50 King Street and 399 Ridout Street North, London Transportation Impact Assessment

Paradigm Transportation Solutions Limited

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Project Summary

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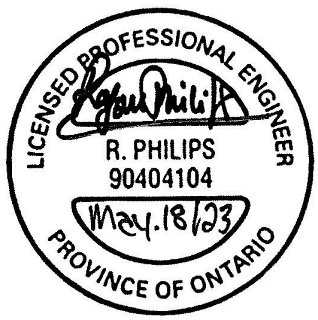
Client
YORK Developments
303 Richmond Street, Suite 201
London ON M6B 2H8

Client Contact
Carlos Ramirez

50 King Street and 399 Ridout Street North, London
Transportation Impact Assessment



Rajan Philips, M.Sc. (PI), P.Eng.

Consultant Project Team
Rajan Philips, M.Sc. (PI), P.Eng.
Maddison Murch, P.Eng.

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Paradigm Transportation Solutions Limited
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684
www.ptsl.com

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed mixed-use development located at 50 King Street and 399 Ridout Street North in the City of London.

This Transportation Impact Study (TIS) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from development completion (2030), assessment of traffic impacts with recommendations to accommodate the proposed development as appropriate, and Transportation Demand Management measures.

Proposed Development

The subject lands are located on the west side of Ridout Street North between Dundas Street to the north and King Street to the south. The building previously located at 50 King Street has been removed. The property at 399 Ridout Street North, which was previously used as the London Courthouse and Jail, now accommodates Middlesex County offices.

Neither property currently has vehicular access on Ridout Street. A common access is provided on King Street to a shared parking lot located between the two properties. As part of the redevelopment of the site, the parking lot is to be removed and parking for both properties will be provided in a new underground parking garage with access on King Street slightly east of the existing access point.

The proposed development will include two mixed-use high-rise towers with 2,865 m^2 (30,839 ft^2) Gross Floor Area (GFA) ground floor retail, 10,920 m^2 (117,542 ft^2) GFA office, and 800 residential units. A one-way internal roadway for drop-off purposes is being proposed between the two towers with a right-in only connection to Ridout Street and outbound only connection to King Street.

The vehicular access to the two properties will be on King Street as it is now, with a potential right-in vehicular access on Ridout Street.

The development is anticipated to be completed by 2025.

TIS Scope

The scope of the Transportation Impact Study for the proposed development includes:

- **Study Area intersections:**
  - Ridout Street North and Queens Avenue (signalized);
  - Ridout Street North and Dundas Street (signalized);
  - Ridout Street North and King Street (signalized);
  - Ridout Street North and York Street (signalized);
  - York Street and Thames Street (unsignalized); and
  - Underground parking access to King Street.
- **Analysis Periods:** Weekday AM and PM peak hours.
- **Traffic Conditions:** Existing (2022) and five years from development completion (2030).

BRT Network Changes

The implementation of the City's BRT system that is currently underway will result in geometric and operational changes to the study are intersections. These changes, based on information obtained from the City, are incorporated in the analysis of future traffic conditions.

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:
  - <u>Ridout Street North and King Street:</u> The eastbound through movement is operating with LOS E and a v/c ratio greater than 0.90 during the AM peak hour; and

    The northbound right-turn movement is operating with LOS F/E and a v/c ratio greater than 0.90 during the AM and PM peak hours, respectively.
  - <u>Ridout Street North and York Street:</u> The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour.

- **Development Trip Generation:** The development is forecast to generate 359 and 440 trips during the AM and PM peak hours, respectively.
- **2030 Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service and critical movements as under existing traffic conditions, with the addition of the southbound left-turn movement at the intersection of Ridout Street North and King Street which is forecast to operate with 95^{th} percentile queues exceeding the available storage of 55 metres during the AM peak hour.
- **2030 Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service and critical movements as under existing and background traffic conditions, with the addition of the following critical movements at the intersection of Ridout Street North and King Street:
  - The northbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95^{th} percentile queues exceeding the available storage of 35 during the AM and PM peak hours;
  - The northbound right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour;
  - The southbound left-turn movement is forecast to operate with 95^{th} percentile queues exceeding the available storage of 55 metres by one metre during the PM peak hour; and
  - The southbound shared through/right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.
- **Site Access:** The access arrangement for the site, which includes the existing Middlesex County offices and the proposed new development, will remain the same – with all-moves access on King Street and a potential right-in only access on Ridout Street.

  An eastbound left-turn lane with 15 metres of storage is identified as warranted on King Street at the proposed new access.
- **Intersection Modifications:** As noted, future (2030) total traffic conditions were analyzed with the BRT network changes assumed to be in place, but with the existing storage lengths for auxiliary turn lanes. Based on the results of the operational

analysis, the following operational and geometric modifications have been identified for consideration:

- Ridout Street North and York Street: Eastbound left-turn lane storage be increased from 40 to 60 metres.
- Ridout Street North and King Street:
  - Protected northbound and southbound left-turn phases;
  - Signal timing optimization;
  - Southbound right-turn auxiliary lane with 35 metres of storage, if feasible; and
  - Southbound left-turn lane storage be increased from 55 to 75 metres.

- **Summary of Impact Assessment:** The following summarizes the subject site characteristics and the traffic impact assessment of the proposed redevelopment:
  - The subject site includes two properties, 50 King Street and 399 Ridout Street. The existing site access includes all-moves access on King Street and a potential right-in only vehicular access on Ridout Street.
  - The existing building at 399 Ridout Street houses the Middlesex County offices which shares a surface parking lot with the property to the south.
  - The proposed redevelopment of 50 King Street will eliminate the surface parking lot and include a new underground parking garage that will be shared with the Middlesex County offices.
  - The existing access on King Street will be shifted to the east as the driveway to the new underground parking garage. The access arrangement is the same as at present and is compatible with the BRT network changes.
  - The traffic generated by the development can be accommodated by the study area roads and intersections, with potential for traffic distribution between intersections to avoid potential peak hour delays.
- **Transportation Demand Management:** The following TDM measures can be implemented in the subject development to support the use of alternative modes:
  - Internal walkways with connections to the surrounding municipal pedestrian network;
  - A minimum of 800 bicycle parking spaces on-site;

- Unbundling parking from the sale/rent of dwelling units;
- Provide a minimum of one carshare parking space and one rideshare/carpooling parking space on-site;
- Provide a welcome package to residents and employees that informs them of available transit, future BRT operations, and active transportation infrastructure in the area; and
- Wayfinding signage be posted in the lobby or near main entrances.

Recommendations

Based on the findings and conclusions of this study, it is recommended that the proposed development be considered for approval with the provision of an eastbound left-turn lane at the site driveway on King Street.

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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed mixed-use development located at 50 King Street and 399 Ridout Street North in the City of London. **Figure 1.1** illustrates the subject development location.

The subject lands are located on the west side of Ridout Street North between Dundas Street to the north and King Street to the south. The building previously located at 50 King Street has been removed. The property at 399 Ridout Street North, which was previously used as the London Courthouse and Jail, now accommodates Middlesex County offices.

Neither property currently has vehicular access on Ridout Street. A common access is provided on King Street to a shared parking lot located between the two properties. As part of the redevelopment of the site, the parking lot is to be removed and parking for both properties will be provided in a new underground parking garage with access on King Street slightly east of the existing access point.

The proposed development will include two mixed-use high-rise towers with 2,865 m^2 (30,839 ft^2) Gross Floor Area (GFA) ground floor retail, 10,920 m^2 (117,542 ft^2) GFA office, and 800 residential units. A one-way internal roadway for drop-off purposes is being proposed between the two towers with a right-in only connection to Ridout Street and outbound only connection to King Street.

The vehicular access to the two properties will be on King Street as it is now, with a potential right-in vehicular access on Ridout Street.

The development is anticipated to be completed by 2025.

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 September 2022, includes:

- Assessment of the current traffic and site conditions within the study area;

- Estimates of background traffic growth for five years from development completion (2030);
- 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:
  - Ridout Street North and Queens Avenue (signalized);
  - Ridout Street North and Dundas Street (signalized);
  - Ridout Street North and King Street (signalized);
  - Ridout Street North and York Street (signalized);
  - York Street and Thames Street (unsignalized); and
  - Underground parking access to King Street.
- Recommendations necessary to mitigate the site generated traffic in a satisfactory manner; and
- Transportation Demand Management measures appropriate to the subject site.

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

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Location of Subject Lands

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:

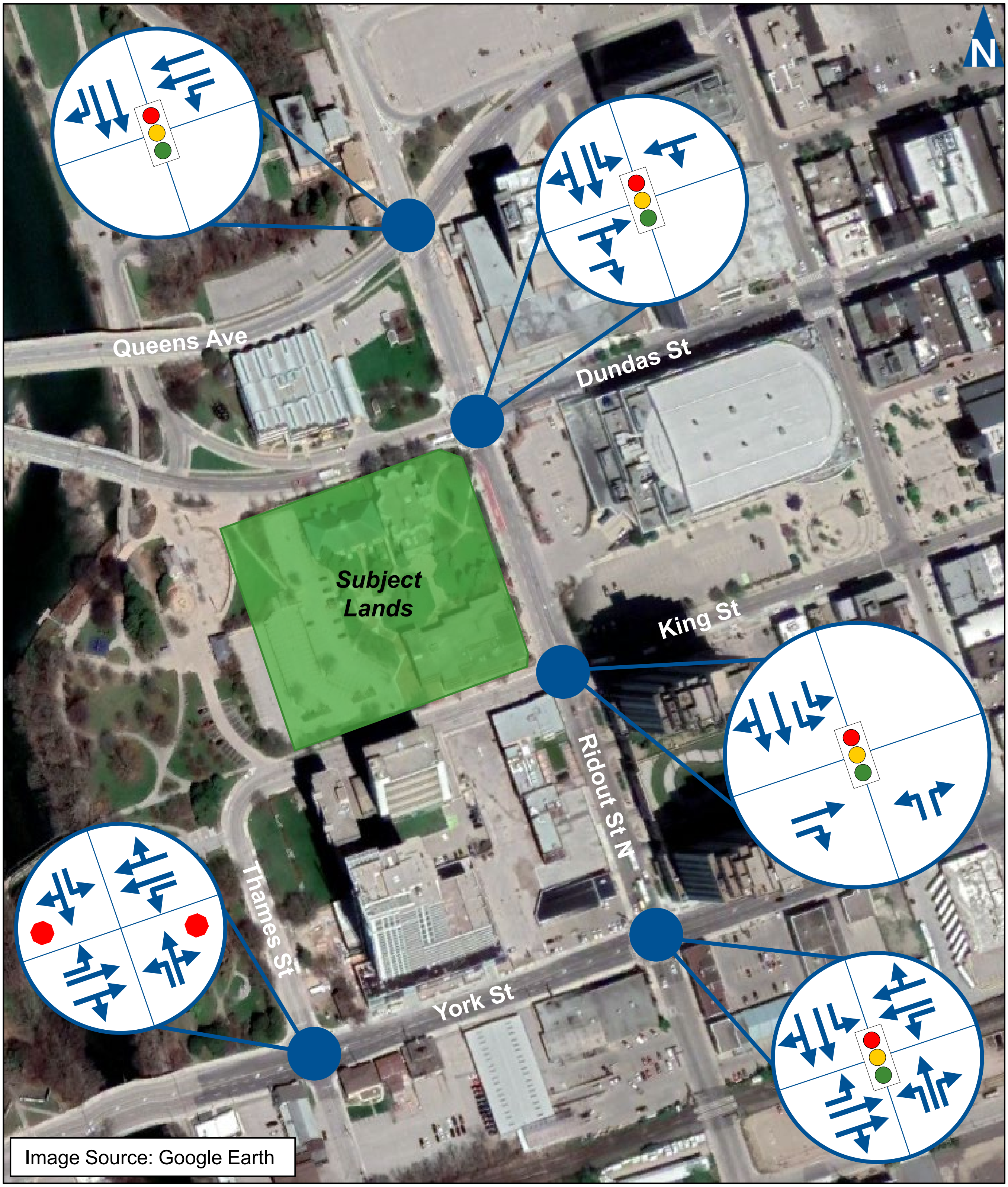
- **Ridout Street North** is a north-south Neighbourhood Connector[2] north of Queens Avenue and south of King Street, and Rapid Transit Boulevard between Queens Avenue and King Street. The roadway changes from a two-lane cross-section (north of Queens Avenue) to a four-lane cross section (south of Queens Avenue) within the study area. The roadway is also one-way southbound to the north of King Street, and two-way to the south of King Street.
- **Queens Avenue** is an east-west Rapid Transit Boulevard with a two-lane cross section west of Ridout Street North and three-lane cross section to the east. This roadway is one-way westbound and crosses the Thames River west of Ridout Street North.
- **Dundas Street** is an east-west Neighbourhood Connector to the east of Ridout Street North with a two-lane cross section and posted speed limit of 30 km/h.

  To the west of Ridout Street North, the roadway is classified as a Civic Boulevard with a posted speed limit of 40 km/h. This portion of Dundas Street has a three-lane cross section, two lanes eastbound continuing from Riverside Drive crossing the Thames River; and one lane westbound terminating at Harris Park Gate.
- **King Street** is an east-west Rapid Transit Boulevard east of Ridout Street North and local road to the west. The roadway has a two-lane cross section and is one-way eastbound east of Ridout Street and two-way to the west.
- **York Street** is an east-west Civic Boulevard with a four-lane cross section within the study area and a posted speed limit of 50 km/h.
- **Thames Street** is a north-south local road with a two-lane cross section.

The above roadways have a posted speed limit of 40 km/h unless otherwise noted.

