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Transportation Impact Study Update

Zoning By-law Amendment – Proposed Commercial Fitness Centre Use

Tafia Development Corp.
Block 152, Plan 20M-1221
65, 71, 77, 83 & 89 Loyalist Trail
Town of Oakville

September 11, 2024
Project No: NT-21-047

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NextEng Consulting Group Inc

September 11, 2024

Trinistar Corporation
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Attention: Ms. Tina Arruda

Re: Transportation Impact Study Update
Proposed Mixed-Use Development
Block 152, Plan 20M-1221
65, 71, 77, 83, 89 Loyalist Trail, Town of Oakville
Our Project No. NT-21-047

Nextrans Consulting Engineers ("Nextrans"), a Division of NextEng Consulting Group Inc., is pleased to present the enclosed Transportation Impact Study Addendum in support of a Zoning By-law Amendment Application for a proposed mixed-use development at the property of 65, 71, 77, 83, 89 Loyalist Trail in the Town of Oakville.

The subject site is legally known as Block 152, Plan 20M-1221 and is municipally known as 65, 71, 77, 83, 89 Loyalist Trail. Based on the architectural site plan, the development proposes five (5) one-storey buildings with a total GFA of 15,578.83m^2 (167,689ft^2), to accommodate light industrial, office, and commercial fitness centre (CFC) uses. Three (3) unsignalized full moves driveway accesses are proposed along Loyalist Trail.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

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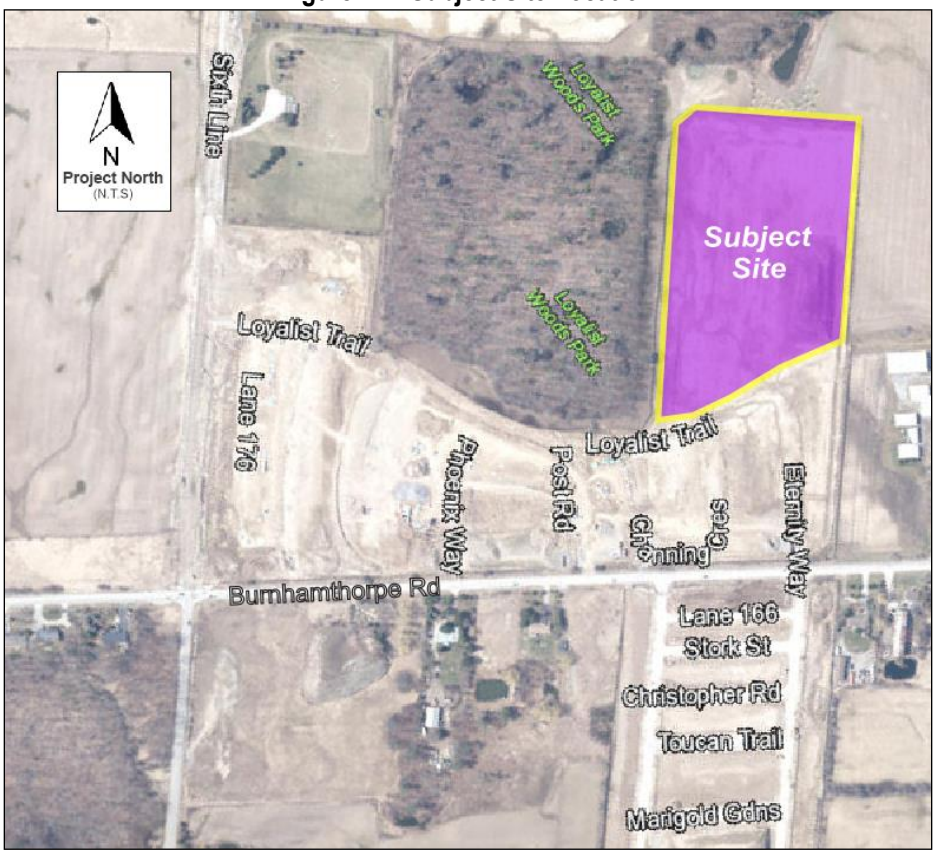
1.0 INTRODUCTION

Nextrans Consulting Engineers ("Nextrans"), a Division of NextEng Consulting Group Inc., has been retained by Tafia Development Corporation ("client") to undertake this Transportation Impact Study (TIS) Update in support of a Zoning By-law Amendment Application for the permission of Commercial Fitness Centre use at property of 65, 71, 77, 83, 89 Loyalist Trail (herein referred as the "subject site") in the Town of Oakville. The subject site is legally known as Block 152, Plan 20M-1221. The subject site is located within the North Oakville East Secondary Plan. The subject site location is provided in **Figure 1-1**.

Figure 1-1: Subject Site Location



Source: Town of Oakville Maps

The development proposes to expand the list of permitted uses for the existing employment development which features five (5) one-storey buildings containing a total gross floor area (GFA) of 15,578.83m^2 (167,689ft^2), to accommodate light industrial, office, and commercial fitness centre (CFC) uses. The proposed development is seeking to permit a maximum GFA floor for commercial fitness center use of 50%A vehicular parking provision of 341 spaces will be provided. The subject site will be accessed by three (3) unsignalized full moves driveways proposed along Loyalist Trail.

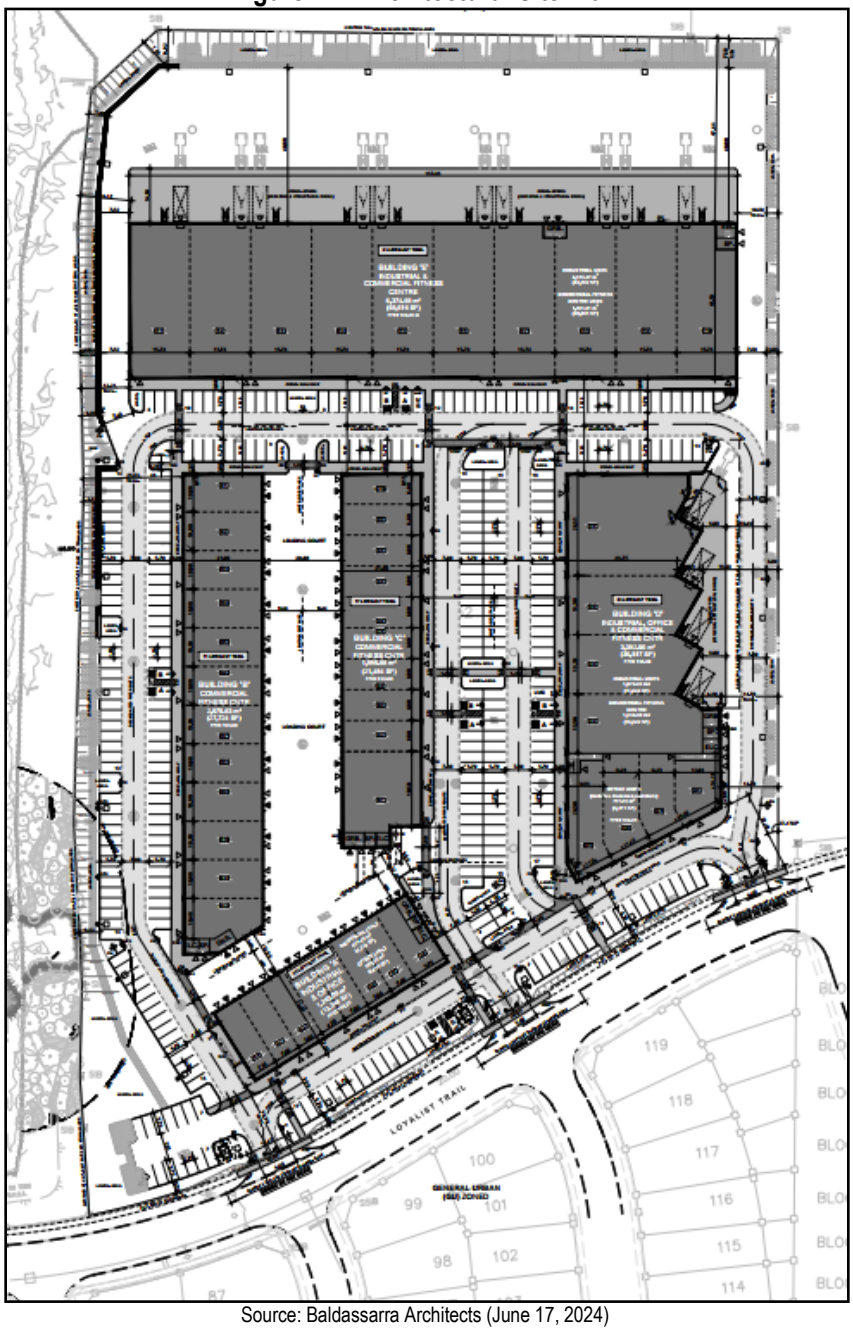
By way of background, Nextrans previously prepared a Transportation Impact Study (TIS) for the subject site dated May 2021 and ensuing transportation reports dated October 2021, March 2022, and April 2022, in support of a Site Plan (SPA) Application (Town File 1215.003/01). The SPA Application was approved by the Town of Oakville, for industrial and office uses.

This study was prepared as a TIS Update to the previous Nextrans transportation reports, in support of a Zoning By-law Amendment Application to permit commercial fitness centre (CFC) uses in addition to the industrial and office uses.

Examples of CFC uses include indoor sports facilities, kids' play area, golf simulator, gymnastics club, and swimming school. The built form of the development remains generally unchanged from the SPA Application.

The architectural site plan and summarized site statistics are provided in **Figure 1-2** and **Table 1-1**, respectively. The architectural site plan is enclosed in **Appendix A**.

Figure 1-2: Architectural Site Plan



Source: Baldassarra Architects (June 17, 2024)

Table 1-1: Site Statistics

Building	Building Address	GFA of Proposed Land Use			Building GFA
		Industrial	Office	Commercial Fitness Centre (CFC)	
A	65 Loyalist Trail	671.63m² (7,229ft²)	568.45m² (6,119ft²)	-	1,240.08m² (13,348ft²)
B	71 Loyalist Trail	-	-	2,575.63m² (27,724ft²)	2,575.63m² (27,724ft²)
C	77 Loyalist Trail	-	-	1,995.88m² (21,484ft²)	1,995.88m² (21,484ft²)
D	83 Loyalist Trail	1,079.88m² (11,624ft²)	777.78m² (8,371ft²)	1,534.90m² (16,522ft²)	3,392.56m² (36,517ft²)
E	89 Loyalist Trail	4,513.37m² (48,582ft²)	-	1,861.31m² (20,035ft²)	6,374.68m² (68,616ft²)
	Total GFA	**6,264.88m² (67,435ft²)**	**1,346.23m² (14,490ft²)**	**7,967.72m² (85,765ft²)**	**15,578.83m² (167,689ft²)**

1.1. TERMS OF REFERENCE

Town transportation staff provided confirmation, dated July 19, 2024, for an updated TIS and parking justification study for this rezoning submission, which is enclosed in **Appendix B**.

1.2. STUDY AREA

The study area was determined by assessing the size of the proposed development, the transportation impact that is anticipated from the proposed development, and through discussion with Town staff from the Town of Oakville (herein referred to as the "Town"). The study area includes the following intersections. It is noted that with the exception of Sixth Line and Burnhamthorpe Road, all other roads shown were under construction during traffic data (TMC) collection on April 7, 2021 that was initially obtained for the Nextrans May 2021 TIS.

Existing Intersections

- Sixth Line & Burnhamthorpe Road (unsignalized).

Future Intersections

- Sixth Line & Loyalist Trail (unsignalized);
- Phoenix Way & Burnhamthorpe Road (unsignalized);
- Post Road & Burnhamthorpe Road (unsignalized);
- Eternity Way & Burnhamthorpe Road (unsignalized);
- Phoenix Way & Loyalist Trail (unsignalized);
- Post Road & Loyalist Trail (unsignalized);
- Site Access West / Channing Crescent & Loyalist Trail (unsignalized);

- Site Access Centre / Eternity Way & Loyalist Trail (unsignalized);
- Site Access East & Loyalist Trail (unsignalized).

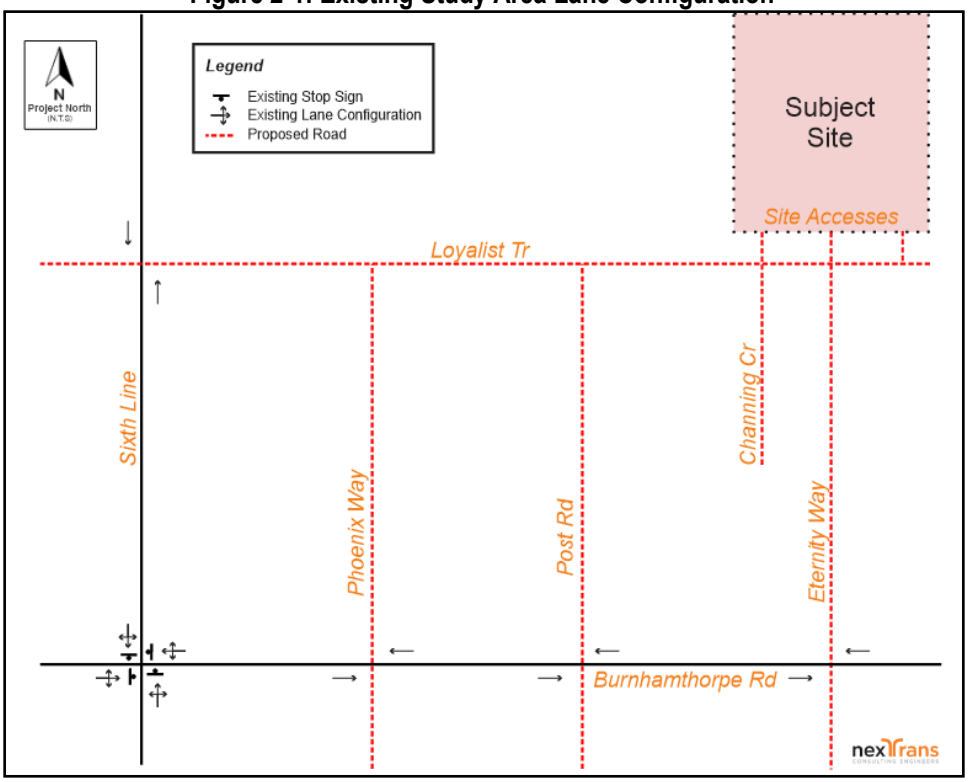
2.0 EXISTING TRANSPORTATION CONDITIONS

This section will identify and consider the existing transportation conditions for the road, transit, bicycling, and pedestrian networks within the study area.

2.1. ROAD NETWORK

This subsection will describe the study area road network. Illustrated in **Figure 2-1** are the existing lane configurations and intersection control of the roads within the study area at the time of the initial Nextrans May 2021 TIS.

Figure 2-1: Existing Study Area Lane Configuration



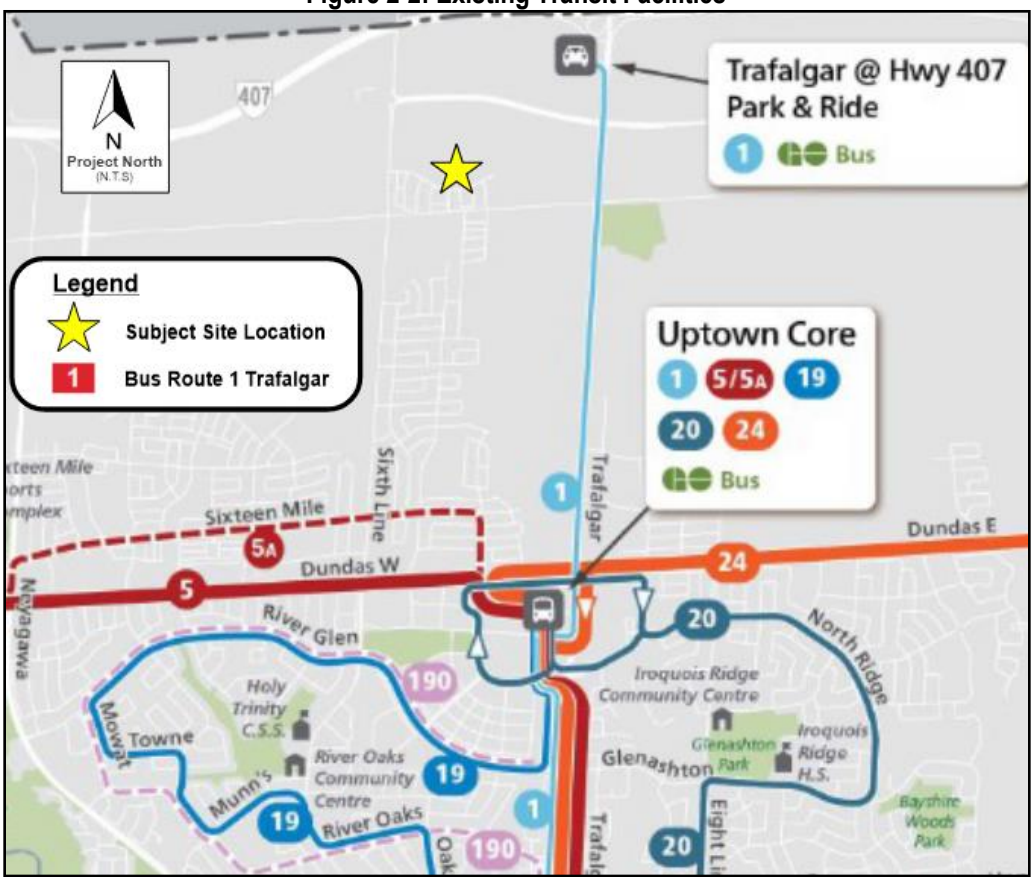
The existing road network descriptions are as follows:

- **Sixth Line** is north-south rural roadway consisting of a two (2)-lane cross-section (one lane per direction) and maintains a posted speed limit of 60km/h in the within the study area. Sixth Line is under the jurisdiction of the Town. Within the Town, Sixth Line runs between North Service Road East to the south and the Town limits to the north.
- **Burnhamthorpe Road** is an east-west regional roadway consisting of a two (2)-lane cross-section (one lane per direction) and maintains a posted speed limit of 60km/h within the study area. Burnhamthorpe Road is under the jurisdiction of the Halton Region. Within the Town, Burnhamthorpe Road runs between the Town limits to the east at Ninth Line and the Town limits to the west.

