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Engineers, Planners & Landscape Architects

T E C H N I C A L M E M O R A N D U M

DATE: **NOVEMBER 29, 2022**

TO: **JOSIANE GERVAIS, CITY OF OTTAWA**

FROM: **ROCHELLE FORTIER**

RE: **444 CITIGATE DRIVE AND 560 DEALERSHIP DRIVE**
TRAFFIC PROJECTIONS
PROJECT NO. 122003

CC: **BONNIE MARTELL, COLONNADE BRIDGEPORT**

1.0 Introduction

This technical memorandum has been prepared in support of a Draft Plan of Subdivision application for 444 CitiGate Drive and 560 Dealership Drive. The subject site totals approximately 26.61 hectares in size and is located within the CitiGate Business Park.

In November 2012, Novatech prepared the CitiGate *Highway 416 Employment Lands Community Transportation Study (CTS)* in support of the overall CitiGate Business Park. More recent traffic projections were prepared in August 2020 for the *222 CitiGate Drive TIA* and the City's November 2021 *McKenna Casey Drive Realignment Study (Addendum to the 1991 Strandherd Drive Environmental Assessment Study).*

Site traffic generated by the remaining vacant parcels within the CitiGate Business Park (including the subject lands) was estimated for the above-mentioned studies using rates for Prestige Business Park and Business Park. As more information is now known about the remaining types of uses within the Business Park, updated traffic projections are required to determine the ultimate control and right-of-way (ROW) requirements at the internal intersections.

This technical memorandum will include new trip generation and traffic projections for the remaining parcels within the CitiGate Business Park. The internal intersections within the CitiGate Business Park will be analyzed, including CitiGate Drive/CrossKeys Place, CitiGate Drive/Systemhouse Street, and CitiGate Drive/Dealership Drive. The recommended future control type at the CitiGate Drive/Systemhouse Street and CitiGate Drive/Dealership Drive intersections will be identified with and without the planned McKenna Casey Drive Realignment. Updated projections/analysis of the intersections along Strandherd Drive is not required as revised traffic projections are less than the assumed traffic in the recent studies.

2.0 Proposed Development

The proposed development would conceptually include a total of six industrial/warehouse buildings (four at 444 CitiGate Drive and two at 560 Dealership Drive) for a total of 1,174,800 ft^2 (109,145 m^2) of GFA. A copy of the proposed Draft Plan is included in **Appendix A**.

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The buildings at 444 CitiGate Drive would be served via the extension of CitiGate Drive which will be extended between Systemhouse Street and Dealership Drive.

The City's 2017 TIA Guidelines identifies three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the TIA Screening Form which is included as **Appendix B**. The trigger results are as follows:

- Trip Generation Trigger – The development is not anticipated to generate over 60 peak hour person trips compared to the approved uses in the 2012 CTS for the subject site; further assessment **is not required** based on this trigger.

- Location Triggers – The development site is not located in a Design Priority Area (DPA) or Transit-Oriented Development (TOD) zone and boundary streets are not designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Routes; further assessment **is not required** based on this trigger.

- Safety Triggers – The development does not satisfy any of the safety triggers listed on the Screening Form; further assessment **is not required** based on this trigger.

3.0 Existing Conditions

3.1 Roadways

An aerial depicting the roadway network within the area is provided in **Figure 1**.

CitiGate Drive runs on a north-south alignment between Strandherd Drive/Fallowfield Road and Systemhouse Street. It is classified as a major collector road, with a two lane, undivided urban cross section and a regulatory speed limit of 50km/h. It is planned to extend south to McKenna Casey Drive.

CrossKeys Place runs on a north-south alignment between Strandherd Drive and CitiGate Drive. It is classified as a collector, with a two lane, undivided urban cross section and a regulatory speed limit of 50km/h.

Systemhouse Street and Dealership Drive are collector roadways with two-lane urban cross sections that extend westerly from Strandherd Drive. Both roadways have regulatory speed limits of 50km/h.

McKenna Casey Drive is a local roadway with a two-lane rural cross-section that runs from Moodie Drive in the west and formerly to Strandherd Drive in the east. As part of the Strandherd Drive Widening Project (ongoing construction from Dealership Drive to Jockvale Road), this road has been closed just west of its intersection with the VIA rail line since October 2020. McKenna Casey Drive has a regulatory speed limit of 80km/h. Planned development within the CitiGate Business Park provides an opportunity to realign McKenna Casey Drive west of the rail line. This is depicted in Schedule A of the 2018 *Nepean Secondary Plan – Areas 9 and 10*, in Schedule C4 of the City's New *Official Plan*, and detailed as part of the November 2021 *McKenna Casey Drive Realignment Study (Addendum to the 1991 Strandherd Drive Environmental Assessment Study).*

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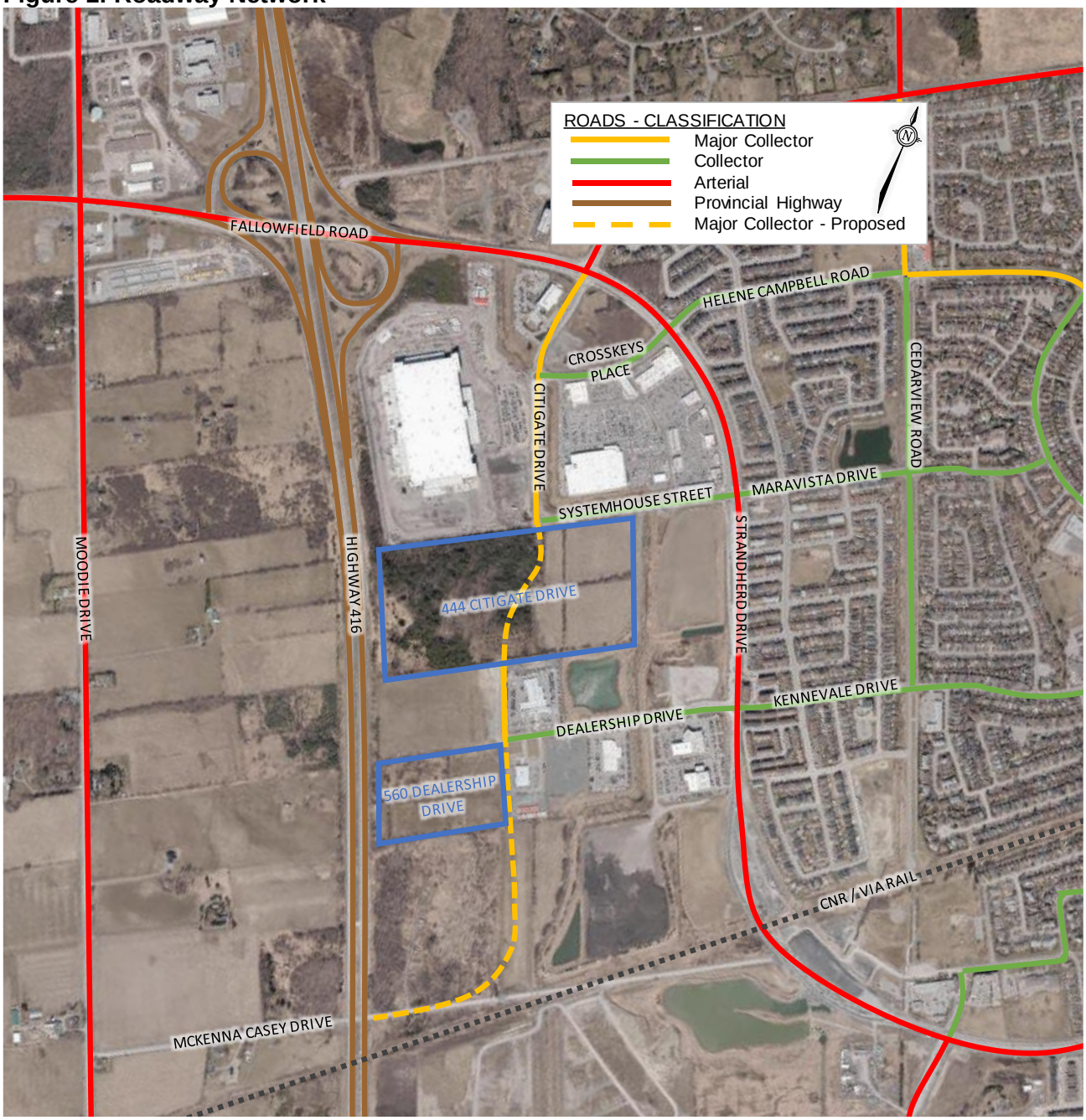
Figure 1: Roadway Network



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3.2 Existing Traffic Volumes

Weekday traffic counts were obtained from the City of Ottawa at the Strandherd Drive/Hélène Campbell Road/CrossKeys Place, Strandherd Drive/Fallowfield Road/CitiGate Drive, Strandherd Drive/Kennevale Drive/Dealership Drive, Strandherd Drive/Maravista Drive/Systemhouse Street, and Strandherd Drive/McKenna Casey Drive intersections.

A weekday traffic count was completed by Novatech at the at the CitiGate Drive/CrossKeys Place intersection and the Fallowfield Road/Highway 416 Northbound and Southbound Off-Ramps.

The traffic counts were completed on the following dates:

- Strandherd Drive/Hélène Campbell Road/CrossKeys Place — May 30, 2018
- Strandherd Drive/Fallowfield Road/CitiGate Drive — March 8, 2018
- Strandherd Drive/Kennevale Drive/Dealership Drive — January 18, 2018
- Strandherd Drive/Maravista Drive/Systemhouse Street — January 18, 2018
- CitiGate Drive/CrossKeys Place — August 23, 2018
- Fallowfield Road/Highway 416 Northbound Ramps — March 4, 2020
- Fallowfield Road/ Highway 416 Southbound Ramps — March 4, 2020
- Strandherd Drive/McKenna Casey Drive — June 27, 2019

At the time of the traffic counts, the Amazon facility was not yet constructed, and CitiGate Drive was not yet built between CrossKeys Place and Systemhouse Street. The following developments within the CitiGate Business Park were operational and are captured in the traffic counts along Strandherd Drive/Fallowfield Road:

- Hyundai, Honda, and Toyota Dealerships
- CitiGate retail plaza (Costo, gas bar, other retail/restaurant uses)
- Tomlinson Headquarters (office)

The existing traffic volumes are shown in the following figure.

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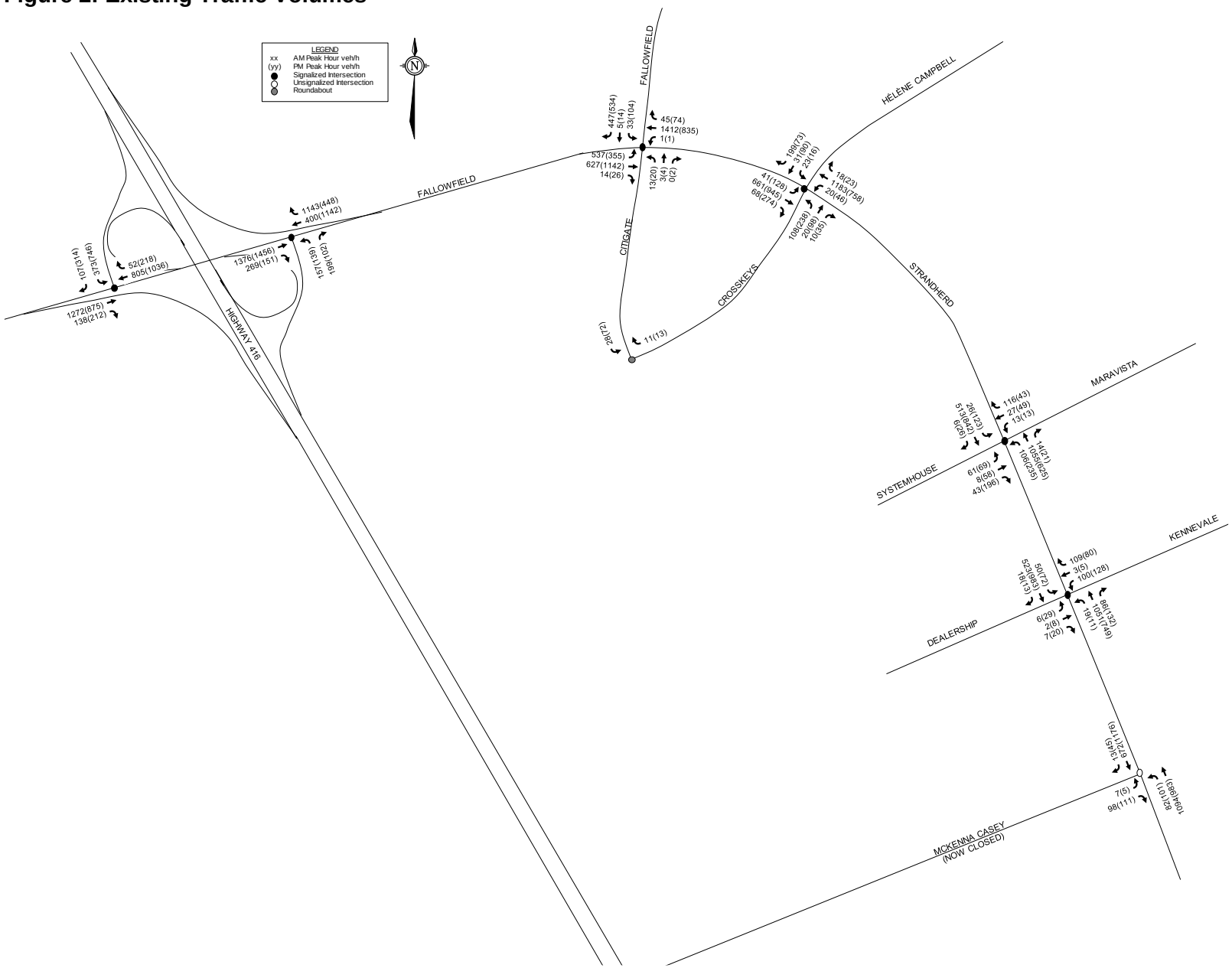
Figure 2: Existing Traffic Volumes



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4.0 Forecasting

4.1 Existing/Planned Uses

An aerial showing the existing and planned land uses within the CitiGate Business Park is included as **Figure 3**.

The following developments are located within the CitiGate Business Park lands:

Built or Under Construction

- Tomlinson Corporate Headquarters (office), 100 CitiGate Drive
- Amazon Distribution Facility, 222 CitiGate Drive
- Costco with Gas Bar, 4225 Strandherd Drive
- CitiGate Retail Plaza (including retail/restaurant uses), 4235 Strandherd Drive
- Car Dealership – Volkswagen (phase 1 of development), 4149 Strandherd Drive
- Car Dealership – Toyota, 4123 Strandherd Drive
- Car Dealership – Hyundai, 4115 Strandherd Drive
- Car Dealership – Honda, 530 Dealership Drive
- Car Dealership – Ford, 555 Dealership Drive
- Autobody Shop – CARSTAR, 550 Dealership Drive

Proposed

- Proposed Industrial, 444 CitiGate Drive and 560 Dealership Drive (subject lands)
- Proposed Hotel, 101 CitiGate Drive
- Proposed Car Dealership at 540 Dealership Drive
- Proposed Hotel and Office (phases 2/3 of development), 4149 Strandherd Drive

Future

- Future Hotel, 4433 Strandherd Drive
- Future Industrial (Warehouse), 575 Dealership Drive
- Future Prestige Business Park/Office Park, 4175 Strandherd Drive
- Future Prestige Business Park/Office Park, vacant lands south of 560 Dealership and west of future realigned McKenna Casey Drive (approximately 11.8 hectares)
- Future Prestige Business Park/Office Park, vacant lands south of existing McKenna Casey Drive, east of Highway 416 and north of VIA rail corridor (approximately 1.2 hectares)
- Future Business Park, vacant lands south of car dealerships and east of future realigned McKenna Casey Drive (approximately 4.1 hectares)

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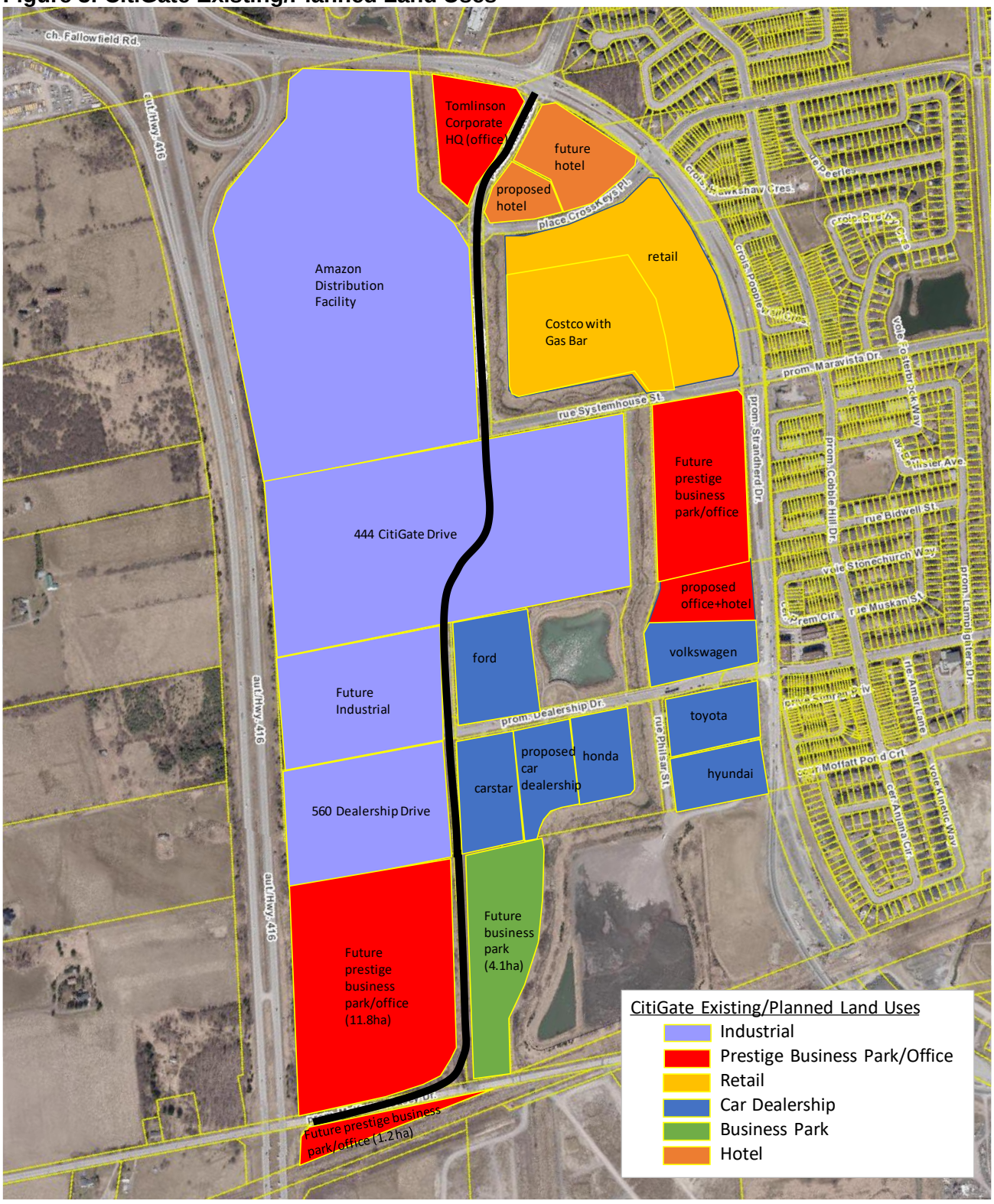
Figure 3: CitiGate Existing/Planned Land Uses



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4.2 Site Traffic

Trips generated by the proposed development have been estimated using relevant rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition for the General Light Industrial land use. All trips estimated were converted to person trips using an ITE Trip to Person Trip adjustment factor of 1.28, consistent with the TIA Guidelines. Person trips generated by the proposed site are shown in the following table.