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

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



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Existing Lane Configuration and Traffic Control

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Figure 2.1

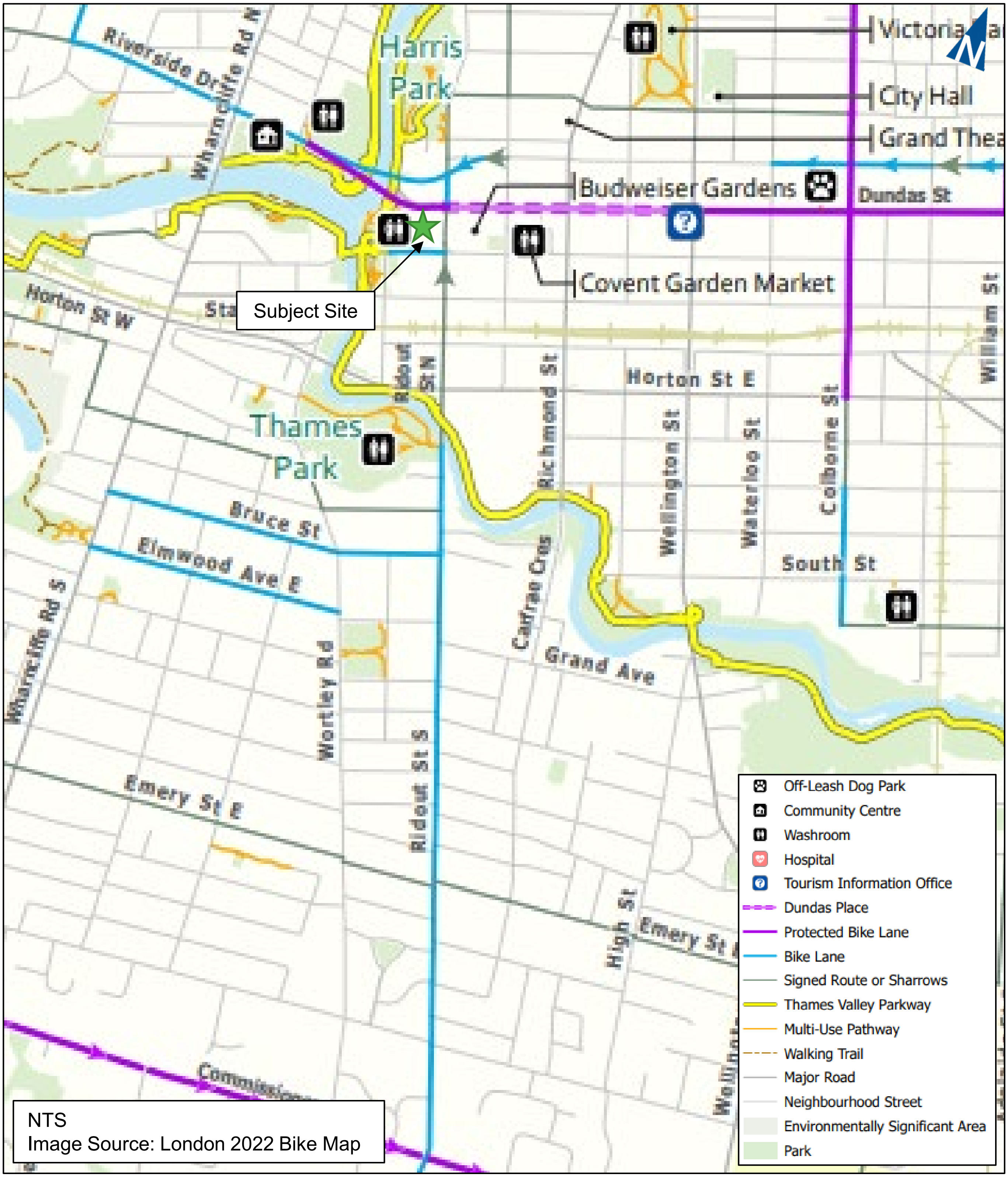
2.2 Active Transportation

Sidewalks are provided on both sides of all study area roadways.

The following cycling facilities are currently provided:

- Bike lanes on both sides of King Street between Thames Street and Ridout Street North;
- Protected bike lanes on both sides of Dundas Street west of Ridout Street North and Dundas Place is located to the east of Ridout Street North;
- A single westbound bike lane is provided on Queens Avenue; and
- Southbound sharrows are provided on Ridout Street North within the study area.

Figure 2.2 illustrates the existing cycling network.



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Existing Cycling Network

Figure 2.2

2.3 Transit Service

2.3.1 Existing Bus Routes

The study area road network is currently under construction for the future Bus Rapid Transit (BRT) system with temporary bus stops provided. Prior to construction, London Transit operated a total of nine routes within 200 metres from the subject site. **Figure 2.3** illustrates the existing transit service. The closest stops to the subject site include the following:

- Stop #1549 (Route 5 and Route 7) is located on Ridout Street North immediately fronting the subject site.
- Stop #1443 (Route 2, 9, 12, 19, 20 and 102) is located on Queens Avenue immediately east of Ridout Street North (215 metres from the subject site).
- Stop #2736 (Route 2, 5, 7, 9, 12, 19, 20 and 106) is located on the south side of King Street between Ridout Street North and Talbot Street (125 metres from the subject site).

While the surrounding area is under construction, Stop #600 (Route 2, 9, 19, and 106) is located on Dundas Street immediately west of Ridout Street North (fronting the 399 Ridout Street North property).

The above routes and bus stops are subject to change following the implementation of the BRT network.

2.3.2 BRT Network

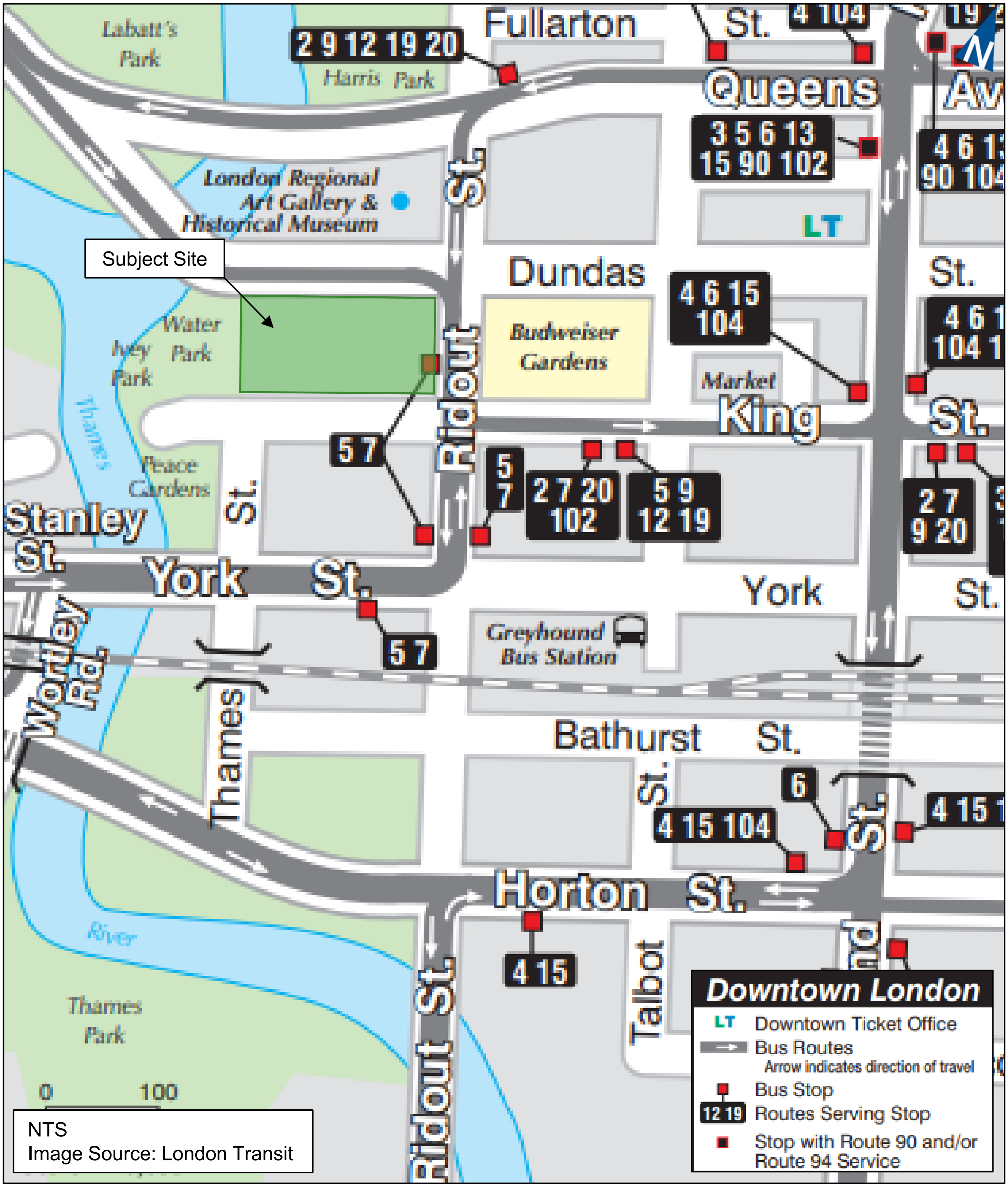
The City is currently implementing a Bus Rapid Transit system for enhancing transit usage. The system will consist of the following routes:

- The **Downtown Loop** will operate buses along Queens Avenue, King Street, Ridout Street and Wellington Street. This loop is the first of the BRT network and includes curbside bus alignments only. Construction currently underway and is anticipated to be completed by 2024.
- The **East London Link** will operate buses between Downtown and Fanshawe College along King Street, Dundas Street, Highbury Avenue and Oxford Street East.
- The **Wellington Gateway** will operate buses between Downtown and Highway 401 along Wellington Road.

Within the study area, the Downtown Loop is expected to run westbound on Queens Avenue, southbound on Ridout Street North (fronting the subject site), and eastbound on King Street east of Ridout Street North.

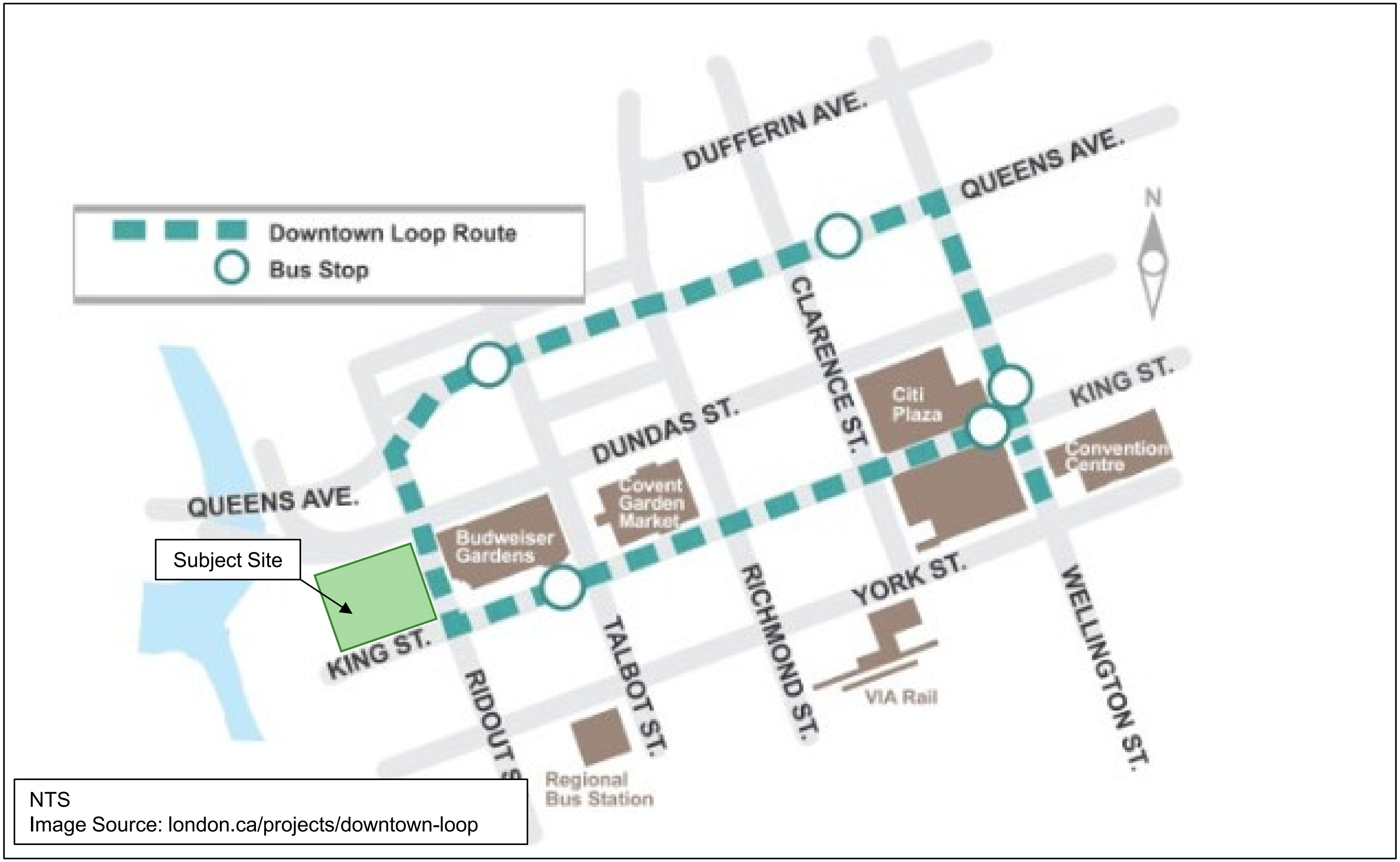
The closest BRT stations are located on King Street and on Queens Avenue between Ridout Street North and Talbot Street.

Figure 2.4 illustrates the proposed BRT Downtown Loop.



Existing Transit Network

Figure 2.3



Future BRT Downtown Loop

Figure 2.4

2.4 Traffic Volumes

2.4.1 Base Year Traffic Volumes

Turning movement counts were collected by Paradigm or provided by the City. **Table 2.1** summarizes the traffic count date, source and peak hour start times for each intersection.

TABLE 2.1: EXISTING TURNING MOVEMENT COUNT SUMMARY

Intersection	Count Date	Source	AM Peak Hour	PM Peak Hour
Ridout Street North and Queens Avenue	September 11, 2018	Paradigm	7:45 AM	4:15 PM
Ridout Street North and Dundas Street	June 23, 2021	City	8:00 AM	4:00 PM
Ridout Street North and King Street	August 28, 2019	City	7:45 AM	4:15 PM
Ridout Street North and York Street	December 17, 2019	City	7:45 AM	4:15 PM
Thames Street and York Street	November 22, 2022	Paradigm	7:45 AM	4:15 PM

2.4.2 Volume Adjustments

Due to BRT construction and road closures in the study area, the City requested that older traffic counts be used and increased to 2022.