2.2. EXISTING TRANSIT FACILITIES

Nearby the study area are a limited number of transit facilities. The broader area surrounding the subject site is currently serviced by Oakville Transit and GO Transit, as shown in **Figure 2-2**.

Figure 2-2: Existing Transit Facilities



Source: Oakville Transit (September 2024)

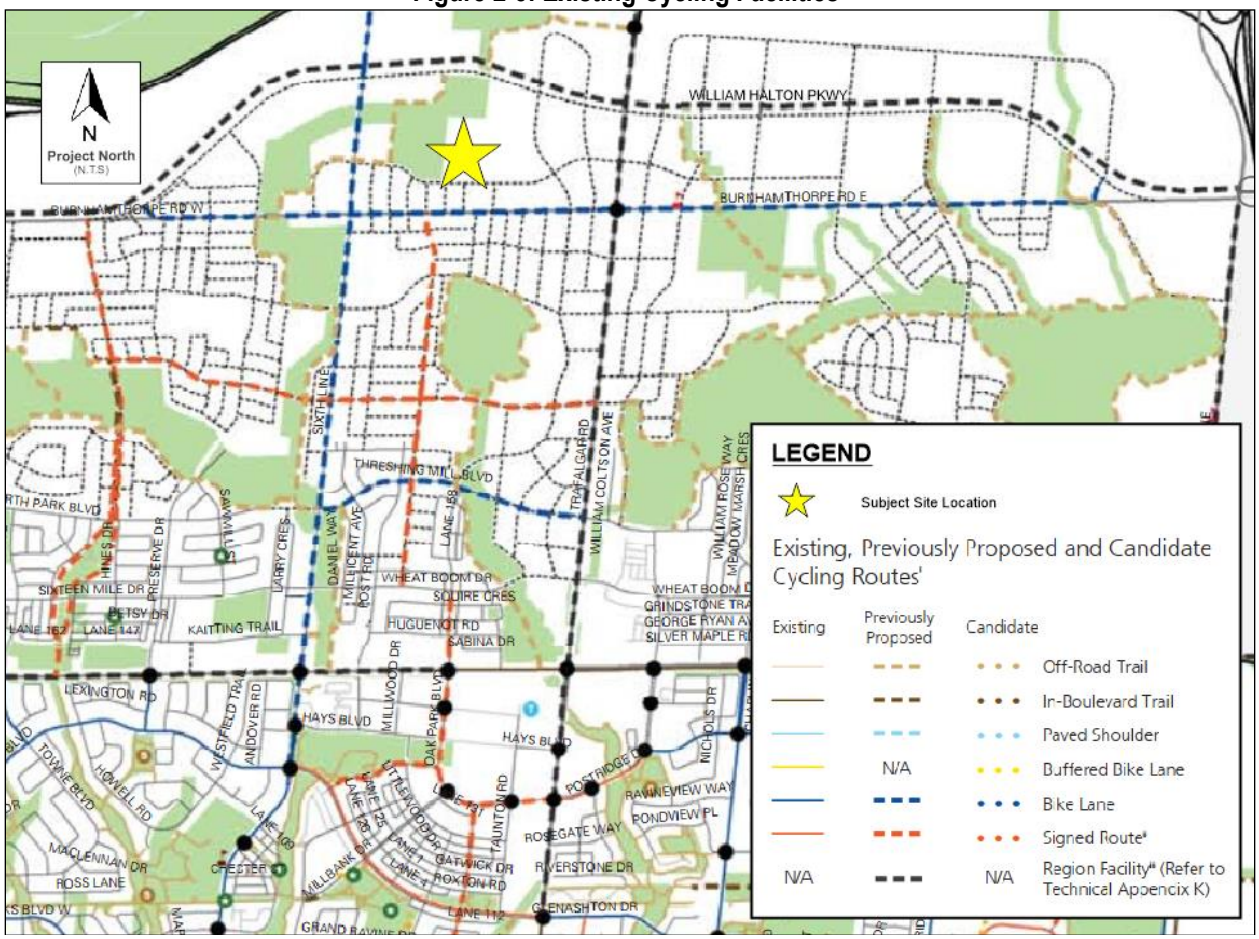
The following transit services and facilities are available within the broader area to the subject site:

- **Oakville Transit Bus Route 1 Trafalgar** primarily operates along Trafalgar Road between Oakville GO Station to the south and Trafalgar / 407 GO Carpool Lot to the north. The nearest bus stop is located at the intersection of Trafalgar Road and Burnhamthorpe Road East and is approximately an eleven-minute walk (approximately 900m) from the subject site. Route 1 operates weekdays, with headways of one (1) hour all day.
- **Trafalgar at Hwy 407 GO Park and Ride** is a GO carpool lot and bus stop primarily for "park and ride" commuting. The facility provides bus stops for Oakville Transit Route 1 and GO Bus routes including **Route 22 Milton/Oakville**, **Route 41 Hamilton/Pickering**, **Route 47/47G Hamilton/Pickering**, and **Route 56/56B Oshawa/Oakville**.

2.3. CYCLING NETWORK

Shown in **Figure 2-3** is the cycling network located within the broader area surrounding the subject site.

Figure 2-3: Existing Cycling Facilities



Source: Town of Oakville Active Transportation Master Plan (November 2017)

Limited biking facilities exist within the broader area surrounding the subject site as shown in the Existing, Previously Proposed, and Candidate Cycling Routes Map within the Town of Oakville Active Transportation Master Plan dated November 2017.

Along the recent Phase 1 completion of William Halton Parkway between Sixth Line and Ninth Line (construction completed November 2020) are paved on-road bike lanes. Many cycling facilities are planned along the roads surrounding the broader area to the subject site, including bike lanes along Sixth Line, Burnhamthorpe Road, and along Phase 2 of the extension of William Halton Parkway (i.e. east of Sixth Line). Further planned cycling facilities include a boulevard mixed-use trail along Trafalgar Road as per the Proposed Regional Cycling Network Map within the Halton Region Active Transportation Master Plan dated 2015 and a signed route along Post Road south of Burnhamthorpe Road East.

2.4. PEDESTRIAN NETWORK

Sidewalks are available along Loyalist Trail and local roads south of Loyalist Trail. The pedestrian network will be bolstered by sidewalks planned along Sixth Line as per the Sixth Line Class Environmental Assessment Study dated July 2014.

2.5. TRAFFIC DATA COLLECTION

Weekday morning and afternoon peak period turning movement counts (TMC) were undertaken by Spectrum Traffic Data Inc. on Wednesday, April 7, 2021 (i.e. prior to the provincial stay-at-home order issued April 8, 2021 in response to the COVID-19 pandemic), for the following study area intersection of Sixth Line and Burnhamthorpe Road during the weekday AM and PM peak periods of 7:00AM to 10:00PM and 4:00PM to 7:00PM, respectively. Existing traffic data is enclosed in **Appendix C**.

Adjustment factors were applied to the existing traffic volumes to compensate for the overall reduction in traffic due to COVID-19, which was deemed acceptable by the Town.

2.6. ADJUSTMENT FACTORS TO BASELINE TRAFFIC VOLUMES

To account for a reduction in traffic volumes at the study area intersection of Sixth Line and Burnhamthorpe Road due to the COVID-19 pandemic, traffic data from various intersections throughout the Greater Toronto Area were assessed for the percentage decrease in traffic volumes during weekday total AM and PM peak hours, between pre-COVID (2019) and the second provincial lockdown (March 2021). Based on the provided data, an increase of 26.1% and 14.8% was applied to the existing traffic volumes during the weekday AM and PM peak hours, respectively, at the intersection of Sixth Line and Burnhamthorpe Road. Calculations for the COVID-19 adjustment factors are enclosed in **Appendix C**.

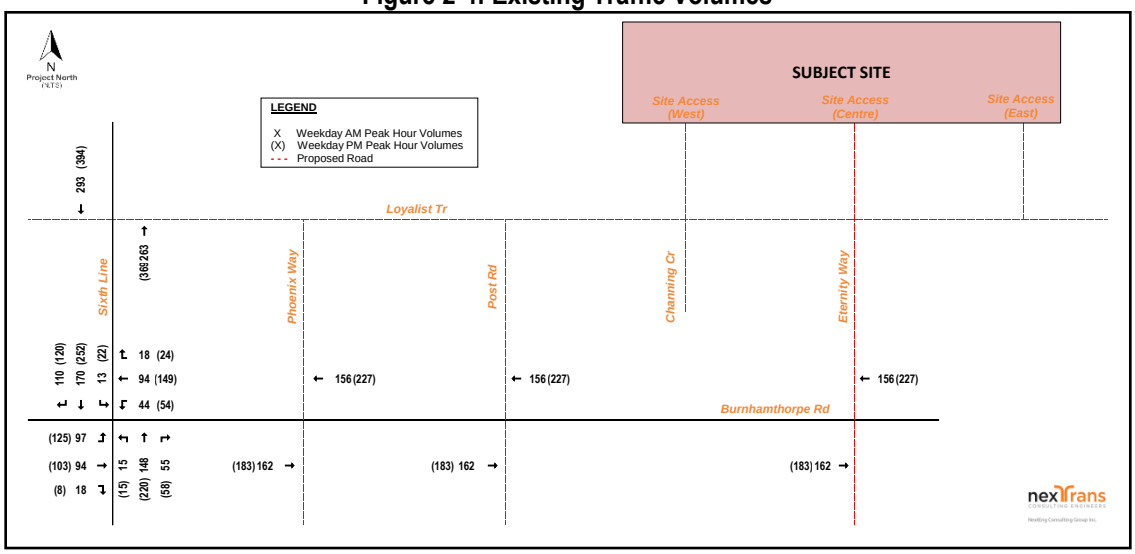
Additionally, a 2.0% per annum growth was applied to the road corridors of Burnhamthorpe Road and Sixth Line to prorate the 2021 traffic volumes to 2024 baseline volumes.

2.7. EXISTING INTERSECTION CAPACITY ANALYSIS

The existing traffic was analyzed using *SYNCHRO 10* which incorporates Highway Capacity Manual (HCM) 2000 methodology for signalized and unsignalized intersections and adheres to the Town's *North Oakville Terms of Reference for Transportation Impact Studies and Transportation Functional Design Studies* dated August 2009.

The intersection capacity analysis has been conducted for the weekday AM and PM peak hours. Existing traffic volumes within the study area road network are displayed in **Figure 2-4**.

Figure 2-4: Existing Traffic Volumes



The existing intersection capacity analysis results for the study area intersection is summarized in **Table 2-1**. The detailed Synchro outputs for existing conditions are provided in **Appendix D**.

Table 2-1: Existing Intersection Capacity Analysis

Intersection	Movement of Interest	AM Peak Hour				PM Peak Hour			
		Delay (s)	95th Queue (m)	V/C	LOS	Delay (s)	95th Queue (m)	V/C	LOS
Sixth Line & Burnhamthorpe Rd	EBLTR	12	-	-	B	16	-	-	C
	WBLTR	11	-	-	B	15	-	-	C
	NBLTR	12	-	-	B	17	-	-	C
	SBLTR	13	-	-	B	22	-	-	C

Under the existing conditions, the unsignalized study area intersection of Sixth Line and Burnhamthorpe Road operates with acceptable levels of service of LOS C or better during the weekday AM and PM peak hours.

3.0 FUTURE BACKGROUND TRAFFIC CONDITIONS

The five-year horizon of 2029 was selected and assumed in this analysis to allow for sufficient time for the full buildout of the proposed development. The future background conditions include the summation of existing traffic volumes, corridor growth due to new developments within broader area, and site traffic volumes generated from other new developments within the surrounding area. The future background condition also incorporates planned road improvement works such as road widenings.

3.1. ROAD NETWORK IMPROVEMENTS

Enclosed in **Appendix E** are corresponding documents for planned road improvements within the study area.

As previously mentioned in **Section 1**, with the exception of Sixth Line and Burnhamthorpe Road, all other roads shown in **Figure 1-1** including Loyalist Trail, Phoenix Way, Post Road, Channing Crescent, and Eternity Way were under construction during the TMC survey and are incorporated into the analysis for the future conditions as two-lane roads (one lane per direction).

As part of the proposed urbanization of Sixth Line, it will be widened to a four (4)-lane cross-section (two lanes per direction) with bike lanes and the intersection with Burnhamthorpe Road will be signalized and contain exclusive left turn lanes as per the approved *Sixth Line from Dundas Street to Highway 407 ETR Class Environmental Assessment Study* undertaken by Morrison Hershfield and dated July 2014. The signal timing parameters and future lane configuration for the intersection of Sixth Line and Burnhamthorpe Road have been adopted from the Synchro reports for the 2031 weekday AM and PM peak hours as per Appendix B.6 of the Sixth Line EA Study. Construction of the widening was completed in 2023 for Phase 1 between Dundas Street and Threshing Mill Boulevard as per the Town's website. As the Town website notes that construction is estimated to be completed through spring 2026, Nextrans has assumed Phase 2 of construction, including the study area intersections along Sixth Line, will be completed within the five-year horizon of this study.

Burnhamthorpe Road is planned to be widened to a four (4)-lane cross-section (two lanes per direction) with bike lanes and the intersection with Sixth Line will be signalized and contain exclusive northbound and southbound left turn lanes as per the approved *Burnhamthorpe Road Character Study and Municipal Class Environmental Assessment* undertaken by MMM Group and DTAH dated December 2014. However, as the timeline and implementation of the future east-west road is uncertain and not expected to be completed within the study five-year horizon (i.e. design work for the widening commenced in 2024 as per the Town of Oakville website), the road widening for Burnhamthorpe Road was not accounted for within this study.

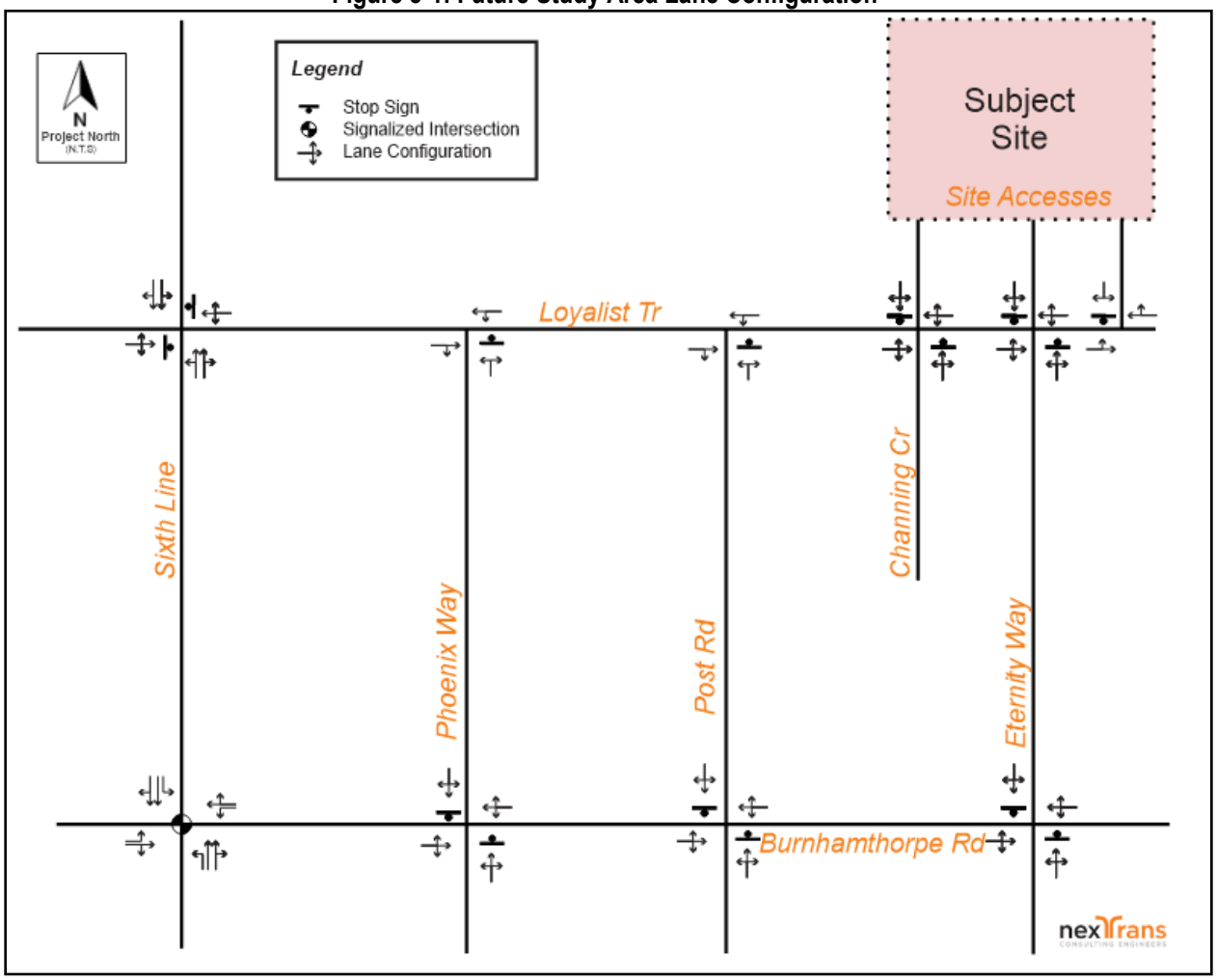
Per the Petgor Lands TIS noted in Section 3.2 of this study, Post Road south of Burnhamthorpe Road is assumed to be completed in the future conditions and forms the south leg of the intersection of Burnhamthorpe Road and the north leg of Post Road. Hence, the south leg of Post Road at Burnhamthorpe Road was applied to the analysis of the future conditions.

