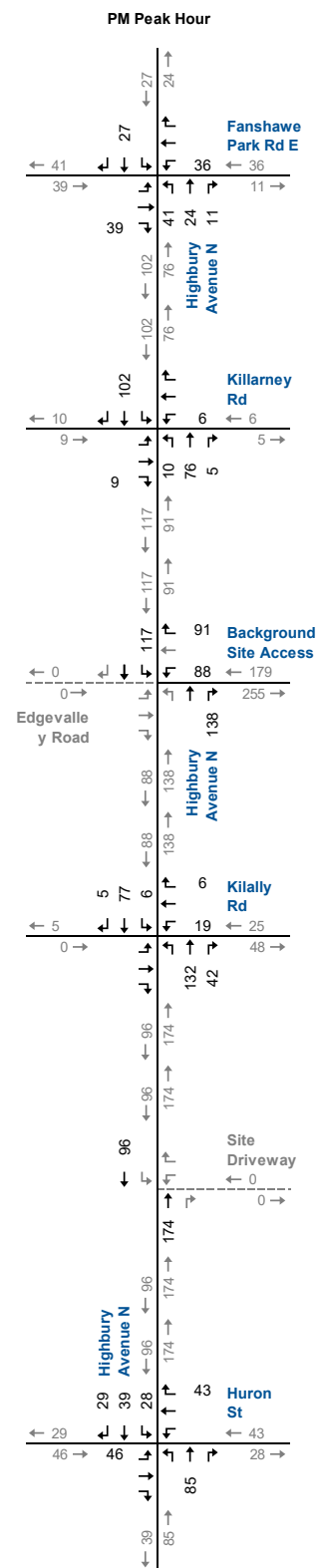
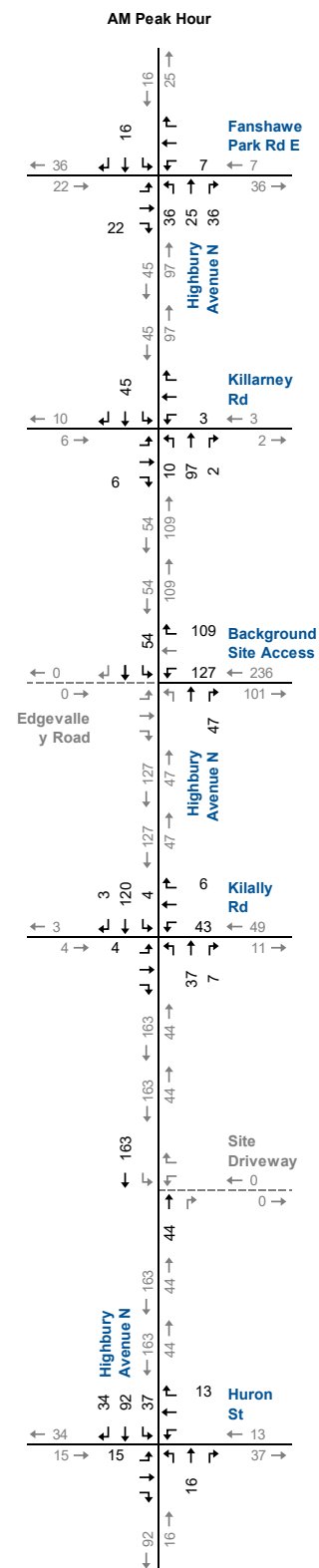
The same trip distribution as for the subject site shown in **Table 3.2**, was applied to the other area development traffic.



Figure 4.2 illustrates the AM and PM Peak Hour traffic volumes for the other area developments.







Other Area Development Traffic AM and PM Peak Hour

4.2 2024 Traffic Conditions

The 2024 horizon year corresponds to five years from the existing conditions scenario. The study area intersections were analysed under 2024 background traffic conditions and 2024 total traffic conditions.