Table 1: Site Traffic - Person Trips

Land Use	ITE Code	Size	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
Proposed Draft Plan of Subdivision								
Light Industrial	110	1,174,800 ft^2	979	133	1112	137	841	978

The site traffic generation for the subject lands was previously identified in the November 2012 CitiGate Highway 416 Employment Lands Community Transportation Study (CTS) using the following estimated rates:

- Prestige business park - 110 employees/ha and 350 sf/employee
- Business park – 75 employees/ha and 900 sf/employee

The uses that were originally considered for the subject lands included approximately 9.19 hectares of Business Park and 14.52 hectares of Prestige Business Park. The following table summarizes the site generated person trips for the subject site using the rates outlined in the CitiGate CTS.

Table 2: CTS Site Traffic - Person Trips

Land Use	ITE Code	Size	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
Prestige Business Park	750	559,020 ft^2	819	102	921	129	799	928
Business Park	770	620,325 ft^2	828	146	974	242	689	931
		Total	**1,647**	**248**	**1,895**	**371**	**1,488**	**1,859**

Based on the above tables, these sites are anticipated to generate approximately 780 less person trips in the AM and 880 less person trips in the PM peak hour, compared to the approved 2012 CTS concept for the subject lands.

The modal shares from the 2012 CTS, also used for the Amazon (222 CitiGate) TIA, have been applied to the site generated person trips. A full breakdown of the projected person trips by modal share are shown in the following table.

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Table 3: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
Proposed Draft Plan of Subdivision							
Total Person Trips		979	133	1112	137	841	978
Auto Driver	**56%**	**548**	**75**	**623**	**77**	**471**	**548**
Auto Passenger	13.5%	132	18	150	18	114	132
Transit	23%	225	31	256	32	193	225
Non-Auto	7.5%	74	9	83	10	63	73

Trips generated by the subject site have been assigned to the study area intersection using the distribution as outlined in the 2012 CTS. The distribution is as follows:

- 10% to/from the north via Highway 416
- 25% to/from the west via Fallowfield Road
- 5% to/from the south via Highway 416
- 10% to/from the east via Fallowfield Road
- 10% to/from the east via Helene Campbell Drive
- 5% to/from the east via Maravista Drive
- 5% to/from the east via Kennevale Drive
- 30% to/from the east via Strandherd Drive

When McKenna Casey Drive is realigned, it is assumed that 5% of site traffic to/from the west via Fallowfield Road will be diverted to the McKenna Casey Drive connection. This route may become an attractive alternative for site traffic in the event of congested traffic conditions on Strandherd Drive.

Consistent with the CTS trip assignment, trips arriving from or departing to the east or west via Fallowfield and to/from the north/south via Highway 416 have been assigned 30% to CitiGate Drive, 10% to CrossKeys Place, 35% to Systemhouse Street, and 25% to Dealership Drive. Trips arriving/departing via Helene Campbell Drive have been assigned to CrossKeys Place. Trips arriving/departing via Maravista Drive have been assigned to Systemhouse Street. Trips arriving/departing via Kennevale Drive have been assigned to Dealership Drive. Trips arriving/departing from the east via Strandherd Drive have been assigned 50% to Dealership Drive and 50% to Systemhouse Street.

It is assumed that driveway connections will be mainly to CitiGate Drive with an additional connection to Systemhouse Street (serving the 444 CitiGate Drive property). Approximately 25% of site traffic destined to 444 CitiGate Drive has been assigned to a driveway on Systemhouse Street with the balance utilizing CitiGate Drive driveways to access the sites. All site traffic destined to 560 Dealership Drive has been assigned to CitiGate Drive, south of Dealership Drive.

Site traffic volumes shown with and without the McKenna Casey realignment is included in **Figures 4** and **5**.

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Figure 4: Site Traffic - Buildout Year

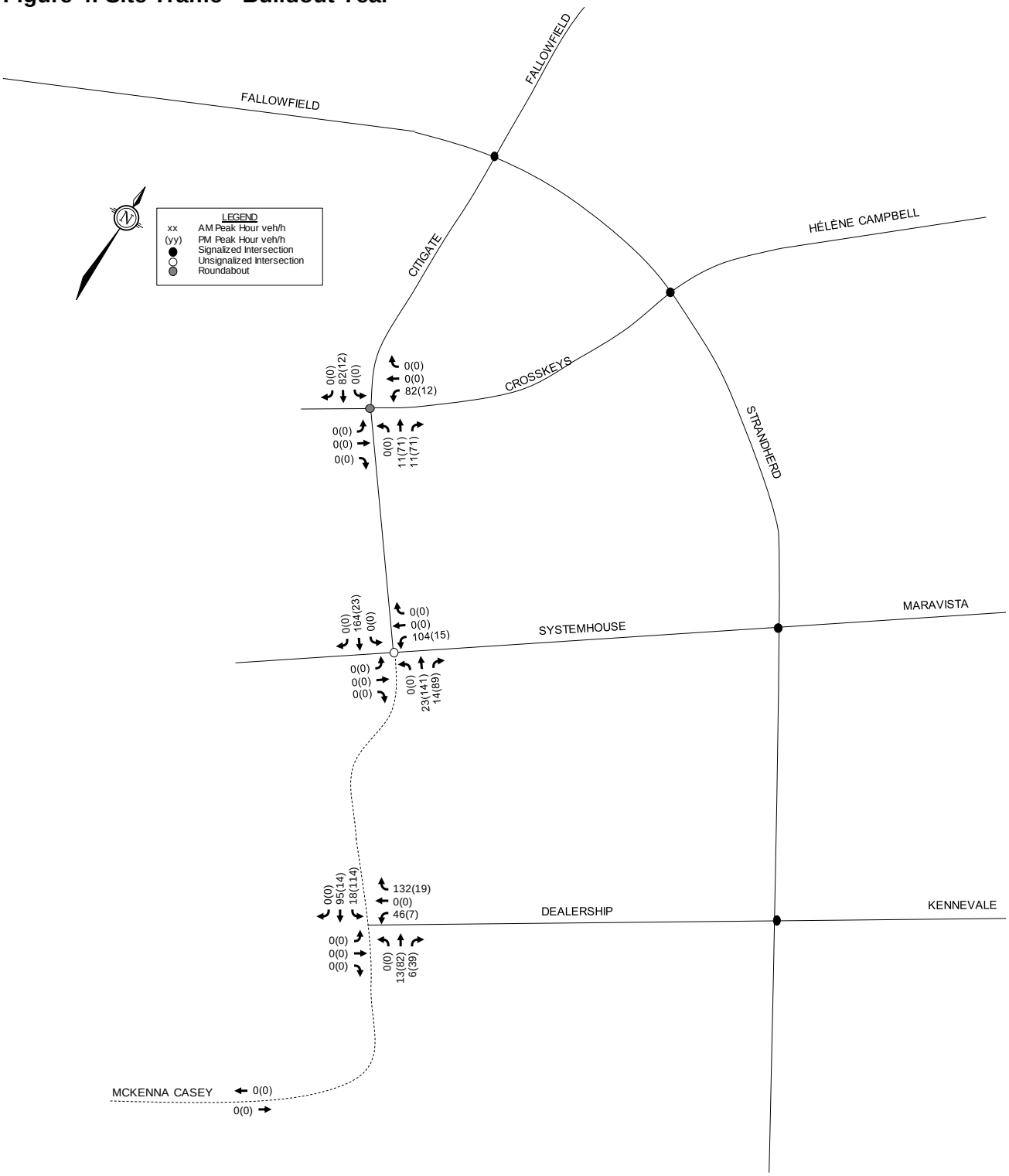

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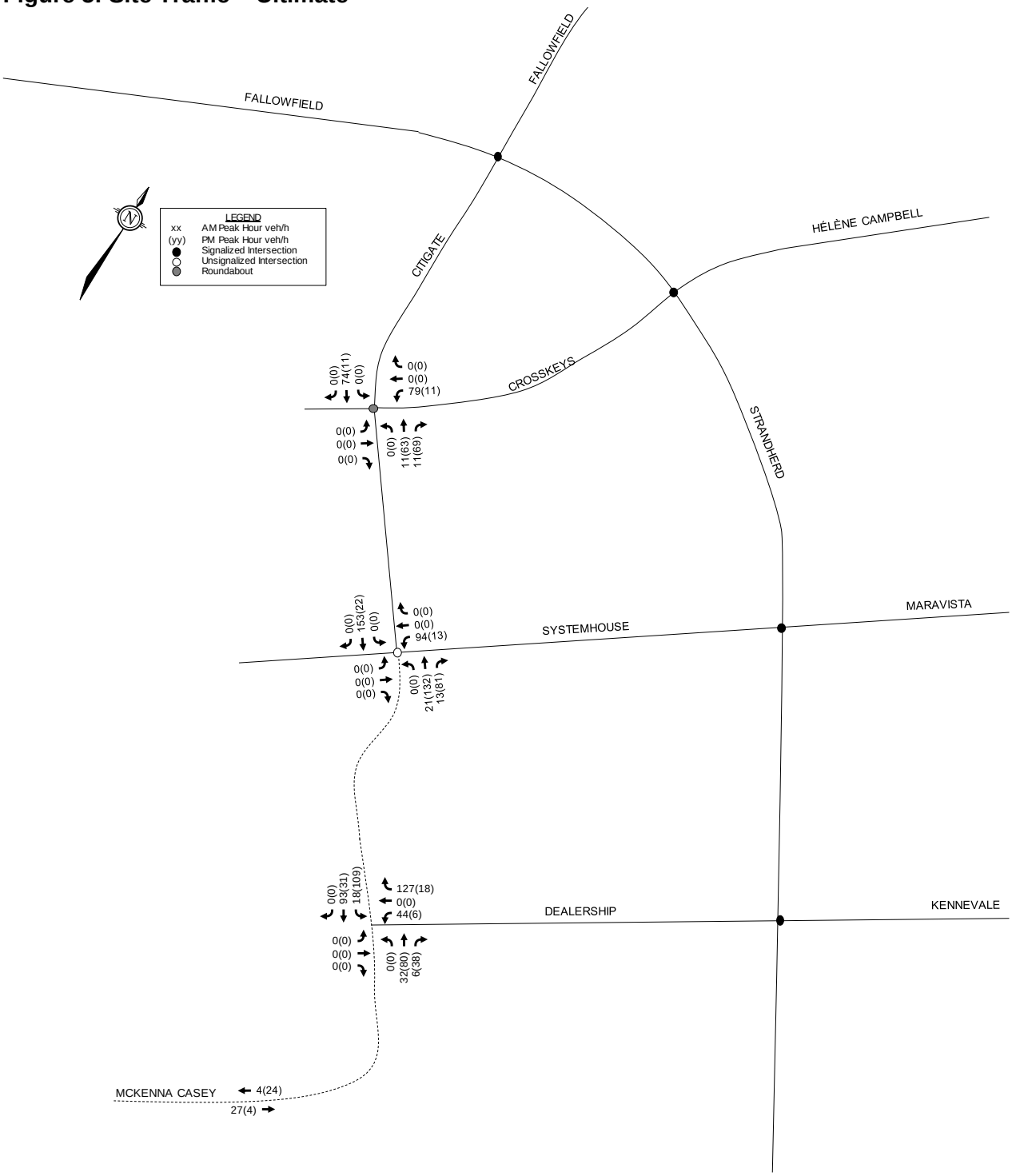
Figure 5: Site Traffic – Ultimate



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4.3 Other CitiGate Traffic

Trips generated by the car dealerships as well as developments at 4175/4149 Strandherd Drive (Blocks 3 and 4) are anticipated to generate traffic to/from Strandherd Drive and not utilize the internal Business Park intersections. The following table shows person trips generated by the proposed/future uses within the CitiGate Business Park that are anticipated to generate traffic at the internal intersections.

Peak hour of site traffic for the neighboring Amazon facility is anticipated to occur at 6:00AM-7:00AM and 5:30PM-6:30PM, due to the nature of shift work anticipated at this facility. Based on the recent traffic counts, the weekday peak hour of adjacent road traffic along Strandherd Drive typically occurs between 7:45AM-8:45AM and from 4:00PM-5:00PM. While Amazon site traffic and peak hour of road traffic are not expected to coincide, the Amazon site traffic has been superimposed on peak hour of road traffic for this memo. This will result in a more conservative and robust analysis.

Table 4: Other CitiGate Traffic - Person Trips

Land Use	ITE Code	Size	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
Amazon Distribution Facility								
Distribution Facility	-	2,728,000 ft^2	519	538	1057	679	691	1370
Proposed Hotel – 101 CitiGate								
Phase 1 – Hotel	310	99 rooms	34	23	57	32	30	62
Phase 2 – Hotel	310	85 rooms	26	19	45	23	22	45
Future Hotel – 4433 Strandherd								
Phase 1 – Hotel	310	120 rooms	37	31	68	40	38	78
Phase 1 – Restaurant	932	5,000 ft^2	33	28	61	35	23	58
Phase 2 – Hotel	310	135 rooms	44	33	77	47	45	92
Phase 2 – Restaurant	932	5,000 ft^2	33	28	61	35	23	58
Future Warehouse - 575 Dealership								
Warehouse	150	320,000 ft^2	54	15	69	20	54	74
Future Prestige Business Park (lands south of Dealership Drive)								
Office Park	750	500,000 ft^2	756	95	851	116	718	834
Future Business Park (lands south of Dealership Drive)								
Business Park	770	275,000 ft^2	388	68	456	119	338	457

Modal shares are anticipated to be consistent with recent traffic studies prepared for the above developments or the overall 2012 CitiGate CTS. Vehicle trips generated by the proposed/future uses within the CitiGate Business Park are shown in **Table 5**.

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Trips generated by the Amazon facility and the proposed hotel at 101 CitiGate Drive have been assigned using the assumptions outlined in their respective traffic studies. Trips generated by the hotel at 4433 Strandherd Drive have been assigned in a similar manner to the traffic study for the hotel at 101 CitiGate Drive. Trips generated by the future warehouse, prestige business park and business park lands have been assigned in a manner consistent with the 2012 CTS.

The Amazon facility and proposed hotel at 101 CitiGate Drive have been assumed to be in place for the subject site buildout year. For the ultimate development scenario, the McKenna Casey Drive realignment is anticipated to be in place and 5% of Amazon traffic destined to the west has been reassigned to this connection. All other developments and the McKenna Casey Drive realignment are assumed to be in place for the ultimate condition.

Table 5: Other CitiGate Traffic – Vehicle Trips

Land Use	Auto Driver Share	Size	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
Amazon Distribution Facility								
Distribution Facility	56%	2,728,000 ft^2	284	295	579	375	381	756
Proposed Hotel – 101 CitiGate								
Phases 1 and 2 (two hotels)	85%	184 rooms	51	36	87	47	44	91
Future Hotel – 4433 Strandherd								
Phases 1 and 2 (two hotels and two restaurants)	85%	255 rooms, 10,000 ft^2 restaurant	125	102	227	133	110	243
Future Warehouse - 575 Dealership								
Warehouse	56%	320,000 ft^2	30	8	38	11	30	41
Future Prestige Business Park (lands south of Dealership Drive)								
Office Park	56%	500,000 ft^2	423	53	476	65	402	467
Future Business Park (lands south of Dealership Drive)								
Business Park	56%	275,000 ft^2	217	38	255	67	189	256

Background and total traffic volumes are shown in the following figures:

- **Figure 6** shows the background traffic (not including subject site) for the buildout year.
- **Figure 7** shows the background traffic (not including the subject site) for the ultimate condition.
- **Figure 8** shows the total traffic (including the subject site) for the buildout year.
- **Figure 9** shows the total traffic (including the subject site) for the ultimate condition.