It was assumed that the south leg of Pheonix Way will be introduced based on the site traffic volumes figure of the Neighbourhood 9/10/11 transportation study by CGH as noted in Section 3.2 of this study.

Based on the North Oakville School and Commercial Development noted in Section 3.2 of this study, the west leg of the Sixth Line and Loyalist Trail intersection was assumed for the future study area. The Sixth Line and Loyalist Trail intersection was assumed as a two-way stopped-controlled intersection.

The future study area road lane configuration is illustrated in **Figure 3-1**.

Figure 3-1: Future Study Area Lane Configuration



3.2. CORRIDOR GROWTH

A general corridor traffic growth rate of 2.0% per annum was applied along the study area roads of Sixth Line and Burnhamthorpe Road.

3.3. BACKGROUND DEVELOPMENTS

Background developments nearby the subject site were identified by Nextrans as summarized in **Table 3-1**. Background development documents are enclosed in **Appendix E**. **Figure 3-2** illustrates the locations of the background developments. **Figure 3-2** illustrates the background development traffic volumes.

Table 3-1: Summary of Background Developments

#	Development	Description / Statistics	Source (Date)
1	Star Oak Developments Lands	Mixed-use subdivision primarily for residential and employment uses. Bounded by Sixth Line to the west, West Drive (Oak Park Boulevard) to the east, the Town limits to the north, and Burnhamthorpe Road East to the south. Consists of 126 single detached homes and 91 townhouses for a total of 217 dwelling units and an employment GFA of 153,289m^2 (1,650,000ft^2). Includes the subject development of Block 152.	URS (April 2013)

2	Petgor Lands	Residential subdivision of lands located east of Sixth Line, north of Dundas Street, and south of Burnhamthorpe Road. Consists of 631 single detached homes and 149 dwelling units of residential condominium or townhouse for a total of 780 dwelling units.	Read, Voorhees, & Associates (December 2012)
3	North Oakville School and Commercial Development	Mixed-use development at the northwest corner of Burnhamthorpe Road and Sixth Line. Consists of employment buildings with a GFA of 281,600sqft, a secondary school of 80 classrooms and capacity for 1,614 students, and an 8,000sqft childcare facility.	CGH (June 2022)
4	Neighbourhood 9/10/11	Combined development from a group of companies that is bounded generally by Carding Mill Trail to the west, William Halton Parkway to the north, Burnhamthorpe Road to the east, and Threshing Mill Boulevard to the south. Proposal of 788 single detached homes, 1,003 townhouses, 175 midrise dwelling units.	CGH (April 2019)
5	Argo Trafalgar	Development bounded generally by Trafalgar Road to the west, Burnhamthorpe Road to the south, and slightly north of William Halton Parkway to the north. Proposal of 3,000 residential units (where 10% would be townhouses and 90% would be apartment units), 13,200sqm of retail, and 19,700sqm of employment area.	CGH (June 2023)
6	Remington Eno	Development located approximately 400m east of the Burnhamthorpe Road and Neyagawa Boulevard intersection. Proposal of 290 single detached homes, 307 townhouses, and a mid-rise building with a 295 apartment dwelling units and 15,000sqm of retail space.	CGH (June 2023)
7	EMGO North Oakville	Located along Sixth Line between Dundas Street and Burnhamthorpe Road. Proposal of 618 residential dwelling units from single detached homes and townhouses.	Read, Voorhees, & Associates (September 2012)

It is noted that the TIS report for Star Oak Developments Lands includes the subject development (Block 152) as part of employment land use. However, for a conservative analysis, a reduction of the background development traffic from Star Oak Developments Lands was not applied.

Petgor Lands site traffic on Burnhamthorpe Road was shown assigned through Post Road and one amalgamated site access as per the Petgor Lands TIS. The proposed site plan for the Petgor Lands shows two site accesses (instead of a single, amalgamated access) onto Burnhamthorpe Road, including Street ‘P’ and Street ‘S’ (assumed to be Vernon Powell Drive and Eternity Way). Hence, although Vernon Powell Drive is likely to incur higher traffic volumes from the Petgor Lands than Eternity Way due to the Vernon Powell Drive providing direct road access to a higher number of proposed homes, site traffic from the Petgor Lands accessing the amalgamated access was equally split between Vernon Powell Drive and Eternity Way for a conservative analysis.

Figure 3-2: Locations of Background Developments

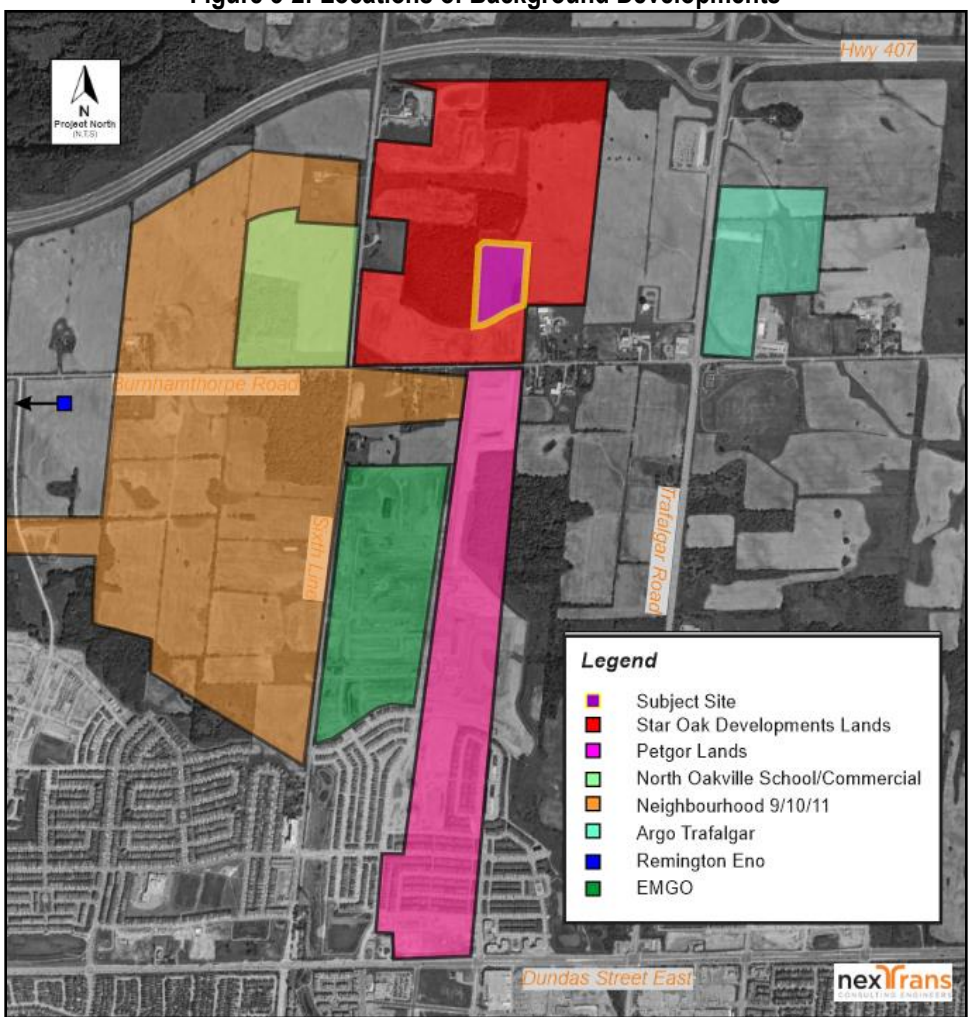
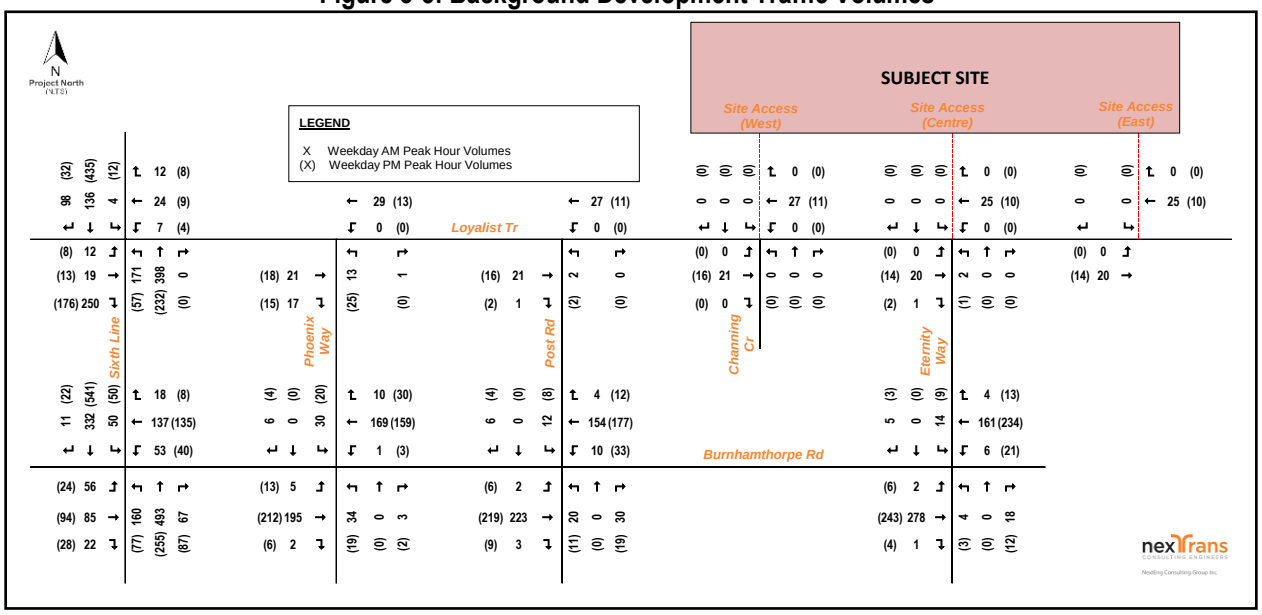


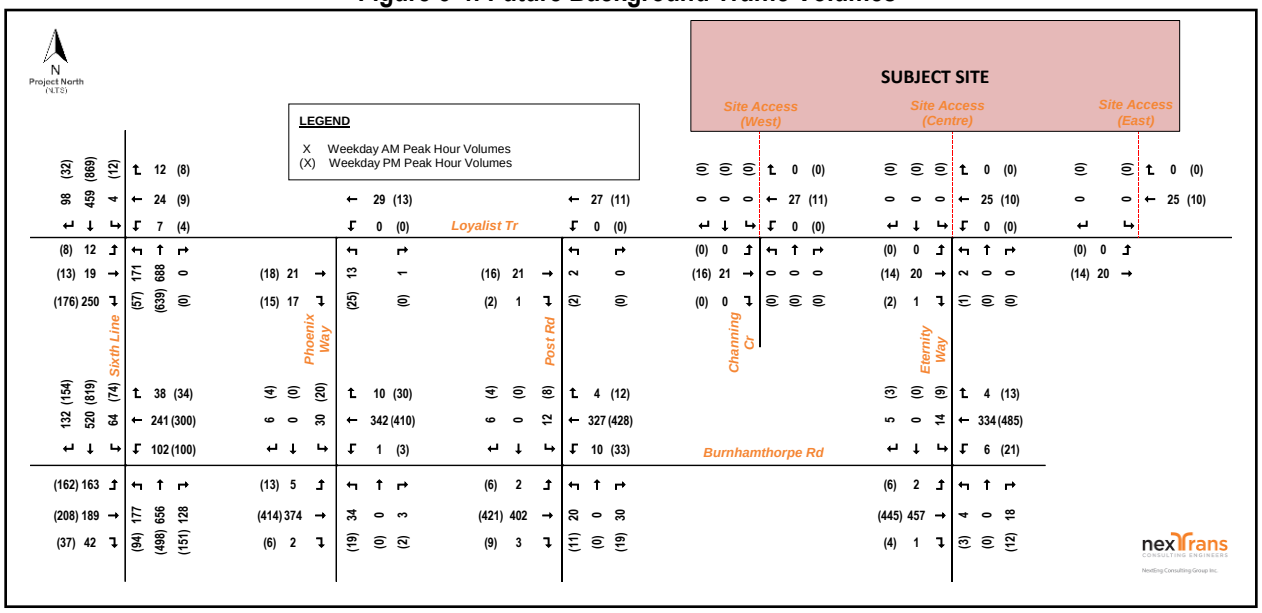
Figure 3-3: Background Development Traffic Volumes



3.4. FUTURE BACKGROUND INTERSECTION CAPACITY ANALYSIS

The future background traffic volumes for the five-year horizon of 2029 were analyzed using Synchro 10 software and incorporates corridor growth traffic, background development traffic for the surrounding area, and planned road improvements. The future background traffic volumes for 2029 are illustrated in **Figure 3-4**.

Figure 3-4: Future Background Traffic Volumes



The future background capacity analysis results for the study area intersections during the five-year horizon of 2029 are summarized in **Table 3-2** and **Table 3-3** for the signalized and unsignalized intersections, respectively. Detailed Synchro results are enclosed in **Appendix D**.

Table 3-2: Future Background Intersection Capacity Analysis – Signalized

Intersection	Movement of Interest	AM Peak Hour								PM Peak Hour							
		Overall			V/C	Delay (s)	LOS	Queue (m)		Overall			V/C	Delay (s)	LOS	Queue (m)	
		V/C	Delay (s)	LOS				50th	95th	V/C	Delay (s)	LOS				50th	95th
Sixth Line & Burnhamthorpe Rd	EBL	0.69	16	B	0.72	31	C	20	41	0.61	11	B	0.62	19	B	11	34
	EBT				0.46	20	C	24	43				0.41	14	B	14	37
	WBL				0.43	20	C	11	24				0.29	13	B	6	19
	WBT				0.55	21	C	31	53				0.57	16	B	22	53
	NBL				0.70	23	C	19	65				0.50	11	B	5	21
	NBT				0.57	15	B	39	78				0.40	8	A	16	33
	SBL				0.22	8	A	3	11				0.25	8	A	4	12
	SBT				0.35	8	A	19	43				0.60	10	A	29	56

Table 3-3: Future Background Intersection Capacity Analysis – Unsignalized

Intersection	Movement of Interest	AM Peak Hour				PM Peak Hour			
		Delay (s)	95th Queue (m)	V/C	LOS	Delay (s)	95th Queue (m)	V/C	LOS
Sixth Line & Loyalist Tr/ Driveway	EBL	65	5	0.18	F	61	3	0.12	F
	EBTR	27	35	0.66	D	26	25	0.56	D
	WBL	179	7	0.29	F	99	2	0.10	F
	WBTR	59	12	0.38	F	40	4	0.16	E
	NBL	10	5	0.19	A	11	2	0.09	B
	SBL	9	0	0.00	A	9	0	0.01	A
Phoenix Way & Burnhamthorpe Rd	EBLTR	0	0	0.00	A	0	0	0.01	A
	WBLTR	0	0	0.00	A	0	0	0.00	A
	NBLTR	18	3	0.13	C	21	2	0.09	C
	SBLTR	17	3	0.12	C	20	3	0.10	C
Post Rd & Burnhamthorpe Rd	EBLTR	0	0	0.00	A	0	0	0.01	A
	WBLTR	0	0	0.01	A	1	1	0.03	A
	NBLTR	15	3	0.13	B	16	2	0.09	C
	SBLTR	16	1	0.06	C	20	1	0.05	C
Eternity Way & Burnhamthorpe Rd	EBLTR	0	0	0.00	A	0	0	0.01	A
	WBLTR	0	0	0.01	A	1	1	0.02	A
	NBLTR	13	1	0.05	B	14	1	0.04	B
	SBLTR	18	2	0.07	C	23	1	0.06	C
Phoenix Way & Loyalist Tr	NBLR	9	0	0.02	A	9	1	0.03	A
Post Rd & Loyalist Tr	NBLR	9	0	0.00	A	9	0	0.00	A
Site Access West / Channing Cr & Loyalist Tr	NBLTR	0	0	0.00	A	0	0	0.00	A
	SBLTR	0	0	0.00	A	0	0	0.00	A
Site Access Centre / Eternity Way & Loyalist Tr	NBLTR	9	0	0.00	A	9	0	0.00	A
	SBLTR	0	0	0.00	A	0	0	0.00	A
Site Access East & Loyalist Tr	SBLR	0	0	0.00	A	0	0	0.00	A

Under the future background conditions, all study area intersections will operate under capacity.

At the Sixth Line and Burnhamthorpe Road intersection, all movements of interest will operate with LOS C or better in the AM and PM peak hours. As the intersection of Sixth Line and Burnhamthorpe Road is signalized and Sixth Line is widened under the future conditions, the individual intersection movement v/c ratios will improve relative to the existing conditions.

The unsignalized intersection of Sixth Line and Loyalist Trail / Driveway will operate with LOS F for the eastbound left, westbound left, westbound through-right movements in the AM and PM peak hours, with long delay time prior to finding an available gap to make a left or right turning movement.

4.0 SITE TRAFFIC

The following section discusses the calculation, distribution, and assignment of trips generated by the subject site.

4.1. TRIP GENERATION

The trip generation for the introduction of the new use was derived from the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition using land use code (LUC) 110 General Light Industrial (for light industrial use) and LUC 710 General Office Building for office land use. Given the broad and varied nature of the commercial fitness centre (CFC) uses, LUC 492 Health/Fitness Club was assumed for all CFC uses. The weekday peak hour trip generation volumes for the proposed development were calculated for the weekday AM and PM peak hour of adjacent street traffic using the average rate for LUC 110 and LUC 492 due to a low coefficient of determination and the fitted curve equation for LUC 710 with a higher R-squared value of greater than 0.75 for both peak hours. The truck trip generation was determined from the ITE Trip Generation Manual 10th Edition Supplement for LUC 110 using weekday peak hour of adjacent street. The summary of trip generation calculations is shown in **Table 4-1**.