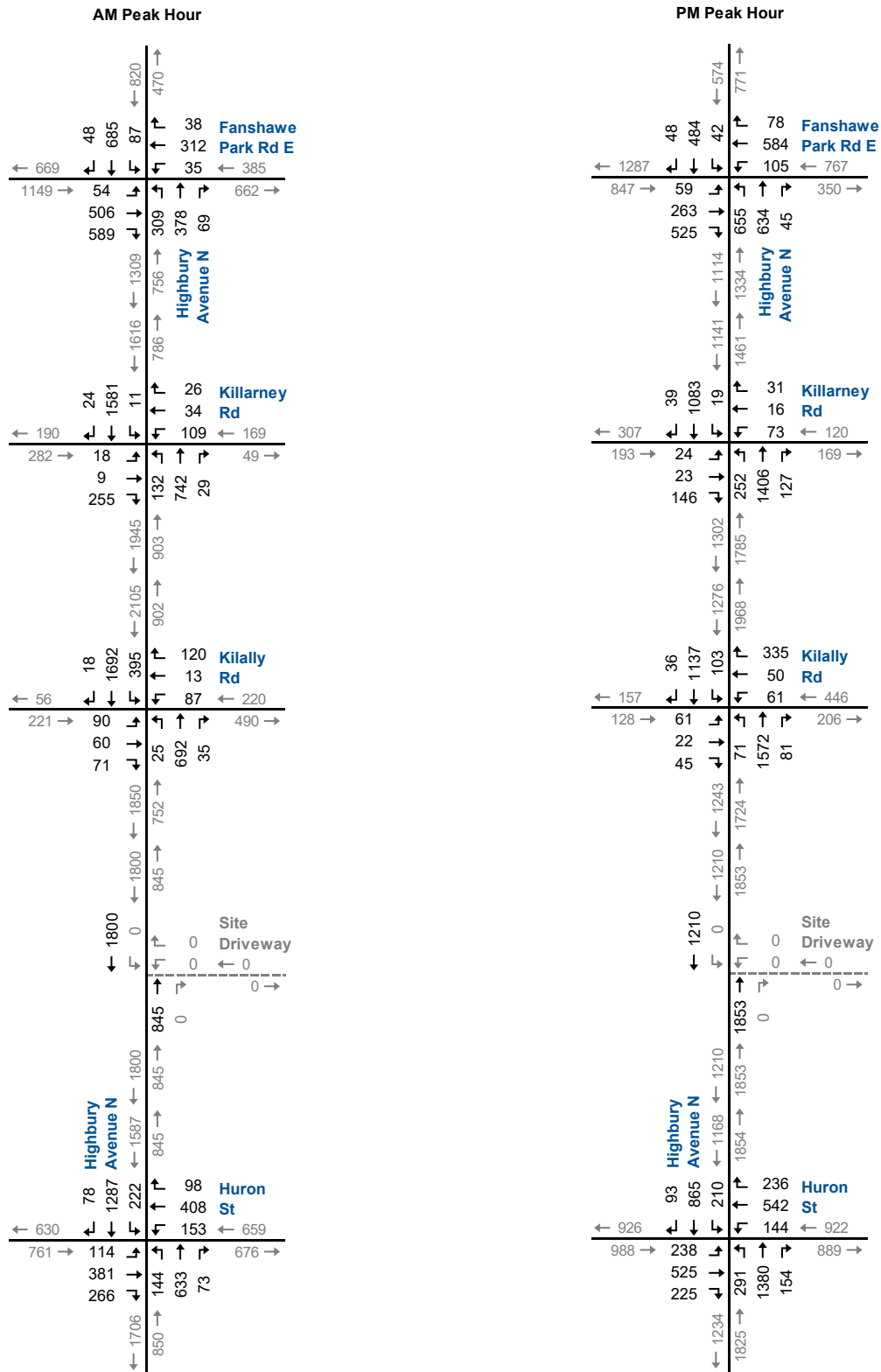
2024 background traffic conditions include increases in background road traffic and development traffic from other area developments described in **Section 4.1.2**.

2024 total traffic condition includes the addition development traffic generated by the subject site to the 2024 background traffic.

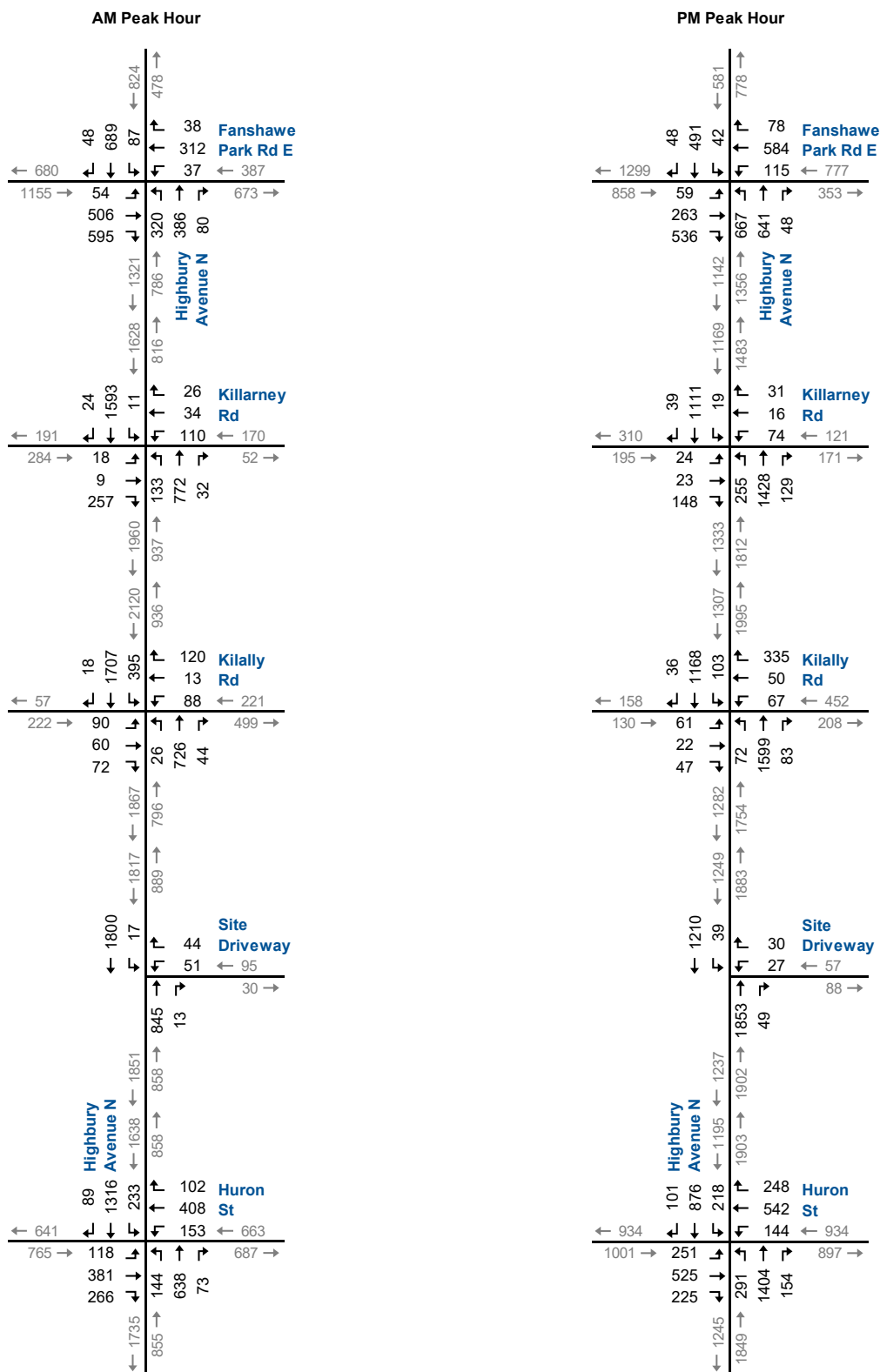
Figure 4.3 details the AM and PM peak hour 2024 background traffic volumes.