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Figure 6: Background Traffic - Buildout Year

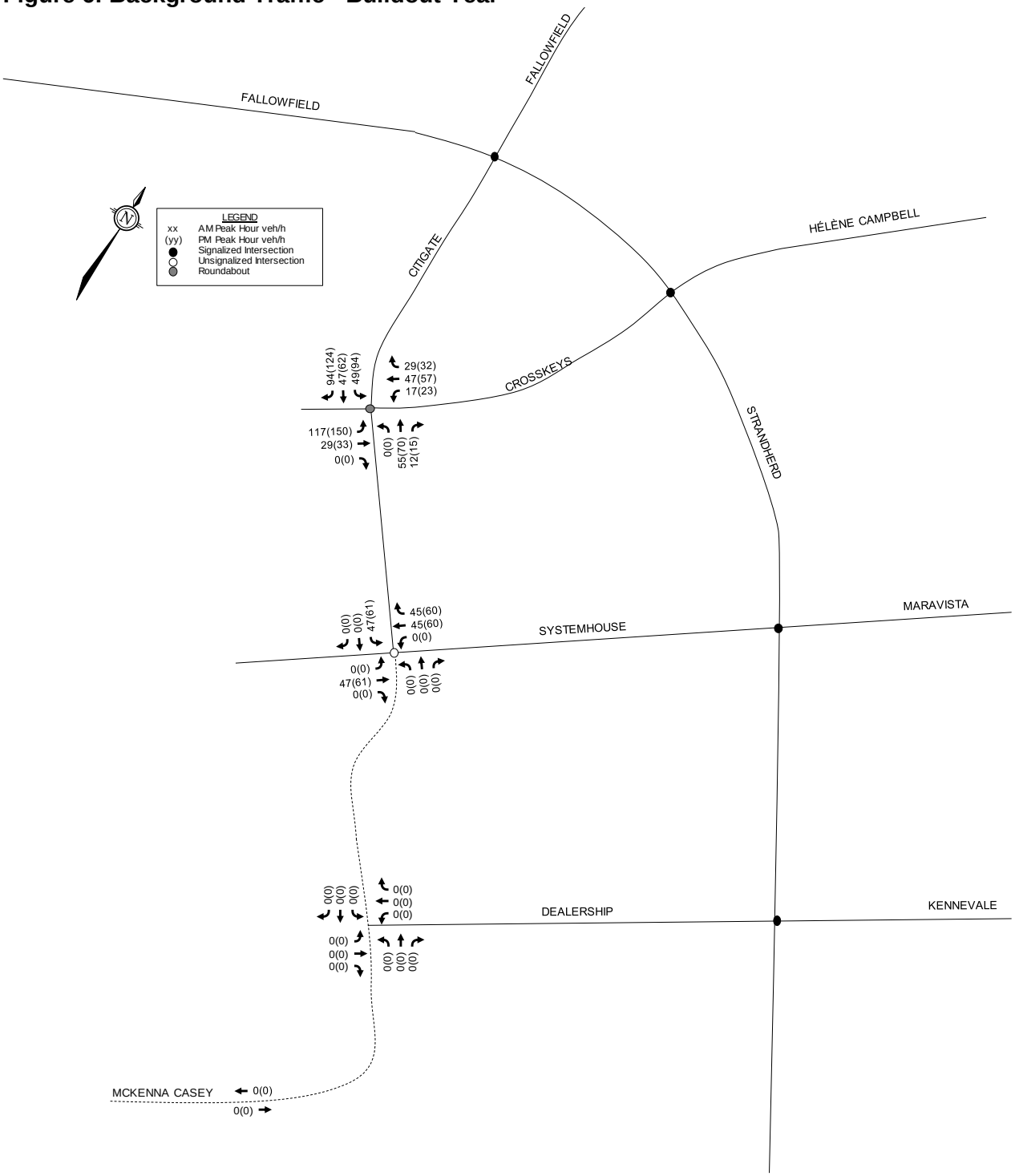

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Figure 7: Background Traffic – Ultimate

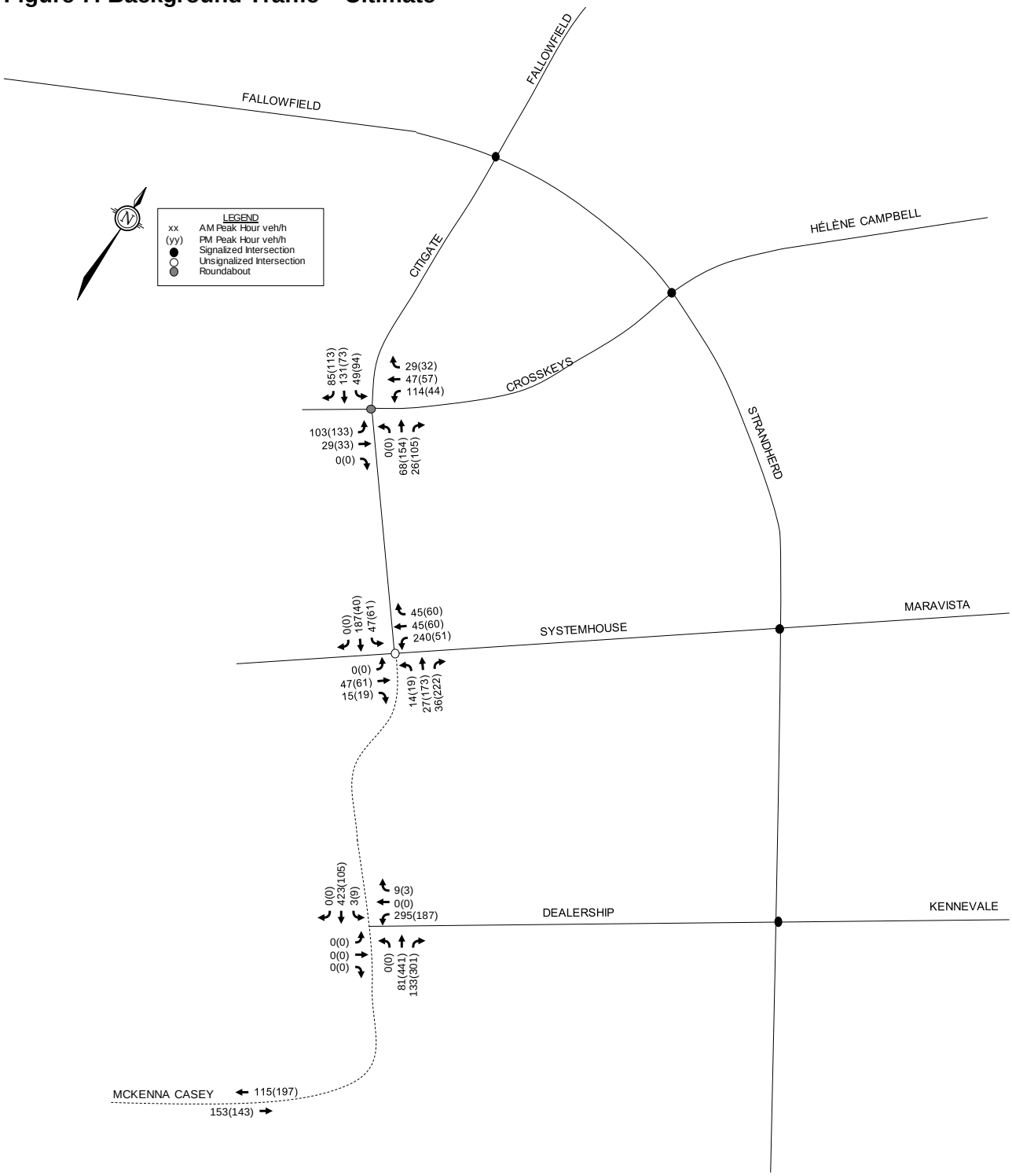

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Figure 8: Total Traffic - Buildout Year

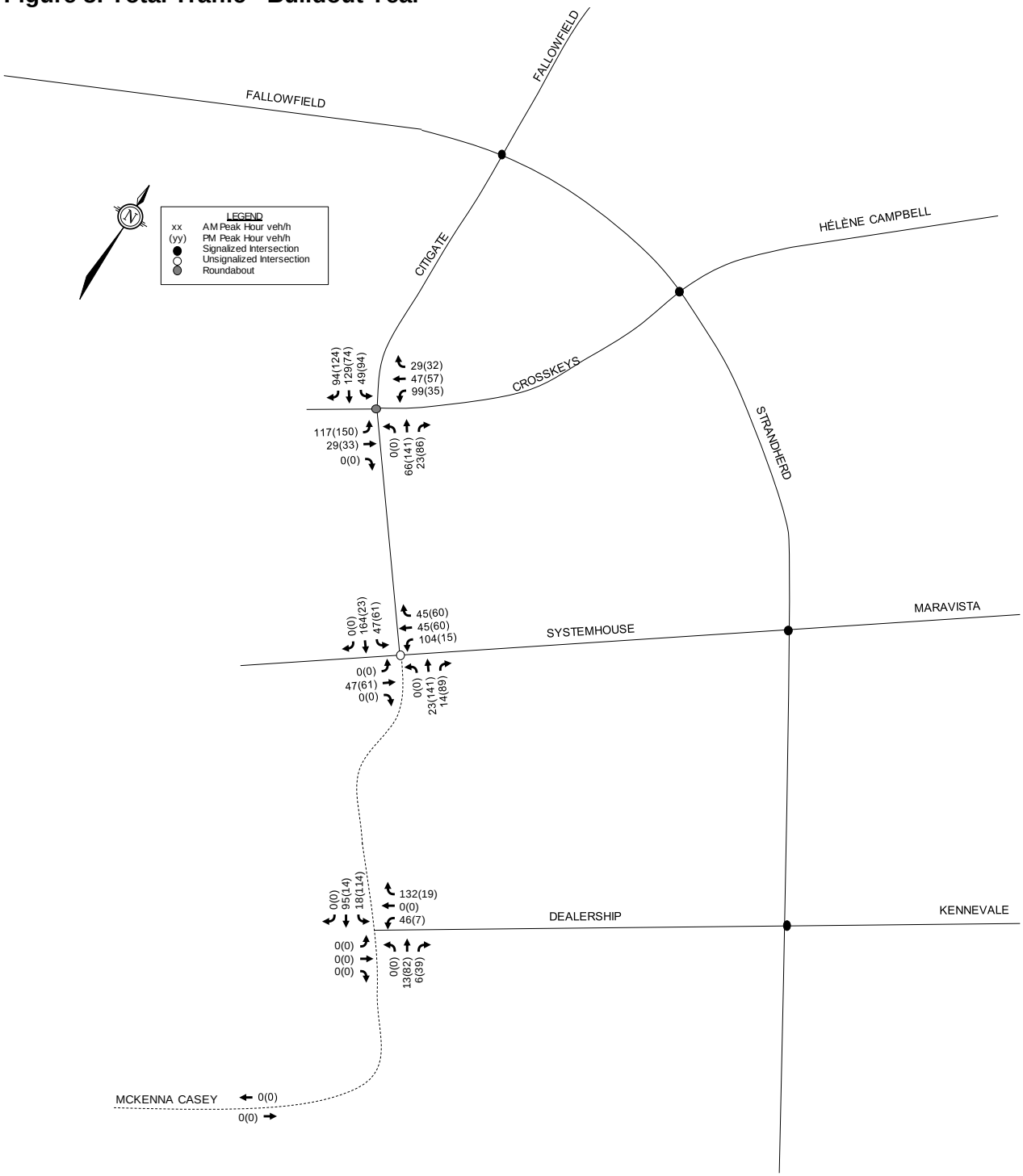

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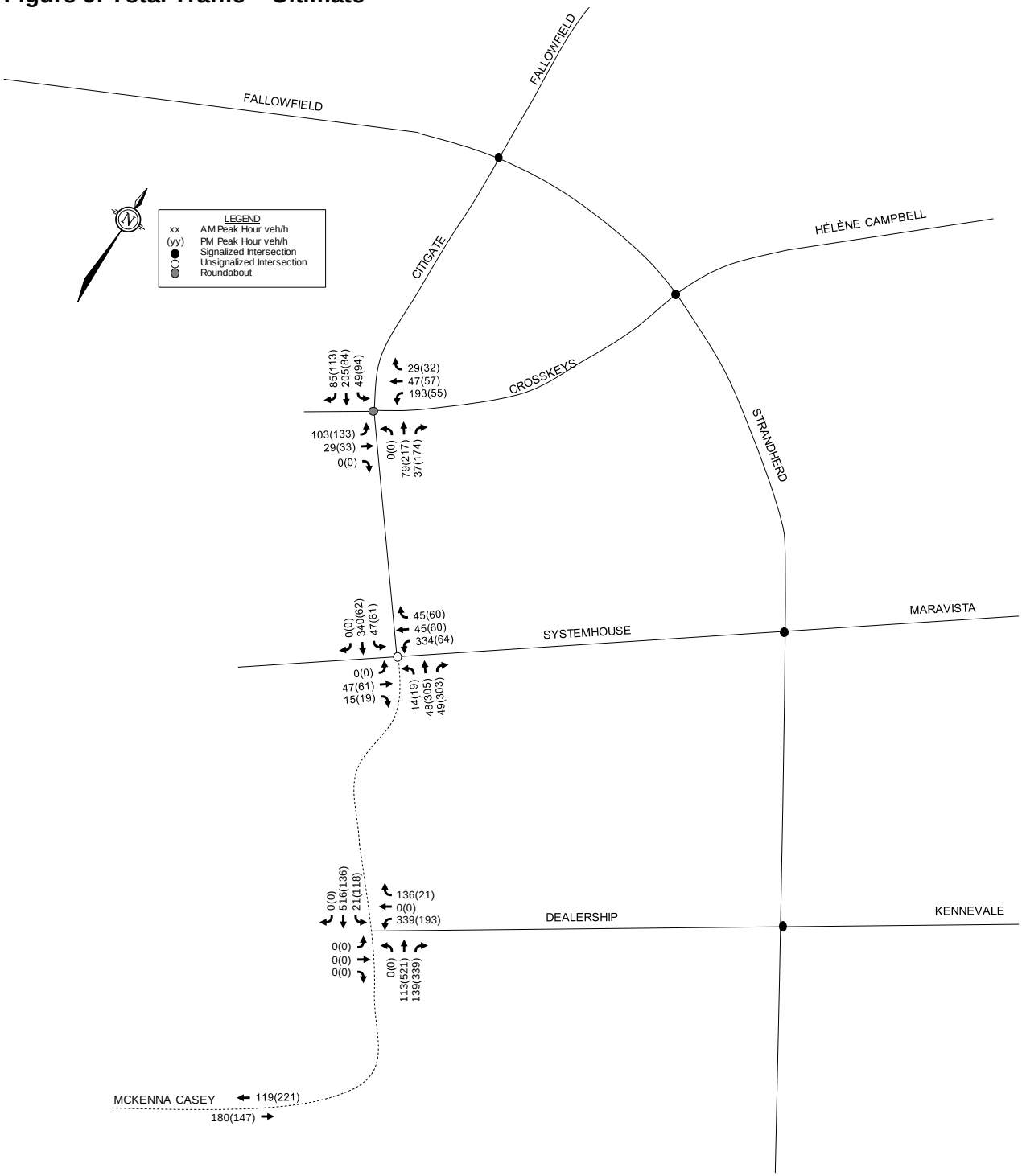
Figure 9: Total Traffic – Ultimate



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5.0 Analysis

Intersection capacity analysis has been completed for the projected total traffic conditions. The intersection parameters used in this analysis are consistent with the City's TIA Guidelines (saturation flow rate: 1800 vphpl, PHF: 1.0). The target for all unsignalized intersections within the City's jurisdiction is a delay of 35 seconds or less, and the target for all signalized intersection is a v/c ratio of 0.90 or less, which represent a LOS D.

Intersection capacity analysis was performed using Synchro 11 software for unsignalized intersections and Rodel V1-Win software for roundabout intersections. Synchro and Rodel reports are included in **Appendix E**.

5.1 Intersection Operations – Buildout Year

Intersection operations for the site's buildout year are shown in the following table. The following intersection configurations were modelled:

- The CitiGate Drive/CrossKeys Place intersection was modelled as a roundabout.
- The CitiGate Drive/Systemhouse Street intersection was modelled as a side-street stop-controlled intersection, with stop control provided on the Systemhouse Street/Amazon approaches and free flow on CitiGate Drive.
- The CitiGate Drive/Dealership Drive intersection was modelled as a side-street stop controlled intersection, with stop control provided on the south approach and free flow on Dealership Drive/CitiGate Drive (north).

Table 6: Intersection Operations - Buildout Year

Intersection	Mvmt	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
CitiGate Drive/ CrossKeys Place	NB	3 sec.	A	3 sec.	A
	EB	3 sec.		3 sec.	
	SB	4 sec.		3 sec.	
	WB	3 sec.		3 sec.	
CitiGate Drive/ Systemhouse Street	NB	0 sec.	B	0 sec.	B
	EB	12 sec.		13 sec.	
	SB	2 sec.		6 sec.	
	WB	13 sec.		12 sec.	
CitiGate Drive/ Dealership Drive	NB	10 sec.	A	10 sec.	A
	SB	0 sec.		0 sec.	
	WB	2 sec.		2 sec.	

As shown in the above table, the study area intersections are anticipated to operate with acceptable conditions in the AM and PM peak hours.