Table 4-1: Auto Site Trip Generation for the Proposed Development

Land Use	GFA	Parameter	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Industrial (LUC 110)	6,264.88m² (67,435ft²)	Directional Distribution	88%	12%	100%	14%	86%	100%
		Trip Rate	0.65	0.09	0.74	0.09	0.56	0.65
		Primary Trips	44	6	50	6	38	44
Office (LUC 710)	1,346.23m² (14,490ft²)	Directional Distribution	88%	12%	100%	17%	83%	100%
		Trip Rate	1.93	0.28	2.21	0.41	1.86	2.28
		Primary Trips	28	4	32	6	27	33
Commercial Fitness Centre (CFC) (LUC 492)	7,967.72m² (85,765ft²)	Directional Distribution	51%	49%	100%	16%	84%	100%
		Trip Rate	0.66	0.64	1.31	0.19	0.96	1.14
		Primary Trips	57	55	112	16	82	98
		Auto Site Trips Generated	**129**	**65**	**194**	**28**	**147**	**175**
Industrial (LUC 110)	6,264.88m² (67,435ft²)	Truck Directional Distribution	63%	37%	100%	50%	50%	100%
		Truck Trip Rate	0.01	0.00	0.01	0.01	0.00	0.01
		Truck Primary Trips	1	0	1	1	0	1
		Total Site Trips Generated	**130**	**65**	**195**	**29**	**147**	**176**

The resulting total trip generation for the proposed development yields 195 trips (130 in, 65 out) and 176 trips (29 in, 147 out) in the weekday AM and PM peak hours, respectively, including one (1) inbound truck trip in both the AM and PM peak hours.

The truck trip generation for the weekday AM and PM peak hour of generator was also reviewed. It is noted that the variance in truck trips generated by the subject site during the weekday AM and PM peak hour of generator (based on LUC 110) to the weekday AM and PM peak hour of adjacent street is nominal, with a total peak hour of generator yield of 2 two-way truck trips (1 in, 1 out) and 3 two-way truck trips (2 in, 1 out) in the weekday AM and PM peak hours, respectively.

4.2. TRIP DISTRIBUTION AND ASSIGNMENT

The vehicular trip distribution of for industrial and office uses was derived from the *2016 Transportation Tomorrow Survey (TTS),* which is a comprehensive travel survey conducted in the Greater Toronto and Hamilton Area (GTHA) in order to derive the auto trip distribution within the Town of Oakville. Since TTS data is typically applicable to mature

areas with similar land uses, the trip distribution of the industrial and office uses was determined based on trip patterns for the area east of the subject site, bounded by Highway 403 to the west and Ridgeway Drive to the east, due to the number of industrial and office developments interwoven within the area. Using engineering judgement, extracted data was further reviewed to derive trip distributions on roads within the study area, based on routes that drivers would likely take to access the subject development site. The existing trip distribution from the TMC survey was used for CFC uses given the variability of the CFC uses. Site truck trip distribution was derived from the existing heavy vehicle trip distribution of the TMC survey. The trip distribution for industrial and office, CFC, and heavy trucks, are summarized in **Table 4-2**, **Table 4-3** and **Table 4-4**, respectively.

Table 4-2: Directional Trip Distribution (Industrial and Office)

Corridor	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
		In	Out	In	Out
Burnhamthorpe Road	Eastbound	24%	59%	8%	50%
	Westbound	58%	8%	63%	25%
Sixth Line	Northbound	10%	25%	5%	19%
	Southbound	9%	8%	24%	6%
	TOTAL	**100%**	**100%**	**100%**	**100%**

Table 4-3: Directional Trip Distribution (CFC)

Corridor	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
		In	Out	In	Out
Burnhamthorpe Road	Eastbound	24%	19%	21%	16%
	Westbound	18%	25%	20%	25%
Sixth Line	Northbound	25%	30%	25%	32%
	Southbound	33%	26%	34%	27%
	TOTAL	**100%**	**100%**	**100%**	**100%**

Table 4-4: Directional Trip Distribution (Heavy Trucks)

Corridor	Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
		In	Out	In	Out
Burnhamthorpe Road	Eastbound	19%	11%	0%	27%
	Westbound	25%	22%	9%	27%
Sixth Line	Northbound	31%	31%	27%	27%
	Southbound	25%	36%	64%	18%
	TOTAL	**100%**	**100%**	**100%**	**100%**

The site-generated traffic volumes were assigned accordingly to reflect the configuration of the site accesses, turning restrictions, and based on logical routing. The site traffic volumes for industrial use, office use, CFC use, and total auto traffic volumes are illustrated in **Figure 4-1**, **Figure 4-2**, **Figure 4-3**, and **Figure 4-4**, respectively. The site traffic volumes for industrial heavy trucks are illustrated in **Figure 4-5**. Detailed TTS data is enclosed in **Appendix F**.

Figure 4-1: Industrial Site Traffic Volumes

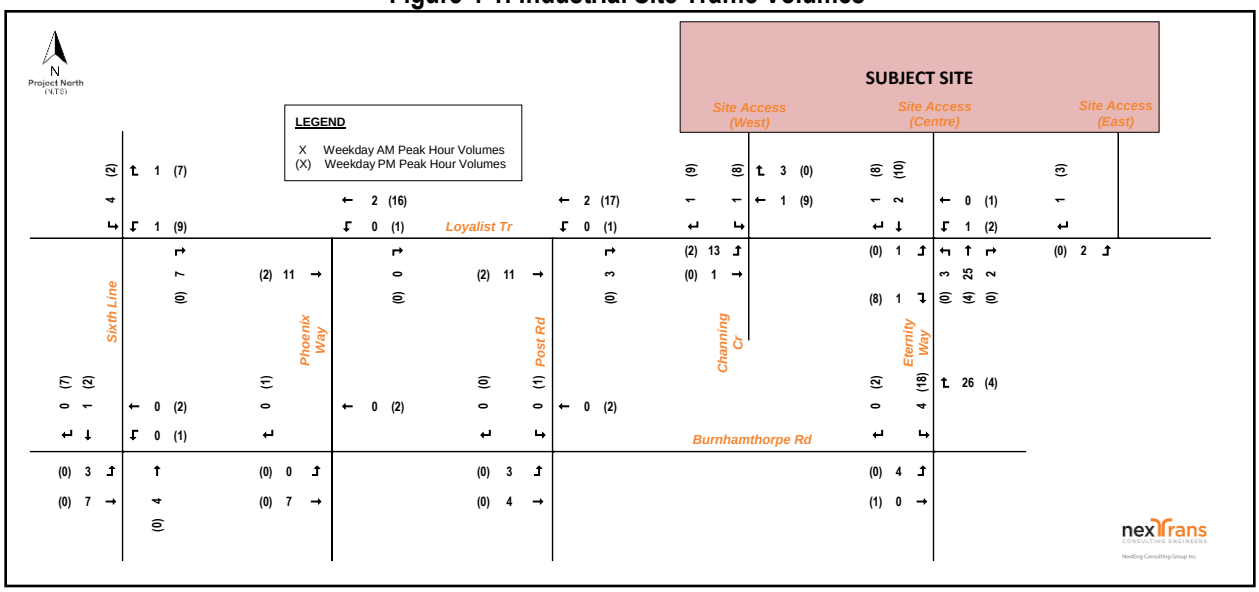


Figure 4-2: Office Site Traffic Volumes

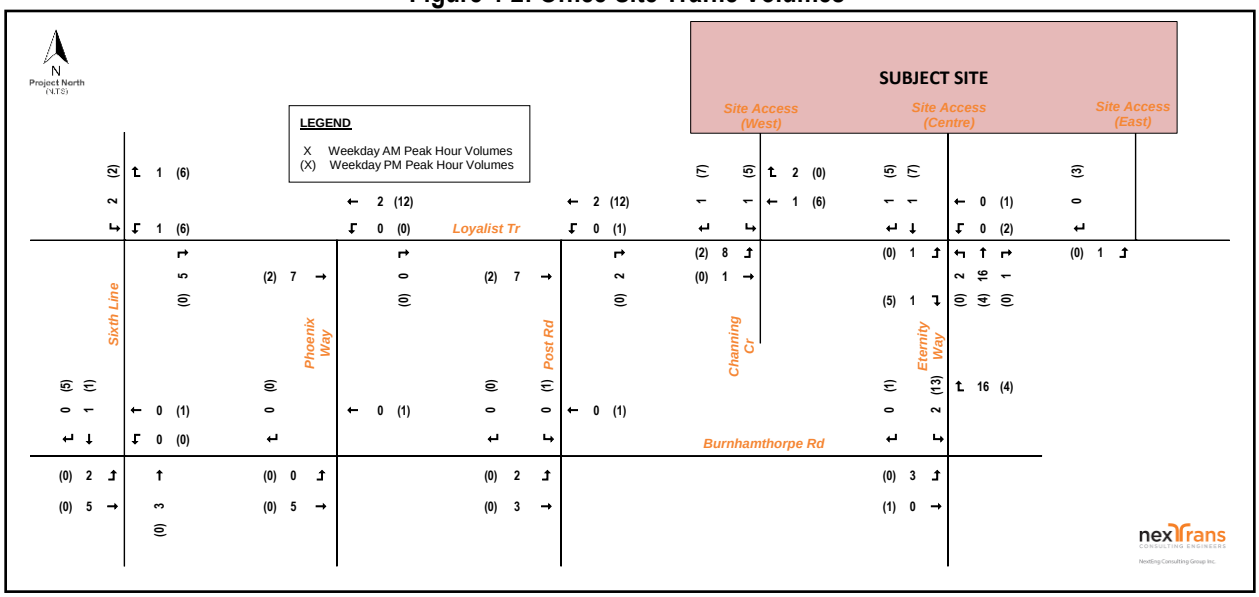


Figure 4-3: CFC Site Traffic Volumes

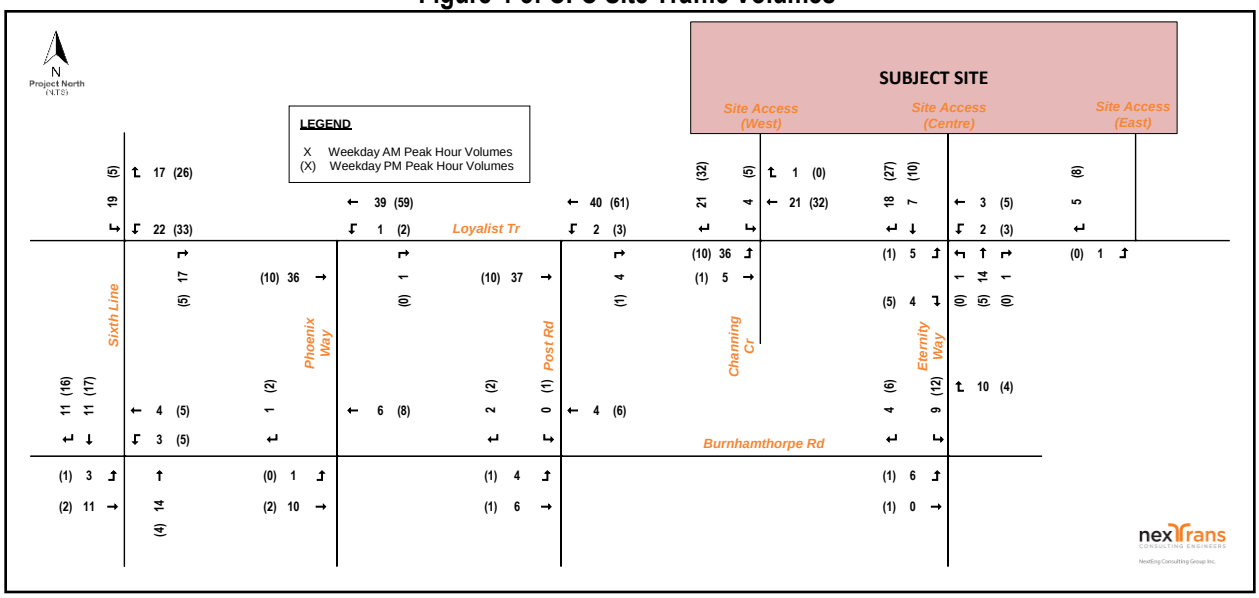


Figure 4-4: Site Traffic Volumes (Total Auto)

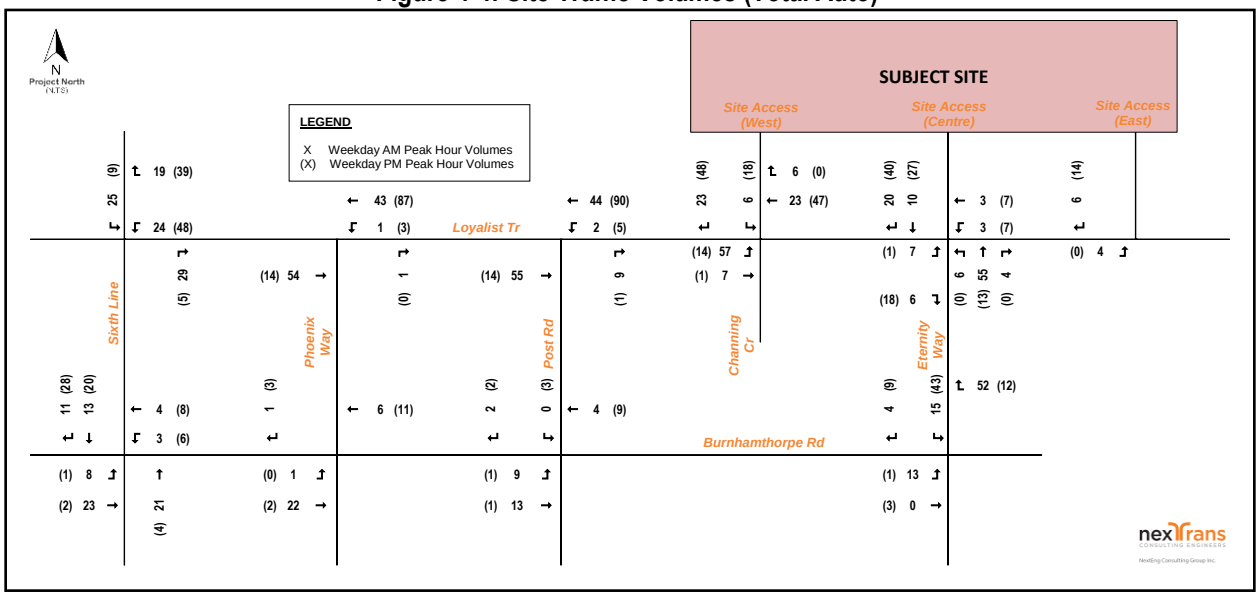
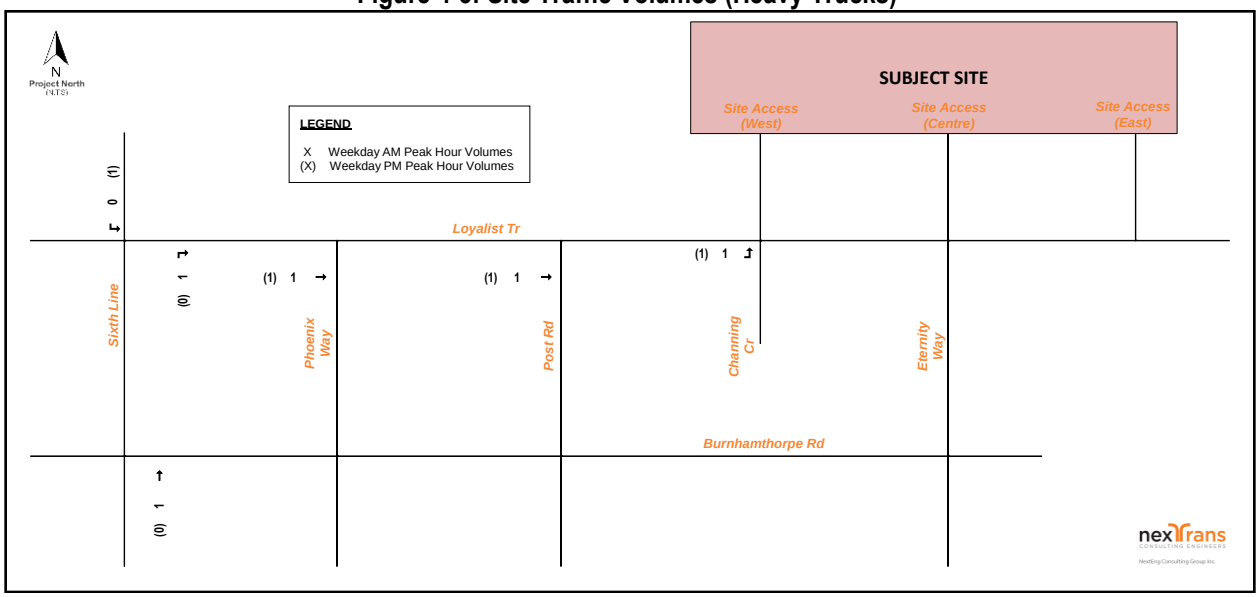


Figure 4-5: Site Traffic Volumes (Heavy Trucks)



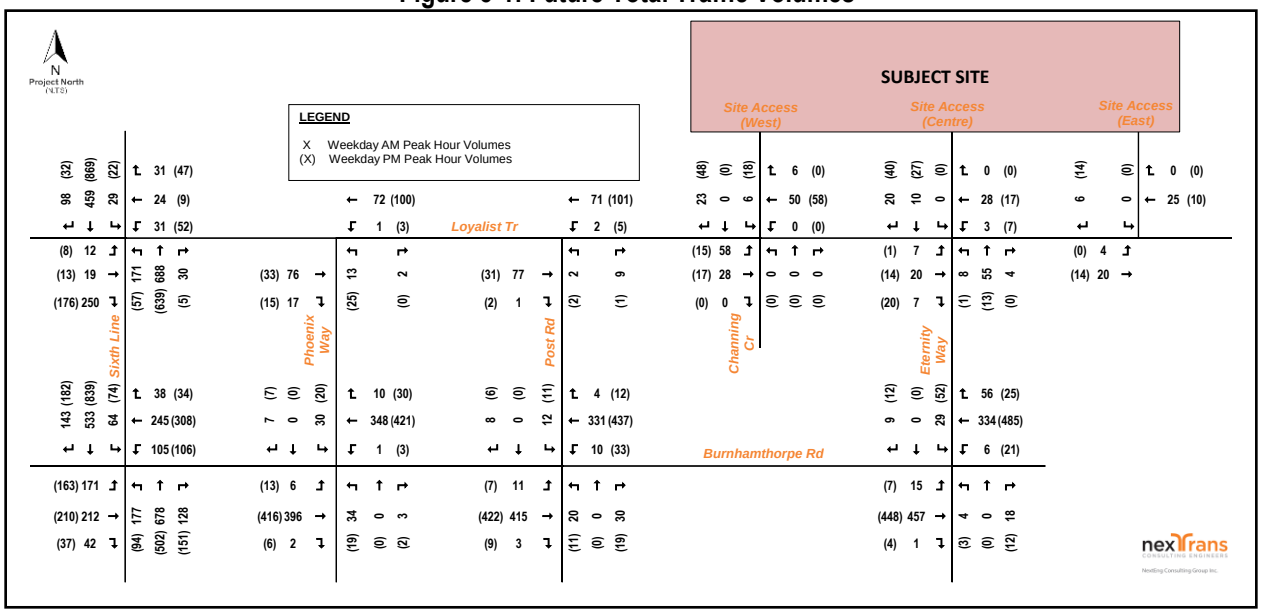
5.0 FUTURE TOTAL TRAFFIC CONDITIONS

The future total traffic conditions include existing traffic volumes, future background traffic volumes, and site-generated auto trips produced by the proposed development. SYNCHRO 10 software was used to analyze the future total traffic conditions for the weekday AM and PM peak hours.