Figure 4.4 details the AM and PM peak hour 2024 total traffic volumes.





Background (2024) Traffic AM and PM Peak Hour



Total (2024) Traffic AM and PM Peak Hour

4.3 2024 Background Traffic Operations

The operational analysis for the study area intersections under 2024 background traffic conditions followed the same methodology as well as existing intersection geometry and signal timings used for existing traffic conditions.

Table 4.3 details the AM and PM peak hour Level of Service conditions. In comparison to 2019 existing traffic conditions, two of the study area intersections, namely, the intersection at Highbury Avenue North and Killarney Road and the intersection at Highbury Avenue North and Huron Street, register Level of Service E during AM peak hour and PM peak hour, respectively.

In addition, the queue lengths of critical turning movements at all four intersections are projected to exceed the available storage lengths during both peak hours.

Appendix D contains the detailed Synchro 9 results.



TABLE 4.3: 2024 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	C	C	D	D	C	C	C	C	C	D	C	B	C	B	C	C	
			Delay	31	35	48	42	32	33	29	32	25	22	46	25	19	21	16	21	31
			V/C	0.24	0.57	0.81		0.25	0.39	0.03		0.43	0.22	0.05		0.23	0.46	0.04		
			Storage Avail.	135	-	75		75	-	75		170	-	110		80	-	80		
AM Peak Hour	Highbury Ave N & Killarney Rd	TCS	LOS	C	D	>	D	F	C	>	F	B	>	F	A	C	>	C	E	
			Delay	31	52	>	51	111	31	>	83	779	12	>	124	7	30	>	30	63
			V/C	0.07	0.83	>		0.99	0.12	>		2.59	0.48	>		0.06	0.96	>		2.12
			Storage Avail.	20	-	>		25	-	>		85	-	>		35	-	>		
AM Peak Hour	Highbury Ave N & Kilally Rd	TCS	LOS	D	D	>	D	D	D	>	D	A	>	A	F	B	>	C	C	
			Delay	55	44	>	48	51	38	>	43	25	7	>	8	91	12	>	27	25
			V/C	0.71	0.59	>		0.67	0.16	>		0.43	0.37	>		1.11	0.81	>		1.04
			Storage Avail.	37	47	>		35	34	>		25	118	>		124	129	>		
AM Peak Hour	Highbury Ave N & Huron St	TCS	LOS	C	D	>	D	E	D	>	D	C	B	C	A	D	>	C	C	
			Delay	31	42	>	40	60	40	>	45	23	23	18	23	9	37	>	33	34
			V/C	0.53	0.75	>		0.85	0.71	>		0.60	0.48	0.05		0.50	0.96	>		0.87
			Storage Avail.	225	-	>		50	-	>		130	-	200		75	-	>		
PM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	D	D	D	D	D	D	C	B	B	C	B	C	C	B	C	C	
			Delay	52	37	38	38	40	47	34	45	20	18	22	19	21	22	19	22	30
			V/C	0.63	0.32	0.37		0.49	0.79	0.06		0.64	0.34	0.04		0.15	0.34	0.04		0.70
			Storage Avail.	135	-	75		75	-	75		170	-	110		80	-	80		
PM Peak Hour	Highbury Ave N & Killarney Rd	TCS	LOS	D	E	>	E	F	D	>	F	B	>	E	A	A	>	A	D	
			Delay	44	58	>	56	105	44	>	81	346	12	>	59	10	7	>	7	41
			V/C	0.15	0.72	>		0.90	0.18	>		1.69	0.78	>		0.27	0.57	>		1.54
			Storage Avail.	20	-	>		25	-	>		85	-	>		35	-	>		
PM Peak Hour	Highbury Ave N & Kilally Rd	TCS	LOS	F	C	>	F	C	F	>	F	C	D	D	F	B	>	D	D	
			Delay	147	28	>	84	29	101	>	91	35	46	>	46	370	15	>	44	52
			V/C	1.01	0.09	>		0.21	1.07	>		0.64	1.02	>		1.66	0.67	>		1.47
			Storage Avail.	25	-	>		45	-	>		35	-	>		60	-	>		
PM Peak Hour	Highbury Ave N & Huron St	TCS	LOS	F	D	>	E	D	D	>	D	E	F	C	D	D	>	D	E	
			Delay	166	40	>	70	38	46	>	45	57	122	24	104	52	52	>	52	73
			V/C	1.22	0.77	>		0.71	0.85	>		0.90	1.17	0.11		0.86	0.92	>		1.19
			Storage Avail.	225	-	>		50	-	>		130	-	200		75	-	>		