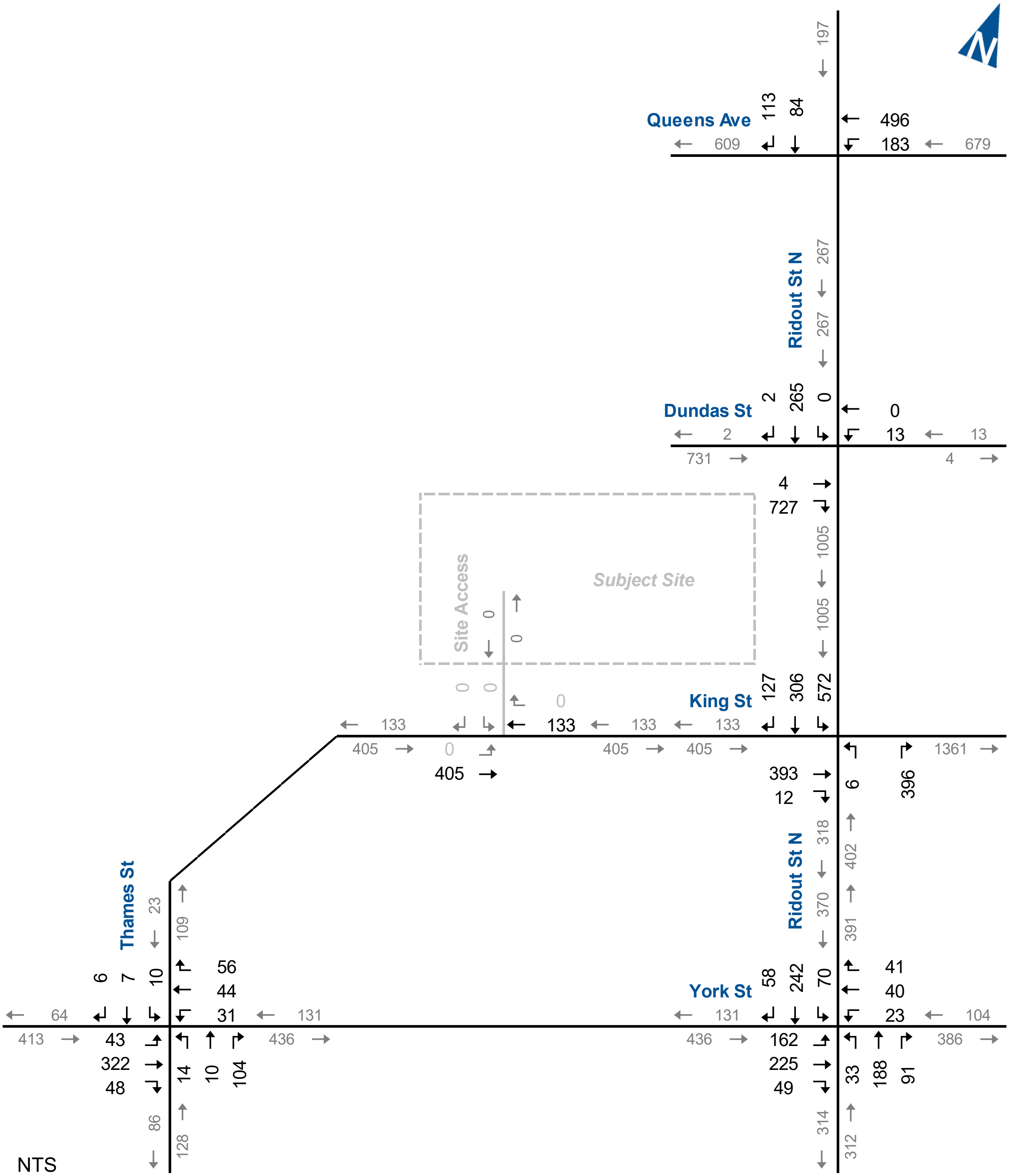
To obtain 2022 traffic volumes, a growth rate of 1% was applied to the 2018, 2019 and 2021 turning movement counts. This growth rate was confirmed with City of London staff during pre-study consultation.

The 2021 traffic counts at Ridout Street North and Dundas Street were adjusted for COVID reductions by increasing the southbound through volume to match the southbound total at Ridout Street North and Queens Avenue. Eastbound right-turn traffic volumes were increased by the difference between the total southbound volumes at Dundas Street and at King Street.

New traffic counts were collected at the intersection of Thames Street and York Street. The 2022 traffic counts at Thames Street and York Street were compared to the 2019 traffic counts at York Street and Ridout Street North. The eastbound and westbound traffic volumes on York Street and Thames Street were balanced.

Figure 2.5a and **Figure 2.5b** illustrate the base year (2022) AM and PM weekday peak hour traffic volumes, respectively.

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



Base Year (2022) Traffic Volumes AM Peak Hour

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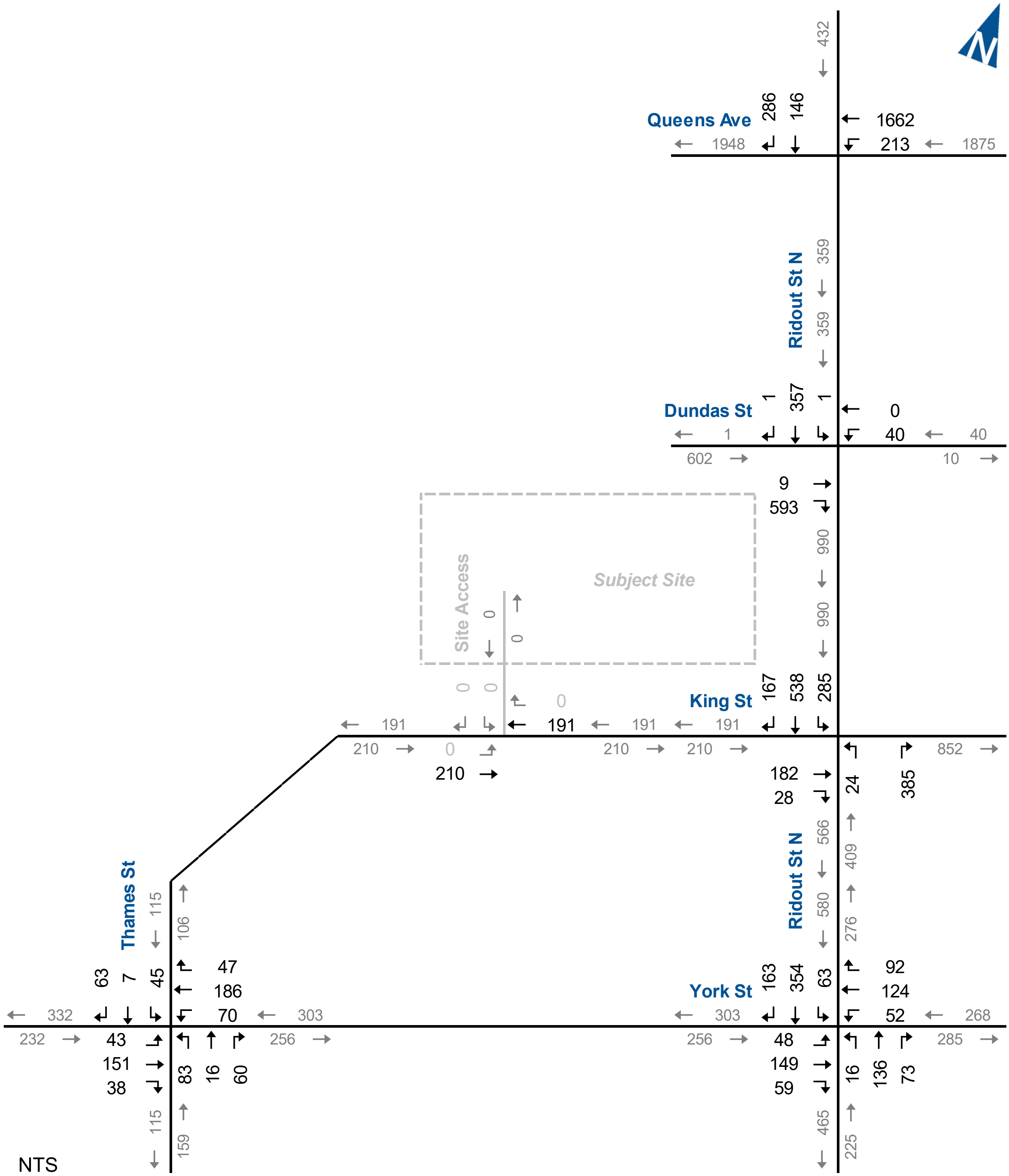
Figure 2.5a



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Base Year (2022) Traffic Volumes PM Peak Hour

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Figure 2.5b

2.5 Traffic Operations

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;
- 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 2.2a and **Table 2.2b** summarize 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 movements:

Ridout Street North and King Street

- The eastbound through movement is operating with LOS E and a v/c ratio greater than 0.90 during the AM peak hour; and

- The northbound right-turn movement is operating with LOS F/E and a v/c ratio greater than 0.90 during the AM and PM peak hours, respectively.

Ridout Street North and York Street

- The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour.

Appendix C contains the detailed Synchro 11 reports.

TABLE 2.2A: EXISTING TRAFFIC OPERATIONS – AM PEAK HOUR

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	Ridout St N & Queens Ave	TCS	LOS					A	A		A						D	B	C	A
			Delay					1	3		2						45	16	28	8
			V/C					0.17	0.21								0.31	0.52		
			Q					4	18								17	17		
	Ridout St N & Dundas St	TCS	LOS		C	B	C	<	D		D					A	C	>	C	C
			Delay		25	18	21	<	43		43					0	23	>	23	22
			V/C		0.86	0.80		<	0.05							0.00	0.21	>		
			Q		53	32		<	9							0	38	>		
			Stor.		-	-		<	-				-			15	-	>		
			Avail.		-	-		<	-							15	-	>		
	Ridout St N & King St	TCS	LOS		E	A	E					D		F	F	C	C	>	C	E
			Delay		72	0	70					40		177	174	20	22	>	21	66
			V/C		0.96	0.03						0.11		1.27		0.48	0.41	>		
			Q		149	0						5		180		54	46	>		
			Stor.		-	10			-			35	-	-		55	-	>		
			Avail.		-	10						30		-		1	-	>		
	Ridout St N & York St	TCS	LOS	D	C	>	D	C	B	>	B	A	B	A	B	B	B	>	B	C
			Delay	55	33	>	41	23	13	>	15	10	16	4	12	13	17	>	16	24
			V/C	0.74	0.43	>		0.10	0.12	>		0.06	0.19	0.13		0.11	0.17	>		
			Q	52	34	>		8	8	>		9	48	10		16	30	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	-12	-	>		42	-	>		16	-	-		29	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	A	A	A	>	A	C	B	>	B	B	B	>	B	
			Delay	8	0	>	1	8	0	>	2	16	11	>	12	14	12	>	13	
			V/C	0.03	0.00	>		0.03	0.00	>		0.04	0.18	>		0.03	0.03	>		
			Q	1	0	>		1	0	>		1	4	>		1	1	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	19	-	>		19	-	>		19	-	>		29	-	>		

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

TABLE 2.2B: EXISTING TRAFFIC OPERATIONS – PM PEAK HOUR

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	
PM Peak Hour	Ridout St N & Queens Ave	TCS	LOS					A	B		**B**						C	D	**D**	**B**
			Delay					2	16		**15**						27	50	**42**	**20**
			V/C					0.24	0.80								0.20	0.85		
			Q					9	165								20	85		
	Ridout St N & Dundas St	TCS	LOS		C	B	**C**	<	D		**D**					C	C	>	**C**	**C**
			Delay		27	17	**22**	<	40		**40**					24	25	>	**25**	**24**
			V/C		0.84	0.76		<	0.13							0.00	0.29	>		
			Q		49	28		<	19							1	49	>		
			Stor.		-	-		<	-				-			15	-	>		
			Avail.		-	-		<	-							14	-	>		
	Ridout St N & King St	TCS	LOS		D	A	**D**					D		E	**E**	A	C	>	**C**	**D**
			Delay		47	1	**41**					40		65	**64**	8	29	>	**23**	**36**
			V/C		0.64	0.09						0.31		0.94		0.26	0.71	>		
			Q		55	0						14		152		15	81	>		
			Stor.		-	10			-			35	-	-		55	-	>		
			Avail.		-	10						21		-		40	-	>		
	Ridout St N & York St	TCS	LOS	D	C	>	**C**	C	B	>	**B**	A	B	A	**A**	A	A	>	**A**	**B**
			Delay	50	29	>	**33**	24	16	>	**17**	8	14	2	**9**	7	8	>	**8**	**15**
			V/C	0.47	0.49	>		0.20	0.31	>		0.03	0.14	0.09		0.09	0.28	>		
			Q	20	24	>		15	18	>		4	30	4		6	23	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	20	-	>		35	-	>		21	-	-		39	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	**A**	A	A	>	**A**	C	B	>	**C**	C	B	>	**B**	
			Delay	8	0	>	**2**	8	0	>	**2**	19	12	>	**16**	18	10	>	**14**	
			V/C	0.04	0.00	>		0.06	0.00	>		0.26	0.13	>		0.15	0.10	>		
			Q	1	0	>		2	0	>		8	3	>		4	2	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	19	-	>		18	-	>		12	-	>		26	-	>		

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

3 Development Concept

3.1 Development Description

The subject lands are located on the west side of Ridout Street North between Dundas Street to the north and King Street to the south. The building previously located at 50 King Street has been removed. The property at 399 Ridout Street North, which was previously used as the London Courthouse and Jail, now accommodates Middlesex County offices.