5.1. FUTURE TOTAL INTERSECTION CAPACITY ANALYSIS

The future total traffic volumes are illustrated in **Figure 5-1**.

Figure 5-1: Future Total Traffic Volumes



The results of the intersection capacity analysis under the five-year future total conditions for the signalized and unsignalized intersections are summarized in **Table 5-1** and **Table 5-2,** respectively. Detailed Synchro capacity results are available in **Appendix D**.

Table 5-1: Future Total Intersection Capacity Analysis – Signalized

Intersection	Movement of Interest	AM Peak Hour								PM Peak Hour							
		Overall			V/C	Delay (s)	LOS	Queue (m)		Overall			V/C	Delay (s)	LOS	Queue (m)	
		V/C	Delay (s)	LOS				50th	95th	V/C	Delay (s)	LOS				50th	95th
Sixth Line & Burnhamthorpe Rd	EBL	0.71	17	B	0.73	32	C	21	43	0.64	13	B	0.77	34	C	17	36
	EBT				0.49	20	C	27	48				0.52	19	B	22	39
	WBL				0.46	21	C	12	26				0.48	19	B	10	22
	WBT				0.54	21	C	31	54				0.57	20	B	25	44
	NBL				0.72	25	C	19	67				0.58	11	B	11	46
	NBT				0.60	15	B	42	83				0.46	8	A	23	49
	SBL				0.23	8	A	3	12				0.22	7	A	3	12
	SBT				0.37	8	A	20	46				0.38	7	A	18	38

Table 5-2: Future Total Intersection Capacity Analysis – Unsignalized

Intersection	Movement of Interest	AM Peak Hour				PM Peak Hour			
		Delay (s)	95th Queue (m)	V/C	LOS	Delay (s)	95th Queue (m)	V/C	LOS
Sixth Line & Loyalist Tr/ Driveway	EBL	81	6	0.22	F	92	6	0.24	F
	EBTR	31	40	0.70	D	32	41	0.71	D
	WBL	577	32	1.42	F	641	33	1.53	F
	WBTR	53	15	0.45	F	56	16	0.47	F
	NBL	10	5	0.19	A	10	5	0.19	A
	SBL	9	1	0.04	A	9	1	0.04	A
Phoenix Way & Burnhamthorpe Rd	EBLTR	0	0	0.01	A	0	0	0.01	A
	WBLTR	0	0	0.00	A	0	0	0.00	A
	NBLTR	19	4	0.13	C	19	4	0.13	C
	SBLTR	18	3	0.13	C	18	3	0.13	C
Post Rd & Burnhamthorpe Rd	EBLTR	0	0	0.01	A	0	0	0.01	A
	WBLTR	0	0	0.01	A	0	0	0.01	A
	NBLTR	15	4	0.14	C	15	4	0.14	C
	SBLTR	17	2	0.07	C	17	2	0.07	C
Eternity Way & Burnhamthorpe Rd	EBLTR	0	0	0.01	A	0	0	0.01	A
	WBLTR	0	0	0.01	A	0	0	0.01	A
	NBLTR	13	1	0.05	B	13	1	0.05	B
	SBLTR	21	4	0.16	C	21	4	0.16	C
Phoenix Way & Loyalist Tr	WBLT	0	0	0.00	A	0	0	0.00	A
	NBLR	9	0	0.02	A	9	0	0.02	A
Post Rd & Loyalist Tr	WBLT	0	0	0.00	A	0	0	0.00	A
	NBLR	9	0	0.01	A	9	0	0.01	A
Site Access West / Channing Cr & Loyalist Tr	EBLTR	5	1	0.04	A	5	1	0.04	A
	NBLTR	0	0	0.00	A	0	0	0.00	A
	SBLTR	9	1	0.03	A	9	1	0.03	A
Site Access Centre / Eternity Way & Loyalist Tr	EBLTR	2	0	0.01	A	2	0	0.01	A
	WBLTR	1	0	0.00	A	1	0	0.00	A
	NBLTR	10	2	0.09	A	10	2	0.09	A
	SBLTR	9	1	0.03	A	9	1	0.03	A
Site Access East & Loyalist Tr	EBLT	1	0	0.00	A	1	0	0.00	A
	SBLR	8	0	0.01	A	8	0	0.01	A

Under the future total conditions at the Sixth Line and Burnhamthorpe Road intersection, the intersection will operate within capacity, with all movements of interest will operate with LOS C or better in the AM and PM peak hours.

The unsignalized intersection of Sixth Line and Loyalist Trail / Driveway will operate above capacity for the westbound left movement in the AM and PM peak hours, and continue to operate with LOS F for the eastbound left, westbound left, westbound through-right movements in the AM and PM peak hours. To mitigate the overcapacity and poor levels of service, signalization of the intersection is recommended.

A traffic signal warrant analysis was undertaken for the intersection of Loyalist Trail / Driveway and Sixth Line for the 2026 future total condition as per Ontario Traffic Manual (OTM) Book 12 based on Justification 7 for Projected Volumes (OTM Book 12, Section 4.10). Based on the signal warrant analysis, the warrants are not met for traffic signalization of the intersection. The traffic signal warrant is enclosed in **Appendix G**.

It should be noted that the need for improvements at the intersection of Sixth Line and Loyalist Trail / Driveway is mainly a result of background traffic. The introduction of 50% of GFA as CFC use will contribute a negligible amount

of traffic and there would be a need for signalization regardless. Notwithstanding the foregoing, signalization is recommended.

The future total intersection capacity results for the signalized intersection of Sixth Line and Loyalist Trail / Driveway are summarized in **Table 5-3** based on a 60-second cycle length with permissive left-turns and optimized signal timing splits. Synchro reports are enclosed in **Appendix D**.

Table 5-3: Results of Mitigation Measures – Sixth Line and Loyalist Trail/Driveway (Signalized)

Intersection	Movement of Interest	AM Peak Hour								PM Peak Hour							
		Overall			V/C	Delay (s)	LOS	Queue (m)		Overall			V/C	Delay (s)	LOS	Queue (m)	
		V/C	Delay (s)	LOS				50th	95th	V/C	Delay (s)	LOS				50th	95th
Sixth Line & Loyalist Tr/ Driveway	EBL	0.34	9	A	0.07	23	C	1	5	0.45	9	A	0.04	21	C	1	4
	EBT				0.25	24	C	2	18				0.47	24	C	11	25
	WBL				0.27	24	C	4	9				0.31	23	C	6	13
	WBT				0.12	23	C	3	10				0.07	21	C	1	8
	NBL				0.35	6	A	7	23				0.19	6	A	2	9
	NBT				0.36	5	A	15	33				0.31	5	A	15	29
	SBL				0.07	4	A	1	5				0.05	4	A	1	4
	SBT				0.27	5	A	10	23				0.44	6	A	23	44

With signalization, all intersection movements at the intersection of Sixth Line and Loyalist Trail / Driveway will operate within capacity and acceptable levels of service of LOS C or better within the AM and PM peak hours.

6.0 PARKING AND LOADING REVIEW

This section will review the proposed parking provision for the proposed development and compare it to the parking and loading requirements defined in the Town's Zoning By-law.

6.1. LOADING DOCK REQUIREMENTS

The proposed development is subject to loading dock requirements of the North Oakville Zoning By-law No. 2009-189 and was reviewed to determine the minimum number of loading docks required. As per Section 5.6.1 of Zoning By-law 2009-189, loading docks may be permitted, but shall not be required for any uses, with the exception of industrial uses. Although leasable units are proposed, the zoning by-law loading requirements are applied against the leasable floor area (LFA) of the entirety of the proposed development as confirmed by the Town zoning staff. **Table 6-1** summarizes the minimum loading dock requirements for the entirety.

Table 6-1: Minimum Loading Dock Requirements

Land Use	Leasable Floor Area, LFA (m^2)	Loading Dock Requirement	Loading Docks Provided
Industrial	15,245.99m^2	2	14

The proposed development meets the minimum loading dock zoning by-law requirement of two (2) loading docks with a proposed loading provision of fourteen (14) loading docks.

6.2. VEHICULAR PARKING REQUIREMENTS

The proposed development is subject to the parking requirements of North Oakville Zoning By-law No. 2009-189. A summary of the minimum parking supply requirements and proposed parking supply for the subject site is provided in **Table 6-2**.

Table 6-2: Summary of Vehicular Parking Supply Requirements

Use	LFA (m^2)	North Oakville Zoning By-law No. 2009-189		Proposed Parking Supply	Variance (+/-)
		Parking Rate	Required Parking		
Industrial	6,092.87m^2	1 space per 100m^2	61	341	-17
Office	1,294.68m^2	1 space per 37m^2	35		
Commercial Fitness Centre (CFC)	7,858.44m^2	1 space per 30m^2	262		
TOTAL	15,249.99m^2	-	**358**	**341**	**-17**

The proposed development does not meet the minimum zoning by-law parking requirement of 358 parking spaces as a parking provision of 341 parking spaces is proposed (i.e. technical parking supply shortfall of 17 spaces). Hence, parking justification is required for the proposed parking reduction.

6.3. PROXY PARKING UTILIZATION SURVEYS

To quantify and ensure the availability of a residual parking supply during the peak parking demand of the subject site, Nextrans conducted proxy parking utilization surveys at the following proxy sites for the noted uses that have been approved as proxy sites for this parking survey by Town Transportation staff (see **Appendix B**). All three proxy sites have a mix of industrial, office, and commercial fitness centre (CFC) uses within industrial multi-unit buildings, similar to the subject development.

<u>3260-3280 South Service Road, Town of Oakville</u>

- 3 industrial buildings with 27,468sqm (295,663sqft) of occupied GFA, with mix of industrial/office and commercial fitness centre (CFC) uses.
- CFC land use tenant includes Playlicious Oakville (kids' indoor playground).
- Industrial/Commercial uses include Burloak Technologies, Precision Record Pressing, Dynamic Connections, Hoskin Scientific.

<u>208-220 Wyecroft Road, Town of Oakville</u>

- 3 industrial buildings with approx. 9,323sqm (100,352sqft) of occupied GFA, with mix of industrial/office and commercial fitness centre (CFC) uses.
- CFC uses include:
    - Indoor golf simulation/range (Tracer Golf)
    - Martial arts schools (OCTA Brazillian Jiu-Jitsu, Horizon Taekwon-Do)
    - Gymnastics centre (Schlegel's Gymnastics Centre)
    - Fencing (Canadian Fencing Academy)
    - Fitness gym (Revolution Fitness Centre)
- Industrial/Commercial uses include:
    - Industrial suppliers/services/manufacturing (Drive-Line, Fluidline Inc, VL Motion Systems Inc, Inscan)
    - Sports accessories warehouse/wholesaler (The Sports Company)
    - Print shops (OTB, Print Panther, Binders Galore, Champ)
    - Offices (BlueFrog Environmental Consulting, Global Manager Research)
    - Commercial (Sounds Good, Steamoji)
-

<u>505 Iroquois Shore Road, 1130-1150 Eighth Line, Town of Oakville</u>

- 3 industrial buildings with approx. 11,651sqm (125,410sqft) of occupied GFA, with mix of CFC and industrial/commercial uses.
- CFC uses include:
    - Gym (Oakville Athletic Academy)
    - Swim School (Goldfish Swim School Oakville)
    - Multi-Sports Facility (JSI Hockey and Pickle Ball Court)
    - Boxing Gym (JTI Boxing)
    - Indoor Baseball Training Facility (Ontario Royals Baseball Club)
- Industrial/Commercial uses include:
    - Suppliers (Nortec, InSchoolWear, Striker Bowling Solutions, D-Tec Systems, Liquid Rubber, Eureka Kitchen and Bath)

The proxy parking surveys were undertaken at 30-minute intervals for the foregoing proxy sites during Wednesday, July 24, 2024, between 8am and 8pm, and Saturday, July 27, 2024, between 9am to 9pm.

The selected survey methodologies (i.e. date and duration) were selected to reflect the anticipated peak operational parking demand for the proposed land uses. The proxy parking demand survey results for the foregoing proxy sites are detailed in **Table 6-3**, **Table 6-4**, and **Table 6-5**.

Table 6-3: Proxy Parking Demand Survey Results - 3260-3280 South Service Road

Date	Wednesday, July 24, 2024		Saturday, July 27, 2024	
Time Period (Start)	Parking Demand	Utilization Rate (per 100 m²)	Parking Demand	Utilization Rate (per 100 m²)
8:00 AM	87	0.32	-	-
8:30 AM	98	0.36	-	-
9:00 AM	119	0.43	4	0.01
9:30 AM	124	0.45	6	0.02
10:00 AM	127	0.46	9	0.03
10:30 AM	121	0.44	13	0.05
11:00 AM	123	0.45	32	0.12
11:30 AM	132	0.48	42	0.15
12:00 PM	133	0.48	39	0.14
12:30 PM	132	0.48	38	0.14
1:00 PM	133	0.48	25	0.09
1:30 PM	138	0.5	31	0.11
2:00 PM	**145**	**0.53**	45	0.16
2:30 PM	144	0.52	43	0.16
3:00 PM	137	0.5	50	0.18
3:30 PM	120	0.44	47	0.17
4:00 PM	116	0.42	49	0.18
4:30 PM	86	0.31	50	0.18
5:00 PM	84	0.31	**51**	**0.19**
5:30 PM	46	0.17	36	0.13
6:00 PM	46	0.17	35	0.13
6:30 PM	47	0.17	28	0.1
7:00 PM	50	0.18	27	0.1
7:30 PM	49	0.18	29	0.11
8:00 PM	46	0.17	11	0.04
8:30 PM	-	-	7	0.03
9:00 PM	-	-	5	0.02
Maximum	**145**	**0.53**	**51**	**0.19**

Table 6-4: Proxy Parking Demand Survey Results - 208-220 Wyecroft Road

Date	Wednesday, July 24, 2024		Saturday, July 27, 2024	
Time Period (Start)	Parking Demand	Utilization Rate (per 100 m²)	Parking Demand	Utilization Rate (per 100 m²)
8:00 AM	47	0.5	-	-
8:30 AM	52	0.56	-	-
9:00 AM	77	0.83	38	0.41
9:30 AM	**113**	**1.21**	43	0.46
10:00 AM	102	1.09	51	0.55
10:30 AM	100	1.07	59	0.63
11:00 AM	93	1	56	0.6
11:30 AM	95	1.02	66	0.71
12:00 PM	93	1	**73**	**0.78**
12:30 PM	85	0.91	54	0.58
1:00 PM	89	0.95	47	0.5
1:30 PM	97	1.04	45	0.48
2:00 PM	81	0.87	51	0.55
2:30 PM	79	0.85	44	0.47
3:00 PM	83	0.89	46	0.49

3:30 PM	85	0.91	43	0.46
4:00 PM	84	0.9	43	0.46
4:30 PM	73	0.78	35	0.38
5:00 PM	76	0.82	25	0.27
5:30 PM	81	0.87	22	0.24
6:00 PM	84	0.9	26	0.28
6:30 PM	72	0.77	26	0.28
7:00 PM	75	0.8	25	0.27
7:30 PM	64	0.69	32	0.34
8:00 PM	51	0.55	35	0.38
8:30 PM	-	-	34	0.36
9:00 PM	-	-	24	0.26
Maximum	**113**	**1.21**	**73**	**0.78**

Table 6-5: Proxy Parking Demand Survey Results - 505 Iroquois Shore Road, 1130-1150 Eighth Line

Date	Wednesday, July 24, 2024		Saturday, July 27, 2024	
Time Period (Start)	Parking Demand	Utilization Rate (per 100 m²)	Parking Demand	Utilization Rate (per 100 m²)
8:00 AM	53	0.45	-	-
8:30 AM	63	0.54	-	-
9:00 AM	76	0.65	61	0.52
9:30 AM	94	0.81	**74**	**0.64**
10:00 AM	99	0.85	67	0.58
10:30 AM	102	0.88	54	0.46
11:00 AM	88	0.76	65	0.56
11:30 AM	96	0.82	59	0.51
12:00 PM	95	0.82	59	0.51
12:30 PM	83	0.71	57	0.49
1:00 PM	83	0.71	59	0.51
1:30 PM	95	0.82	52	0.45
2:00 PM	96	0.82	39	0.33
2:30 PM	92	0.79	29	0.25
3:00 PM	78	0.67	22	0.19
3:30 PM	80	0.69	20	0.17
4:00 PM	82	0.7	19	0.16
4:30 PM	101	0.87	16	0.14
5:00 PM	**106**	**0.91**	12	0.1
5:30 PM	79	0.68	10	0.09
6:00 PM	89	0.76	9	0.08
6:30 PM	85	0.73	10	0.09
7:00 PM	75	0.64	6	0.05
7:30 PM	57	0.49	7	0.06
8:00 PM	44	0.38	6	0.05
8:30 PM	-	-	6	0.05
9:00 PM	-	-	6	0.05
Maximum	**106**	**0.91**	**74**	**0.64**

Based on the parking demand survey results of all three proxy sites, the maximum parking demand rate was 1.21 space per 100sqm as observed for 208-220 Wyecroft Road on Wednesday, July 24, 2024 at 9:30am. The peak proxy parking demand rate of 1.21 space per 100sqm was adopted as the anticipated peak parking demand rate for the subject site.