MOE - Measure of Effectiveness
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 LOS - Level of Service

V/C - Volume to Capacity Ratio
 95th - 95th Percentile Queue Length
 Storage - Existing Storage (m)

> - Shared Right-Turn Lane
 < - Shared Left-Turn Lane
 Avail. - Available Storage (m)



4.4 2024 Total Traffic Operations

The study area intersection operations analysis for 2024 total traffic conditions followed the same methodology as well as intersection geometry and signal timings used for existing traffic and 2024 background traffic conditions.

Table 4.4 details the Level of Service conditions for the AM and PM peak hours.

The overall Levels of Service at the four study area intersections remain the same as under 2024 background traffic conditions. The excessive queuing at critical turning movements also remain the same. These results indicate that the Levels of Service and critical movements identified under 2024 background traffic conditions are only marginally affected by the addition of development traffic generated by the subject site.

The proposed site driveway is projected to operate with acceptable Levels of Service, although in the PM peak hour delays are projected for WB traffic, i.e. outbound traffic leaving the site, with moderate v/c ratios.

Appendix E contains the detailed Synchro 9 results.



TABLE 4.4: 2024 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL				
				Eastbound				Westbound				Northbound				Southbound								
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach					
AM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	C	C	D	D	C	C	C	C	C	C	D	C	B	C	B	C	C				
			Delay	31	35	49	42	32	32	29	32	25	23	50	27	20	22	17	20	0.47	0.04	21	31	
			V/C	0.23	0.56	0.82		0.26	0.38	0.03		0.45	0.22	0.06		0.24	0.24	0.06	0.24	0.47				0.59
			95th	26	65	95		22	52	12		52	61	24		29	80	10	80					
	Storage	135	-	75		75	-	75		170	-	110		50	-	80	-	80						
	Avail.	109	-	-20		53	-	63		118	-	86		81	-	70	-	70						
	Highbury Ave N & Killarney Rd	TCS	LOS	C	D	>	D	F	C	>	F	F	B	>	F	A	C	>	C	E				
			Delay	31	52	>	51	110	31	>	82	792	12	>	123	7	32	>	32	65				
			V/C	0.07	0.84	>		0.99	0.12	>		2.62	0.51	>		0.06	0.98	>		2.12				
			95th	22	71	>		36	38	>		162	666	>		10	95	>						
Storage	25	-	>		25	-	>		85	-	>		35	-	>									
Avail.	3	-	>		-11	-	>		-77	-	>		26	-	>									
Highbury Ave N & Kilally Rd	TCS	LOS	D	D	>	D	D	D	>	D	C	A	>	A	F	B	>	C	C					
		Delay	54	44	>	48	51	38	>	43	25	7	>	8	118	13	>	32	28					
		V/C	0.70	0.60	>		0.67	0.16	>		0.45	0.40	>		1.18	0.82	>		1.10					
		95th	34	43	>		35	33	>		23	62	>		193	548	>							
Storage	25	-	>		45	-	>		35	-	>		60	-	>									
Avail.	-9	-	>		11	-	>		12	-	>		-133	-	>									
Highbury Ave N & Site Driveway	TWSC	LOS					C	C	C	C	A	>	A	A	A	A		A						
		Delay					18	18		18	0	>	0	1	0	0.77		0						
		V/C					0.27	0.27		0.27	0.36	>		0.02	0.77									
		95th					73	73		73	3	>		88	85									
Storage					-	-		-	-	>		-	-											
Avail.					-	-		-	-	>		-	-											
Highbury Ave N & Huron St	TCS	LOS	C	D	>	D	E	D	>	D	C	B	C	B	D	>	D	D						
		Delay	32	41	>	40	60	40	>	45	24	24	19	23	10	44	>	40	37					
		V/C	0.56	0.75	>		0.85	0.71	>		0.60	0.49	0.05		0.53	0.99	>		0.89					
		95th	37	78	>		39	57	>		64	82	16		167	1209	>							
Storage	225	-	>		50	-	>		130	-	200		75	-	>									
Avail.	188	-	>		11	-	>		66	-	184		-92	-	>									
PM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	D	D	D	D	D	C	D	C	B	C	B	C	C	B	C	C					
			Delay	52	37	38	39	41	47	34	45	20	18	22	19	21	23	19	22	30				
			V/C	0.63	0.32	0.40		0.54	0.79	0.06		0.65	0.35	0.04		0.15	0.35	0.04		0.71				
			95th	38	48	85		57	84	17		84	74	11		21	72	12						