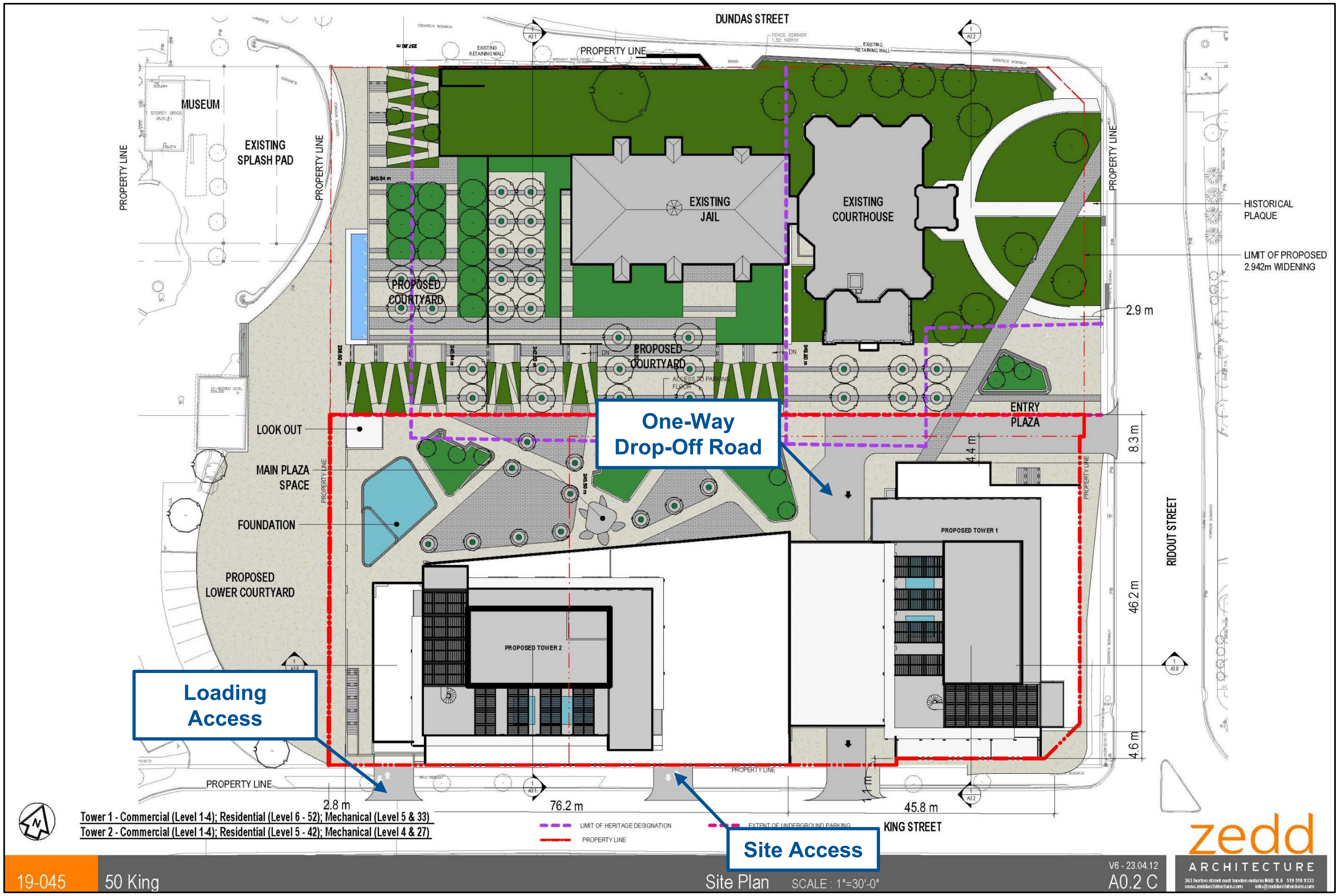
Neither property currently has vehicular access on Ridout Street. A common access is provided on King Street to a shared parking lot located between the two properties. As part of the redevelopment of the site, the parking lot is to be removed and parking for both properties will be provided in a new underground parking garage with access on King Street slightly east of the existing access point.

The proposed development will include two mixed-use high-rise towers with 2,865 m^2 (30,839 ft^2) Gross Floor Area (GFA) ground floor retail, 10,920 m^2 (117,542 ft^2) GFA office, and 800 residential units. A one-way internal roadway for drop-off purposes is being proposed between the two towers with a right-in only connection to Ridout Street and outbound only connection to King Street.

The vehicular access to the two properties will be on King Street as it is now, with a potential right-in vehicular access on Ridout Street.

The development is anticipated to be completed by 2025.

Figure 3.1 shows the development concept.



Proposed Site Plan

Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual[3] provides rates and equations for the following Land Use Codes (LUC), of which have been used to estimate the peak hour traffic volumes generated by this development:

- LUC 222 (Multifamily Housing, High-Rise);
- LUC 710 (General Office Building); and
- LUC 822 (Strip Retail Plaza, <40k).

The mixed-use nature of the proposed development will encourage shared trips by different land uses. Potential internal capture reductions have been estimated using the NCHRP 8-51 Internal Trip Capture Estimation Tool. **Appendix D** contains the NCHRP 8-51 Internal Trip Capture Estimation Tool data sheets.

The proximity to transit services including future BRT, and pedestrian/cycling facilities, will encourage alternative mode usage involving walking, cycling, and transit. The City of London Household Travel Survey Report identifies a daily modal share of 8% for transit and 13% for walking/cycling[4]. An alternative modal share of 15% has been conservatively assumed for the development. The modal share reduction has been applied after the internal capture reduction.

The ITE Trip Generation manual provides information on average pass-by rates for land use codes. No pass-by rates for LUC 822 are provided. Given the location of minimal ground floor retail within a mixed-use building and to remain conservative, no reductions for pass-by have been applied.

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

[3] Institute of Transportation Engineers Trip Generation Manual 11th Edition, 2021.
[4] IBI Group, 2016 Household Travel Survey Summary Report, City of London, July 2018.

TABLE 3.1: TRIP GENERATION

Land Use	Number of Units	GFA (1,000 ft^2)	Trip Type	AM Peak Hour				PM Peak Hour			
				Rate	In	Out	Total	Rate	In	Out	Total
LUC 222 - Multifamily Housing (High-Rise)	800	-	Total	Eq	51	144	**195**	Eq	143	88	**231**
			Internal		1	4	5		29	14	43
			Mode Split	15%	8	21	29	15%	17	11	28
LUC 710 - General Office Building	-	117.54	Total	Eq	169	23	**192**	Eq	32	158	**190**
			Internal		10	6	16		6	11	17
			Mode Split	15%	24	3	27	15%	4	22	26
LUC 822 - Strip Retail Plaza (<40k)	-	30.84	Total	2.36	44	29	**73**	6.59	102	101	**203**
			Internal		7	8	15		18	28	46
			Mode Split	15%	6	3	9	15%	13	11	24
Total Trip Generation					**264**	**196**	**460**		**277**	**347**	**624**
Total Internal Capture				*8%*	*18*	*18*	*36*	*17%*	*53*	*53*	*106*
Total Mode Split					*38*	*27*	*65*		*34*	*44*	*78*
Net Trip Generation					**208**	**151**	**359**		**190**	**250**	**440**

LUC 222 - AM: T = 0.22(X) + 18.85 | PM: T = 0.26(X) + 23.12

LUC 710 - AM: Ln(T) = 0.86Ln(X) + 1.16 | PM: Ln(T) = 0.83Ln(X) + 1.29

In addition to the mixed-use buildings proposed, the Middlesex County offices will continue on-site with parking provided in the new underground parking garage. Traffic counts were collected at the existing parking lot on 22 November 2022 and **Table 3.2** summarizes the existing trips generated by the Middlesex County offices. These trips are added to the new driveway traffic on King Street as described below.

TABLE 3.2: TRIP GENERATION – MIDDLESEX COUNTY OFFICES

Land Use	GFA (1,000 ft^2)	AM Peak Hour				PM Peak Hour			
		In	Out	Total	Rate	In	Out	Total	Rate
Middlesex County Offices	31.562	67	0	67	2.12	55	64	119	3.77

3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing traffic volumes at the study area intersections. **Table 3.3** displays the breakdown of trip distributions used in this study.

TABLE 3.3: ESTIMATED TRIP DISTRIBUTION

Origin/Destination	Inbound	Outbound
North via Ridout St N	10%	-
South via Ridout St N	20%	20%
South via Thames	15%	15%
East via Queens	10%	-
East via Dundas	0%	0%
East via King	-	30%
East via York	10%	10%
West via Queens	-	-
West via Dundas	20%	-
West via York	15%	25%
Total	**100%**	**100%**

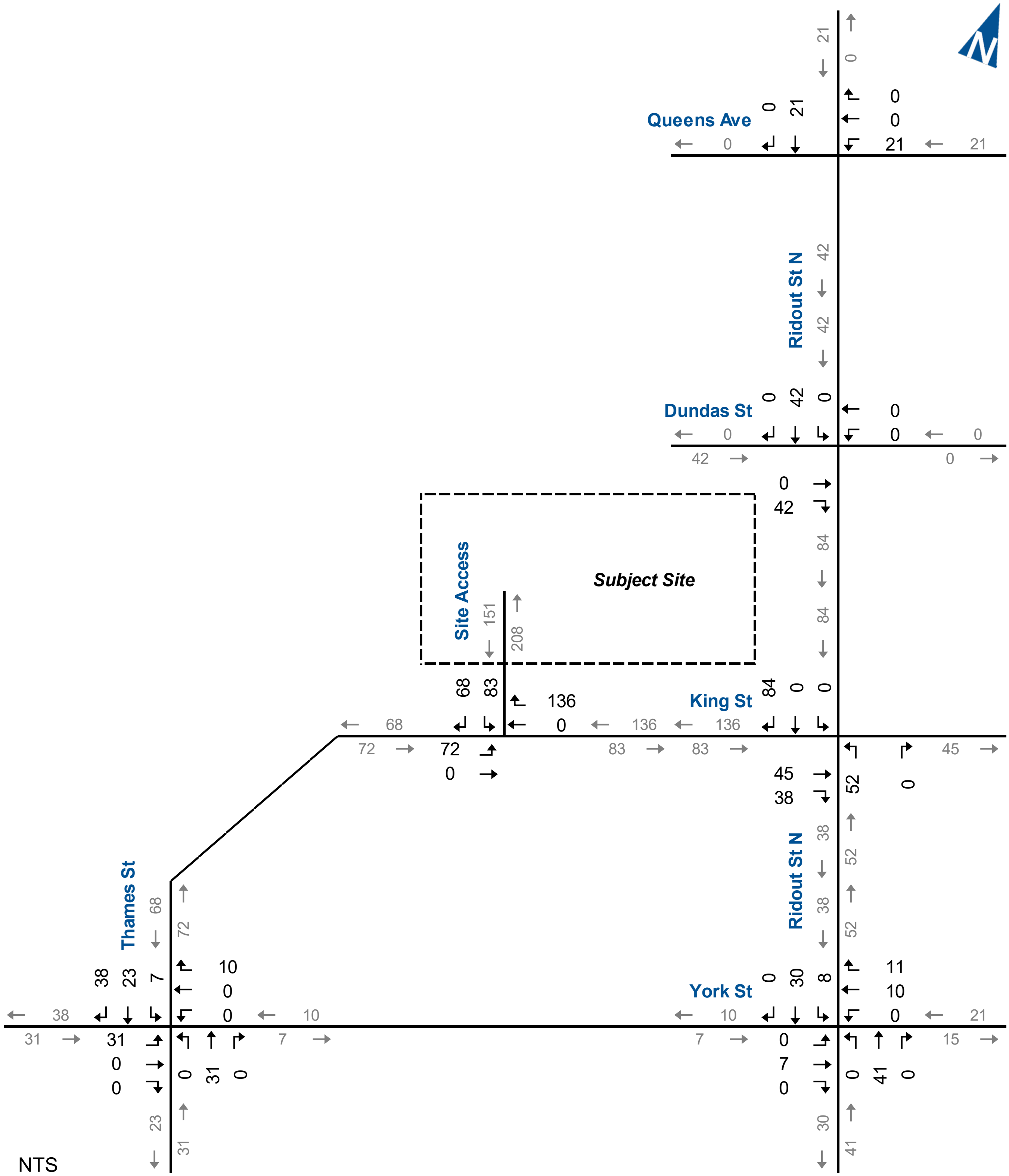
Figure 3.2a and **Figure 3.2b** illustrate the site-generated traffic volumes for the AM and PM peak hours, respectively.

Figure 3.3a and **Figure 3.3b** illustrate the re-distributed old courthouse traffic volumes for the AM and PM peak hours, respectively.

It is noted that in addition to the assignment of development traffic to the study area intersections shown in the above figures, there are opportunities for traffic distribution between the different study area intersections to avoid potential peak hour delays.

Internal Drop-off Roadway

As noted, the development will include an internal drop-off road with right-in only on Ridout Street and outbound only on King Street. The use of the proposed internal roadway for drop-off purposes is not anticipated to be operationally significant, and all development traffic volumes have been assigned to the main vehicular access point and study area intersections.



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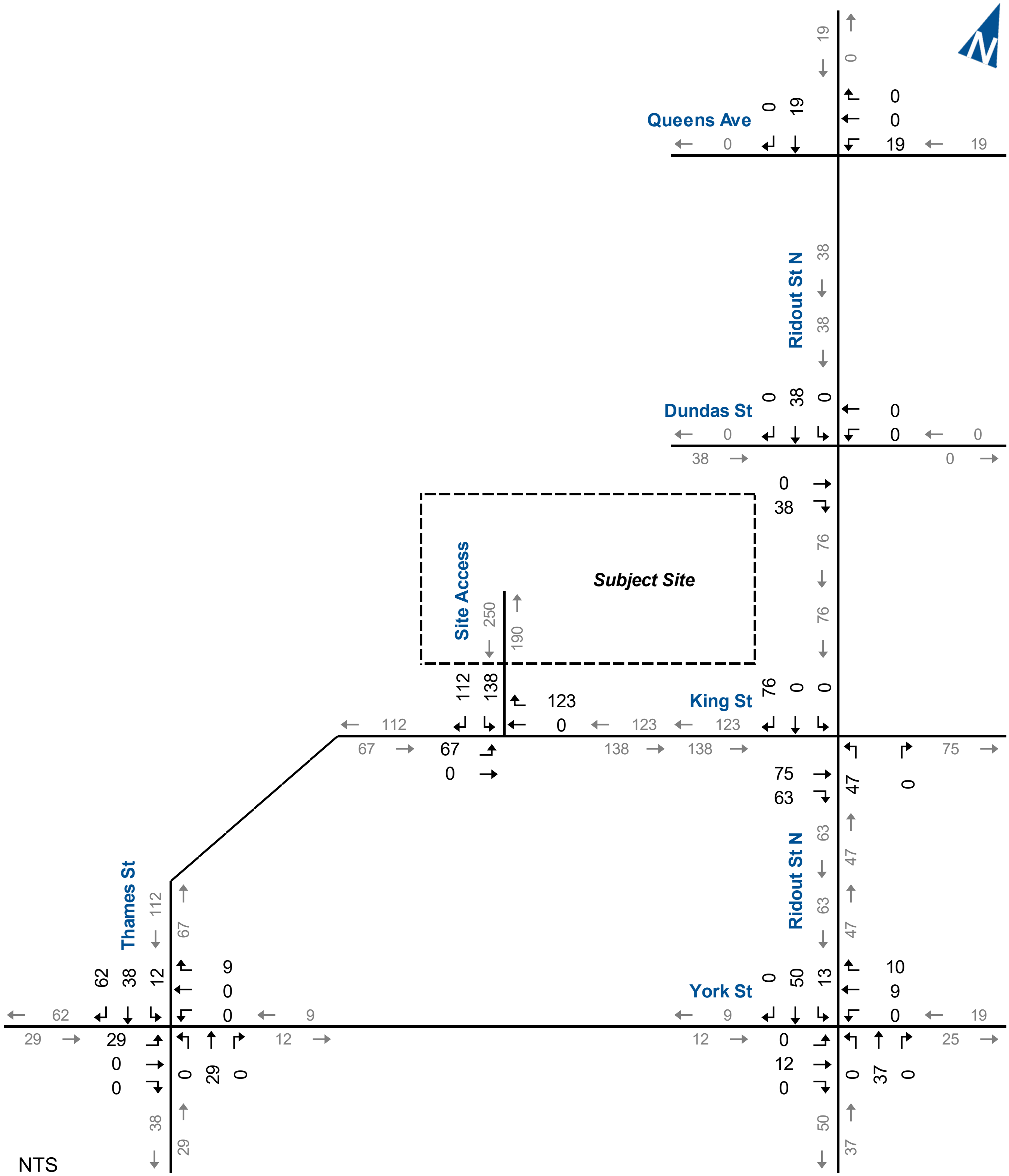
Site Generated Traffic Volumes
AM Peak Hour