For an apples-to-apples comparison, the proposed GFA of 15,578.83sqm for the subject site was used given that the estimated GFA was considered for the proxy sites. Based on the peak proxy parking demand of 1.21 space per 100sqm, a total of 189 parking spaces is required to accommodate the anticipated peak parking demand for the subject development. The proposed parking provision of 341 spaces will be able to accommodate the peak parking demand of 189 spaces, with a peak residual parking supply of 152 spaces. On this basis, the proposed parking provision of 341 spaces is sufficient to meet the anticipated parking demand of the subject development.

6.4. ACCESSIBLE PARKING REQUIREMENTS

The proposed development is subject to the accessible (i.e. barrier-free) parking requirements of North Oakville Zoning By-law No. 2009-189. A summary of the minimum accessible parking spaces required and proposed accessible parking supply for the subject site is provided in **Table 6-6**.

Table 6-6: Summary of Accessible Parking Supply Requirements

North Oakville Zoning By-law No. 2009-189		Proposed Accessible Parking Supply	Variance (+/-)
Required Parking Supply for General Vehicular Parking	Required Accessible Parking Supply		
358	8 (4 Type A, 4 Type B)	10 (5 Type A, 5 Type B)	+2

The proposed development meets the minimum zoning by-law accessible parking requirement of eight (8) parking spaces with a proposed accessible parking provision of 10 parking spaces.

6.5. BICYCLE PARKING REQUIREMENTS

The proposed development is subject to the bicycle parking requirements of North Oakville Zoning By-law No. 2009-189. A summary of the minimum bicycle parking spaces required and proposed bicycle parking supply for the subject site is provided in **Table 6-7**.

Table 6-7: Summary of Bicycle Parking Supply Requirements

North Oakville Zoning By-law No. 2009-189	
Minimum Bicycle Parking Rate	Required Bicycle Parking Supply
7% of required automobile parking spaces	26

A minimum of 26 bicycle parking spaces is recommended to meet the minimum zoning by-law bicycle parking requirement of 26 parking spaces.

7.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management (TDM) is a set of strategies that strive towards a more efficient transportation network by influencing travel behaviour and patterns. Efficient implementation of TDM strategies can reduce vehicle usage and encourage people to engage in more sustainable modes of travel. In addition to the active transportation and transit networks discussed under **Section 2**, there are several opportunities to incorporate TDM measures that support alternative modes of travel. The recommendations should enhance non-single occupant auto vehicle trips for the future tenants, employees, and visitors of the subject development. These TDM strategies are critical in achieving a balanced multi-modal transportation system in the Town of Oakville. As per Section 7.7.2.3 of the North Oakville East Secondary Plan, the Town recognizes the role of TDM to promote more efficient use of transportation infrastructure, to encourage increased transit use, and to promote a number of TDM measures. A variety of multi-modal infrastructure strategies and TDM measures have been detailed below.

7.1. PEDESTRIAN-BASED STRATEGIES

Ensure convenient pedestrian connections to the future pedestrian and transit facilities in the vicinity of the subject site.

Pedestrian sidewalks are proposed within the subject site along the frontage and sides of the proposed buildings and along the frontage of the subject site along Loyalist Trail, in addition to a number of proposed internal pedestrian crosswalks between the proposed buildings, to provide direct connection between the proposed buildings and external access to future transit stops along Sixth Line and Burnhamthorpe Road.

7.2. CYCLING-BASED STRATEGIES

Connection to the future cycling network.

As the frontage of the proposed development is within short walking distance to Sixth Line, cyclists will have direct connection to the future bike paths along Sixth Line after the completion of the Sixth Line road widening and improvements. The active transportation infrastructure nearby the study area will encourage employees to travel via cycling.

Promote and increase cycling awareness & multi-modal transportation.

It is recommended that information packages be provided to tenants to help encourage active transportation and increase awareness of different travel alternatives. The package should include information regarding the environmental and health benefits of cycling, rules of the road, and maps of existing and future active transportation infrastructure in the surrounding area.

Provision of short-term bicycle parking.

The provision of bicycle parking facilities will support and encourage active transportation, while taking advantage of the proposed cycling infrastructure around the subject site. Short-term bicycle parking facilities are recommended to be located at-grade in a highly visible and convenient area close to each building for employees.

7.3. TRANSIT-BASED STRATEGIES

Connection to the existing and future transit network.

Currently, transit service is provided via Oakville Transit Home to Hub on-demand transit service. Home to Hub service for North Oakville provides on-demand bus service between eligible areas including the frontage of the subject site along Loyalist Trail and Uptown Core Terminal south of the area for connection to fixed route transit services from Oakville Transit and GO Transit.

Further existing transit services within the broader area to the subject site include Oakville Transit Route 1 Trafalgar to the east and the Trafalgar / 407 GO Carpool lot for carpooling and connection to Route 1 and GO Bus routes servicing the GTA.

The North Oakville East Secondary Plan provides policies that are supportive of future transit implementation for North Oakville including the surrounding area to the subject site. Within the secondary plan, Section 7.7.2.2(a), states the following:

> "*The Town shall support a "transit first" policy to ensure that development will proceed in a manner which will be supportive of the early provision of transit services"…"There will be a transit stop at the centre of each neighbourhood. Additional stops will be located so that all residents and employees are predominantly within 400 metre walking distance of a transit stop."*

Burnhamthrope Road and Sixth Line are designated as planned transit corridors as per Figure NOE 4 *Transportation Plan* within the North Oakville East Secondary Plan. Oakville Transit staff have noted that future local transit stops will be located nearby the subject site along Sixth Line and Burnhamthorpe Road, in which fixed route bus transit service will be available to the subject site and the surrounding area in the future. The implementation of bus transit service along Sixth Line and Burnhamthorpe Road will provide east-west and north-south transit connections to further transit service within the Town of Oakville and within the rest of the GTA.

Further, within the 2041 Frequent Rapid Transit Network as per the Metrolinx 2041 Regional Transportation Plan, Trafalgar Road is designated as a proposed frequent rapid transit corridor for Bus Rapid Transit (BRT) or Light Rail Transit (LRT) between Oakville GO Station and Highway 407 and for priority bus service between Highway 407 and Milton GO Station. The subject site will be located within a reasonable walking distance (i.e. approximately an eleven-minute walk) to planned BRT/LRT facilities along Trafalgar Road at Burnhamthorpe Road East. The planned higher order transit corridor within the area to the subject site will encourage employees to use alternative means of transportation.

Communication Strategy.

In order for employees to take advantage of the transit services surrounding the subject site, it is recommended that information packages be provided to new tenants and employees to increase awareness of existing and future multi-modal modes of transportation. Public transit information such as existing and proposed route maps, transit services, schedule timetables should be made available to employees. Route, on-demand transit service, scheduling information could be provided on a display board located at a central, convenient location to subject site or at each proposed building. The owner can also direct tenants and employees to websites and mobile apps for further information and real-time information. Further, Presto cards pre-loaded with a nominal value can be provided to all employees to encourage and promote non-auto commuting.

7.4. AUTOMOBILE-BASED STRATEGIES

The Smart Commute Program has been established in the form of ten (10) transportation management associations (TMAs) across the GTHA. The Smart Commute TMAs are supported by Metrolinx to coordinate and implement TDM initiatives. They are committed to:

- Implement employee trip reduction program at local workplaces;
- Decrease traffic congestion, and improve air quality and health by reducing vehicle emissions;
- Improve employee productivity and morale, and reduce employee turnover;
- Advocate for improved transit service, and increased local transportation infrastructure;
- Bus-only and cycling lanes, and a wider network of subway and light rapid transit;
- Promote the benefits of transit-supportive development and smart-growth strategies;
- Encourage legislative flexibility in support of high-value, cost effective transportation strategies such as vanpools, telework, transit subsidies and shuttle services; and;
- Increase opportunities for TMA collaboration with business and government.

Smart Commute offers one-on-one support for staff to use sustainable modes and provides promotions and incentive on an on-going basis. A web-based car matching tool is providing to allow carpooler to easily identify ride matching options among a large membership base and form carpooling arrangements. The benefits of this program include the following.

Employer Benefits:

- A more attractive workplace for potential recruits;
- Better employee retention;
- Increased employee productivity; and,
- Reduced parking requirements.

Employee Benefits:

- Reduced commuting time and costs;
- Increased job satisfaction; and
- Improved health and well-being.

Carpooling with other employees and priority carpool parking spaces.

The owner can promote and encourage tenants and employees to seek carpooling initiatives with other employees of the subject site through information packages to reduce the trip generation of single occupancy vehicles (SOVs). The Smart Commute program by Metrolinx, with support from local municipalities, can assist and encourage smart travel options such as carpooling. An online platform tool by Smart Commute provides commuters with the opportunity to match with potential carpool partners, minimizing the costs of owning a car by sharing the costs of fuel instead. Through the information packages, employees can be directed to Smart Commute to discover potential carpooling opportunities within its workplace commuter program.

Further, a number of parking spaces located at convenient locations near the front of each subject building are recommended to be demarcated as parking spaces exclusively reserved or prioritized for carpool vehicles to provide convenience to carpool users and incentivize people to carpool.

Guaranteed Ride Home Service.

An impediment to some commuters participating in TDM initiatives is the need and flexibility to have a ride home in the event of a personal need or emergency. Guaranteed Ride Home programs have been developed in many communities and by employers to provide card fare or alternative methods of ensuring that there is a return mode of travel if an emergency arises.

7.5. WORK-BASED STRATEGIES

Flexible work arrangements.

Employers can partner with Smart Commute and its workplace commuter program to explore sustainable options such as teleworking (i.e. work from home) arrangements, wherein employees in which teleworking is viable, can work a number of days of the week at home instead of physically commuting to the workplace. Teleworking can help employees save fuel costs and commuting time, increase employee productivity, reduce traffic congestion, and can lower facility costs through fewer overhead costs and workstations.

Individualized Programs and Planning

Through the employer workplace program with Smart Commute, the applicant can coordinate for a Smart Commute representative can attend an information session to introduce Smart Commute initiatives and TDM measures and to work directly with individuals or groups on travel behavior to develop a program that can meet the needs of the workplace.

7.6. TDM IMPLEMENTATION

Based on the review noted, the following additional TDM measures and incentives are recommended to compliment the TDM initiatives of the proposed development. **Table 7-1** summarizes the TDM checklist which is recommended for the proposed development.

Table 7-1: TDM Measures Checklist

Category	TDM Measure	Recommended Actions	Responsibility
Cycling and Walking	• Pedestrian Connections • Cycling Connections • Ped/cycling connections to transit facilities • Internal ped/cycling circulation • Bicycle parking	• The proposed development provides direct shared pedestrian and cycling connection to nearby pedestrian and road network. • It is recommended to provide bicycle parking as proposed in the latest proposed site plan to help promote a reduction in SOV trips.	• Applicant • Applicant
Transit	• Transit incentives (i.e. PRESTO cards) • Information packages (Oakville Transit/GO maps, transit schedules, Home to Hub and Care-A-Van information and schedules, cycling maps) • Communication strategy and physical location to deliver PRESTO cards and information packages	• The amount of transit incentive to be provided per building shall be decided by the Town. • The applicant shall coordinate with the Town to deliver and promote the transit, active transportation, and Smart Commute information packages. • It is recommended that the owner provide one-time pre-loaded PRESTO Cards with a nominal value to employees on an initial demand basis. This will encourage employees to consider taking transit as alternative modes of transportation.	• Town to consider • Applicant, Town • Applicant

Automobile	• Carpool parking • Membership with Smart Commute • Teleworking	• The proposed development is recommended to provide carpool parking spaces. • Committing to a 2-year membership with Smart Commute. • Provide Smart Commute information such as website or pamphlets to employees. • It is recommended that the Owner coordinate with Town to have a representative from the Town provide a "lunch and learn" presentation about alternative modes of transportation and introduce the Smart Commute program to tenants and employees.	• Applicant • Applicant • Applicant • Applicant
Work	• Telework • Individualized programs	• The applicant can coordinate with Smart Commute via workplace program to introduce opportunities for telework for employees where applicable and coordinate for possible individualized workplace travel programs.	• Applicant
Monitoring Program/ Report	• The applicant will undertake the TDM Monitoring Follow-up Survey with tenants / employees two years after the Initial Surveys and report back to the Town staff.	• The Applicant shall coordinate with Town staff for list of follow-up survey questions.	• Applicant

In summary, TDM implementation actively encourages employees to explore and take advantage of the alternative modes of travel. The Smart Commute website and mobile app can provide support for individuals to travel efficiently and sustainably through materials, e-resources, and an online tool for carpool matching.

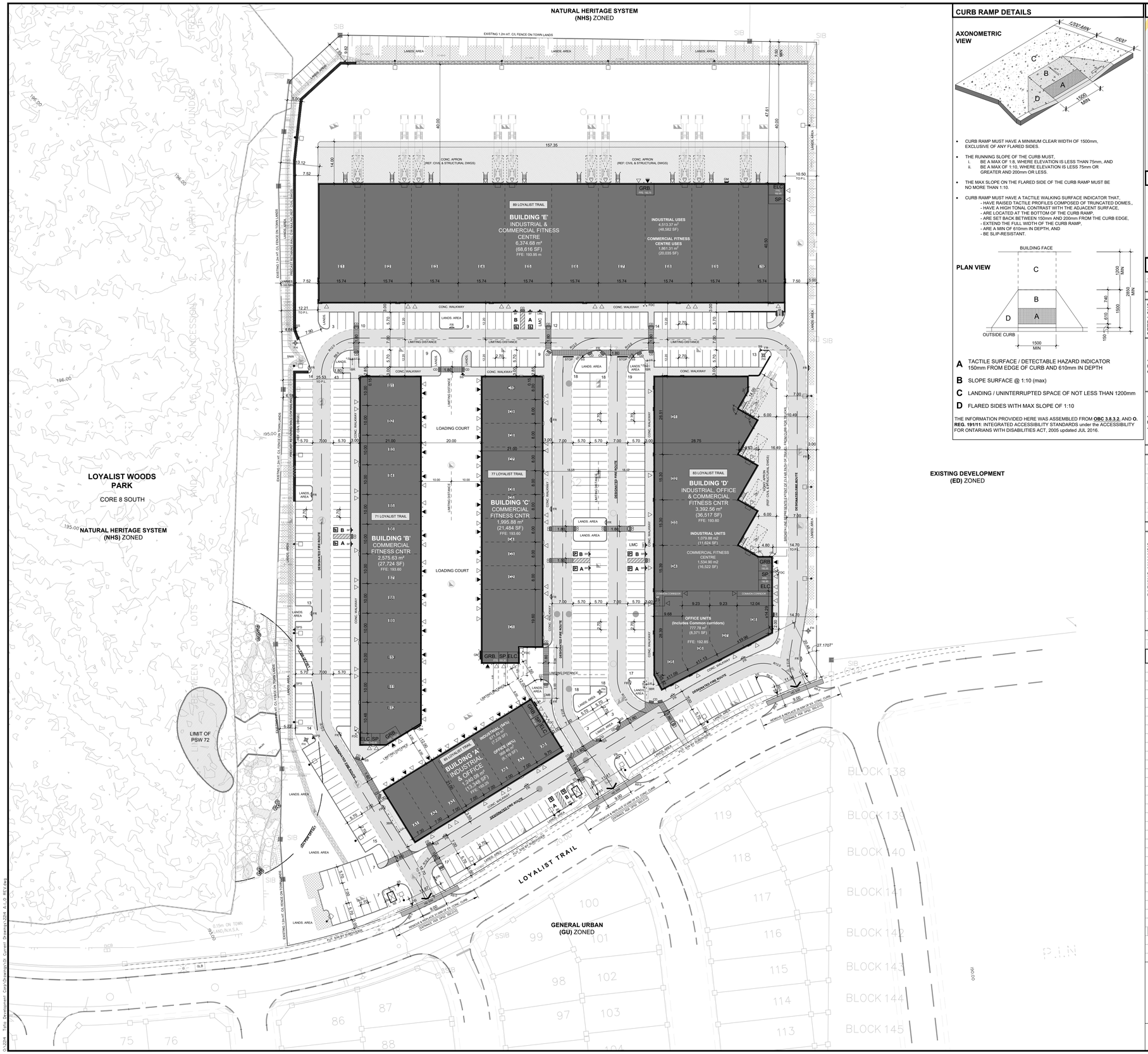
8.0 CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations of this transportation impact study are summarized as follows:

- The proposed development will generate 195 trips (130 in, 65 out) and 176 trips (29 in, 147 out) in the weekday AM and PM peak hours, respectively, including one (1) inbound truck trip in both the AM and PM peak hours (based on AM and PM peak hour of adjacent street).
- The truck trip generation for the weekday AM and PM peak hour of generator was also reviewed. It is noted that the variance in truck trips generated by the subject site during the weekday AM and PM peak hour of generator (based on ITE LUC 110) to the weekday AM and PM peak hour of adjacent street is nominal, with a total peak hour of generator yield of 2 two-way truck trips (1 in, 1 out) and 3 two-way truck trips (2 in, 1 out) in the weekday AM and PM peak hours, respectively.
- Traffic signalization of the intersection of Sixth Line and Loyalist Trail / Driveway is recommended for the future conditions to mitigate poor levels of service from the turning movements of the minor roads.
- The proposed loading provision of fourteen (14) loading docks meets the North Oakville Zoning By-law 2009-189 minimum loading dock requirement of two (2) loading docks.
- The proposed parking provision of 341 parking spaces does not meet the North Oakville Zoning By-law 2009-189 minimum parking supply requirement of 358 parking spaces. A parking demand survey was undertaken at three proxy sites of similar built form and uses to the proposed development. The highest peak parking demand rate of all proxy sites was 1.21 space per 100sqm, which was considered as the anticipated peak parking demand rate for the subject development. Per this rate, a minimum of 189 spaces is required to accommodate the anticipated parking demand of the subject site, which is met by the proposed parking provision of 341 spaces.
- The proposed accessible parking provision of 10 parking spaces meets the zoning by-law minimum accessible parking space requirement of 8 parking spaces.
- A bicycle parking provision of 26 bicycle parking spaces is recommended to meet the North Oakville Zoning By-law 2009-189 minimum bicycle parking supply requirement.
- A range of Transportation Demand Management (TDM) measures that target a reduction in single occupancy vehicle trips are proposed including pedestrian connections, bicycle parking, communications packages, transit incentives, connections to future transit networks, Smart Commute, and carpooling.