	Storage	135	-	75		75	-	75		170	-	110		80	-	80								
	Avail.	97	-	-10		18	-	58		86	-	99		59	-	68								
	Highbury Ave N & Killarney Rd	TCS	LOS	D	E	>	E	F	D	>	E	F	B	>	E	B	A	>	A	D				
			Delay	44	58	>	57	100	44	>	78	401	13	>	67	11	7	>	7	46				
			V/C	0.15	0.73	>		0.88	0.18	>		1.81	0.79	>		0.28	0.59	>		1.64				
			95th	21	49	>		32	25	>		159	566	>		16	44	>						
Storage	25	-	>		25	-	>		85	-	>		35	-	>									
Avail.	4	-	>		-7	-	>		-74	-	>		19	-	>									
Highbury Ave N & Kilally Rd	TCS	LOS	F	C	>	F	C	F	>	F	D	D	>	D	F	B	>	D	D					
		Delay	147	28	>	84	29	102	>	91	41	52	>	51	370	15	>	43	55					
		V/C	1.01	0.10	>		0.23	1.07	>		0.69	1.04	>		1.66	0.69	>		1.47					
		95th	26	26	>		51	126	>		52	127	>		115	99	>							
Storage	25	-	>		45	-	>		35	-	>		60	-	>									
Avail.	-1	-	>		-6	-	>		-17	-	>		-55	-	>									
Highbury Ave N & Site Driveway	TWSC	LOS					F	F	F	F	A	>	A	A	A		A							
		Delay					57	57		57	0	>	0	6	0		2							
		V/C					0.48	0.48		0.48	0.79	>		0.15	0.52									
		95th					82	82		82	2	>		57	49									
Storage					-	-		-	-	>		-	-											
Avail.					-	-		-	-	>		-	-											
Highbury Ave N & Huron St	TCS	LOS	F	D	>	E	D	D	>	D	E	F	C	F	E	D	>	E	E					
		Delay	200	40	>	80	38	46	>	45	58	130	24	110	58	54	>	55	79					
		V/C	1.31	0.77	>		0.71	0.86	>		0.91	1.19	0.11		0.90	0.94	>		1.23					
		95th	308	348	>		82	133	>		203	316	297		152	457	>							
Storage	225	-	>		50	-	>		130	-	200		75	-	>									
Avail.	-83	-	>		-32	-	>		-73	-	-97		-77	-	>									

MOE - Measure of Effectiveness
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 LOS - Level of Service
 V/C - Volume to Capacity Ratio
 95th - 95th Percentile Queue Length
 Storage - Existing Storage (m)
 > - Shared Right-Turn Lane
 < - Shared Left-Turn Lane
 Avail. - Available Storage (m)



5 Remedial Measures

This section outlines the remedial measures that were identified to mitigate the capacity and operational problems that are forecast to occur at the four study area intersections under 2024 background and 2024 total traffic conditions, as discussed in Section 4. Specific remedial measures were reviewed for each of the four intersections. The operational analysis was repeated for 2024 traffic conditions with the identified remedial measures in place. The results are summarized in **Table 5.1**. The remedial measures and resulting improvements are discussed below.

Appendix F contains the detailed Synchro 9 results.

5.1 Highbury Avenue North and Fanshawe Park Road East

- ▶ Extend EB right-turn storage length from 75 metres to minimum 110 metres.

The results of the operational analysis under 2024 traffic conditions indicate that the proposed storage extension will address the projected queue lengths for the EB right-turn movement.

5.2 Highbury Avenue North and Killarney Road

- ▶ Extend WB left-turn storage length from 25 metres to minimum 45 metres;
- ▶ Optimization of signal timing and cycle lengths; and
- ▶ Add northbound left-turn and westbound left-turn phases for the PM peak hour.

The results indicate that the overall intersection Level of Service improves from Level of Service D to Level of Service C, and the overall intersection v/c ratio improves from 1.64 to 0.85. It is noted that the location of the bridge (over Thames River) to the south limits the potential for extending NB left-turn storage length.

5.3 Highbury Avenue North and Kilally Road

- ▶ Extend EB left-turn storage length from 25 metres to minimum 40 metres;
- ▶ Extend WB left-turn storage length from 45 metres to minimum 60 metres; and
- ▶ Extend NB left-turn storage from 35 metres to minimum 60 metres.