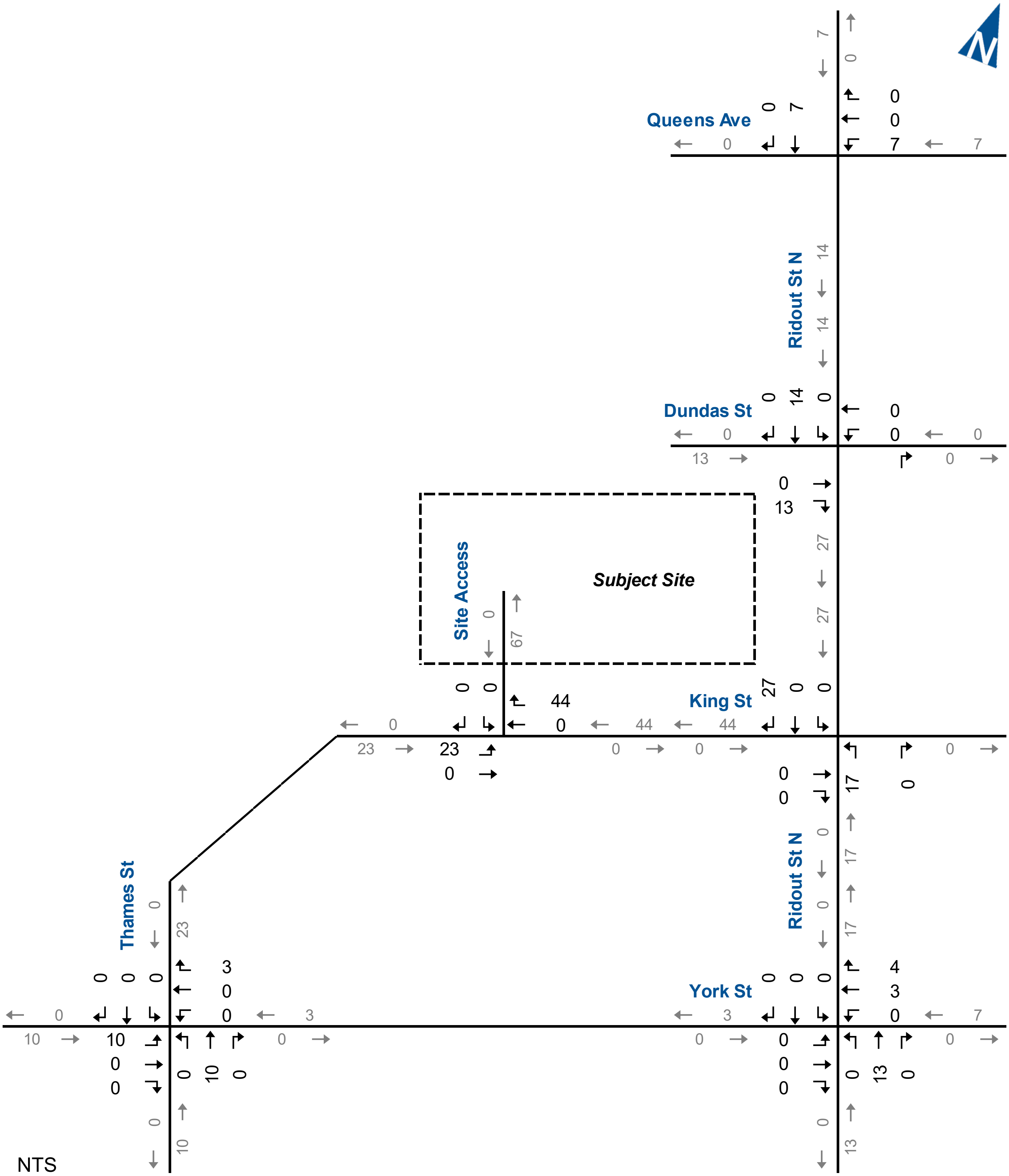
50 King St & 399 Ridout St N, London | TIA
210661

Figure 3.2a



Site Generated Traffic Volumes PM Peak Hour

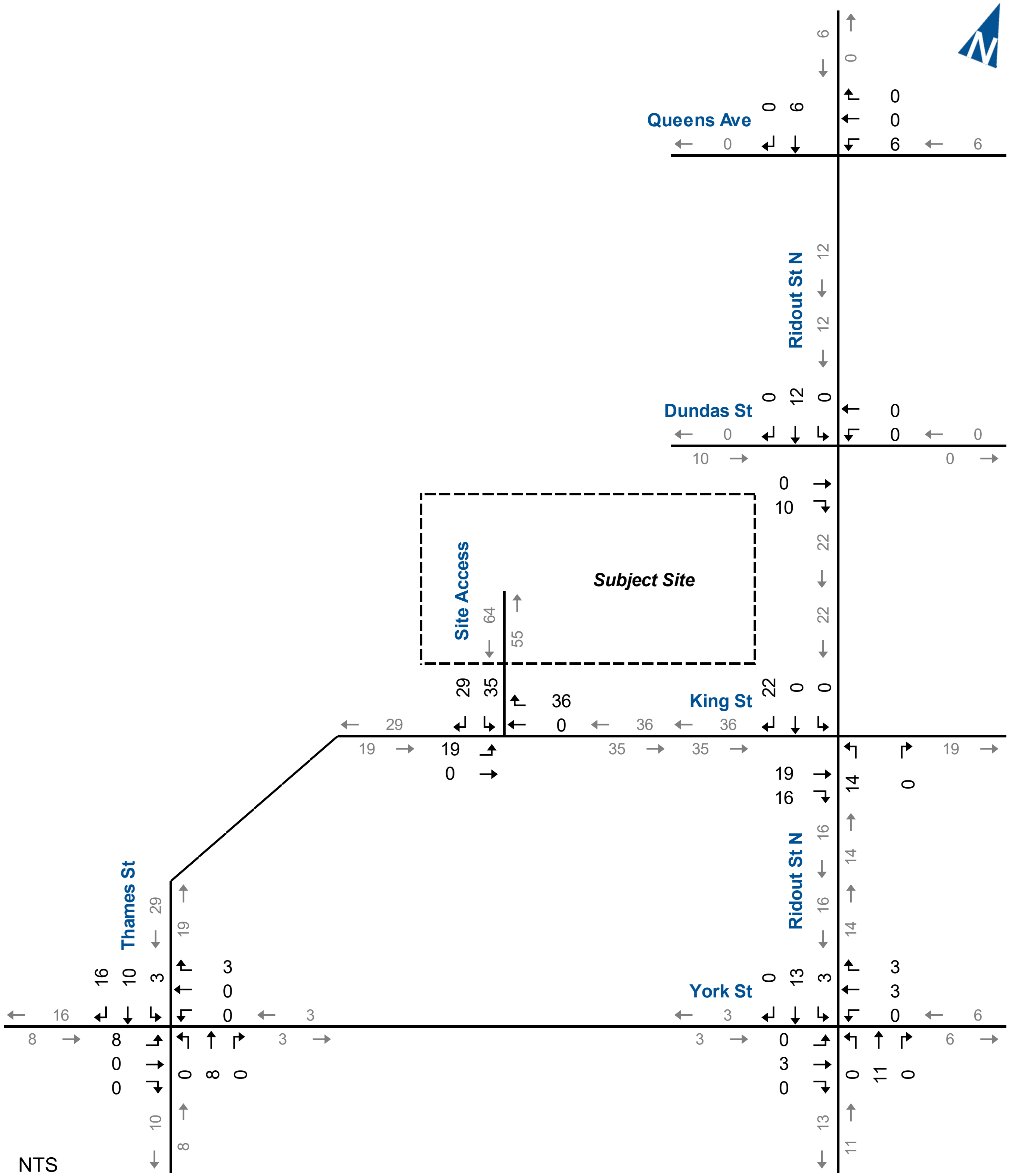
Figure 3.2b



Middlesex County Offices
Traffic Volumes - AM Peak Hour

50 King St & 399 Ridout St N, London | TIA
210661

Figure 3.3a



Middlesex County Offices
Traffic Volumes - PM Peak Hour

50 King St & 399 Ridout St N, London | TIA
210661

Figure 3.3b

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 2030 horizon.

4.1 Background Traffic Forecasts

To derive the 2030 generalized background traffic volumes, a growth rate of 1% was applied to the existing roadway traffic volumes. This growth rate was confirmed with City staff during the pre-study consultation.

4.1.1 Road Network Changes

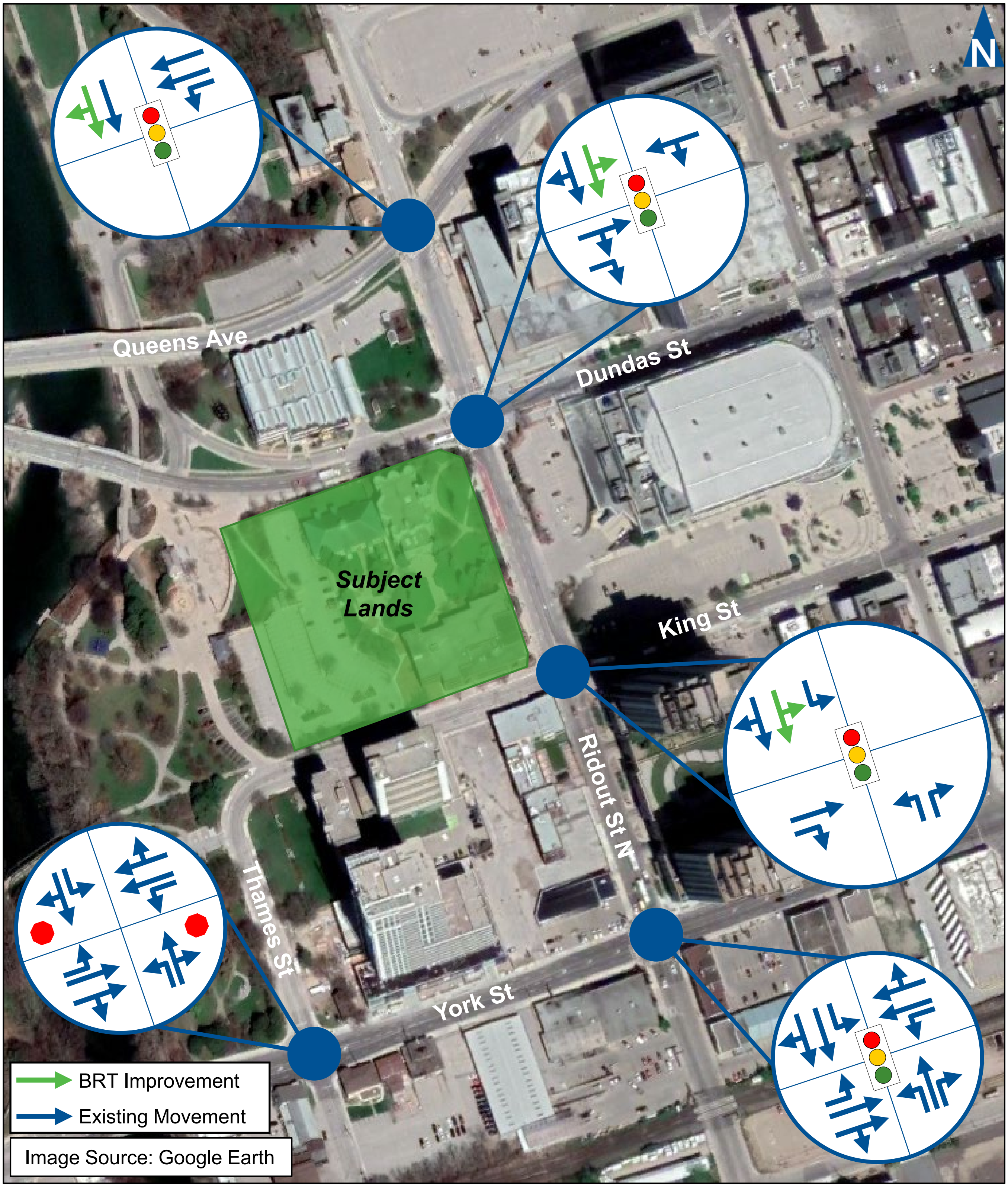
The City's BRT system is currently under construction within the downtown and is planned to be completed by 2024. The Downtown Loop will operate along Queens Avenue, Ridout Street, King Street and Wellington Street, along the curbside of the roadway. Changes to the lane configurations were provided by the City during pre-study consultation.

Figure 4.1 illustrates the future lane configuration and traffic control.

Detailed construction drawings have not been provided and therefore storage lengths have been assumed to be the same as under existing traffic conditions.

Operationally, as specified in the Environmental Project Report[5], a 10 second hold has been added to the signal timings at the intersections of King Street and Ridout Street North, and Queens Avenue and Ridout Street North to account for a protected transit priority phase. At these intersections, the cycle length has been increased by 10 seconds from existing conditions to account for the hold phase. Protected phases have been included at intersections where the BRT is anticipated to introduce conflicts for left-turning vehicles.

5 IBI, WSP, *London BRT Transit Project Assessment Process Environmental Project Report Appendix E1 – Traffic Analysis,* March 2019.



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Future Lane Configuration and Traffic Control

Figure 4.1

4.2 2030 Background Traffic Operations

Figure 4.2a and **Figure 4.2b** illustrate the 2030 background traffic volumes, including road traffic growth.