Appendix A

Architectural Site Plan



CURB RAMP DETAILS

AXOMETRIC VIEW

- CURB RAMP MUST HAVE A MINIMUM CLEAR WIDTH OF 1500mm, EXCLUSIVE OF ANY FLARED SIDES.
- THE RUNNING SLOPE OF THE CURB MUST,
  - i. BE A MAX OF 1:8, WHERE ELEVATION IS LESS THAN 75mm, AND
  - ii. BE A MAX OF 1:10, WHERE ELEVATION IS LESS 75mm OR GREATER AND 200mm OR LESS.
- THE MAX SLOPE ON THE FLARED SIDE OF THE CURB RAMP MUST BE NO MORE THAN 1:10.
- CURB RAMP MUST HAVE A TACTILE WALKING SURFACE INDICATOR THAT,
  - HAVE RAISED TACTILE PROFILES COMPOSED OF TRUNCATED DOMES.,
  - HAVE A HIGH TONAL CONTRAST WITH THE ADJACENT SURFACE,
  - ARE LOCATED AT THE BOTTOM OF THE CURB RAMP.
  - ARE SET BACK BETWEEN 150mm AND 200mm FROM THE CURB EDGE,
  - EXTEND THE FULL WIDTH OF THE CURB RAMP,
  - ARE A MIN OF 610mm IN DEPTH, AND
  - BE SLIP-RESISTANT.

PLAN VIEW

A TACTILE SURFACE / DETECTABLE HAZARD INDICATOR 150mm FROM EDGE OF CURB AND 610mm IN DEPTH

B SLOPE SURFACE @ 1:10 (max)

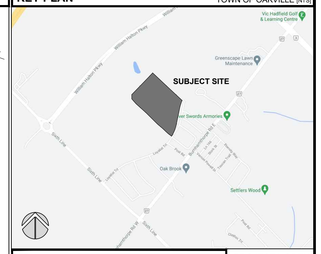
C LANDING / UNINTERRUPTED SPACE OF NOT LESS THAN 1200mm

D FLARED SIDES WITH MAX SLOPE OF 1:10

THE INFORMATION PROVIDED HERE WAS ASSEMBLED FROM **OBC 3.8.3.2**, AND **O. REG. 191/11**: INTEGRATED ACCESSIBILITY STANDARDS under the ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT, 2005 updated JUL 2016.

KEY PLAN

TOWN OF OAKVILLE (NTS)



LEGAL DESCRIPTION

Block 152 on Plan 20M-1221
PLAN OF SUBDIVISION OF
PART OF LOTS 14 AND 15,
CONCESSION 2
NORTH OF DUNDAS STREET
(GEOGRAPHIC TOWNSHIP OF TRAFALGAR)
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

AS PREPARED BY:
R-PE SURVEYING LTD. ONTARIO LAND SURVEYORS

PROJECT NORTH

TRUE NORTH

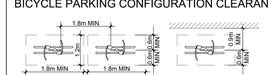
SITE STATISTICS

ZONING	LIGHT EMPLOYMENT | LE sp:45		
SITE AREA	47,513.48 m2	or	11.74 Ac
	REQUIRED		PROVIDED
SETBACKS: FRONT YARD (Loyalist Trail)	3.0 m MIN		18.70 m
SETBACKS: FRONT YARD	24.0 m MAX		18.70 m
SETBACKS: SIDE YARD	3.0 m MIN		10.50 m
SETBACKS: REAR YARD	7.5 m MIN		47.61 m
G.F.A.: BUILDING 'A'	1,240.08 m2	or	13,348 SF
G.F.A.: BUILDING 'B'	2,575.63 m2	or	27,724 SF
G.F.A.: BUILDING 'C'	1,995.88 m2	or	21,484 SF
G.F.A.: BUILDING 'D'	3,392.56 m2	or	36,517 SF
G.F.A.: BUILDING 'E'	6,374.68 m2	or	68,616 SF
G.F.A.: TOTAL G.F.A.	15,578.83 m2	or	167,689 SF
L.F.A.: BUILDING 'A'	1,188.00 m2	or	12,788 SF
L.F.A.: BUILDING 'B'	2,518.35 m2	or	27,107 SF
L.F.A.: BUILDING 'C'	1,943.88 m2	or	20,924 SF
L.F.A.: BUILDING 'D'	3,284.25 m2	or	35,351 SF
L.F.A.: BUILDING 'E'	6,311.51 m2	or	67,937 SF
L.F.A.: TOTAL L.F.A.	15,245.99 m2	or	164,106 SF
	REQUIRED		PROVIDED
FLOOR SPACE INDEX	3.0 MAX		0.32
LOT FRONTAGE	15.0 m MIN		±198 m
BUILDING HEIGHT	15 STRY MAX		1 STRY
LANDSCAPED AREA	10 % MIN		16.51 % or 7,845.26 m2
SITE COVERAGE	15,578.83 m2	or	32.78 %
PAVED AREA	24,092.43 m2	or	50.71 %
	REQUIRED		PROVIDED
PARKING ANALYSIS: **BASED ON TOTAL L.F.A.**			
OFFICE USES: 1,294.68 m2 @ 1 Space / 37 m2 =	35 Spaces		
INDUSTRIAL USES: 6,092.87 m2 @ 1 Space / 100 m2 =	61 Spaces		
COMMERCIAL FITNESS CENTRE: 7,858.44 @ 1 Space / 30 m2 =	262 Spaces		
TOTAL PARKING	358 Spaces		341 Spaces
ACCESSIBLE PARKING 201-300 spaces PROVIDED	3 Type **A** 4 Type **B** OR **7 Spaces**		5 Type **A** 5 Type **B** OR **19 Spaces**
LOADING SPACES [min]	2 Spaces		14 Spaces
BICYCLE SPACES [7% of Parking]	16 Spaces		16 Spaces

SYMBOL LEGEND

	MAN DOOR LOCATIONS
	LOADING DOCK LOCATIONS
	DRIVE-IN OR OVERHEAD DOORS
FH	FIRE HYDRANT + VALVE
CB	CATCH BASIN (Ref: CIVIL DWGS)
DCB	DOUBLE CATCH BASIN (Ref: CIVIL DWGS)
SANMH	SANITARY MANHOLE (Ref: CIVIL DWGS)
CB/MH	CATCH BASIN / MANHOLE (Ref: CIVIL DWGS)
SMH	STORM MANHOLE (Ref: CIVIL DWGS)
HP	HYDRO POLE STANDARD / UTILITY POLE
1BR	1 BICYCLE RING: 2 SPACES (Ref: DTL BELOW & LANDS. DWGS)
	DIRECTION OF TRAFFIC FLOW
HT	HYDRO TRANSFORMER ON CONC. PAD (Ref: ELEC. DWGS)
GM	GAS METER LOCATIONS
	HANDICAP PARKING | TYPE 'A' (3.40m MIN) TYPE 'B' (2.70m MIN)
D+H	LIGHT STANDARD (Ref: ELEC. DWGS)
	PEDESTRIAN DRIVE AISLE CONNECTIONS: IMPRESSED ASPHALT
CD	CURB DEPRESSION / RAMP WITH TACTILE PLATES
	CONC. FILLED STEEL BOLLARDS AT O/H DOORS
FDC	FIRE DEPARTMENT CONNECTION / SIAMESE CONNECTION
BF	BARRIER-FREE PARKING SIGNAGE
BN WR	BENCH & WASTE RECEPTACLE (Ref: LANDS. DWGS)
FR	FIRE ROUTE
SIB	STOP SIGN
	PAINTED STOP BAR (WHERE REQUIRED)
SP.	SPRINKLER ROOM
ELC.	ELECTRICAL ROOM
GRB.	INTERNAL REFUSE STORAGE
	LOADING SPACE (9.0 m x 3.7 m x 4.2 m Clear Height)
LMC	LIMITED MOBILITY & CAREGIVER PARKING SPACE / SIGN
	SNOW STORAGE AREAS
P.L.	PROPERTY LINE (EXTENT OF LIMITING DISTANCE)
CMB	SHARED COMMUNITY MAILBOX: CPC- 4 MODULE
SPS	'SNOW PILES NOT PERMITTED' SIGNAGE

BICYCLE PARKING CONFIGURATION CLEARANCES



OTM BOOK 18 - CYCLING FACILITIES

GENERAL NOTES

REFER TO LANDSCAPE DRAWINGS FOR SNOW STORAGE DETAILS.

No.	ISSUED	DATE
1	ISSUED FOR SPA	JUL. 16, 2021
2	RE-ISSUED FOR SPA	NOV. 23, 2021
3	RE-ISSUED FOR SPA	MAR. 01, 2022
4	RE-ISSUED FOR SPA	MAY 19, 2022
5	ISSUED FOR ZBLA	JUNE 17, 2024

No.	REVISION	DATE
7	REVISED PARKING ANALYSIS PER UPDATED USES	JUNE 14, 2024
6	REVISED AS PER BLDG D. C.C.N. #1	JUNE 01, 2023
5	REVISED AS PER BLDG D. C.C.N. #1	MAY 31, 2023
4	BUILDING D GRID 6c REVISION	MAY 05, 2023
3	TRANSFORMERS RELOCATED AT OAKVILLE HYDRO'S REQUEST	AUG. 31 2022
2	REVISED TO SUIT MARKETING CRITERIA	JAN. 13, 2022
1	REVISED TO SUIT SPA 1ST ROUND COMMENTS	NOV. 23, 2021

BALDASSARRA Architects Inc.

30 Great Gulf Drive, Unit 20 | Concord ON | L4K 0K7
T. 905.660.0722 | **www.baldassarra.ca**

ONTARIO ASSOCIATION OF ARCHITECTS
A. BALDASSARRA LICENSE 3654

OWNERS INFORMATION:

TAFIA DEVELOPMENT CORP.

65, 71, 77, 83 & 89 LOYALIST TRAIL,
OAKVILLE, ON.

SITE PLAN

SP.1215.003/01

DATE:	DRAWN BY:	CHECKED:	SCALE:
JUL. 2021	CI/DW		1:600

PROJECT No. 22-14

DRAWING No. A-1.0

Appendix B

Terms of Reference

John Nhan

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: July 19, 2024 9:53 AM
To: John Nhan
Cc: Tina Arruda; Leigh Musson; Eric Chan
Subject: RE: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

Follow Up Flag: Follow up
Flag Status: Flagged

Hi John;

Forgive the delayed response, the third proxy site should include all three buildings on the site (3260 – 3280 South Service Road) as the whole site is reflective of the proposed application.
Please undertake the survey time during the weekday from 8am – 8pm.

If you have any further questions or comments, please feel free to contact me.

Regards
Aquisha

Aquisha Khan, **(She/Her/Hers)**, **P. Eng.**
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, ext. 3236 | www.oakville.ca

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From: John Nhan <john@nextrans.ca>
Sent: Friday, July 19, 2024 9:17 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Tina Arruda <tinaa@trinistar.com>; Leigh Musson <leigh.musson@oakville.ca>; Eric Chan <eric.chan@oakville.ca>
Subject: RE: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

> Some people who received this message don't often get email from john@nextrans.ca. Learn why this is important

Hi Aquisha,

I left a voicemail earlier this week.

I'd like to follow up on this matter for confirmation of the third proxy site, as this is the one remaining item we require prior to proceeding with the parking survey.

Thank you,
John Nhan, B.Eng., EIT
Transportation Analyst

o: 905-503-2563 ext.223
e: john@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

From: John Nhan
Sent: Monday, July 15, 2024 6:30 PM
To: 'Aquisha Khan' <aquisha.khan@oakville.ca>
Cc: 'Tina Arruda' <tinaa@trinistar.com>; 'Leigh Musson' <leigh.musson@oakville.ca>; Richard Pernicky <richard@nextrans.ca>; 'Eric Chan' <eric.chan@oakville.ca>
Subject: RE: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study
Importance: High

Hi Aquisha,

Just following up on if the third proxy site is acceptable, as we'd like to move forward with conducting the surveys.

To confirm your previous comment of "Please undertake the parking studies for at least 1 weekday and 1 weekend 12-hour period increments", the surveys will be undertaken on one middle weekday (9am-9pm) and one Saturday (9am-9pm).

Thank you,
John Nhan, B.Eng., EIT
Transportation Analyst

o: 905-503-2563 ext.223
e: john@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

From: John Nhan
Sent: Thursday, July 11, 2024 6:20 PM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Tina Arruda <tinaa@trinistar.com>; Leigh Musson <leigh.musson@oakville.ca>; Richard Pernicky <richard@nextrans.ca>; Eric Chan <eric.chan@oakville.ca>
Subject: RE: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study
Importance: High

Hi Aquisha,

Please see the following updated estimated *occupied* GFA breakdown based on our proxy site review as summarized:

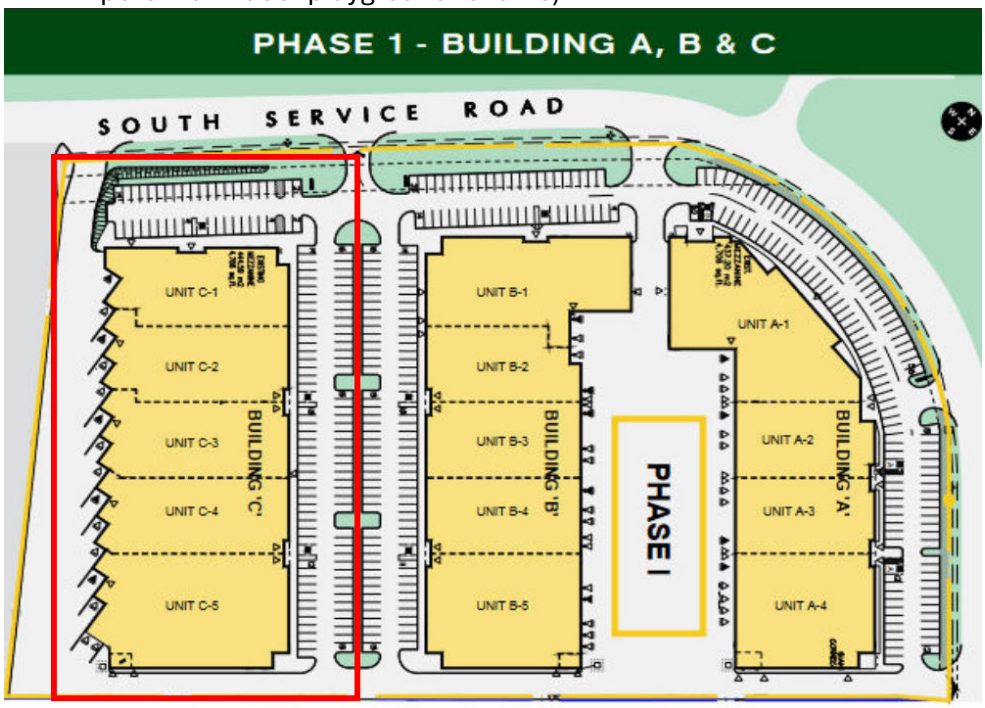
- 208-220 Wyecroft Road, Oakville: 93,248sqft total (63,335sqft industrial/office, 29,913sqft CFC)

- 505 Iroquois Shore Road, 1130-1150 Eighth Line, Oakville: 125,410sqft total (93,323sqft industrial/office, 32,087sqft CFC)

In lieu of 2450 Bristol Circle that was not accepted, can you please provide confirmation/comment on 3280 S Service Road (Oakville) as a suitable proxy site at your earliest convenience?