The results indicate that the mitigation measures will accommodate forecast queue length increases, and the intersection will operate with acceptable Levels of Service for both the AM and PM peak hours.



5.4 Highbury Avenue North and Huron Street

- ▶ Optimization of signal timing and cycle lengths.

The optimization of the signal timings for the intersection of Highbury Avenue North and Huron Street reduces the overall intersection delay by more than 10 seconds; however, the Level of Service remains E. As well, existing driveways and nearby intersections will prevent the extension of storage lengths for left-turn lanes at this intersection.

5.5 Site Driveway

The requirement for southbound left-turn lane on Highbury Avenue was examined for the full-movement driveway as proposed. Based on the low volume of southbound left-turns, the four-lane road cross-section, and the acceptable Level of Service for driveway operations, an auxiliary turn lane is not identified as required.

However, given the existing pavement configuration including a painted centre median between Kilally Road and Huron Street, a SB left-turn lane could be provided on Highbury Avenue North at the proposed site driveway.



TABLE 5.1: 2024 REMEDIAL MEASURES TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	C	C	D	D	C	C	C	C	B	B	C	B	C	B	C	C	
			Delay	31	35	49	42	32	32	29	32	20	16	30	19	20	22	17	21	30
			V/C	0.23	0.56	0.82		0.26	0.38	0.03		0.45	0.22	0.06		0.24	0.47	0.04		0.59
			95th	27	68	110		25	50	12		52	47	18		33	84	11		
	Storage Avail.	135	-	110		75	-	75		170	-	110		80	-	80				
	Highbury Ave N & Killarney Rd	TCS	LOS	C	D	>	D	F	C	>	F	F	B	>	F	A	C	>	C	E
	Delay	31	52	>	51	110	31	>	82	792	12	>	123	8	33	>	33	65		
	V/C	0.07	0.84	>		0.99	0.12	>		2.62	0.51	>		0.06	0.98	>		2.12		
	95th	21	68	>		40	24	>		162	441	>		10	80	>				
	Storage Avail.	25	-	>		45	-	>		85	-	>		35	-	>				
Highbury Ave N & Kilally Rd	TCS	LOS	D	D	>	D	D	D	D	C	A	>	A	F	B	>	C	C		
Delay	54	44	>	48	51	38	>	43	25	6	>	7	118	13	>	32	28			
V/C	0.70	0.60	>		0.67	0.16	>		0.45	0.40	>		1.18	0.82	>		1.10			
95th	33	42	>		35	33	>		21	59	>		170	309	>					
Storage Avail.	40	-	>		60	-	>		60	-	>		95	-	>					
Highbury Ave N & Site Driveway	TWSC	LOS					C	C	C	A	>	A	A	A			A			
Delay					18	18		18		0	>	0	10	0			0			
V/C					0.27	0.27		0.27		0.36	>	0.02	0.58							
95th					50	50		50		1	>	10	0							
Storage Avail.					-	-		-		-	>	-	-							
Highbury Ave N & Huron St	TCS	LOS	D	D	>	D	E	D	>	D	C	B	C	B	D	>	D	D		
Delay	35	44	>	43	79	42	>	50	27	23	18	23	14	40	>	36	37			
V/C	0.59	0.76	>		0.91	0.71	>		0.65	0.47	0.05		0.52	0.93	>		0.90			
95th	37	81	>		43	65	>		57	82	17		168	791	>					
Storage Avail.	225	-	>		50	-	>		130	-	200		75	-	>					
PM Peak Hour	Highbury Ave N & Fanshawe Park Rd E	TCS	LOS	D	D	D	D	D	C	D	B	A	B	C	C	B	C	C		
Delay	52	37	38	39	41	47	34	45	13	11	9	12	21	23	19	22	27			
V/C	0.63	0.32	0.40		0.54	0.79	0.06		0.65	0.35	0.04		0.15	0.35	0.04		0.71			
95th	37	47	71		53	85	19		78	63	9		21	71	13					
Storage Avail.	135	-	110		75	-	75		170	-	110		80	-	80					
Highbury Ave N & Killarney Rd	TCS	LOS	E	E	>	E	F	E	>	F	D	B	>	B	C	C	>	C		
Delay	66	66	>	66	113	56	>	91	49	11	>	16	25	34	>	34	28			
V/C	0.33	0.38	>		0.89	0.20	>		0.76	0.75	>		0.25	0.83	>		0.85			
95th	22	61	>		37	21	>		68	108	>		20	104	>					
Storage Avail.	25	-	>		45	-	>		85	-	>		35	-	>					
Highbury Ave N & Kilally Rd	TCS	LOS	F	C	>	F	C	F	>	F	D	D	>	D	F	B	>	D		
Delay	147	28	>	84	29	102	>	91	41	52	>	51	370	15	>	43	55			
V/C	1.01	0.10	>		0.23	1.07	>		0.69	1.04	>		1.66	0.69	>		1.47			
95th	30	23	>		62	133	>		57	126	>		188	251	>					
Storage Avail.	40	-	>		60	-	>		60	-	>		80	-	>					
Highbury Ave N & Site Driveway	TWSC	LOS					F	F	F	A	>	A	C	A			A			
Delay					57	57		57		0	>	0	21	0			0.6			
V/C					0.48	0.48		0.48		0.79	>		0.15	0.39						
95th					56	56		56		0	>		8	0						
Storage Avail.					-	-		-		-	>		-	-						
Highbury Ave N & Huron St	TCS	LOS	F	D	>	E	D	E	>	E	E	C	E	F	D	>	E	E		
Delay	164	49	>	78	45	68	>	64	75	67	22	65	151	44	>	64	67			
V/C	1.21	0.83	>		0.72	0.96	>		0.95	1.03	0.11		1.17	0.83	>		1.18			
95th	297	338	>		116	340	>		197	356	255		143	413	>					
Storage Avail.	225	-	>		50	-	>		130	-	200		75	-	>					