Side street stop control is sufficient at the CitiGate Drive/Systemhouse Street and CitiGate Drive/Dealership Drive intersections, and no capacity issues are anticipated at the CitiGate Drive/CrossKeys Place roundabout with build out of the subject site.

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5.2 Intersection Operations – Ultimate

Intersection operations for the ultimate condition are shown in the following table. The following intersection configurations were modelled:

- The CitiGate Drive/CrossKeys Place intersection was modelled as a roundabout.
- The CitiGate Drive/Systemhouse Street intersection was modelled as a side-street stop-controlled intersection, with stop control provided on the Systemhouse Street/Amazon approaches and free flow on CitiGate Drive.
- The CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersection was modelled as a side-street stop-controlled intersection, with stop control provided on the Dealership Drive approach and free flow on CitiGate Drive/Realigned McKenna Casey Drive.

Table 7: Intersection Operations - Ultimate

Intersection	Mvmt	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
CitiGate Drive/ CrossKeys Place	NB	3 sec.	A	3 sec.	A
	EB	4 sec.		3 sec.	
	SB	4 sec.		3 sec.	
	WB	4 sec.		3 sec.	
CitiGate Drive/ Systemhouse Street	NB	1 sec.	A	0 sec.	A
	EB	14 sec.	C	19 sec.	C
	SB	1 sec.	A	5 sec.	A
	WB	**90 sec.**	**F**	25 sec.	D
CitiGate Drive/ Dealership Drive/ Realigned McKenna Casey Drive	NB	0 sec.	A	0 sec.	A
	SB	1 sec.	A	65 sec.	A
	WB	**88 sec.**	**F**	**98 sec.**	**F**

As shown in the above table, the CitiGate Drive/CrossKeys Place intersection is anticipated to operate with a LOS A in the AM and PM peak hours. Under side street stop control, the westbound movement at the CitiGate Drive/Systemhouse Street intersection is anticipated to operate with a LOS F in the AM peak hour, and the westbound movement at the CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersection is anticipated to operate with a LOS F in the AM and PM peak hours.

Per the City's criteria approved at the Transportation Committee in October 2020, all-way stop-control may be considered on minor roadways if the following conditions are met:

- Total vehicle volume on all intersection approaches average more than 200 per hour recorded over a weekday 8-hour period;
- Total minor street volume (including pedestrians) average more than 80 per hour over the same 8-hour period; and
- The volume split does not exceed 75/25 for three-way control of 65/35 for four-way control.

Based on the projected volumes:

- Both the CitiGate Drive/Systemhouse Street and CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersections are anticipated to meet the total vehicle volume threshold of 200 vehicles and the minor street volume threshold of 80.

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- The CitiGate Drive/Systemhouse Street intersection is anticipated to achieve a 65/35 volume split in the AM and a 62/38 volume split in the PM.
- The CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive is anticipated to achieve a 75/25 volume split in the AM and PM.
- Traffic signals are only 46% warranted at CitiGate Drive/Systemhouse Street.
- Traffic signals are only 45% warranted at CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive.

Traffic signalization warrants are included in **Appendix D**.

The CitiGate Drive/Systemhouse Street and CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersections have been further modelled with all-way stop-control and with single-lane roundabout control under ultimate traffic conditions. The results are shown in the following table for the AM and PM peak hours.

Table 8: Intersection Operations – Ultimate (AWSC vs RAB)

Intersection	Control	Mvmt	AM Peak		PM Peak	
			Delay	LOS	Delay	LOS
CitiGate Drive/ Systemhouse Street	AWSC	NB	10 sec.	B	24 sec.	C
		EB	10 sec.	A	10 sec.	A
		SB	17 sec.	C	10 sec.	B
		WB	19 sec.	C	11 sec.	B
	RAB	NB	3 sec.	A	5 sec.	A
		EB	4 sec.	A	3 sec.	A
		SB	5 sec.	A	3 sec.	A
		WB	4 sec.	A	4 sec.	A
CitiGate Drive/ Dealership Drive/ Realigned McKenna Casey Drive	AWSC	NB	14 sec.	B	**78 sec.**	**F**
		SB	**42 sec.**	**E**	12 sec.	B
		WB	32 sec.	D	13 sec.	B
	RAB	NB	3 sec.	A	8 sec.	A
		SB	6 sec.	A	4 sec.	A
		WB	4 sec.	A	4 sec.	A

All-way stop control at the CitiGate Drive/Systemhouse Street intersection would result in a maximum delay of 24 seconds (LOS C) on the northbound approach in the PM peak hour. Introduction of single lane roundabout control at the CitiGate Drive/Systemhouse Street intersection would result in a maximum delay of 5 seconds (LOS A) in the AM and PM peak hours. Based on the above, with full buildout of the CitiGate lands and realignment of McKenna Casey Drive, all-way stop control is sufficient at the CitiGate Drive/Systemhouse Street intersection.

All-way stop control at the CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive would result in a maximum delay of 42 seconds (LOS E) on the southbound approach in the AM peak hour and 78 seconds (LOS F) on the northbound approach in the PM peak hour. Introduction of single lane roundabout control at the CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersection would result in a maximum delay of 8 seconds (LOS A) in the AM and PM peak hours. Based on the above, with full buildout of the CitiGate lands and realignment of McKenna Casey Drive, roundabout control is recommended at the CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersection.

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It has conservatively been assumed that the lands south of 560 Dealership Drive and south of the car dealerships may still developed as Prestige Business Park/Business Park uses. This should be reassessed as part of future development applications. It is recommended that the right-of-way for a roundabout at CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive be conveyed in accordance with the City's EA when the lands to the south develop, if required based on further study.

6.0 Conclusions

The main conclusions and findings of this memo are summarized below.

With buildout of the subject site,

- No capacity issues are anticipated at the CitiGate Drive/CrossKeys Place roundabout.
- Side street stop control is sufficient at the CitiGate Drive/Systemhouse Street intersection.
- Side street stop control is sufficient at the CitiGate Drive/Dealership Drive intersection.

With full buildout of the CitiGate lands and realignment of McKenna Casey Drive,

- No capacity issues are anticipated at the CitiGate Drive/CrossKeys Place roundabout.
- All-way stop control is sufficient at the CitiGate Drive/Systemhouse Street intersection.
- Roundabout control is recommended at the CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive intersection.

It is recommended that the right-of-way for a roundabout at CitiGate Drive/Dealership Drive/Realigned McKenna Casey Drive be conveyed in accordance with the City's EA when the lands to the south develop, if required based on further study.

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Prepared by:

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Reviewed by:

Jennifer Luong, P.Eng.
Senior Project Manager | Transportation

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APPENDIX A

Draft Plan

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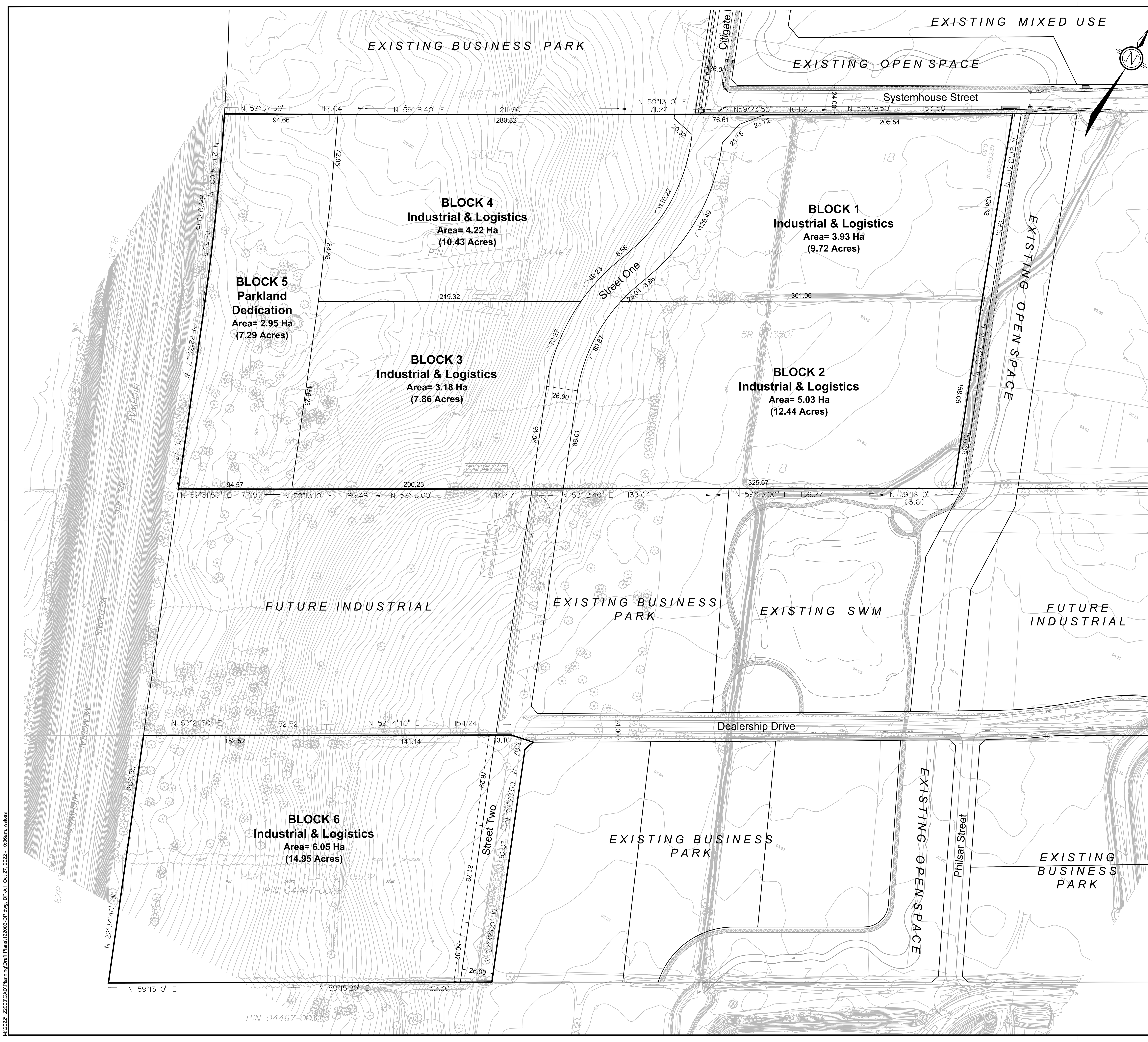

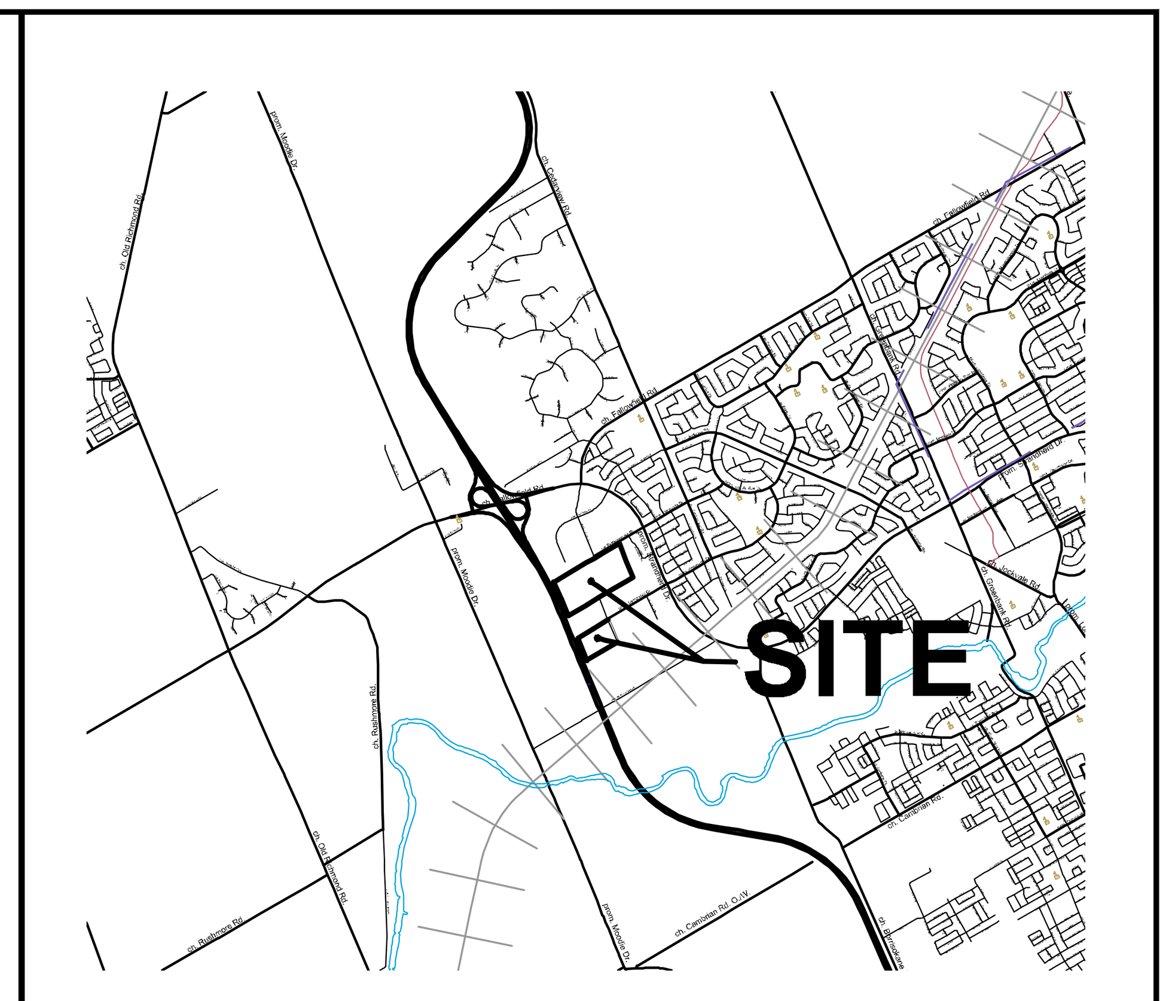

KEY MAP
NOT TO SCALE

METRIC : MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

DRAFT PLAN OF SUBDIVISION OF
PART LOT 17 & 18
CONCESSION 4 (RIDEAU FRONT)
Geographic Township of Nepean
CITY OF OTTAWA
SCALE
1 : 1500
DATE: OCTOBER, 2022

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJOINING LANDS ARE CORRECTLY SHOWN.

DATED ______________________ ______________________
?surveyor name?
ONTARIO LAND SURVEYOR

?name of surveying company?
ONTARIO LAND SURVEYORS
?surveyor job number?

OWNER'S CERTIFICATE

I/WE, ,BEING THE REGISTERED OWNER(S), HEREBY AUTHORIZE NOVATECH TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF OTTAWA FOR REVIEW AND APPROVAL.

DATED ______________________ ______________________
owner name

OWNER'S CERTIFICATE

I/WE, CITY OF OTTAWA, BEING THE REGISTERED OWNER(S), HEREBY AUTHORIZE NOVATECH TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF OTTAWA FOR REVIEW AND APPROVAL.

DATED ______________________ ______________________
owner name

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT.

A) The boundaries of the land proposed to be subdivided, certified by an Ontario land Surveyor;
As shown on Draft Plan

B) The locations, widths & names of the proposed highways within the proposed subdivision & of existing highways on which the proposed subdivision abuts;
As shown on Draft Plan

C) On a small keyplan, on a scale of not less than 1cm to 100m, all of the land adjacent to the proposed subdivision that is owned by the applicant or in which the applicant has an interest, every subdivision adjacent to the proposed subdivision & the relationship of the boundaries of the land to be subdivided to the boundaries of the township lot of other original grant of which the land forms the whole part;
As Shown on Draft Plan

D) The purpose for which the proposed lots are to be used;
Industrial, and Open Space shown on Draft Plan

E) The existing uses of all adjoining lands;
Business Park, Open Space, and Stornwater Management shown on Draft Plan

F) The approximate dimensions & layout of the proposed lots;
As shown on Draft Plan

G) Natural & artificial features such as buildings or other structures or installations, railways, highways, watercources, drainage ditches, wetlands & wooded areas within or adjacent to the land proposed to be subdivided;
As shown on Draft Plan

H) The availability and nature of domestic water supplies;
Development will be supplied with full municipal piped water service

I) The nature & porosity of the soil;
See Soils Report

J) Existing contours or elevations as may be required to determine the grade of the highways and the drainage of the land proposed to be subdivided;
Contours shown at 0.25 metre intervals on Draft Plan

K) The municipal services available or to be available to the land proposed to be subdivided;
Development will be supplied with full sanitary and storm water sewer services.

L) The nature & extent of any restrictions affecting the land proposed to be subdivided, including restrictive covenants or easements. 1994, c. 23, s. 30; 1996, c. 4, s. 28 (3).;
As shown on Draft Plan.