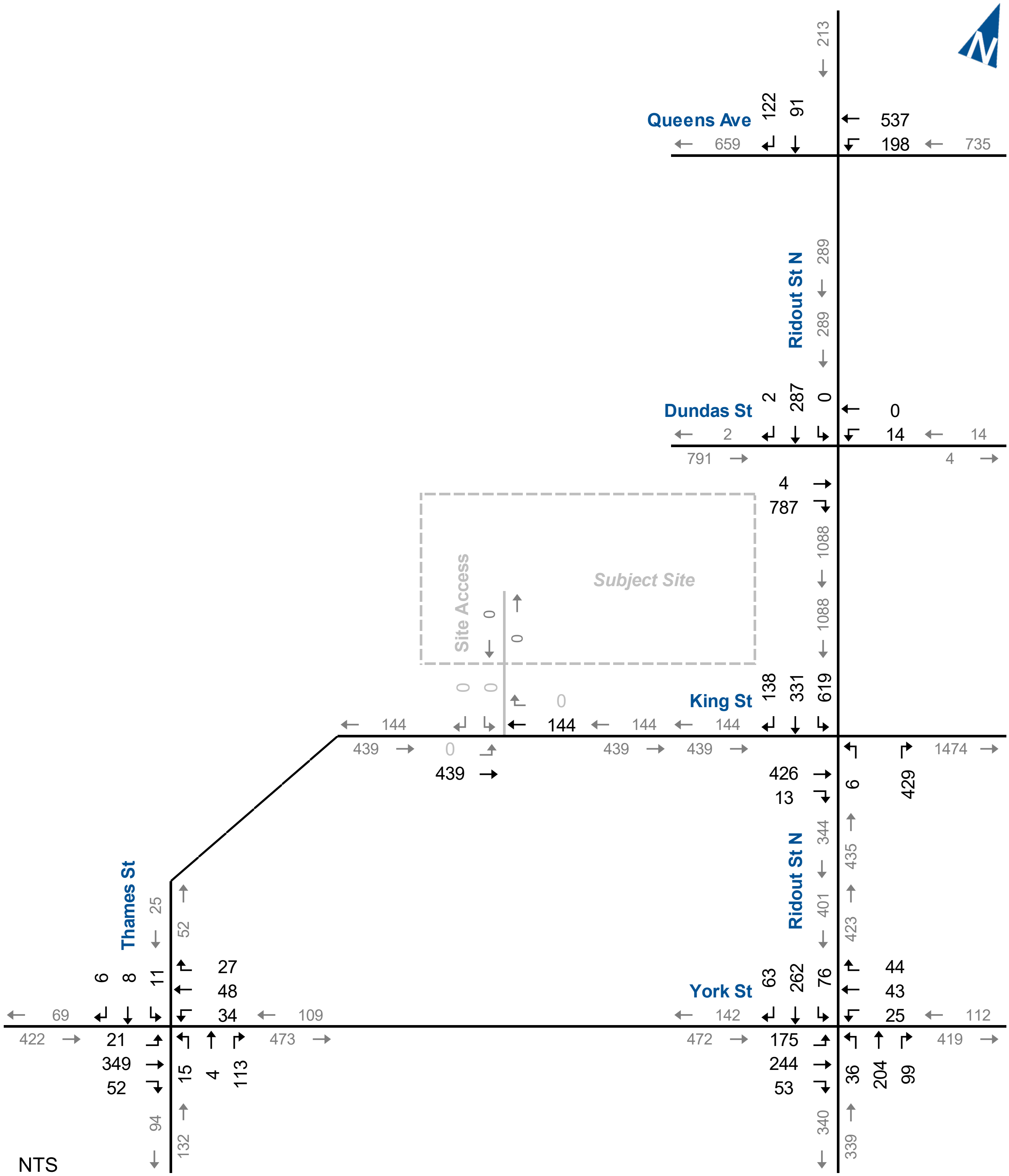
Due to closure at Ridout Street North and King Street, old courthouse trips used Thames Street to enter/exit the existing parking lot. Existing parking lot trips have been removed from the network based on the distribution of existing traffic volumes at the existing parking lot entrance on King Street and at Thames Street and York Street.

Appendix D contains the removal of old courthouse trips.

The 2030 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings and lane configurations have been updated to accommodate the BRT network as discussed in **Section 4.1.1**.

Table 4.1a and **Table 4.1b** summarize the results of the 2030 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, except for the southbound left-turn movement at the intersection of Ridout Street North and King Street which is forecast to operate with 95th percentile queues exceeding the available storage of 55 metres during the AM peak hour.

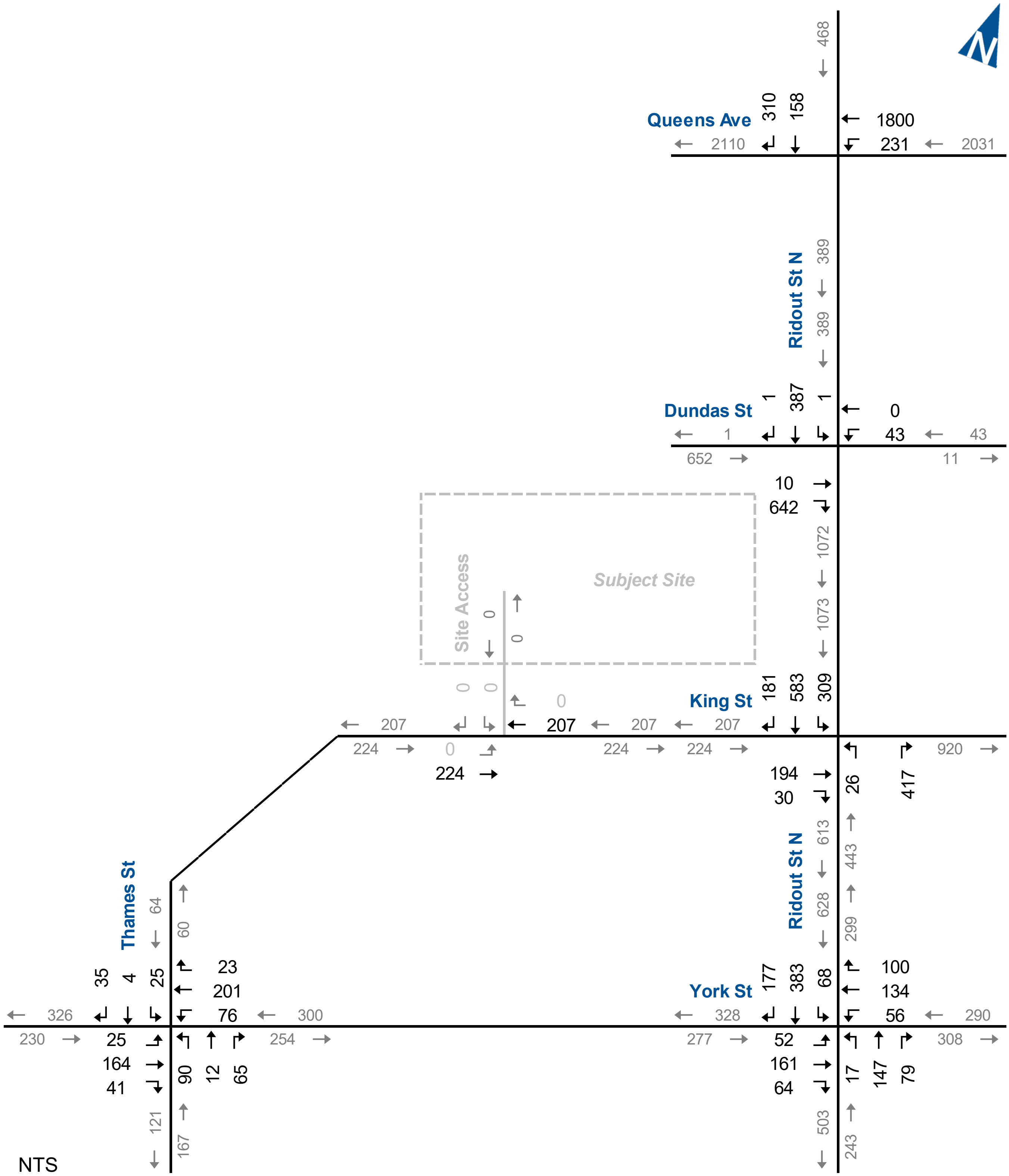
Appendix E contains the supporting detailed Synchro 11 reports.



2030 Background Traffic Volumes AM Peak Hour

50 King St & 399 Ridout St N, London | TIA
210661

Figure 4.2a



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2030 Background Traffic Volumes PM Peak Hour

50 King St & 399 Ridout St N, London | TIA
210661

Figure 4.2b

TABLE 4.1A: 2030 BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Eastbound Left	Eastbound Through	Eastbound Right	Eastbound Approach	Westbound Left	Westbound Through	Westbound Right	Westbound Approach	Northbound Left	Northbound Through	Northbound Right	Northbound Approach	Southbound Left	Southbound Through	Southbound Right	Southbound Approach	Overall
AM Peak Hour	Ridout St N & Queens Ave	TCS	LOS					A	A		**A**						C	>	**C**	**A**
			Delay					1	3		**2**						27	>	**27**	**8**
			V/C					0.18	0.22								0.60	>		
			Q					5	21								23	>		
	Ridout St N & Dundas St	TCS	LOS		C	B	**C**	<	D		**D**					<	C		**C**	**C**
			Delay		24	18	**21**	<	44		**44**					<	23		**23**	**22**
			V/C		0.87	0.82		<	0.05							<	0.23			
			Q		56	33		<	10							<	42			
			Stor.		-	-		<	-				-			<	-			
			Avail.		-	-		<	-							<	-			
	Ridout St N & King St	TCS	LOS		F	A	**F**					C		F	**F**	C	C	>	**C**	**E**
			Delay		130	0	**126**					33		107	**106**	24	34	>	**30**	**69**
			V/C		1.14	0.03						0.12		1.09		0.64	0.74	>		
			Q		187	0						5		183		88	100	>		
			Stor.		-	10			-			35	-	-		55	-	>		
			Avail.		-	10						30		-		-33	-	>		
	Ridout St N & York St	TCS	LOS	D	C	>	**D**	C	B	>	**B**	B	B	A	**B**	B	B	>	**B**	**C**
			Delay	55	32	>	**41**	21	12	>	**14**	11	18	5	**14**	11	14	>	**14**	**23**
			V/C	0.76	0.44	>		0.10	0.11	>		0.07	0.23	0.15		0.13	0.20	>		
			Q	56	36	>		8	8	>		10	54	12		17	36	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	-16	-	>		42	-	>		15	-	-		28	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	**A**	A	A	>	**A**	C	B	>	**B**	B	B	>	**B**	
			Delay	7	0	>	**0**	8	0	>	**3**	15	11	>	**11**	14	12	>	**13**	
			V/C	0.01	0.00	>		0.03	0.00	>		0.04	0.17	>		0.03	0.03	>		
			Q	0	0	>		1	0	>		1	4	>		1	1	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	20	-	>		19	-	>		19	-	>		29	-	>		

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

TABLE 4.1B: 2030 BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Eastbound Left	Eastbound Through	Eastbound Right	Eastbound Approach	Westbound Left	Westbound Through	Westbound Right	Westbound Approach	Northbound Left	Northbound Through	Northbound Right	Northbound Approach	Southbound Left	Southbound Through	Southbound Right	Southbound Approach	Overall
PM Peak Hour	Ridout St N & Queens Ave	TCS	LOS					A	B		**B**						D	>	**D**	**B**
			Delay					2	14		**13**						38	>	**38**	**18**
			V/C					0.25	0.79								0.89	>		
			Q					12	193								56.0	>		
	Ridout St N & Dundas St	TCS	LOS		C	B	**C**	<	D		**D**					<	C		**C**	**C**
			Delay		26	17	**22**	<	40		**40**					<	25		**25**	**24**
			V/C		0.85	0.78		<	0.15							<	0.32			
			Q		53	29		<	20							<	54			
			Stor.		-	-		<	-				-			<	-			
			Avail.		-	-		<	-							<	-			
	Ridout St N & King St	TCS	LOS		D	A	**D**					D		D	**D**	B	D	>	**D**	**D**
			Delay		50	0	**44**					43		53	**53**	16	50	>	**41**	**44**
			V/C		0.68	0.09						0.37		0.90		0.53	0.93	>		
			Q		61	0						17		163		51	132	>		
			Stor.		-	10			-			35	-	-		55	-	>		
			Avail.		-	10						18		-		4	-	>		
	Ridout St N & York St	TCS	LOS	D	C	>	**C**	C	B	>	**B**	A	B	A	**A**	A	B	>	**B**	**B**
			Delay	50	29	>	**33**	24	15	>	**17**	8	14	2	**10**	8	10	>	**10**	**16**
			V/C	0.50	0.51	>		0.21	0.32	>		0.03	0.16	0.10		0.10	0.31	>		
			Q	21	26	>		16	18	>		4	33	5		12	48	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	19	-	>		34	-	>		21	-	-		33	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	**A**	A	A	>	**A**	C	B	>	**B**	C	B	>	**B**	
			Delay	8	0	>	**1**	8	0	>	**2**	18	11	>	**15**	17	10	>	**13**	
			V/C	0.02	0.00	>		0.06	0.00	>		0.27	0.12	>		0.08	0.06	>		
			Q	1	0	>		2	0	>		8	3	>		2	2	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	19	-	>		18	-	>		12	-	>		28	-	>		

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 2030 Total Traffic Operations

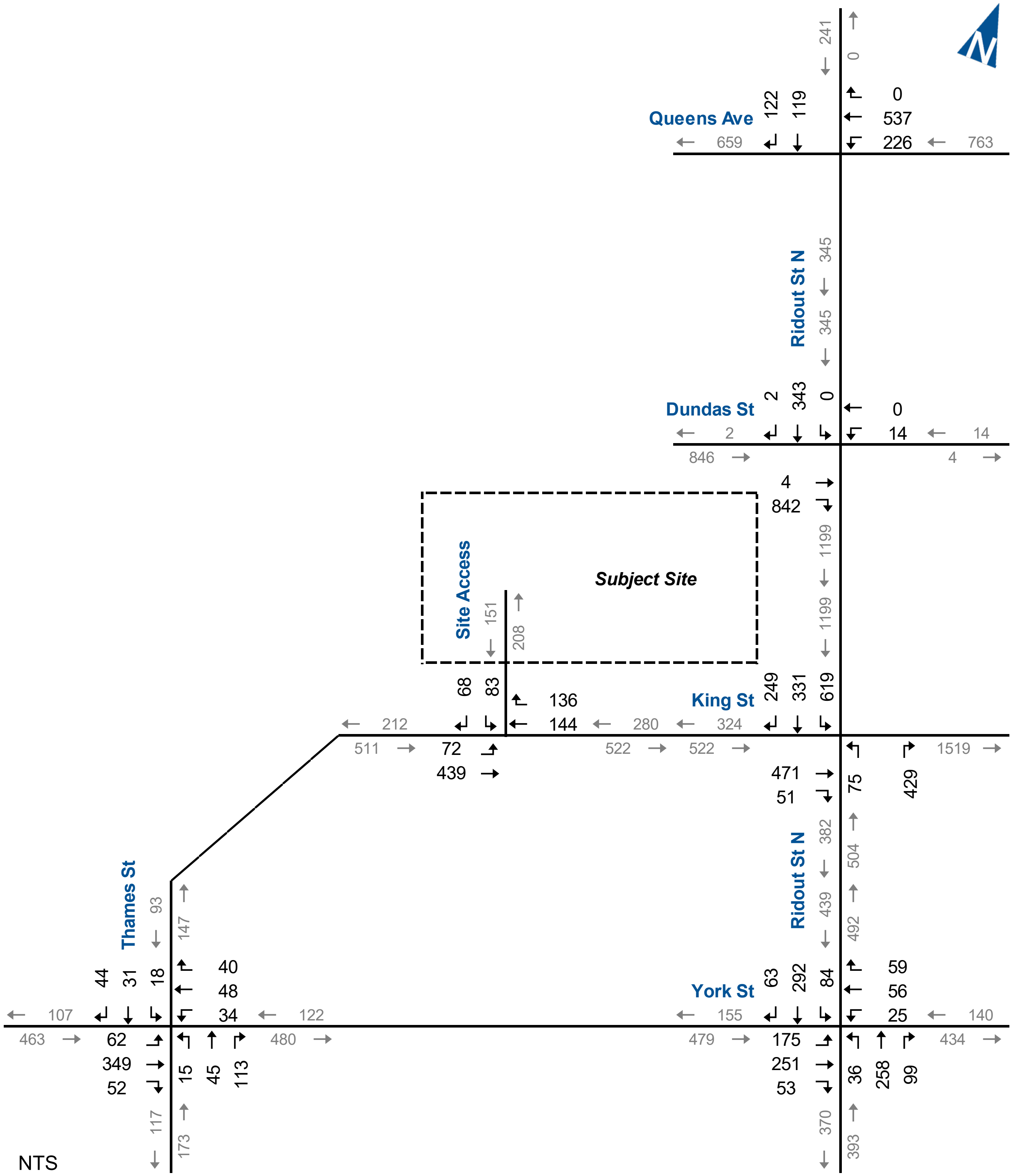
Figure 4.3a and **Figure 4.3b** illustrate the 2030 total traffic volumes, including trips generated by the proposed development. Trips generated by the old courthouse (**Table 3.2**) have been added back onto the network following the trip distribution outlined in **Table 3.3.**

The 2030 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings and lane configurations remain the same as under background traffic conditions.