MOE - Measure of Effectiveness
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 LOS - Level of Service
 V/C - Volume to Capacity Ratio
 95th - 95th Percentile Queue Length
 Storage - Existing Storage (m)
 > - Shared Right-Turn Lane
 < - Shared Left-Turn Lane
 Avail. - Available Storage (m)



6 Transportation Demand Management

Transportation Demand Management (TDM) programs consider how people's choices of mode travel 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 alternatives to single occupant vehicle travel, such as transit or carpooling, are more competitive. TDM strategies can be divided into two basic categories:

- ▶ **Pre-occupancy:** things that need to be done while a development is being designed and built; and
- ▶ **Post-development:** things that can be done once people have moved into the development.

The pre-occupancy actions are critical because they are most likely to determine how attractive, convenient and safe alternative travel will be once the site is occupied. Before a site is occupied, or during a remodel, it can be designed to be convenient and safe for pedestrians and cyclists. As well, vehicle parking can be provided to meet but not exceed demand.

After the development is built, incentives can be offered, but those incentives will not work as well if the site and its surroundings are already auto oriented. The incentives generally include subsidies to use transit or rideshare and information about where and how to use alternative modes of transportation.

TDM is one of the tools that municipalities are using to create vibrant and sustainable communities. Using policies and programs to make active and sustainable transportation more convenient, a TDM approach to transportation can deliver long-term environmental sustainability, improve public health, create stronger communities, and build more prosperous and liveable cities.

6.1 TDM Measures

To further promote sustainable modes of travel, some of the TDM measures that could be implemented at the proposed development are described below. Due to the subject site's location adjacent to existing transit routes, and existing pedestrian facilities several initiatives could be considered.

6.2.1 Walking

The pedestrian accessibility of a development is essential to ensure that those who can walk, have access to accessible pedestrian connections. Proper pedestrian connections from the surrounding community to the site should be available to ensure safety and to enhance the experience of those who choose to walk.



Sidewalks currently exist on both sides of Fanshawe Park Road East, Killarney Road, Huron Street and most of Highbury Avenue North. Kilally Road has sidewalks on all sides within the study area except for the southerly side east of Highbury Avenue North. The preliminary site concept plan shows sidewalks proposed throughout the subject site as well as a connection to the existing sidewalk network along Highbury Avenue North.

To further promote walking, the City should consider adding sidewalks on the easterly side of Highbury Avenue North north of Kilally Road and on the southerly side of Kilally Road east of Highbury Avenue North.

6.2.2 Cycling

The bicycle parking supply requirements from the City of London's Downtown Parking Strategy⁵ are shown in **Table 6.1** below. Based on these rates, about 300 bicycle parking spaces for residents and 28 bicycle parking spaces for visitors are appropriate for a residential development comprising 400 apartments.

TABLE 6.1: BICYCLE PARKING SUPPLY REQUIREMENTS

Use	Bicycle Parking Rates		Site Statistics	Bicycle Parking Spaces		
	Residential/ Staff	Visitor		Residential/ Staff	Visitor	Total
Residential	0.75	per unit	400 units	300	28	328

6.2.3 Transit

The availability of convenient and desirable transit options can reduce the number of personal automobile trips. As mentioned in Section 2, public transportation is provided via London Transit Routes 14, 25 and 32. These routes provide good connectivity to the broader transit network and key destinations within the City, including recreational facilities and shopping. A northbound transit stop for Route 25 is located along Highbury Avenue North approximately 90 metres north of the subject site. A southbound transit stop for Route 25 with a bench is located along Highbury Avenue North approximately 90 metres south of the subject site, directly in front of the 1600 Hyde Park Road site.

To further promote the use of transit, the City should provide shelters at these stops. The shelter would provide transit users protection from extreme weather elements while they wait for the bus. Moreover, the City should consider extending Routes 14 and 32 to utilize the Highbury Avenue North stops near and north of the subject site as more developments are being built within the study area.