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Website www.novatech-eng.com

PROJECT No. 122003

Dxx-xx-xx-xxxx

#xxxxx

APPENDIX B

TIA Screening Form

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City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**444 CitiGate Drive and 560 Dealership Drive**
Description of Location	**444 CitiGate Drive: South of Systemhouse Street, east of Highway 416, and west of the O'Keefe Drain** **560 Dealership Drive: south of Dealership Drive, east of Highway 416 and west of future CitiGate Drive/realigned McKenna Casey Drive**
Land Use Classification	**Industrial (warehouse)**
Development Size (units)	**Six industrial/warehouse buildings (four at 444 Citigate Drive, two at 560 Dealership Drive)**
Development Size (m^2)	**Total of 109,145m^2 (1,174,800ft^2)**
Number of Accesses and Locations	**Buildings will be served via the extension of CitiGate Drive.**
Phase of Development	**1**
Buildout Year	

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		X
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		X
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?		X

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C

Excerpts from Other Traffic Studies

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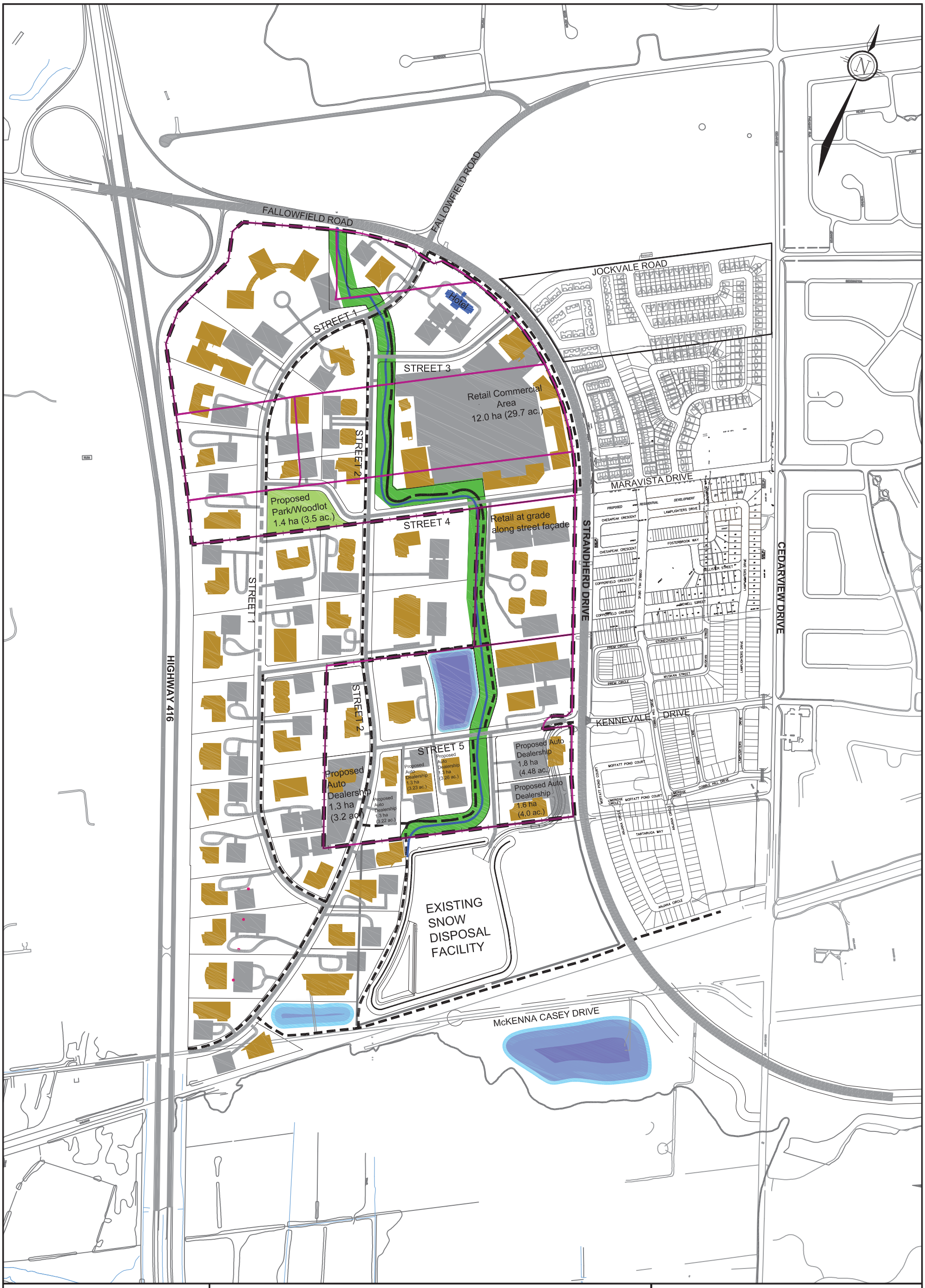

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HIGHWAY 416 EMPLOYMENT LANDS

CONCEPT PLAN

SCALE 1 : 8000

DATE NOV 2012 | JOB 109203 | FIGURE FIGURE # 2

SHT11X17.DWG - 279mmX432mm

M:\2009\109203\CAD\Design\Figures\Traffic\CONCEPT_PLAN.dwg, 11x17 portrait, Nov 06, 2012 - 3:59pm, bbyvelds

Table 5: Intersection Operations – 2029 Background Traffic

Intersection	AM Peak			PM Peak			Saturday Peak		
	max. v/c or delay	LOS	move-ment	max. v/c or delay	LOS	move-ment	max. v/c or delay	LOS	move-ment
Fallowfield/ 416 SB off-ramp	0.68	B	SBL	0.84	D	SBL	0.64	B	SBL
Fallowfield/ 416 NB off-ramp	0.52	A	EB	0.74	C	EB	0.37	A	EB
Fallowfield/ Strandherd	**1.02**	**F**	**WBT**	0.66	B	EBL			
Fallowfield/ Cedarview	0.65	B	EBT	0.71	C	SBT/R			
Strandherd/ Jockvale	0.76	C	WBR	0.55	A	SBT			
Strandherd/ Maravista	0.60	A	WBR	0.54	A	SBT			
Strandherd/ Kennevale	0.66	B	WBT/R	0.61	B	SBT			
Strandherd/ Cedarview	0.74	C	NBL	0.68	B	EBT/R			

Notes:
1. Reassignment of the previously recommended shared left/right turn lane to a second left turn lane and construction of a dedicated right turn assumed at the 416 SB off-ramp/Fallowfield Road intersection.
2. A channelized westbound right turn lane assumed at the Fallowfield Road/Strandherd Drive intersection.

Acceptable operating conditions are expected for all movements with the exception of the westbound approach of the Fallowfield Road/Strandherd Drive intersection in the a.m. peak.

The City defines the overall v/c ratio for an intersection as the sum of equivalent volumes for all critical movements divided by the sum of capacities for all critical movements, assuming the that v/c ratios for critical movements can be equalized. The eastbound left and westbound through movements are considered critical at the Fallowfield Road/Strandherd Drive intersection. The overall v/c for the intersection is 0.82 in the a.m. peak, which is an acceptable level of service based on the City's criteria and no mitigation measures are required.

3.8. Trip Generation

Trips generated by the proposed development have been estimated using the peak hour rates identified in the *ITE Trip Generation Manual, 8th Edition* for the following land uses and sizes:

Table 6: Proposed Land Uses and Sizes

Land Use	ITE Code	Interim	Ultimate
Shopping centre	820	350, 000 ft^2	350, 000 ft^2
Hotel	310	N/A	200 rooms
Gas Station	946	8 fuel positions	8 fuel positions

Land Use	ITE Code	Interim	Ultimate
Business Park	770	N/A	16.56 ha
Office Park	750	6.07 ha (15 ac)	67.65 ha
New Car Sales	841	8.6 ha	10.5 ha

Employment projections for the Business Park and Prestige Business Park lands were estimated using rates of 75 employees/ha and 110 employees/ha respectively. The employment projections were converted to gross floor area (GFA) using the following assumptions, which are based on figures identified in the City's 2009 *Development Charges Background Study*: a square foot per employee figure of 350 for commercial uses and 900 for industrial uses. The ITE Business Park land use represents an average mix of 20 to 30 percent office/commercial and 70 to 80 percent industrial/warehousing. A 30/70 mix was assumed for this study and the 350 ft^2 per employee figure was applied for the office/commercial component and the 900 ft^2 figure was applied for the industrial/warehousing component.

The existing woodlot comprises 6 hectares of the Prestige Business Park lands and 7.3 hectares of the Business Park lands. Half of the woodlot lands are assumed to be developed for the purpose of this assessment. Three hectares have been deducted from the Prestige Business Park land area and approximately 3.6 hectares have been deducted from the Business Park land area.

GFA for the Prestige Business Park is estimated at 2,488,500 ft^2 for the buildout condition and 233,800 ft^2 in the interim. GFA for the Business Park lands is estimated at 711,700 ft^2 at full buildout, with no Business Park development anticipated in the interim.

GFA for the car dealerships has been estimated assuming a 20% building coverage. This results in a GFA of 226,040 ft^2 at full buildout and 185,145 ft^2 in the interim, assuming seven hectares of land owned by Strandherd Drive Inc. and 4 acres of land owned by others.

The trip generation surveys compiled in the *ITE Trip Generation Manual* only record vehicle trips, and the sites surveyed are typically located in suburban locations in the United States where non-auto modes of transportation typically have a modal share of 10% or less. Where multiple modes of transportation are readily available, it is considered good practice to express projected trip generation volumes in terms of person trips, instead of vehicle trips. To convert ITE vehicle trip rates to person trip rates, two adjustment factors have been applied:

- Vehicle occupancy factor: **1.23** (taken from the TRANS 2005 O-D Survey Report)
- Non-auto usage factor: **1.1** (non-auto trips not counted in ITE surveys, assumed 10%)

Combining the two factors gives an overall vehicle trip to person trip adjustment factor of approximately 1.35. The conversion of vehicle trips into person trips for each land use is shown in the following table.

Table 7: Site-Generated Person Trips

Land Use	Size	AM Peak			PM Peak			Saturday Peak		
		In	Out	Total	In	Out	Total	In	Out	Total
Interim										
Shopping centre	350, 000 ft^2	289	184	473	975	1014	1989	1358	1254	2612
Gas Station	8 fuel pos.	48	47	95	57	55	112	81	81	162
Office Park	233,800 ft^2	535	66	601	72	442	514	33	12	45
New Car Sales	185,145 ft^2	376	132	508	253	395	648	379	364	743
Interim		**1248**	**429**	**1677**	**1357**	**1906**	**3263**	**1851**	**1711**	**3562**
Ultimate Concept										
Shopping centre	350, 000 ft^2	289	184	473	975	1014	1989	1358	1254	2612
Hotel	200 rooms	59	38	97	63	55	118	79	62	141
Gas Station	8 fuel pos.	48	47	95	57	55	112	81	81	162
Business Park	711,700 ft^2	1110	212	1322	285	954	1239	110	110	220
Office Park	2,488,500 ft^2	4246	525	4771	592	3636	4228	348	122	470
New Car Sales	226,040 ft^2	459	161	620	308	482	790	462	444	906
Ultimate Concept		**6211**	**1167**	**7378**	**2280**	**6196**	**8476**	**2438**	**2073**	**4511**

The number of car trips that the site will generate has been estimated by categorizing the person trips by modal share. The modal share assumptions used in this study are based on the BS CTS, which are as follows for the ultimate and interim development scenarios:

- Ultimate modal share: 23% transit, 2.5% cycling, 5% walking, and 69.5% auto
- Interim modal share: 15% transit, 2% cycling, 3% walking, and 80% auto

As noted in the BS CTS, these assumptions reflect a number of planned City improvements that will promote a higher transit modal share within the study area, including the following projects:

- Southwest Transitway Extension (Barrhaven Town Centre to Cambrian Road)
- Barrhaven-Riverside South Transitway, and
- Connection of the North-South LRT line to the Southwest Transitway.

Trips generated by the gas station and the hotel are assumed to be auto trips given the nature of the land use.

A breakdown of the projected number of trips by modal share is shown in the following table.

Table 8: Site-Generated Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak			Saturday Peak		
		In	Out	Total	In	Out	Total	In	Out	Total
Interim										
Total Person Trips		1248	429	1677	1357	1906	3263	1851	1711	3562
Auto Driver	**64%**	**816**	**291**	**1107**	**889**	**1240**	**2129**	**1214**	**1125**	**2339**
Auto Passenger	16%	192	61	253	208	296	504	283	261	544
Transit	15%	180	57	237	195	278	473	265	245	510
Non-Auto	5%	60	20	80	65	92	157	89	80	169
Ultimate Concept										
Total Person Trips		6211	1167	7378	2280	6196	8476	2438	2073	4511
Auto Driver	**56%**	**3563**	**704**	**4267**	**1330**	**3518**	**4848**	**1436**	**1224**	**2660**
Auto Passenger	13.5%	824	146	970	292	822	1113	308	261	568
Transit	23%	1404	249	1653	497	1400	1897	524	444	968
Non-Auto	7.5%	420	68	488	161	456	618	170	144	315

The *ITE Trip Generation Handbook* outlines a method for determining the number of internal trips generated at mixed-use developments. Internal trips are trips that are made on-site without using the external roadway system. The ITE Handbook provides internal capture rates for various combinations of office, retail and residential land uses. The number of internal trips is limited by the land use with the lower internal capture rate, which in this case is the retail component. Tables 7.1 and 7.2 of the ITE Handbook suggest that the internal capture rate of trips from a retail use to an office use and trips to a retail use from an office use is in the order of 2 to 3%. For the purpose of this assessment, the number of internal trips generated by the development is considered insignificant.

The ITE Handbook also outlines a method for determining the number of pass-by trips that are generated by certain types of developments. Pass-by trips are made as an intermediate stop on the way to another destination and primary trips are made for the specific purpose of visiting the site. The retail and gas station land uses are expected to generate both pass-by and primary trips. The pass-by trips are only added at the access points and not the study area intersections as they are already accounted for on the adjacent road system. The number of pass-by trips generated by the development has been estimated using percentages identified in the ITE Handbook. A rate of 30% has been assumed for the retail component of development and a rate of 60% has been assumed for the gas station.

Primary and pass-by trips generated by the proposed development are summarized in the following table for the weekday and Saturday peak hours.

Table 9: Pass-by and Primary Trips

Trip Type	AM Peak			PM Peak			Saturday Peak		
	In	Out	Total	In	Out	Total	In	Out	Total
Interim									
Total Vehicle Trips	**816**	**291**	**1107**	**889**	**1240**	**2129**	**1214**	**1125**	**2339**
Pass-by Trips	75	75	150	225	225	450	300	300	600
Primary Trips	741	216	957	664	1015	1679	914	825	1739
Ultimate Concept									
Total Vehicle Trips	**3563**	**704**	**4267**	**1330**	**3518**	**4848**	**1436**	**1224**	**2660**
Pass-by Trips	69	69	138	202	202	404	269	269	538
Primary Trips	3494	635	4129	1128	3316	4444	1167	955	2122

3.9. Vehicle Trip Distribution

The distribution of new vehicle trips generated by the development has been estimated based on the existing pattern of traffic entering the study area in the a.m. peak and leaving the study area in the p.m. peak. The trip distribution assumptions for the interim development scenario are summarized as follows.

- 10% to/from the north via Highway 416
- 20% to/from the east via Fallowfield Road and Jockvale Road
- 15% to/from the east via Maravista Drive, Kennevale Drive and Tartan Drive
- 20% to/from the east via Strandherd Drive
- 10% to/from the south via Cedarview Road and Highway 416
- 25% to/from the west via Fallowfield Road

For the ultimate development scenario, 5% of traffic has been redistributed from Fallowfield Road to the McKenna Casey Drive connection at the 416 underpass. This route may become an attractive alternative for site traffic in the event of congested traffic conditions on Strandherd Drive.

The distribution of trips generated by the hotel has been estimated based on the Average Annual Daily Traffic (AADT) of the arterial study area roads. The trip distribution assumptions for hotel trips are as follows:

- 30% to/from the north via Highway 416
- 10% to/from the east via Fallowfield Road
- 15% to/from the east via Strandherd Drive
- 25% to/from the south via Highway 416
- 20% to/from the west via Fallowfield Road

The distribution of pass-by trips generated by the retail and gas station components has been estimated based on the existing peak hour traffic patterns adjacent to the site.

Trips generated by the shopping centre have been assigned equally between the Street Three, Right-in Right-out driveway and Street Four accesses.

The hotel, the gas station and the interim Prestige Business Park area will all be located at the north end of the site near the Street One/Fallowfield Road/Strandherd Drive access. Trips generated by these uses have been assigned as follows:

- Trips to/from the north or west will use the Street One access
- Trips to/from the south will use the Street Three access
- Trips to/from the east will use Fallowfield Road or Jockvale Road

The trip assignment for the ultimate Business Park and Prestige Business Park areas is based on the site layout, the proposed road pattern, and logical routing assumptions. Trips with origins and destinations north or south of the subject site have been assigned as follows:

- 40% of trips will use Street One or Street Three
- 35% of trips will use Street Four
- 25% of trips will use Street Five

Trips to and from the east via Fallowfield Road, Jockvale Road, Maravista Drive, and Kennevale Drive have been assigned according to the trip distribution assumptions noted above.

Trips generated by the car dealerships have been assigned to the Street Five access.

Interim and ultimate site traffic is shown in **Figures 9** and **10** for the weekday and Saturday peak hours.

Total traffic for the 2019 and 2029 horizon years has been calculated by adding the peak hour site traffic with the projected background traffic. The 2019 and 2029 total traffic volumes are shown in **Figures 11** and **12**.