Table 4.2a and **Table 4.2b** summarize the results of the 2030 total traffic operations. The results indicate that the study area intersections are forecast to operate with similar levels of service as under existing and background traffic conditions, except for the following movements at the intersection of Ridout Street North and King Street:

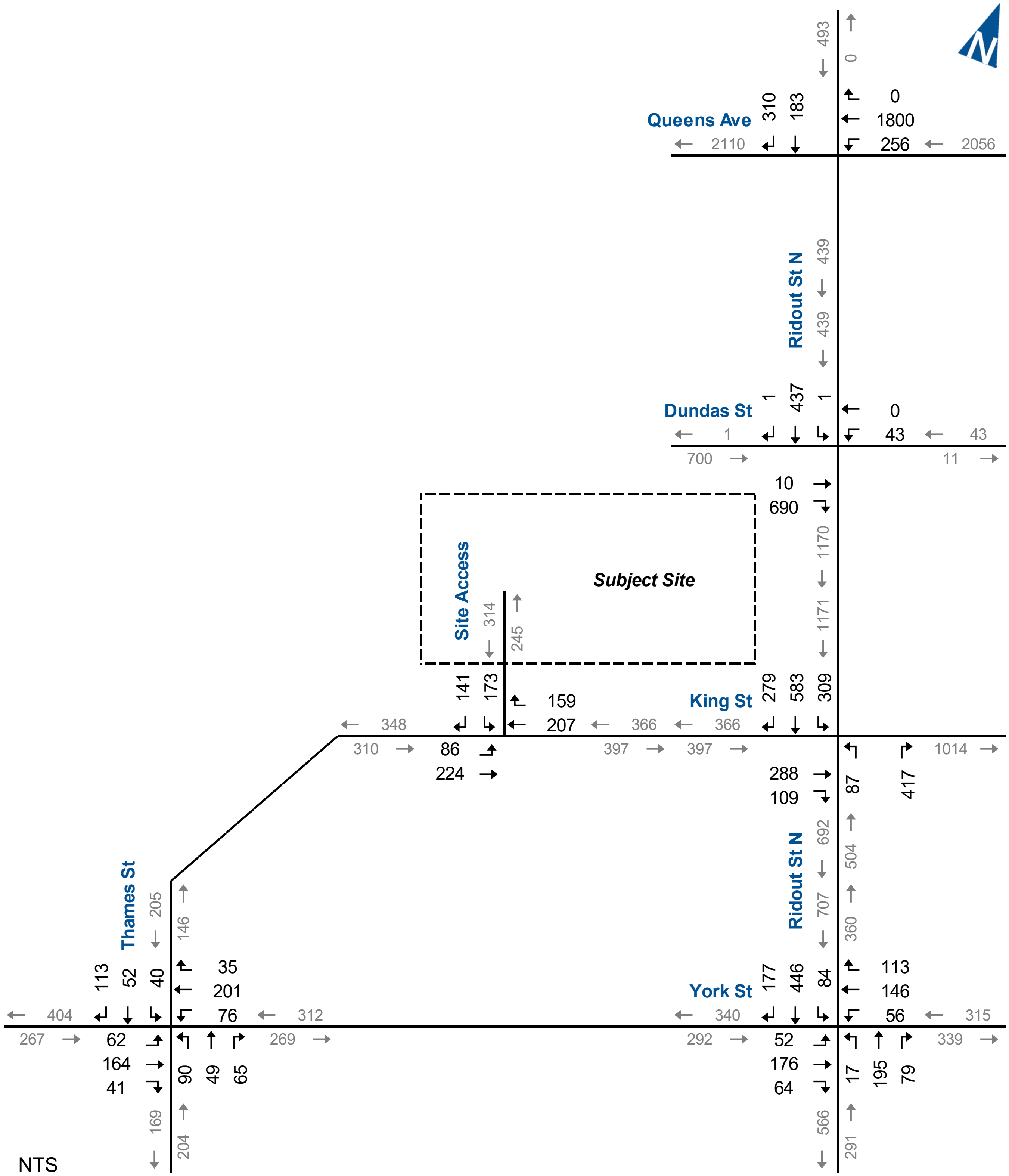
- The northbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95th percentile queues exceeding the available storage of 35 during the AM and PM peak hours;
- The northbound right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour;
- The southbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 55 metres by one metre during the PM peak hour; and
- The southbound shared through/right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

Appendix F contains the supporting detailed Synchro 11 reports.



2030 Total Traffic Volumes AM Peak Hour

Figure 4.3a



2030 Total Traffic Volumes
PM Peak Hour

Figure 4.3b

TABLE 4.2A: 2030 TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR

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	Ridout St N & Queens Ave	TCS	LOS					A	A		**A**						C	>	**C**	**A**
			Delay					1	3		**2**						30	>	**30**	**9**
			V/C					0.21	0.22								0.64	>		
			Q					5	22								28	>		
	Ridout St N & Dundas St	TCS	LOS		C	B	**C**	<	D		**D**					<	C		**C**	**C**
			Delay		24	18	**21**	<	44		**44**					<	24		**24**	**22**
			V/C		0.88	0.83		<	0.05							<	0.27			
			Q		59	34		<	10							<	51			
			Stor.		-	-		<	-							<	-			
			Avail.		-	-		<	-							<	-			
	Ridout St N & King St	TCS	LOS		F	A	**F**					F		F	**F**	C	D	>	**D**	**F**
			Delay		174	1	**158**					284		107	**134**	28	40	>	**36**	**87**
			V/C		1.26	0.13						1.39		1.09		0.71	0.85	>		
			Q		212	0						57		183		104	120	>		
			Stor.		-	10						35		-		55	-	>		
			Avail.		-	10						-22		-		-49	-	>		
	Ridout St N & York St	TCS	LOS	E	C	>	**D**	C	B	>	**B**	B	B	A	**B**	B	B	>	**B**	**C**
			Delay	55	32	>	**41**	20	12	>	**13**	11	19	5	**15**	11	15	>	**14**	**23**
			V/C	0.76	0.44	>		0.10	0.14	>		0.07	0.29	0.15		0.15	0.21	>		
			Q	56	37	>		8	10	>		10	69	12		18	40	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	-16	-	>		42	-	>		15	-	-		27	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	**A**	A	A	>	**A**	C	B	>	**C**	C	B	>	**B**	
			Delay	8	0	>	**1**	8	0	>	**2**	19	15	>	**15**	17	13	>	**14**	
			V/C	0.04	0.00	>		0.03	0.00	>		0.06	0.32	>		0.06	0.16	>		
			Q	1	0	>		1	0	>		2	10	>		2	4	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	19	-	>		19	-	>		18	-	>		28	-	>		
	King St & Site Access	TWSC	LOS	<	A		**A**		A	>	**A**					C		>	**C**	
			Delay	<	8		**1**		0	>	**0**					19		>	**19**	
			V/C	<	0.06				0.00	>						0.39		>		
			Q	<	2				0	>						14		>		

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

TABLE 4.2B: 2030 TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Eastbound Left	Eastbound Through	Eastbound Right	Eastbound Approach	Westbound Left	Westbound Through	Westbound Right	Westbound Approach	Northbound Left	Northbound Through	Northbound Right	Northbound Approach	Southbound Left	Southbound Through	Southbound Right	Southbound Approach	Overall
PM Peak Hour	Ridout St N & Queens Ave	TCS	LOS					A	B		**B**						D	>	**D**	**B**
			Delay					2	15		**13**						39	>	**39**	**18**
			V/C					0.28	0.80								0.87	>		
			Q					13	193								60	>		
	Ridout St N & Dundas St	TCS	LOS		C	B	**C**	<	D		**D**					<	C		**C**	**C**
			Delay		26	17	**22**	<	40		**40**					<	27		**27**	**24**
			V/C		0.86	0.79		<	0.15							<	0.37			
			Q		55	30		<	20							<	62			
			Stor.		-	-		<	-							<	-			
			Avail.		-	-		<	-							<	-			
	Ridout St N & King St	TCS	LOS		D	A	**D**					F		E	**F**	B	E	>	**E**	**E**
			Delay		54	6	**41**					224		79	**104**	18	80	>	**65**	**70**
			V/C		0.81	0.29						1.27		1.00		0.54	1.06	>		
			Q		90	10						59		168		56	158	>		
			Stor.		-	10						35		-		55	-	>		
			Avail.		-	0						-24		-		-1	-	>		
	Ridout St N & York St	TCS	LOS	D	C	>	**C**	C	B	>	**B**	A	B	A	**B**	A	B	>	**B**	**B**
			Delay	50	31	>	**35**	24	15	>	**17**	8	15	2	**11**	8	11	>	**11**	**16**
			V/C	0.50	0.53	>		0.22	0.35	>		0.04	0.21	0.10		0.13	0.34	>		
			Q	21	28	>		16	20	>		4	44	5		14	57	>		
			Stor.	40	-	>		50	-	>		25	-	-		45	-	>		
			Avail.	19	-	>		34	-	>		21	-	-		31	-	>		
	Thames St & York St	TWSC	LOS	A	A	>	**A**	A	A	>	**A**	D	C	>	**C**	C	C	>	**C**	
			Delay	8	0	>	**2**	8	0	>	**2**	32	16	>	**23**	23	16	>	**17**	
			V/C	0.05	0.00	>		0.06	0.00	>		0.43	0.27	>		0.18	0.35	>		
			Q	2	0	>		2	0	>		15	8	>		4	11	>		
			Stor.	20	-	>		20	-	>		20	-	>		30	-	>		
			Avail.	18	-	>		18	-	>		5	-	>		26	-	>		
	King St & Site Access	TWSC	LOS	<	A		**A**		A	>	**A**					D		>	**D**	
			Delay	<	8		**2**		0	>	**0**					32		>	**32**	
			V/C	<	0.08				0.00	>						0.74		>		
			Q	<	2				0	>						46		>		

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
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5 Remedial Measures