6.2.4 Education/Promotion and Incentives

The following measures could be implemented to inform residents of existing transit and active transportation opportunities and encourage their usage:

⁵ Downtown Parking Strategy, City of London, December 2017



- ▶ Travel planning resources for residents (individualized marketing, active transportation maps, community resources) be provided to first time buyers;

The above TDM measures can assist in further mitigating the site's impact on the adjacent road network, promote a strong and vibrant economy, and create a livable community that has a balanced transportation network that accommodates all modes of transportation.

6.2.5 Car Share

Carsharing encourages more sustainable travel by residents and nearby community members by providing more alternatives to automobile ownership. VRTUCAR, formerly Community CarShare, is a carshare service provider with operations in London. ZipCar is another carsharing service with operations in London. The development should be encouraged to liaise with carshare service providers to facilitate the use carsharing at the development.

6.2 TDM Summary

The proposed developments encourage the use of sustainable transportation as alternatives to automobiles. However, additional measures that could be taken to help promote and encourage TDM include:

- ▶ The City connect the existing sidewalk networks along both Highbury Avenue North and Kilally Road;
- ▶ Wayfinding signage within the common amenity areas to major destinations such as schools, public amenities, and commercial areas; and
- ▶ Consultation with carshare providers, such as VRTUCAR, to provide vehicle(s) and dedicated parking stall(s) within the proposed parking lot.

The TDM measures noted above could be considered for implementation to help promote sustainable and active transportation at the proposed development.



7 Conclusions and Recommendations

7.1 Conclusions

The main findings and conclusions of this study on the transportation impact assessment for the proposed development are as follows:

- ▶ **Description of Development:** Three high-rise apartment buildings, comprising 400 apartments, are proposed to be developed at 1470-1474 Highbury Avenue North.
- ▶ **Vehicular Access:** A full-movement driveway is proposed for the development on Highbury Avenue North, south of Kilally Road.
- ▶ **Horizon years:** Intersection operational analysis was undertaken for the following traffic conditions:
 - Existing (2019) Traffic Conditions
 - 2024 Background and Total Traffic Conditions

- ▶ **Other Area Developments:** A total of approximately 22.5 hectares of developable lands with a potential yield of about 1000 residential units were included as 'other area development' for background traffic estimates. It is likely that the main access to these areas will be provided on Highbury Avenue North at the existing intersection at Edgevalley Road.

- ▶ **Existing Traffic Conditions:**

The study area intersections are operating at acceptable Levels of Service overall. North-south traffic on Highbury Avenue North and east-west traffic on Fanshawe Park Road East operate at acceptable Levels of Service.

Critical turning movements are noted at Highbury Avenue North and Killarney Road during both peak hours, and at Highbury Avenue North and Kilally Road during the PM peak hour.

In addition, 95th percentile queue lengths for mostly left-turn movements on the east-west roadways are exceeding available storage at all the four study area intersections

- ▶ **Development Traffic:** The subject site will generate approximately 125 AM peak hour trips and approximately 145 PM peak hour trips.
- ▶ **2024 Background Traffic Conditions:** Study area intersections overall operations are forecast to operate at generally acceptable Levels of Service during the weekday AM and PM peak hours. However, the intersections of Highbury Avenue North and Killarney Road along with Highbury Avenue North and Huron Street are both forecast to operate with Levels of Service E.
- ▶ **2024 Total Traffic Conditions:** All Study area intersection operations including critical movements are forecast to be similar to those under 2024 background traffic conditions, indicating that the traffic impacts of



the proposed developments are minimal on the study area road system and intersections.

- ▶ **New Road Connection:** It is also noted that with a potential new road connection at the intersection of Highbury Avenue and Edgevalley Boulevard, there will be redistribution of the turning movements at the Killaly Road intersection, thereby improving road and intersection traffic operations.
- ▶ **Site Driveway:** The proposed site driveway on Highbury Avenue for the subject site is projected to operate with acceptable Levels of Service, although in the PM peak hour delays are projected for westbound traffic, i.e. outbound traffic leaving the site, but with moderate v/c ratios. A southbound left-turn lane on Highbury Avenue is not warranted at the driveway, although the existing pavement can accommodate a SB left-turn lane with 15 metre storage.
- ▶ **Remedial Measures:** The critical movements mostly involve left-turn and right-turn queue lengths exceeding existing storage lengths. Accordingly, the identified remedial measures also include auxiliary lane storage extensions where feasible. Additionally, the signal timing and cycle lengths could be optimized along with the implementation of protected left-turn phasing, at the intersections of Highbury Avenue North and Killarney Road and Highbury Avenue North and Huron Street.
- ▶ **Transportation Demand Management:** The TDM measures outlined Section 6 should be considered for implementation as appropriate to the subject development.

7.2 Recommendations

Based on the findings of this study, it is recommended that the City consider:

- ▶ Approval of the subject development, as proposed; and
- ▶ Implementing the remedial measures as identified in this study and within the timeframe as analysed in the study.



Appendix A

Pre-Study Consultation



Appendix B

Existing Count Data



Appendix C

Existing Traffic Operational Conditions



Appendix D

2024 Background Traffic Operational Conditions



Appendix E

2024 Total Traffic Operational Conditions



Appendix F

Remedial Measures Operational Conditions