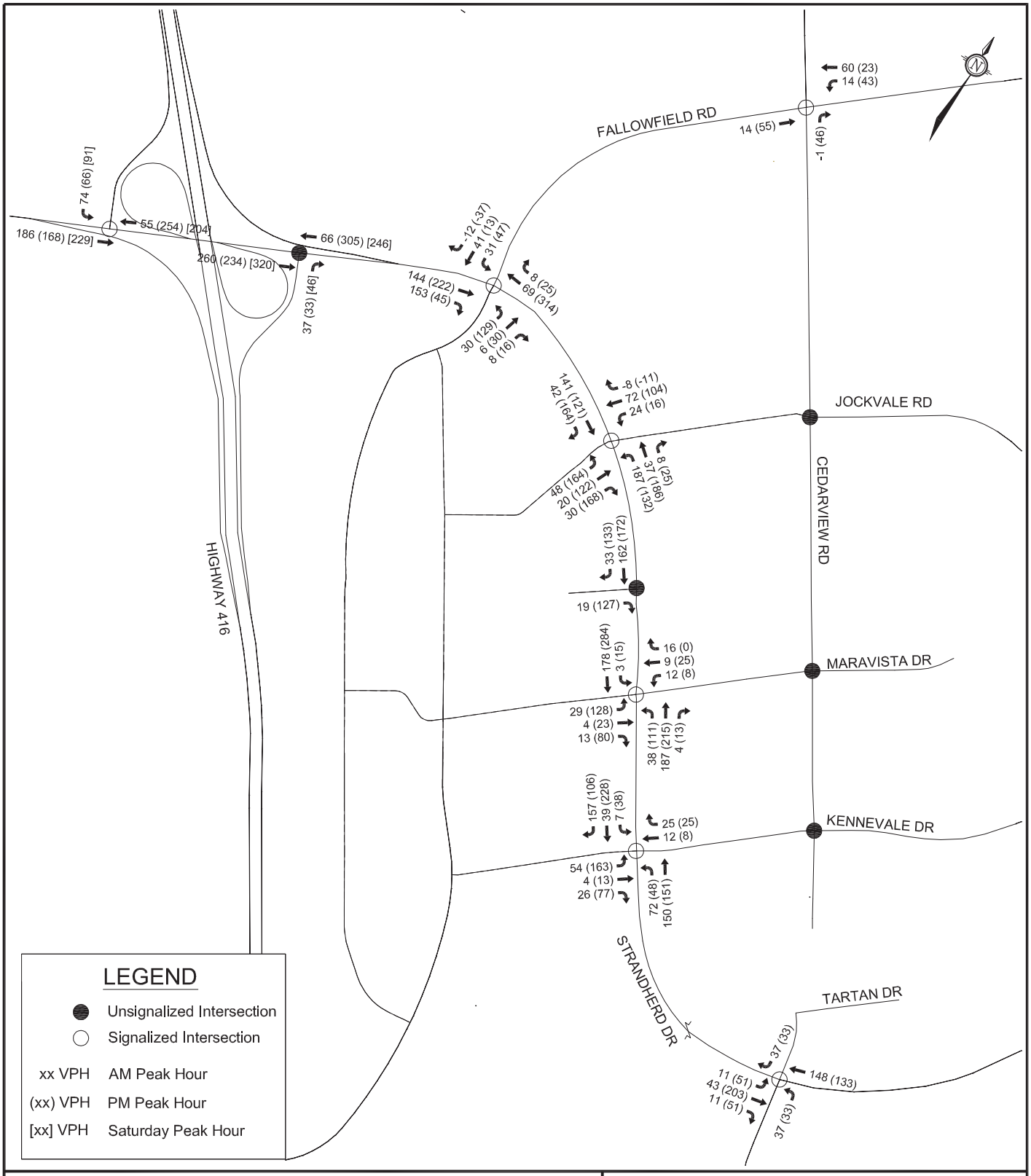
3.10. Transit Trip Distribution

The distribution of transit trips generated by the interim development has been derived from the data presented in Exhibits 6-2 and 6-3 of the *2005 Trans O-D Survey Report.* Copies of these exhibits are included in **Appendix G**.

The top origins and destinations for all arrivals and departures within the South Nepean District are summarized in Table 10.

Table 10: Top Origins/Destinations of South Nepean District

AM Peak Origin of Arrivals	% Trips	PM Peak Destination of Departures	% Trips
South Nepean	65%	South Nepean	55%
Merivale	6%	Merivale	12%



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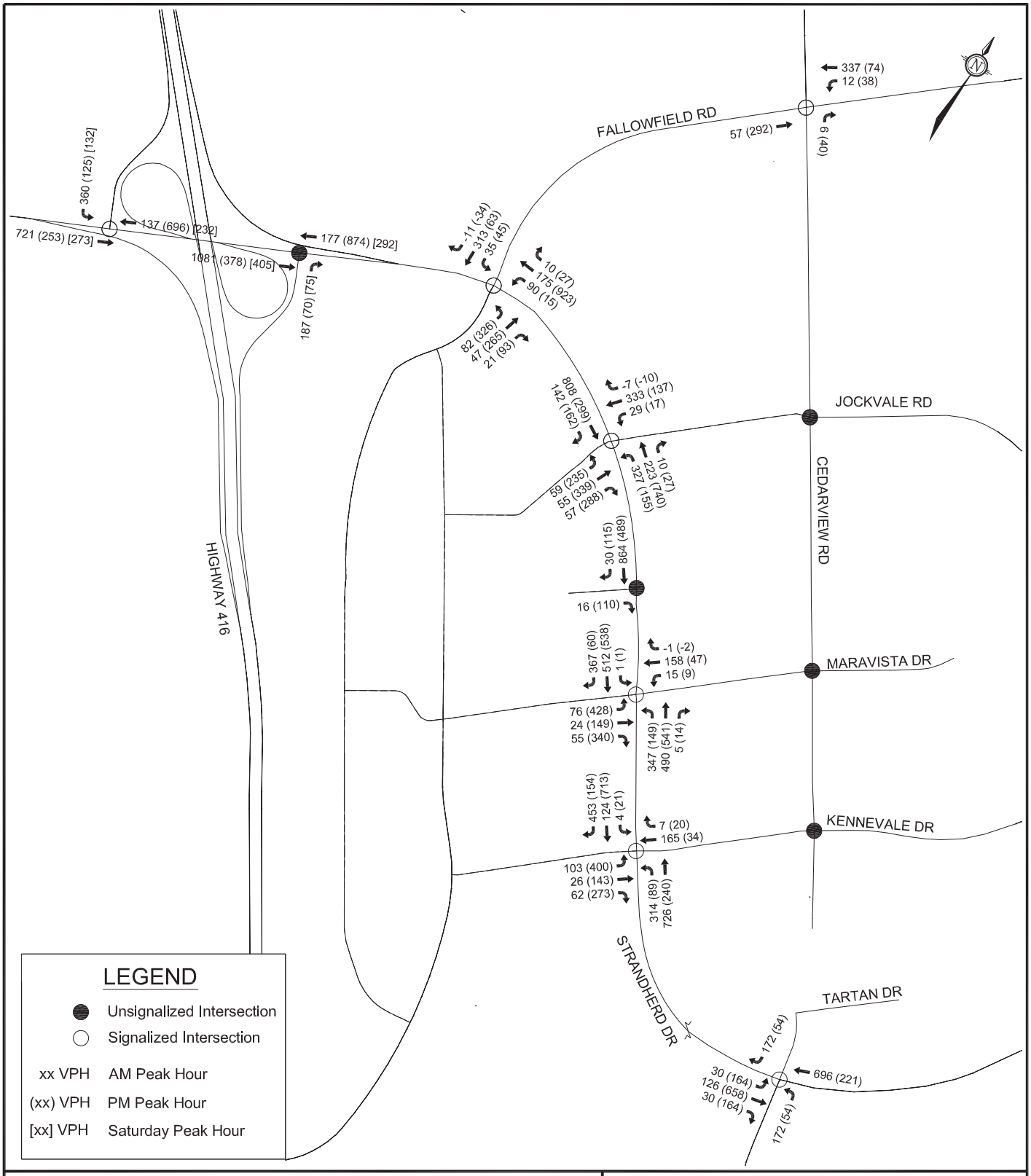
HIGHWAY 416 EMPLOYMENT LANDS

INTERIM SITE TRAFFIC

NOV 2012 109203 FIGURE # 9



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HIGHWAY 416 EMPLOYMENT LANDS

ULTIMATE SITE TRAFFIC

NOV 2012 109203 FIGURE # 10

Module	Element	Exemption Criteria	Exemption Applies
Network Impact Component			
4.5 Transportation Demand Management	*All elements*	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Exempt
4.6 Neighbourhood Traffic Management	*4.6.1* Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept	*All elements*	• Only required when the proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

The proposed parking meets the requirements of the Zoning By-law. As such, a review of spillover parking is not required for the TIA.

The proposed development is not expected to have more than 60 employees on location at any given time. As such, it is proposed to be exempt from Module 4.5 – Transportation Demand Management. As the CitiGate campus further develops, this module should be assessed for future applications.

The traffic count at the Strandherd Drive/CitiGate Drive/Fallowfield Road intersection suggests a two-way total of approximately 34 vehicles use CitiGate Drive during the AM peak hour, approximately 67 during the PM peak hour, and approximately 63 during the Saturday peak hour. The TIA guidelines suggest a threshold of 300 vehicles during the peak hour for a collector roadway. The weekday AM peak directional traffic volume along CitiGate Drive is approximately 20 vehicles (southbound), the weekday PM peak directional traffic volume along CitiGate Drive is approximately 36 vehicles (southbound), and the Saturday peak directional traffic volumes along CitiGate Drive is approximately 50 vehicles (southbound). The lane capacity along CitiGate Drive is estimated at 400 vehicles per hour per lane based on the City's TRANS Long Range Transportation Model. Based on the foregoing, the Neighbourhood Traffic Management is proposed to be exempt from the required analysis in the TIA.

5.0 FORECASTING

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development, consisting of a 5 storey hotel, will provide 99 rooms and 5,409.2 square metres of gross floor area. Trips generated by the proposed development were calculated

using land use code 310 for a Hotel in the ITE *Trip Generation Manual*, 10th Edition. Person trips were calculated using an ITE Trip to Person Trip factor of 1.28, consistent with the TIA Guidelines. The Person Trips generated by the proposed development are summarized in **Table 3**.

Table 3: Person Trip Generation (using the ITE Trip Generation Manual)

Land Use	ITE Code	Units/ GFA	AM Peak (PPH)			PM Peak (PPH)			Sat (PPH)		
			IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Proposed Development											
Hotel	310	99 Rooms	34	23	57	32	30	62	51	40	91

The modal shares for the proposed development are anticipated to be consistent with the modal shares outlined in the 2011 *Trans O-D Survey Report*, for the South Nepean area. The modal share values applied to the trips generated by the proposed development are based on all trips to/from the South Nepean district with an origin or destination beyond that area. As discussed below, adjustments have been made to the Auto Driver Mode and Transit Mode shares to better represent the mode shares for the proposed development.

There are no transit service improvements in the vicinity of the subject site that are planned within the horizon year of this study. Given the distance from express, city-wide transit service providing connections to the city's regional travel hubs, there may be a decreased likelihood that guests of the proposed hotel will travel by public transportation. Therefore, the Transit Mode share has been reduced substantially from 25% to 5%. The difference in mode shares from the reduction in Transit Mode was added to the Auto Driver Mode. This assumption is considered conservative.

A full breakdown of the projected person trips by modal share are shown in **Table 4**.

Table 4: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak			Saturday		
		IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Proposed Development										
Hotel Person Trips		*34*	*23*	*57*	*32*	*30*	*62*	*51*	*40*	*91*
Auto Driver	85%	**29**	**20**	**48**	**27**	**26**	**53**	**43**	**34**	**77**
Auto Passenger	10%	3	2	6	3	3	6	5	4	9
Transit	5%	2	1	3	2	1	3	3	2	5
Non-Auto	0%	0	0	0	0	0	0	0	0	0

From the previous table, the proposed development is projected to generate an additional 48 vehicle trips during the AM peak hour, 53 vehicle trips during the PM peak hour and 77 vehicle trips during the Saturday peak.

5.1.2 Trip Distribution

The distribution of trips generated by the hotel has been estimated based on the AADT along the study area roadways, consistent with the 2012 CitiGate CTS. The trip distribution for the proposed development is as follows:

- 30% to/from the north via Highway 416
- 10% to/from the east via Fallowfield Road
- 15% to/from the east via Strandherd Drive
- 25% to/from the south via Highway 416
- 20% to/from the west via Fallowfield Road

All trips coming from the north or south via Highway 416, and from the east or west via Fallowfield Road have been assigned to CitiGate Drive at the Strandherd Drive/CitiGate Drive/Fallowfield Road intersection. Of the 15% of the trips from the east via Strandherd Drive, 5% have been assumed to turn left onto CrossKeys Place at the Strandherd Drive/CrossKeys Place/Hélène Campbell Road intersection and use the roundabout at CrossKeys Place/CitiGate Drive, and 10% have been assigned to the left turning movement onto CitiGate Drive at the Strandherd Drive/CitiGate Drive/Fallowfield Road intersection.

Site generated traffic volumes are shown in **Figure 4**.

5.2 Background Traffic

5.2.1 General Background Growth Rate

A review of other recent transportation studies in the vicinity of the subject site was conducted in order to establish a base background growth rate.

The CitiGate CTS completed by Novatech in 2012 assumed a background growth rate of 1% as a significant portion of adjacent development traffic was accounted for separately. This approach was consistent with the 4401 Fallowfield Road CTS published by IBI Group in 2015, and the CitiGate Retail Development TIS published by Parsons in 2015.

A 1% background growth factor is assumed for the purpose of this report, in light of the other study area developments that have been accounted for separately. This approach is consistent with other recent transportation studies in the area.

The 1% growth rate was applied to Strandherd Drive, Fallowfield Road, and the Highway 416 ramps. It was not applied to Hélène Campbell Road as the background growth rate is intended to account for growth in regional traffic which is not anticipated on lower class roads. The background growth rate was not applied to CitiGate Drive and CrossKeys Place, as growth on these roads is highly development-driven and has been accounted for separately.

Background growth within the study area for the 2020 build-out and 2025 horizon years is shown in **Figures 5** and **6**.

Figure 4: Site Generated Traffic Volumes

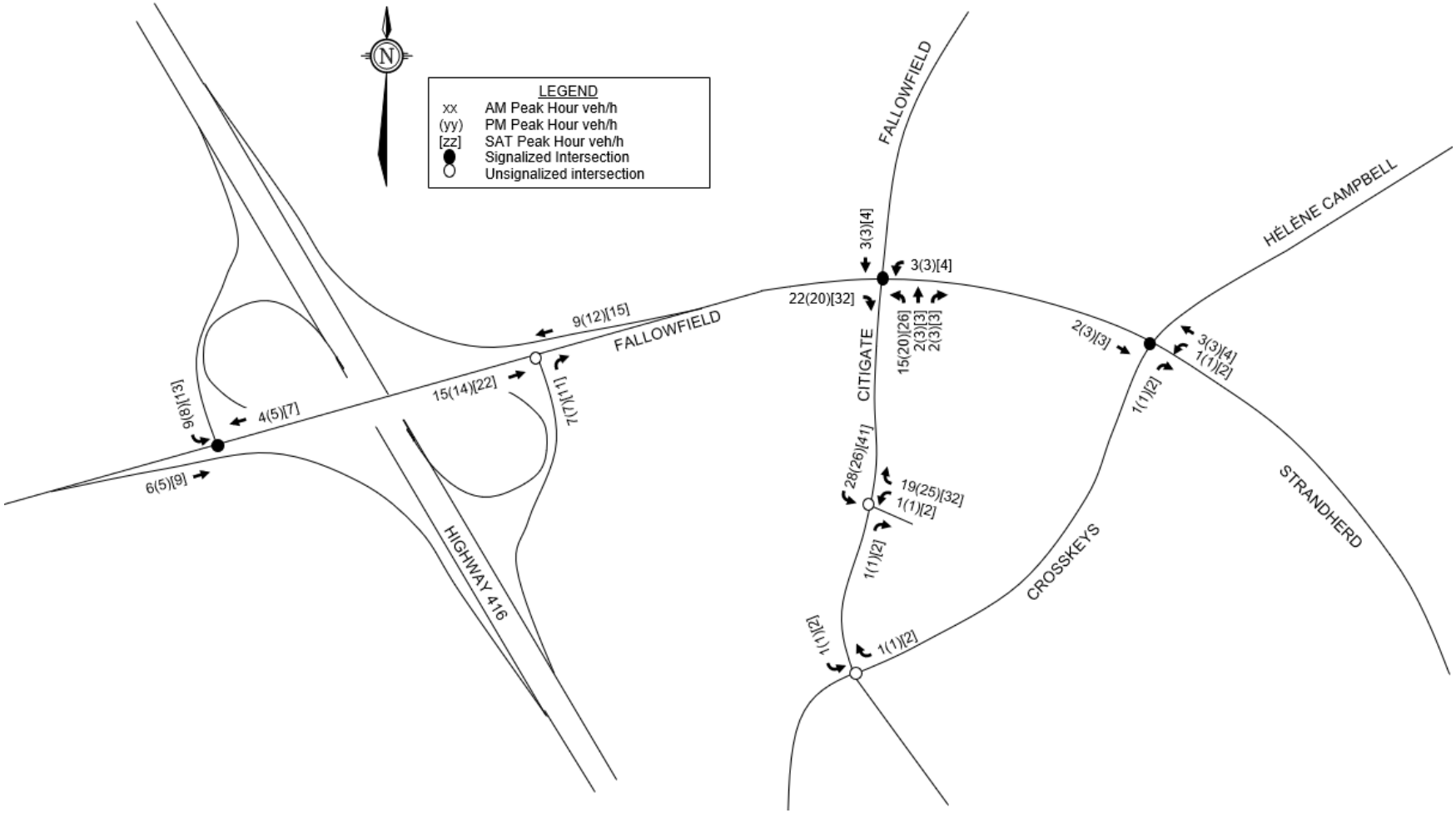


Table 3: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Applies
Design Review Component			
4.1 Development Design	*4.1.2* Circulation and Access	• Only required for site plans	Not Exempt
	4.1.3 New Street Networks	• Only required for plans of subdivision	Exempt
4.2 Parking	*4.2.1* Parking Supply	• Only required for site plans	Not Exempt
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	*All elements*	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Not Exempt
4.6 Neighbourhood Traffic Management	*4.6.1* Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Not Exempt
4.8 Network Concept	*All elements*	• Only required when the proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

5.0 FORECASTING

5.1 Development-Generated Traffic

5.1.1 Trip Generation

This site is expected to operate with two shifts with approximately 750 employees on site during each shift during the off-peak season and approximately 1040 employees on site during each shift during the peak season. The peak season for this site is anticipated to occur from October to January, and the off-peak season from February to September. For the purpose of this report, the total traffic analysis will include the site traffic for the peak season.