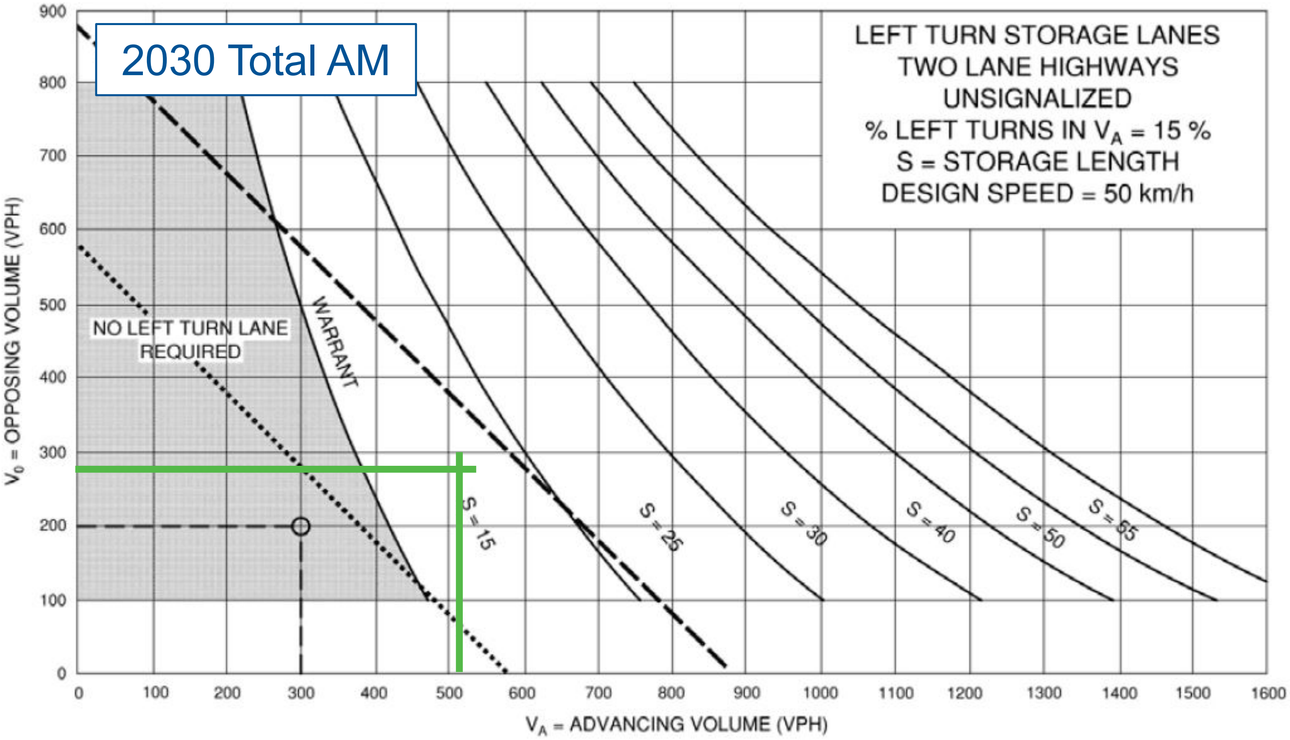
5.1 King Street Access

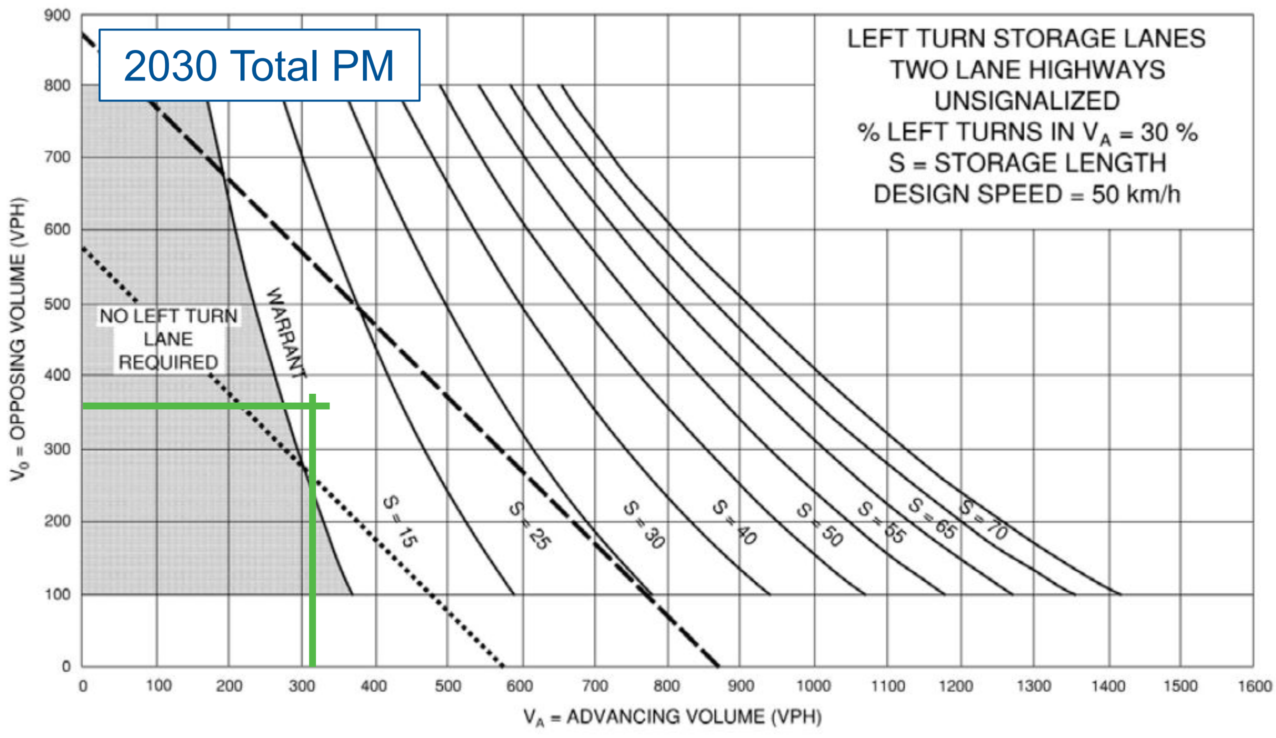
The Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads[6] provides guidance on the assessment and/or need for auxiliary left-turn lanes.

Warrants have been calculated for eastbound left-turns at King Street and the proposed site access. The warrant was calculated using the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 50 km/h (10 km/h over the posted speed limit). Based on this criterion, an eastbound left-turn lane with 15 metres of storage is warranted on King Street and the proposed underground parking site access under 2030 total traffic conditions.

Figure 5.1 illustrates the warrant nomographs.

[6] *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, June 2017.





paradigm TRANSPORTATION SOLUTIONS LIMITED

Eastbound Left-Turn Lane Warrants
King Street & Site Access

Figure 5.1

5.2 Intersection Modifications

Based on the results of the operational analysis under 2030 total traffic conditions, potential intersection modifications were reviewed to address operational issues, as outlined below.

5.2.1 Ridout Street North and York Street

Under existing, background and total traffic conditions, the eastbound left-turn movement is operating with queues exceeding the available storage of 40 metres during the AM peak hour. Although not directly impacted by the subject development, eastbound left-turn lane storage could be increased to 60 metres to accommodate the existing and forecast queues.

5.2.2 Ridout Street North and King Street

Under existing, background and total traffic conditions, multiple movements are considered critical.

As noted in the Environmental Project Report, the intersection of Ridout Street North and King Street is operating with a north-south split phasing and will continue to operate as such in the future and after BRT improvements. The operational analysis in **Section 2.5** and **Section 4** was completed using the signal timing plan. It is noted that protected northbound and southbound left-turn phases might be considered instead of split phasing, and signal timing splits be optimized, in order to improve intersection operations.

It is also noted that the southbound left-turn lane storage could be extended from the existing 55 metres to 75 metres.

In addition, a southbound right-turn auxiliary lane with 35 metres of storage might be considered if feasible for implementation.

Table 5.1 summarizes the results of the intersection operations with the above improvements, indicating that the intersection of Ridout Street North and King Street is forecast to operate with acceptable levels of service under 2030 total traffic conditions, except for the eastbound through movement which is forecast to operate with LOS E and a v/c ratio of 0.93 during the AM peak hour. However, the intersection as a whole is forecast to operate with LOS C.

The above-noted modifications are identified for consideration as part of the full implementation and operation of the BRT System in the study area.

Appendix G contains the supporting detailed Synchro 11 reports.

TABLE 5.1: 2030 TOTAL TRAFFIC OPERATIONS – RIDOUT STREET NORTH AND KING STREET IMPROVEMENTS

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	Ridout St N & King St	TCS	LOS		E	A	**E**					E		E	**E**	C	A	A	**B**	**C**
			Delay		62	0	**56**					56		60	**59**	26	9	8	**13**	**34**
			V/C		0.93	0.10						0.49		0.89		0.74	0.59	0.42		
			Q		172	0						33		160		74	38	31		
			Stor.		-	10						35	-	-		75	-	35		
			Avail.		-	10						2		-		1	-	4		
PM Peak Hour	Ridout St N & King St	TCS	LOS		D	A	**D**					D		C	**C**	C	A	A	**B**	**C**
			Delay		54	6	**41**					50		30	**34**	31	7	7	**13**	**23**
			V/C		0.81	0.29						0.49		0.69		0.80	0.50	0.42		
			Q		90	10						34		150		54	34	30		
			Stor.		-	10			-			35	-	-		75	-	35		
			Avail.		-	0						1		-		21	-	5		

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
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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 single-occupancy travel and potentially reduce reliance on motor vehicles.

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

Potential TDM measures appropriate for the proposed development include the following.

6.1 Walking

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

Sidewalks are provided on both sides of all surrounding roadways. The site plan indicates that internal pedestrian walkways will be provided with connections to the surrounding municipal network.

The subject site is located within the Downtown with convenient access to many attractions, retail establishments, restaurants, and generally a mix of uses.

6.2 Cycling

In addition to the existing cycling facilities discussed in **Section 2.2**, in-boulevard bike lanes are proposed on both sides of Ridout Street North between Fullarton Street and King Street, as part of the BRT network improvements.

To promote cycling to/from the development and the use of these facilities, the City's Zoning By-Law requires 0.90 long-term bicycle parking spaces per residential unit (720 spaces) and 0.10 short-term

[7] City of London 2030 Transportation Master Plan: Smart Moves, January 2013.

bicycle parking spaces per residential unit (80 spaces), for a total of 1.00 spaces per unit (800 spaces). No short-term bicycle parking is required for non-residential uses in Downtown Area 1 or 2.

6.3 Transit

As discussed in **Section 2.2**, London Transit currently operates nine routes within proximity to the subject site. The nearest stops are located within 215 metres from the subject site. The nearby bus stops are easily accessible from the subject development via the pedestrian facilities on both sides of all surrounding roadways. In addition, these routes provide good connectivity to the broader network and key destinations within the City.

The future BRT Downtown Loop will travel southbound on Ridout Street North, immediately fronting the subject site with the closest BRT stations located on King Street and on Queens Avenue between Ridout Street North and Talbot Street (less than 300 metres from the subject site).

6.4 Parking Management

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

6.5 Carshare

Car sharing refers to automobile rental services intended to substitute for private vehicle ownership. It makes occasional use of a vehicle affordable while providing an incentive to minimize driving and rely on alternative travel options as much as possible.

Where car sharing services are available, some households reduce their vehicle ownership, either shifting from two to one vehicle, or from one to zero vehicles. The use of car share benefits employees, residents, visitors and businesses.

By providing this type of mode share on site, lower automobile ownership rates and parking requirements can be further obtained. Residents of the building could choose to use walking, transit or cycling as their primary mode of travel and utilize the car share as secondary mode of travel.

Communauto (VRTUCAR) is currently the only car share provider in the City of London and has six locations. The closest vehicle/space is located on Dufferin Avenue west of Richmond Street (550 metres from the subject site).

In addition to the nearby vehicle/space, the availability of a car share space in a premium location on-site would allow residents of the subject site and surrounding community who normally would not need a vehicle for their daily activities to be comfortable with the decision to not own a vehicle.

6.6 Ride Share / Carpooling

Ride-share/carpooling involves two or more people sharing a vehicle for a trip. The cost of the journey can be split between the driver and passengers, resulting in savings for all concerned. This also reduced the number of vehicle trips and parking demands.

There are several tools available which set up online ride sharing databases. These databases enable people to enter their daily journey so that the database can automatically search out coworkers whose journeys match. Notice boards could also be put up in common areas such as the break/lunch room of the office building for employees who may want to organize informal carpools.

Ridesharing opportunities can also be used in combination with carpool parking stalls. These parking stalls are typically positioned in desirable locations (i.e. next to the building entrance) and are specifically reserved for vehicles with two (2) or more people. Providing a convenient parking location can be a good incentive for stall and visitors to carpool. One or more of the proposed surface parking spaces could be utilized as carpool parking.

6.7 Wayfinding and Travel Planning

Increasing awareness of sustainable transportation opportunities for residents, employees and visitors of the development should be considered by the developer. Residents and employees should be provided with a welcome package that outlines the available transit routes, the future BRT network, and active transportation options such as the development’s proximity to the existing bicycle network. A travel plan will engage and educate residents and employees on the available sustainable modes of travel and how to overcome obstacles that maybe perceived. Wayfinding signage could also be considered in the lobbies or near main entrances to direct residents to nearby transit routes and schedules, bicycle routes and pedestrian walkways.

General education of all modes of transportation, including their benefits and how to make the best use of them, are a key component to TDM success. The strategies require cooperation and coordination with several partners, including transit providers, building owners, area municipalities as well as residents.

By educating about sustainable modes of travel as well as providing travel demand management tools and incentives, TDM can be further integrated within the development to promote all modes of transportation.

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:
  - Ridout Street North and King Street: The eastbound through movement is operating with LOS E and a v/c ratio greater than 0.90 during the AM peak hour; and

    The northbound right-turn movement is operating with LOS F/E and a v/c ratio greater than 0.90 during the AM and PM peak hours, respectively.
  - Ridout Street North and York Street: The eastbound left-turn movement is operating with 95th percentile queues exceeding the available storage of 40 metres during the AM peak hour.
- **Development Trip Generation:** The development is forecast to generate 359 and 440 trips during the AM and PM peak hours, respectively.
- **2030 Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service and critical movements as under existing traffic conditions, with the addition of the southbound left-turn movement at the intersection of Ridout Street North and King Street which is forecast to operate with 95th percentile queues exceeding the available storage of 55 metres during the AM peak hour.
- **2030 Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service and critical movements as under existing and background traffic conditions, with the addition of the following critical movements at the intersection of Ridout Street North and King Street:
  - The northbound 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 35 during the AM and PM peak hours;
  - The northbound right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour;

- The southbound left-turn movement is forecast to operate with 95th percentile queues exceeding the available storage of 55 metres by one metre during the PM peak hour; and
- The southbound shared through/right-turn movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

- **Site Access:** The access arrangement for the site, which includes the existing Middlesex County offices and the proposed new development, will remain the same – with all-moves access on King Street and a potential right-in only access on Ridout Street.

  An eastbound left-turn lane with 15 metres of storage is identified as warranted on King Street at the proposed new access.

- **Intersection Modifications:** As noted, future (2030) total traffic conditions were analyzed with the BRT network changes assumed to be in place, but with the existing storage lengths for auxiliary turn lanes. Based on the results of the operational analysis, the following operational and geometric modifications have been identified for consideration:
  - Ridout Street North and York Street: Eastbound left-turn lane storage be increased from 40 to 60 metres.
  - Ridout Street North and King Street:
    - Protected northbound and southbound left-turn phases;
    - Signal timing optimization;
    - Southbound right-turn auxiliary lane with 35 metres of storage, if feasible; and
    - Southbound left-turn lane storage be increased from 55 to 75 metres.

- **Summary of Impact Assessment:** The following summarizes the subject site characteristics and the traffic impact assessment of the proposed redevelopment:
  - The subject site includes two properties, 50 King Street and 399 Ridout Street. The existing site access includes all-moves access on King Street and a potential right-in only vehicular access on Ridout Street.
  - The existing building at 399 Ridout Street houses the Middlesex County offices which shares a surface parking lot with the property to the south.

- The proposed redevelopment of 50 King Street will eliminate the surface parking lot and include a new underground parking garage that will be shared with the Middlesex County offices.
- The existing access on King Street will be shifted to the east as the driveway to the new underground parking garage. The access arrangement is the same as at present and is compatible with the BRT network changes.
- The traffic generated by the development can be accommodated by the study area roads and intersections, with potential for traffic distribution between intersections to avoid potential peak hour delays.

- **Transportation Demand Management:** The following TDM measures can be implemented in the subject development to support the use of alternative modes:
  - Internal walkways with connections to the surrounding municipal pedestrian network;
  - A minimum of 800 bicycle parking spaces on-site;
  - Unbundling parking from the sale/rent of dwelling units;
  - Provide a minimum of one carshare parking space and one rideshare/carpooling parking space on-site;
  - Provide a welcome package to residents and employees that informs them of available transit, future BRT operations, and active transportation infrastructure in the area; and
  - Wayfinding signage be posted in the lobby or near main entrances.

7.2 Recommendations

Based on the findings and conclusions of this study, it is recommended that the proposed development be considered for approval with the provision of an eastbound left-turn lane at the site driveway on King Street.

Appendix A

Pre-Study Consultation

Appendix B

Existing Traffic Data

Appendix C

Existing Traffic Operations Reports

Appendix D

Internal Capture Worksheet & Background Traffic Volumes

Appendix E

2030 Background Traffic Operations Reports

Appendix F

2030 Total Traffic Operations Reports

Appendix G

2030 Total Traffic Operations Reports – Ridout Street North and King Street Improvements