Person trip generation for the proposed development, consisting of a new prestige office and light industrial building with approximately 2,728,000 square feet of GFA, was determined using first principles. The owner provided typical hourly volumes for both employees and truck movements to and from a building of this size and nature. Shift arrivals and departures are spread over a two-hour period. The peak hour for the site generated traffic occurs between 6:00AM to 7:00AM and 5:30PM to 6:30PM. Person Trips generated by the proposed development are summarized in **Table 4**.

Table 4: Person Trip Generation

Land Use	AM Peak (PPH)			PM Peak (PPH)		
	IN	OUT	TOT	IN	OUT	TOT
Proposed Site (Employees)	508	527	1035	669	681	1350
Proposed Site (Heavy Vehicles)	11	11	22	10	10	20
Proposed Site (Total)	**519**	**538**	**1057**	**679**	**691**	**1370**

The proposed site is expected to generate approximately 24-35 trucks per hour (two-way) between 6:00AM to 8:00PM during the peak season. Truck volume is expected to reach a high of 30-46 two-way trucks per hour between 8:00PM to 3:00AM and drop to approximately 16-21 two-way trucks per hour between 3:00 AM to 6:00 AM.

The ultimate CitiGate Business Park development considered in the 2012 CTS includes the subject site. The traffic generated by the subject site was estimated using the Office Park land use and assuming 110 employees per hectare and 350 square foot per employee. This resulted in 2012 total person trips (1791 in, 221 out) in the AM peak, and 1772 total person trips (248 in, 1524 out) in the PM peak hour. A comparison of person trip generation between the assumed 2012 CTS concept and the proposed development can be found in **Table 5**. Note that negative values indicate that estimated trip generation from the 2012 CTS is higher than the proposed site.

Table 5: Comparison of Person Trips - 2012 CTS vs Proposed Development

Land Use	AM Peak (PPH)			PM Peak (PPH)		
	IN	OUT	TOT	IN	OUT	TOT
2012 CTS – Block 13 Trips	1791	221	2012	248	1524	1772
Proposed Development	519	538	1057	679	691	1370
Difference	**-1272**	**317**	**-955**	**431**	**-833**	**-402**

As indicated in the previous table, the proposed development is anticipated to generate less overall person trips than the CTS concept, however the person trip estimate is higher for trips exiting the site during the AM peak and trips entering the site during the PM peak hour. This is a result of day and night shifts that were not anticipated as part of the 2012 CTS.

The modal shares from the 2012 CTS have been applied to the employee portion of site generated person trips. This modal share is similar to travel data from the City of Ottawa's 2011 TRANS O-

D Survey which indicates that 45-55% of persons trips in the South Nepean area were driver trips. A full breakdown of the projected person trips by modal share are shown in **Table 6**.

Table 6: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
Employees							
Person Trips		508	527	1035	669	681	1350
Auto Driver	56%	284	295	579	375	381	756
Auto Passenger	13.5%	69	71	140	90	92	182
Transit	23%	117	121	238	154	157	311
Non-Auto	7.5%	38	40	78	50	51	101
Heavy Vehicles							
Person Trips		11	11	22	10	10	20
Heavy Vehicles	100%	11	11	22	10	10	20

From the previous table, the proposed development is projected to generate 579 auto vehicle trips during the AM peak hour and 756 auto vehicle trips during the PM peak hour.

5.1.2 Trip Distribution

The trip distribution for the employees is based off population centres within a 50km radius and logical routing assumptions. Working population was tallied for all TRANS O-D Survey districts in the National Capital Region as well as the surrounding communities of Arnprior, Mississippi Mills, Carleton Place, Beckwith, Montague, Smiths Falls, Merrickville-Wolford, North Grenville, North Dundas, and Russell.

The employee trip distribution for the proposed development is as follows:

- 55% to/from the north via Highway 416
- 17% to/from the east via Fallowfield Road
- 5% to/from the south and east via Strandherd Drive
- 10% to/from the south via Highway 416
- 10% to/from the west via Fallowfield Road
- 3% to/from the east via Hélène Campbell Road, Maravista Drive, and Kennevale Drive

Of the trips arriving from or departing to the north and south via Highway 416 or the west via Fallowfield Road, 55% have been assigned to CitiGate Drive, 12% to CrossKeys Place, and 33% to Systemhouse Street. This has been assumed in light of the site's parking configuration and proximity to the nearby streets. Of the trips arriving from the east via Fallowfield Road, half have been assigned to CitiGate Drive and half to CrossKeys Place. This is assumed in light of the fully protected southbound left turn phase and the likelihood of motorists to choose the advanced left if they arrive while the light is red for that approach. All trips departing to the east via Fallowfield Road have been assigned to CitiGate Drive. All trips arriving from or departing to the east via

Hélène Campbell Road have been assigned to CrossKeys Place. All trips arriving from and departing to the south and east via Strandherd Drive, Maravista Drive or Kennevale Drive have been assigned to Systemhouse Street.

All heavy vehicles accessing the site will use Fallowfield Road to access Highway 416. It is anticipated that 50% of heavy vehicles will travel to/from the north towards Highway 417 with the balance, 50% travelling to/from the south towards Highway 401.

Of the employee trips assigned to CitiGate Drive north of the roundabout, one third will access the site via the northerly CrossKeys Drive entrance, one third will access the site via the southerly CrossKeys Drive entrance, and one third will access the site via the northerly CitiGate Drive entrance. Of the employee trips assigned to CrossKeys Drive east of the roundabout, half have been assigned to the southerly CrossKeys Drive entrance and half to the northerly CitiGate Drive entrance. Of the employee trips assigned to Systemhouse Street, half have been assigned to the northerly CitiGate Drive extension entrance, and half have been assigned to the southerly CitiGate Drive extension entrance. Half of the trucks have been assigned to the northerly truck access on CrossKeys Place and half to the southerly CitiGate Drive extension access.

Site generated traffic volumes are shown in **Figure 5**.

5.2 Background Traffic

5.2.1 General Background Growth Rate

A review of other recent transportation studies in the vicinity of the subject site was conducted in order to establish a base background growth rate.

The CitiGate CTS completed by Novatech in 2012 assumed a background growth rate of 1% as a significant portion of adjacent development traffic was accounted for separately. This approach was consistent with the 4401 Fallowfield Road CTS published by IBI Group in 2015, the CitiGate Retail Development TIS published by Parsons in 2015, and the CitiGate Hotel TIA by Novatech in 2018.

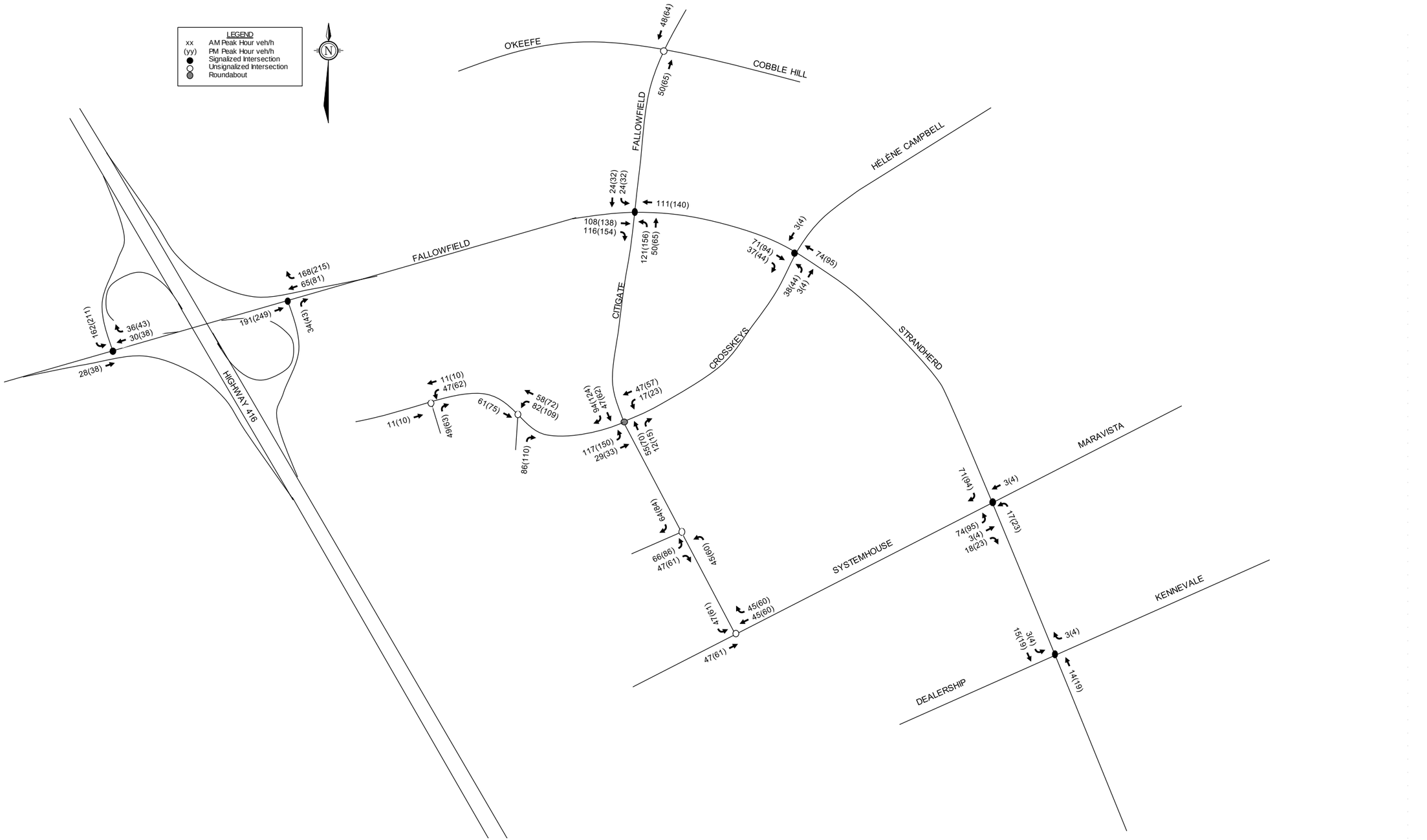
The CitiGate Block 4 TIA completed by Novatech in 2019 and revised in February 2020 assumed a background growth rate of 2% along Strandherd Drive, as requested by the City.

A 1% background growth factor is assumed for the Highway 416 ramps, as discussed with the Ministry of Transportation (MTO). A 2% background growth factor is assumed for Strandherd Drive and Fallowfield Road. Other study area developments will be accounted for separately.

No growth rate was applied to Hélène Campbell Road, Cobble Hill Drive, O'Keefe Court, Maravista Drive, or Kennevale Drive as the background growth rate is intended to account for growth in regional traffic which is not anticipated on lower class roads. The background growth rate was not applied to CitiGate Drive, CrossKeys Place, Systemhouse Street, or Dealership Drive, as growth on these roads is highly development-driven and has been accounted for separately.

Background growth within the study area for the 2021 build-out, 2026 and 2031 horizon years is shown in **Figures 6**, **7** and **8**.

Figure 5: Site Generated Traffic Volumes



APPENDIX D

Traffic Signalization Warrants

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NOVATECH
Engineers, Planners & Landscape Architects

TRAFFIC SIGNAL JUSTIFICATION
USING PROJECTED VOLUMES

LOCATION: Citigate **at** Systemhouse

YEAR: Ultimate

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % (2)
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	720 900 (2 or more lane approach	1080 1350 (2 or more lane approach	500	46%	46%
	B. Vehicle volume along minor street (average hour)	180 270 (tee intersection)	255 383 (tee intersection)	188	74%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	720 900 (2 or more lane approach)	1080 1350 (2 or more lane approach	312	29%	29%
	B (1). Combined vehicle and pedestrian volume crossing the major street (average hour)	75	113	100	88%	

NOTES

4) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
5) The lowest sectional percentage governs the entire Justification.
6) Average hourly volumes estimated from peak hour volumes, AHV = PM / 2 or AHV = (AM + PM) / 4.

Engineers, Planners & Landscape Architects

TRAFFIC SIGNAL JUSTIFICATION
USING PROJECTED VOLUMES

LOCATION: Citigate **at** Dealership

YEAR: Ultimate

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % (2)
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	720 900 (2 or more lane approach	1080 1350 (2 or more lane approach	648	60%	45%
	B. Vehicle volume along minor street (average hour)	180 270 (tee intersection)	255 383 (tee intersection)	172	45%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	720 900 (2 or more lane approach)	1080 1350 (2 or more lane approach	476	44%	44%
	B (1). Combined vehicle and pedestrian volume crossing the major street (average hour)	75	113	133	118%	

NOTES

4) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
5) The lowest sectional percentage governs the entire Justification.
6) Average hourly volumes estimated from peak hour volumes, AHV = PM / 2 or AHV = (AM + PM) / 4.

APPENDIX E

Synchro/Rodel Reports

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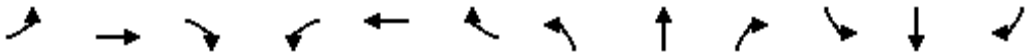
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	47	0	104	45	45	0	23	14	47	164	0
Future Volume (Veh/h)	0	47	0	104	45	45	0	23	14	47	164	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	47	0	104	45	45	0	23	14	47	164	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	356	295	164	312	288	30	164			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	356	295	164	312	288	30	164			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	92	100	82	93	96	100			97		
cM capacity (veh/h)	529	598	881	589	603	1044	1414			1574		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	47	194	37	211
Volume Left	0	104	0	47
Volume Right	0	45	14	0
cSH	598	659	1414	1574
Volume to Capacity	0.08	0.29	0.00	0.03
Queue Length 95th (m)	1.8	8.6	0.0	0.6
Control Delay (s)	11.5	12.7	0.0	1.8
Lane LOS	B	B		A
Approach Delay (s)	11.5	12.7	0.0	1.8
Approach LOS	B	B		

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	43.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	61	0	15	60	60	0	141	89	61	23	0
Future Volume (Veh/h)	0	61	0	15	60	60	0	141	89	61	23	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	0	15	60	60	0	141	89	61	23	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	420	375	23	361	330	186	23			230		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	420	375	23	361	330	186	23			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	89	100	97	89	93	100			95		
cM capacity (veh/h)	448	531	1054	524	562	857	1592			1338		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	135	230	84
Volume Left	0	15	0	61
Volume Right	0	60	89	0
cSH	531	657	1592	1338
Volume to Capacity	0.11	0.21	0.00	0.05
Queue Length 95th (m)	2.7	5.4	0.0	1.0
Control Delay (s)	12.7	11.9	0.0	5.8
Lane LOS	B	B		A
Approach Delay (s)	12.7	11.9	0.0	5.8
Approach LOS	B	B		

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	43.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	47	15	334	45	45	14	48	49	47	340	0
Future Volume (Veh/h)	0	47	15	334	45	45	14	48	49	47	340	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	47	15	334	45	45	14	48	49	47	340	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	602	559	340	573	534	72	340			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	602	559	340	573	534	72	340			97		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	89	98	10	90	95	99			97		
cM capacity (veh/h)	350	419	702	373	433	990	1219			1496		

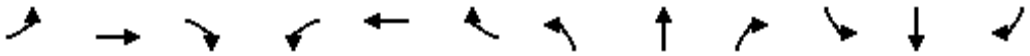
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	62	424	111	387
Volume Left	0	334	14	47
Volume Right	15	45	49	0
cSH	464	405	1219	1496
Volume to Capacity	0.13	1.05	0.01	0.03
Queue Length 95th (m)	3.2	96.8	0.2	0.7
Control Delay (s)	13.9	89.6	1.1	1.2
Lane LOS	B	F	A	A
Approach Delay (s)	13.9	89.6	1.1	1.2
Approach LOS	B	F		

Intersection Summary				
Average Delay	40.1			
Intersection Capacity Utilization	66.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	61	19	64	60	60	19	305	303	61	62	0
Future Volume (Veh/h)	0	61	19	64	60	60	19	305	303	61	62	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	19	64	60	60	19	305	303	61	62	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	768	830	62	728	678	456	62			608		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	768	830	62	728	678	456	62			608		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	78	98	76	83	90	99			94		
cM capacity (veh/h)	235	283	1003	262	346	604	1541			970		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	80	184	627	123
Volume Left	0	64	19	61
Volume Right	19	60	303	0
cSH	341	356	1541	970
Volume to Capacity	0.23	0.52	0.01	0.06
Queue Length 95th (m)	6.3	19.9	0.3	1.4
Control Delay (s)	18.8	25.4	0.4	4.7
Lane LOS	C	D	A	A
Approach Delay (s)	18.8	25.4	0.4	4.7
Approach LOS	C	D		

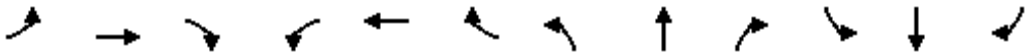
Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	63.5%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	47	15	334	45	45	14	48	49	47	340	0
Future Volume (vph)	0	47	15	334	45	45	14	48	49	47	340	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	47	15	334	45	45	14	48	49	47	340	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	62	424	111	387
Volume Left (vph)	0	334	14	47
Volume Right (vph)	15	45	49	0
Hadj (s)	-0.11	0.13	-0.21	0.06
Departure Headway (s)	6.1	5.6	5.8	5.6
Degree Utilization, x	0.10	0.66	0.18	0.60
Capacity (veh/h)	498	616	537	611
Control Delay (s)	9.8	18.7	10.1	16.7
Approach Delay (s)	9.8	18.7	10.1	16.7
Approach LOS	A	C	B	C

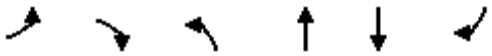
Intersection Summary				
Delay	16.4			
Level of Service	C			
Intersection Capacity Utilization	66.5%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	61	19	64	60	60	19	305	303	61	62	0
Future Volume (vph)	0	61	19	64	60	60	19	305	303	61	62	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	19	64	60	60	19	305	303	61	62	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	80	184	627	123
Volume Left (vph)	0	64	19	61
Volume Right (vph)	19	60	303	0
Hadj (s)	-0.11	-0.09	-0.25	0.13
Departure Headway (s)	6.0	5.8	4.7	5.7
Degree Utilization, x	0.13	0.30	0.81	0.19
Capacity (veh/h)	536	567	758	583
Control Delay (s)	10.0	11.3	24.4	10.1
Approach Delay (s)	10.0	11.3	24.4	10.1
Approach LOS	A	B	C	B

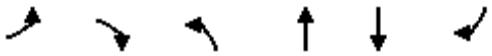
Intersection Summary				
Delay	19.1			
Level of Service	C			
Intersection Capacity Utilization	63.5%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	6	46	132	18	95
Future Volume (Veh/h)	13	6	46	132	18	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	6	46	132	18	95
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	290	66	113			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	66	113			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	97			
cM capacity (veh/h)	679	998	1476			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	178	113
Volume Left	13	46	0
Volume Right	6	0	95
cSH	756	1476	1700
Volume to Capacity	0.03	0.03	0.07
Queue Length 95th (m)	0.5	0.7	0.0
Control Delay (s)	9.9	2.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.9	2.1	0.0
Approach LOS	A		

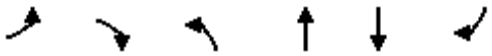
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	82	39	7	19	114	14
Future Volume (Veh/h)	82	39	7	19	114	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	82	39	7	19	114	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	154	121	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	154	121	128			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	96	100			
cM capacity (veh/h)	834	930	1458			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	121	26	128
Volume Left	82	7	0
Volume Right	39	0	14
cSH	862	1458	1700
Volume to Capacity	0.14	0.00	0.08
Queue Length 95th (m)	3.4	0.1	0.0
Control Delay (s)	9.9	2.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.9	2.0	0.0
Approach LOS	A		

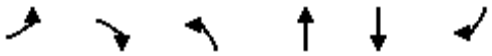
Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	139	339	136	21	516
Future Volume (Veh/h)	113	139	339	136	21	516
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	113	139	339	136	21	516
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1093	279	537			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1093	279	537			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	29	82	67			
cM capacity (veh/h)	159	760	1031			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	252	475	537
Volume Left	113	339	0
Volume Right	139	0	516
cSH	282	1031	1700
Volume to Capacity	0.89	0.33	0.32
Queue Length 95th (m)	56.1	10.1	0.0
Control Delay (s)	69.2	8.3	0.0
Lane LOS	F	A	
Approach Delay (s)	69.2	8.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.9		
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	521	339	193	21	118	136
Future Volume (Veh/h)	521	339	193	21	118	136
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	521	339	193	21	118	136
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	593	186	254			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	593	186	254			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	60	85			
cM capacity (veh/h)	399	856	1311			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	860	214	254
Volume Left	521	193	0
Volume Right	339	0	136
cSH	506	1311	1700
Volume to Capacity	1.70	0.15	0.15
Queue Length 95th (m)	354.6	3.6	0.0
Control Delay (s)	343.8	7.5	0.0
Lane LOS	F	A	
Approach Delay (s)	343.8	7.5	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	223.9		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	339	136	113	139	21	516
Future Volume (vph)	339	136	113	139	21	516
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	339	136	113	139	21	516

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	475	252	537
Volume Left (vph)	339	0	21
Volume Right (vph)	136	139	0
Hadj (s)	0.00	-0.30	0.04
Departure Headway (s)	6.2	6.3	6.1
Degree Utilization, x	0.82	0.44	0.91
Capacity (veh/h)	562	538	576
Control Delay (s)	31.6	14.1	41.8
Approach Delay (s)	31.6	14.1	41.8
Approach LOS	D	B	E

Intersection Summary			
Delay	32.5		
Level of Service	D		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	182	17	530	285	90	147
Future Volume (vph)	182	17	530	285	90	147
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	182	17	530	285	90	147

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	199	815	237
Volume Left (vph)	182	0	90
Volume Right (vph)	17	285	0
Hadj (s)	0.17	-0.18	0.11
Departure Headway (s)	6.4	4.8	5.6
Degree Utilization, x	0.35	1.08	0.37
Capacity (veh/h)	547	756	625
Control Delay (s)	12.8	77.9	11.9
Approach Delay (s)	12.8	77.9	11.9
Approach LOS	B	F	B

Intersection Summary			
Delay	55.0		
Level of Service	F		
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/CrossKeys - Buildout Yr	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	CrossKeys/Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	CrossKeys WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	CrossKeys/Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	CrossKeys WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	49	129	94	0	5.0	1.00	1.000
2	CrossKeys/Amazon EB	0	117	29	0	0	5.0	1.00	1.000
3	CitiGate NB	0	0	66	23	0	5.0	1.00	1.000
4	CrossKeys WB	0	99	47	29	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 AM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 2 - CrossKeys/Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 4 - CrossKeys WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	272		146		212	1235		0.2202	
2	CrossKeys/Amazon EB	None	146		277		141	1156		0.1263	
3	CitiGate NB	None	89		195		228	1206		0.0738	
4	CrossKeys WB	None	175		183		101	1213		0.1443	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.50		3.50	0.70		A		A
2	CrossKeys/Amazon EB	None	3.36		3.36	0.36		A		A
3	CitiGate NB	None	3.05		3.05	0.20		A		A
4	CrossKeys WB	None	3.27		3.27	0.42		A		A

2031 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	272		146		212	1235		0.2202	
2	CrossKeys/Amazon EB	None	146		277		141	1156		0.1263	
3	CitiGate NB	None	89		195		228	1206		0.0738	
4	CrossKeys WB	None	175		183		101	1213		0.1443	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.51		3.51	0.70		A		A
2	CrossKeys/Amazon EB	None	3.37		3.37	0.36		A		A
3	CitiGate NB	None	3.06		3.06	0.20		A		A
4	CrossKeys WB	None	3.27		3.27	0.42		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/CrossKeys - Buildout Yr	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	CrossKeys/Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	CrossKeys WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	CrossKeys/Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	CrossKeys WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	94	74	124	0	5.0	1.00	1.000
2	CrossKeys/Amazon EB	0	150	33	0	0	5.0	1.00	1.000
3	CitiGate NB	0	0	141	86	0	5.0	1.00	1.000
4	CrossKeys WB	0	35	57	32	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 PM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 2 - CrossKeys/Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 4 - CrossKeys WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	292		92		323	1456		0.2006	
2	CrossKeys/Amazon EB	None	183		203		181	1389		0.1318	
3	CitiGate NB	None	227		277		109	1344		0.1689	
4	CrossKeys WB	None	124		291		213	1336		0.0928	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	2.91		2.91	0.62		A		A
2	CrossKeys/Amazon EB	None	2.82		2.82	0.38		A		A
3	CitiGate NB	None	3.03		3.03	0.50		A		A
4	CrossKeys WB	None	2.81		2.81	0.26		A		A

2031 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	292		92		323	1456		0.2006	
2	CrossKeys/Amazon EB	None	183		203		181	1389		0.1318	
3	CitiGate NB	None	227		277		109	1344		0.1689	
4	CrossKeys WB	None	124		291		213	1336		0.0928	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	2.91		2.91	0.62		A		A
2	CrossKeys/Amazon EB	None	2.82		2.82	0.38		A		A
3	CitiGate NB	None	3.04		3.04	0.50		A		A
4	CrossKeys WB	None	2.81		2.81	0.26		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/CrossKeys - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	CrossKeys/Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	CrossKeys WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	CrossKeys/Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	CrossKeys WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	49	205	85	0	5.0	1.00	1.000
2	CrossKeys/Amazon EB	0	103	29	0	0	5.0	1.00	1.000
3	CitiGate NB	0	0	79	37	0	5.0	1.00	1.000
4	CrossKeys WB	0	193	47	29	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 AM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 2 - CrossKeys/Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 4 - CrossKeys WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	339		240		211	1179		0.2876	
2	CrossKeys/Amazon EB	None	132		447		132	1053		0.1253	
3	CitiGate NB	None	116		181		398	1214		0.0955	
4	CrossKeys WB	None	269		182		115	1214		0.2216	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	4.00		4.00	0.99		A		A
2	CrossKeys/Amazon EB	None	3.69		3.69	0.36		A		A
3	CitiGate NB	None	3.10		3.10	0.26		A		A
4	CrossKeys WB	None	3.57		3.57	0.70		A		A

2031 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	339		240		211	1179		0.2876	
2	CrossKeys/Amazon EB	None	132		447		132	1053		0.1253	
3	CitiGate NB	None	116		181		398	1214		0.0955	
4	CrossKeys WB	None	269		182		115	1214		0.2216	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	4.00		4.00	0.99		A		A
2	CrossKeys/Amazon EB	None	3.69		3.69	0.36		A		A
3	CitiGate NB	None	3.10		3.10	0.26		A		A
4	CrossKeys WB	None	3.58		3.58	0.70		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/CrossKeys - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	CrossKeys/Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	CrossKeys WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	CrossKeys/Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	CrossKeys WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	94	84	113	0	5.0	1.00	1.000
2	CrossKeys/Amazon EB	0	133	33	0	0	5.0	1.00	1.000
3	CitiGate NB	0	0	217	174	0	5.0	1.00	1.000
4	CrossKeys WB	0	55	57	32	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 PM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 2 - CrossKeys/Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 4 - CrossKeys WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	291		112		382	1444		0.2016	
2	CrossKeys/Amazon EB	None	166		233		170	1371		0.1211	
3	CitiGate NB	None	391		260		139	1354		0.2887	
4	CrossKeys WB	None	144		350		301	1300		0.1108	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	2.93		2.93	0.62		A		A
2	CrossKeys/Amazon EB	None	2.82		2.82	0.34		A		A
3	CitiGate NB	None	3.48		3.48	0.99		A		A
4	CrossKeys WB	None	2.94		2.94	0.31		A		A

2031 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	291		112		382	1444		0.2016	
2	CrossKeys/Amazon EB	None	166		233		170	1371		0.1211	
3	CitiGate NB	None	391		260		139	1354		0.2887	
4	CrossKeys WB	None	144		350		301	1300		0.1108	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	2.94		2.94	0.62		A		A
2	CrossKeys/Amazon EB	None	2.83		2.83	0.34		A		A
3	CitiGate NB	None	3.49		3.49	0.99		A		A
4	CrossKeys WB	None	2.95		2.95	0.31		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/Dealership - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	4.00	1
2	CitiGate NB	180	0	5.50	1	30	40.00	4.00	1
3	Dealership WB	270	0	5.50	1	30	40.00	4.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0
2	CitiGate NB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0
3	Dealership WB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0

Traffic Flow Data (veh/hr)

2031 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers		
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	21	516	0	5.0	1.00	1.000
2	CitiGate NB	0	113	139	0	5.0	1.00	1.000
3	Dealership WB	0	339	136	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 AM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	3	2	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 2 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	3	2	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 3 - Dealership WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	3	1	5.50	0.00

2031 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	537		339		249	1119		0.4800	
2	CitiGate NB	None	252		21		855	1311		0.1922	
3	Dealership WB	None	475		113		160	1255		0.3784	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	5.62		5.62	2.17		A		A
2	CitiGate NB	None	3.20		3.20	0.59		A		A
3	Dealership WB	None	4.26		4.26	1.46		A		A

2031 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	537		339		249	1119		0.4800	
2	CitiGate NB	None	252		21		855	1311		0.1922	
3	Dealership WB	None	475		113		160	1255		0.3784	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	5.63		5.63	2.17		A		A
2	CitiGate NB	None	3.20		3.20	0.59		A		A
3	Dealership WB	None	4.26		4.26	1.46		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/Dealership - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	4.00	1
2	CitiGate NB	180	0	5.50	1	30	40.00	4.00	1
3	Dealership WB	270	0	5.50	1	30	40.00	4.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0
2	CitiGate NB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0
3	Dealership WB	0	1.000	0	1.000	4.00	2695	0	4.00	1960	0

Traffic Flow Data (veh/hr)

2031 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers		
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	118	136	0	5.0	1.00	1.000
2	CitiGate NB	0	521	339	0	5.0	1.00	1.000
3	Dealership WB	0	193	21	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 PM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 2 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 3 - Dealership WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	254		193		542	1207		0.2104	
2	CitiGate NB	None	860		118		329	1252		0.6867	
3	Dealership WB	None	214		521		457	1009		0.2122	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.55		3.55	0.66		A		A
2	CitiGate NB	None	7.83		7.83	4.71		A		A
3	Dealership WB	None	4.25		4.25	0.66		A		A

2031 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	254		193		542	1207		0.2104	
2	CitiGate NB	None	860		118		329	1252		0.6867	
3	Dealership WB	None	214		521		457	1009		0.2122	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.55		3.55	0.66		A		A
2	CitiGate NB	None	7.87		7.87	4.71		A		A
3	Dealership WB	None	4.25		4.25	0.66		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/Systemhouse - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	Systemhouse WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	Systemhouse WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	47	340	0	0	5.0	1.00	1.000
2	Amazon EB	0	0	47	15	0	5.0	1.00	1.000
3	CitiGate NB	0	14	48	49	0	5.0	1.00	1.000
4	Systemhouse WB	0	334	45	45	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 AM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 2 - Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 AM Peak

Leg 4 - Systemhouse WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	387		393		93	1086		0.3563	
2	Amazon EB	None	62		721		59	888		0.0698	
3	CitiGate NB	None	111		94		689	1267		0.0876	
4	Systemhouse WB	None	424		62		143	1286		0.3296	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	4.76		4.76	1.34		A		A
2	Amazon EB	None	4.13		4.13	0.19		A		A
3	CitiGate NB	None	2.95		2.95	0.24		A		A
4	Systemhouse WB	None	3.88		3.88	1.19		A		A

2031 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	387		393		93	1086		0.3563	
2	Amazon EB	None	62		721		59	888		0.0698	
3	CitiGate NB	None	111		94		689	1267		0.0876	
4	Systemhouse WB	None	424		62		143	1286		0.3296	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	4.77		4.77	1.34		A		A
2	Amazon EB	None	4.13		4.13	0.19		A		A
3	CitiGate NB	None	2.95		2.95	0.24		A		A
4	Systemhouse WB	None	3.88		3.88	1.19		A		A

Scheme Summary

Control Data

Control Data and Model Parameters

122003	2031 PHF Flow Profile (veh)
CitiGate/Systemhouse - Ultimate	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
AVERAGE DELAY to Geometry	Output flows: Vehicles
Metric Units (m)	85% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (m)

Geometry and Design Target

Leg	Leg Names	Approach Geometry (m)				Target	Circulating and Exit Geom		
		Bearing (deg)	Grade Sep G	Half Width V	Lanes n	Average Delay (sec/veh)	Inscribed Diameter D	Half Width Vx	Lanes n
1	CitiGate SB	0	0	5.50	1	30	40.00	5.50	1
2	Amazon EB	90	0	5.50	1	30	40.00	5.50	1
3	CitiGate NB	180	0	5.50	1	30	40.00	5.50	1
4	Systemhouse WB	270	0	5.50	1	30	40.00	5.50	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (m)	Default Capacity	Calib Capacity	V (m)	Default Capacity	Calib Capacity
1	CitiGate SB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
2	Amazon EB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
3	CitiGate NB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0
4	Systemhouse WB	0	1.000	0	1.000	6.00	2695	0	5.50	2695	0

Traffic Flow Data (veh/hr)

2031 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	CitiGate SB	0	61	62	0	0	5.0	1.00	1.000
2	Amazon EB	0	0	61	19	0	5.0	1.00	1.000
3	CitiGate NB	0	19	305	303	0	5.0	1.00	1.000
4	Systemhouse WB	0	64	60	60	0	5.0	1.00	1.000

Operational Results

Geometry for Target Input

Geometry Options for 2031 PM Peak

Leg 1 - CitiGate SB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 2 - Amazon EB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 3 - CitiGate NB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

Geometry Options for 2031 PM Peak

Leg 4 - Systemhouse WB					
nv	ne	nc	nx	E (m)	L' (m)
1	1	1	1	5.50	0.00

2031 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	123		143		365	1237		0.0994	
2	Amazon EB	None	80		187		79	1211		0.0661	
3	CitiGate NB	None	627		122		145	1250		0.5016	
4	Systemhouse WB	None	184		324		425	1128		0.1631	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.06		3.06	0.28		A		A
2	Amazon EB	None	3.02		3.02	0.18		A		A
3	CitiGate NB	None	5.23		5.23	2.35		A		A
4	Systemhouse WB	None	3.59		3.59	0.48		A		A

2031 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	CitiGate SB	None	123		143		365	1237		0.0994	
2	Amazon EB	None	80		187		79	1211		0.0661	
3	CitiGate NB	None	627		122		145	1250		0.5016	
4	Systemhouse WB	None	184		324		425	1128		0.1631	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	CitiGate SB	None	3.06		3.06	0.28		A		A
2	Amazon EB	None	3.02		3.02	0.18		A		A
3	CitiGate NB	None	5.24		5.24	2.35		A		A
4	Systemhouse WB	None	3.60		3.60	0.48		A		A