3280 South Service Road (Building C), Oakville

- Proposed proxy survey of Building C only as Building C includes CFC use and Building C parking is segregated from parking of Buildings A and B. Buildings A and B appear to contain exclusively industrial/office tenants, which would heavily skew overall uses to industrial/office.
- Building C total GFA of 98,554sqft (81,224sqft industrial/office, 17,330sqft CFC).
- CFC land use includes Playlicious Oakville (a kids' indoor playground, which is a specific CFC use that is not provided in the other two proxy sites but would be appropriate to capture in this survey given the potential indoor playground tenants).



Thank you,

John Nhan, B.Eng., EIT
Transportation Analyst

o: 905-503-2563 ext.223
e: john@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: Wednesday, July 10, 2024 12:13 PM
To: John Nhan <john@nextrans.ca>
Cc: Tina Arruda <tinaa@trinistar.com>; Leigh Musson <leigh.musson@oakville.ca>; Richard Pernicky <richard@nextrans.ca>; Eric Chan <eric.chan@oakville.ca>

Subject: RE: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

Hi John,

Thank you for providing the proxy locations. The locations seem acceptable except one. Also, please provide more details to these proxy sites with respect to the GFA between the land uses identified for the site (CFC vs industrial).

- 208-220 Wyecroft Road, Oakville: acceptable
- 505 Iroquois Shore Road, 1130-1150 Eighth Line, Oakville: acceptable
- 2450 Bristol Circle, Oakville: not acceptable, please find another site above 100k sq.ft.

Please undertake the parking studies for at least 1 weekday and 1 weekend 12-hour period increments.

Please confirm the recommendation for the parking rate ensuring that all proposed parking stalls are accommodated on the proposed site.

If you require clarification, please do not hesitate to contact me.

Have a wonderful day 😊 !

Aquisha Khan, (She/Her/Hers), P. Eng.,
Transportation Engineer, East Oakville
Transportation Planning Services,
Town of Oakville | P: 905-845-6601, Ext. 3236 | C: 289-952-9345 | www.oakville.ca

Aquisha Khan, (She/Her/Hers), P. Eng.
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, ext. 3236 | www.oakville.ca

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From: John Nhan <john@nextrans.ca>
Sent: Wednesday, July 10, 2024 10:27 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Tina Arruda <tinaa@trinistar.com>; Leigh Musson <leigh.musson@oakville.ca>; Richard Pernicky <richard@nextrans.ca>
Subject: [EXTERNAL] RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study
Importance: High

Hi Aquisha,

Just following up the Town's review of this Parking Study TOR for Town confirmation and comments. It'd be greatly appreciated if the review can be expedited as this file is time-sensitive.

Thanks!

Thank you,
John Nhan, B.Eng., EIT

Transportation Analyst

o: 905-503-2563 ext.223
e: john@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

From: John Nhan
Sent: Wednesday, July 3, 2024 11:02 PM
To: aquisha.khan@oakville.ca
Cc: Tina Arruda <tinaa@trinistar.com>; Richard Pernicky <richard@nextrans.ca>; leigh.musson@oakville.ca
Subject: FW: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

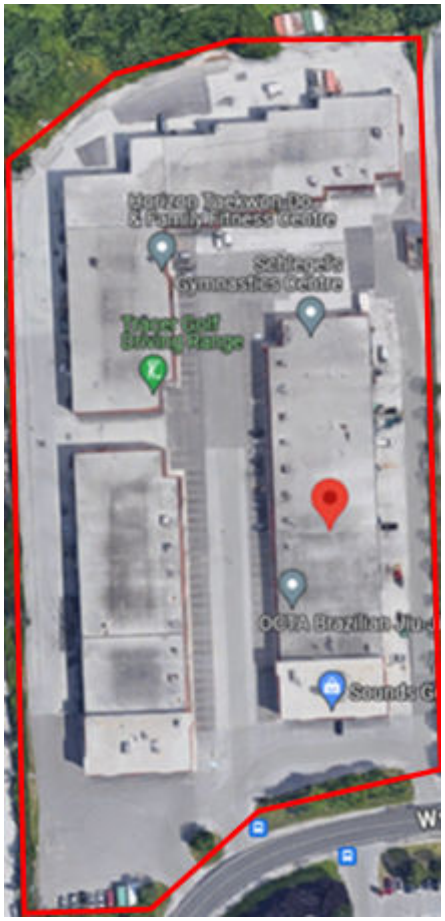
Hi Aquisha,

Given that the Town requests at least 3 proxy sites that contain a mix of industrial and commercial fitness centre (CFC) uses, please confirm if the following proxy sites are acceptable to the Town to undertake a parking demand survey. Each site contains a mix of commercial fitness and industrial uses, similar to the subject development at Loyalist Trail. All sites are located in Oakville.

The parking demand survey will be undertaken in 30-minute intervals on a typical weekday between 9:00am to 9:00pm, Friday between 9:00am to 9:00pm, and Saturday between 11:00am to 9:00pm, to capture the anticipated time-of-day usage and peak parking demand for both industrial/commercial and CFC uses. For each site, the peak parking demand will be applied to the overall estimated GFA of the proxy site to determine a peak parking demand rate. The proxy peak parking rates will be reviewed and applied to the required parking for the proposed development.

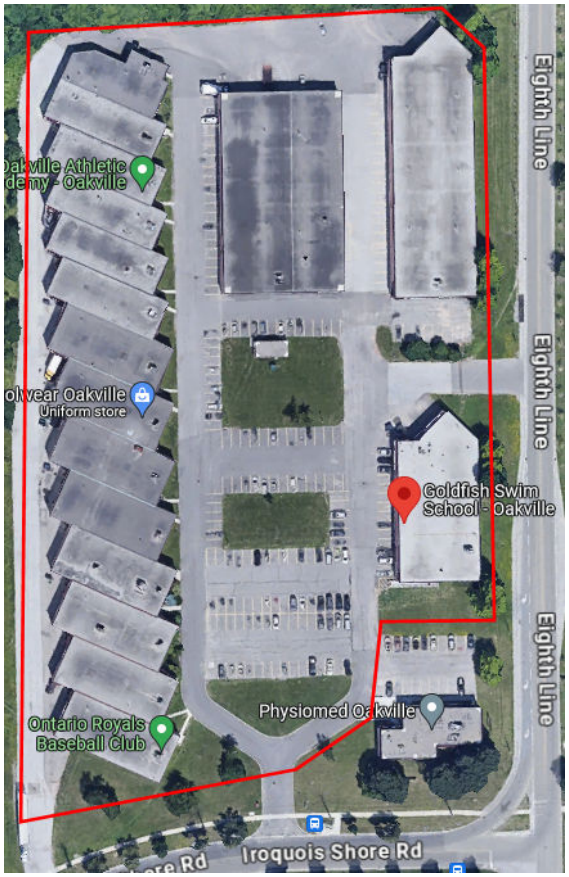
<u>208-220 Wyecroft Road, Oakville</u>

- 3 industrial buildings (approx. 107,000sqft GFA) with mix of industrial/office and commercial fitness centre (CFC) uses.
- CFC uses include:
    - Indoor golf simulation/range (Tracer Golf)ch
    - Martial arts schools (OCTA Brazillian Jiu-Jitsu, Horizon Taekwon-Do)
    - Gymnastics centre (Schlegel's Gymnastics Centre)
    - Fencing (Canadian Fencing Academy)
    - Fitness gym (Revolution Fitness Centre)
- Industrial/Commercial uses include:
    - Industrial suppliers/services/manufacturing (Drive-Line, Fluidline Inc, VL Motion Systems Inc, Inscan)
    - Sports accessories warehouse/wholesaler (The Sports Company)
    - Print shops (OTB, Print Panther, Binders Galore, Champ)
    - Offices (BlueFrog Environmental Consulting, Global Manager Research)
    - Commercial (Sounds Good, Steamoji)



<u>505 Iroquois Shore Road, 1130-1150 Eighth Line, Oakville</u>

- 3 industrial buildings (approx. 137,000sqft GFA) with mix of CFC and industrial/commercial uses.
- CFC uses include:
    - Gym (Oakville Athletic Academy)
    - Swim School (Goldfish Swim School Oakville)
    - Multi-Sports Facility (JSI Hockey and Pickle Ball Court)
    - Boxing Gym (JTI Boxing)
    - Indoor Baseball Training Facility (Ontario Royals Baseball Club)
- Industrial/Commercial uses include:
    - Suppliers (Nortec, InSchoolWear, Striker Bowling Solutions, D-Tec Systems, Liquid Rubber, Eureka Kitchen and Bath)



<u>2450 Bristol Circle, Oakville</u>

- 1 industrial building (approx. 30,000sqft GFA) containing mix of CFC and industrial/commercial uses.
- CFC uses include:
    - Multi-Sports Indoor Courts (Kings Court Oakville)
        - 2 full-size basketball courts and 2 half-courts
        - sports offered include basketball, volleyball, pickleball, cricket
    - Fitness Gym (Element Crossfit)
- Industrial/commercial uses include:
    - Distribution (Nexeo Solutions)
    - Furniture Warehouse/Store (AXNT)
    - Sports Clinic (Active Care)

Thank you,

John Nhan, B.Eng., EIT
Transportation Analyst
NexTrans Consulting Engineers

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: Wednesday, June 26, 2024 11:31 AM
To: John Nhan <john@nextrans.ca>
Cc: Richard Pernicky <richard@nextrans.ca>; Tina Arruda <tinaa@trinistar.com>; Leigh Musson <leigh.musson@oakville.ca>
Subject: RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

Hi John;

As per our discussion this yesterday morning, an updated TIS and Parking Justification Study. The parking study would require a minimum of 3 proxy surveys sites (sites when located to be discussed with staff). Unfortunately, 17 parking stalls shortfall (5%) may seems as insignificant, however, as previously mentioned the residents in this neighbourhood are vocal and would not appreciate the shortfall occupying the limited on-street spaces within the subdivision.

If you have any questions, please do not hesitate to contact me.

Have a wonderful day ☺

Aquisha Khan, P. Eng.
Transportation Engineer,
Transportation Strategy Department,
Town of Oakville | 905-845-6601, | www.oakville.ca

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Aquisha Khan, (She/Her/Hers), P. Eng.
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, ext. 3236 | www.oakville.ca

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From: John Nhan <john@nextrans.ca>
Sent: June 25, 2024 10:58 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Richard Pernicky <richard@nextrans.ca>; Tina Arruda <tinaa@trinistar.com>
Subject: RE: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

Hi Aquisha,

Thank you for the chat we had this morning on call. I confirm that an updated TIS and parking justification study will be provided.

As I understand, this area is vocal from residents and local councillors. Notwithstanding this, and to reiterate our position on parking justification, we are looking at a less than 5% deficiency in parking from the zoning by-law requirement and thus would like to pursue a desktop parking justification as mentioned in my previous email.

Please let us know your thoughts as soon as you can this week as our application is time-sensitive. Looking forward to hearing from you soon.

Thank you,

John Nhan, B.Eng., EIT
Transportation Analyst
NexTrans Consulting Engineers

From: John Nhan
Sent: Friday, June 21, 2024 10:10 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Richard Pernicky <richard@nextrans.ca>; Tina Arruda <tinaa@trinistar.com>
Subject: NT-21-047 - 65, 71, 77, 83, 89 Loyalist Trail, Block 152, Plan 20M-1221, Oakville - TIS Update and Parking Justification Study

Hi Aquisha,

I hope you are well. It's been a while since we last touched base in 2022 for the TIS that was submitted as part of the development application for the property of 65, 71, 77, 83, 89 Loyalist Trail (Block 152) in North Oakville. The SPA application (Town File 1215.003/01) has since been approved for the industrial development and is in construction. Notwithstanding this, the client would like to submit a rezoning application to retain about half of the proposed leasable floor area for industrial use and re-zone about half of the industrial space instead to Commercial Fitness Centre (CFC) use given the demand from a number of future tenants for CFC space (i.e. indoor pickleball courts, indoor soccer/sports facility, indoor kids' play area/trampoline/party rooms, indoor basketball courts, indoor badminton courts, golf simulator, gymnastics club). Attached is the latest site plan for reference.

With the mix of CFC and industrial uses for the proposed development, the parking provision of 341 spaces to be provided does not meet the Town's zoning by-law parking requirement of 358 spaces (shortfall of 17 spaces). However, this shortfall of 17 spaces represents a 4.8% deficiency from the zoning by-law parking requirement which is minor in nature.

Given this, can you advise if the following transportation work scope is acceptable to the Town for the planned rezoning application?

1. Provide an Updated TIS.
2. Given that the 4.8% parking deficiency of the proposed parking provision is near compliance and in line with the Town's required parking rates, provide a Parking Justification Study based on desktop justification, including:
    a. Noting the different time-of-day parking usage expected for the CFC vs Industrial/Office uses
    b. Active Transportation
    c. TDM

Please let me know if this work plan, in particular, the parking justification, is acceptable.

Thank you,

John Nhan, B.Eng., EIT
Transportation Analyst
o: 905-503-2563 ext.223
e: john@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Appendix C

Traffic Data

Spectrum

Turning Movement Count
Location Name: SIXTH LINE & BURNHAMTHORPE RD
Date: Wed, Apr 07, 2021 Deployment Lead: Theo Daglis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (1 . SIXTH LINE & BURNHAMTHORPE RD)

Start Time	N Approach SIXTH LINE						E Approach BURNHAMTHORPE RD						S Approach SIXTH LINE						W Approach BURNHAMTHORPE RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	15	14	3	0	0	32	4	16	9	0	0	29	7	17	2	0	0	26	1	12	9	0	0	22	109	
07:15:00	20	32	4	0	0	56	3	14	6	0	0	23	6	24	3	0	0	33	0	16	22	0	0	38	150	
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BREAK																										
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Grand Total	445	827	84	0	0	1356	86	481	243	0	0	810	265	799	61	0	0	1125	56	441	412	0	0	909	**4200**	-
Approach%	32.8%	61%	6.2%	0%		-	10.6%	59.4%	30%	0%		-	23.6%	71%	5.4%	0%		-	6.2%	48.5%	45.3%	0%		-	-	-
Totals %	10.6%	19.7%	2%	0%		32.3%	2%	11.5%	5.8%	0%		19.3%	6.3%	19%	1.5%	0%		26.8%	1.3%	10.5%	9.8%	0%		21.6%	-	-
Heavy	9	20	4	0		-	4	4	11	0		-	9	18	5	0		-	6	13	9	0		-	-	-
Heavy %	2%	2.4%	4.8%	0%		-	4.7%	0.8%	4.5%	0%		-	3.4%	2.3%	8.2%	0%		-	10.7%	2.9%	2.2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Spectrum

Turning Movement Count
Location Name: SIXTH LINE & BURNHAMTHORPE RD
Date: Wed, Apr 07, 2021 Deployment Lead: Theo Daglis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (6.02 °C)

Start Time	N Approach SIXTH LINE						E Approach BURNHAMTHORPE RD						S Approach SIXTH LINE						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	22	26	1	0	0	49	5	22	9	0	0	36	3	37	2	0	0	42	4	17	20	0	0	41	168
08:15:00	19	32	2	0	0	53	6	14	6	0	0	26	14	26	3	0	0	43	3	14	22	0	0	39	161
08:30:00	15	39	3	0	0	57	0	20	11	0	0	31	9	21	4	0	0	34	4	19	16	0	0	39	161
08:45:00	27	31	4	0	0	62	3	15	7	0	0	25	16	27	3	0	0	46	3	21	15	0	0	39	172
Grand Total	83	128	10	0	0	221	14	71	33	0	0	118	42	111	12	0	0	165	14	71	73	0	0	158	**662**
Approach%	37.6%	57.9%	4.5%	0%		-	11.9%	60.2%	28%	0%		-	25.5%	67.3%	7.3%	0%		-	8.9%	44.9%	46.2%	0%		-	-
Totals %	12.5%	19.3%	1.5%	0%		33.4%	2.1%	10.7%	5%	0%		17.8%	6.3%	16.8%	1.8%	0%		24.9%	2.1%	10.7%	11%	0%		23.9%	-
PHF	0.77	0.82	0.63	0		0.89	0.58	0.81	0.75	0		0.82	0.66	0.75	0.75	0		0.9	0.88	0.85	0.83	0		0.96	-
Heavy	4	5	0	0		9	1	2	6	0		9	2	7	2	0		11	2	2	3	0		7	-
Heavy %	4.8%	3.9%	0%	0%		4.1%	7.1%	2.8%	18.2%	0%		7.6%	4.8%	6.3%	16.7%	0%		6.7%	14.3%	2.8%	4.1%	0%		4.4%	-
Lights	79	123	10	0		212	13	69	27	0		109	40	104	10	0		154	12	69	70	0		151	-
Lights %	95.2%	96.1%	100%	0%		95.9%	92.9%	97.2%	81.8%	0%		92.4%	95.2%	93.7%	83.3%	0%		93.3%	85.7%	97.2%	95.9%	0%		95.6%	-
Single-Unit Trucks	3	4	0	0		7	1	1	4	0		6	1	4	2	0		7	2	2	2	0		6	-
Single-Unit Trucks %	3.6%	3.1%	0%	0%		3.2%	7.1%	1.4%	12.1%	0%		5.1%	2.4%	3.6%	16.7%	0%		4.2%	14.3%	2.8%	2.7%	0%		3.8%	-
Buses	1	0	0	0		1	0	1	2	0		3	1	1	0	0		2	0	0	0	0		0	-
Buses %	1.2%	0%	0%	0%		0.5%	0%	1.4%	6.1%	0%		2.5%	2.4%	0.9%	0%	0%		1.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	2	0	0		2	0	0	1	0		1	-
Articulated Trucks %	0%	0.8%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1.2%	0%	0%	1.4%	0%		0.6%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-

Spectrum

Turning Movement Count
Location Name: SIXTH LINE & BURNHAMTHORPE RD
Date: Wed, Apr 07, 2021 Deployment Lead: Theo Daglis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

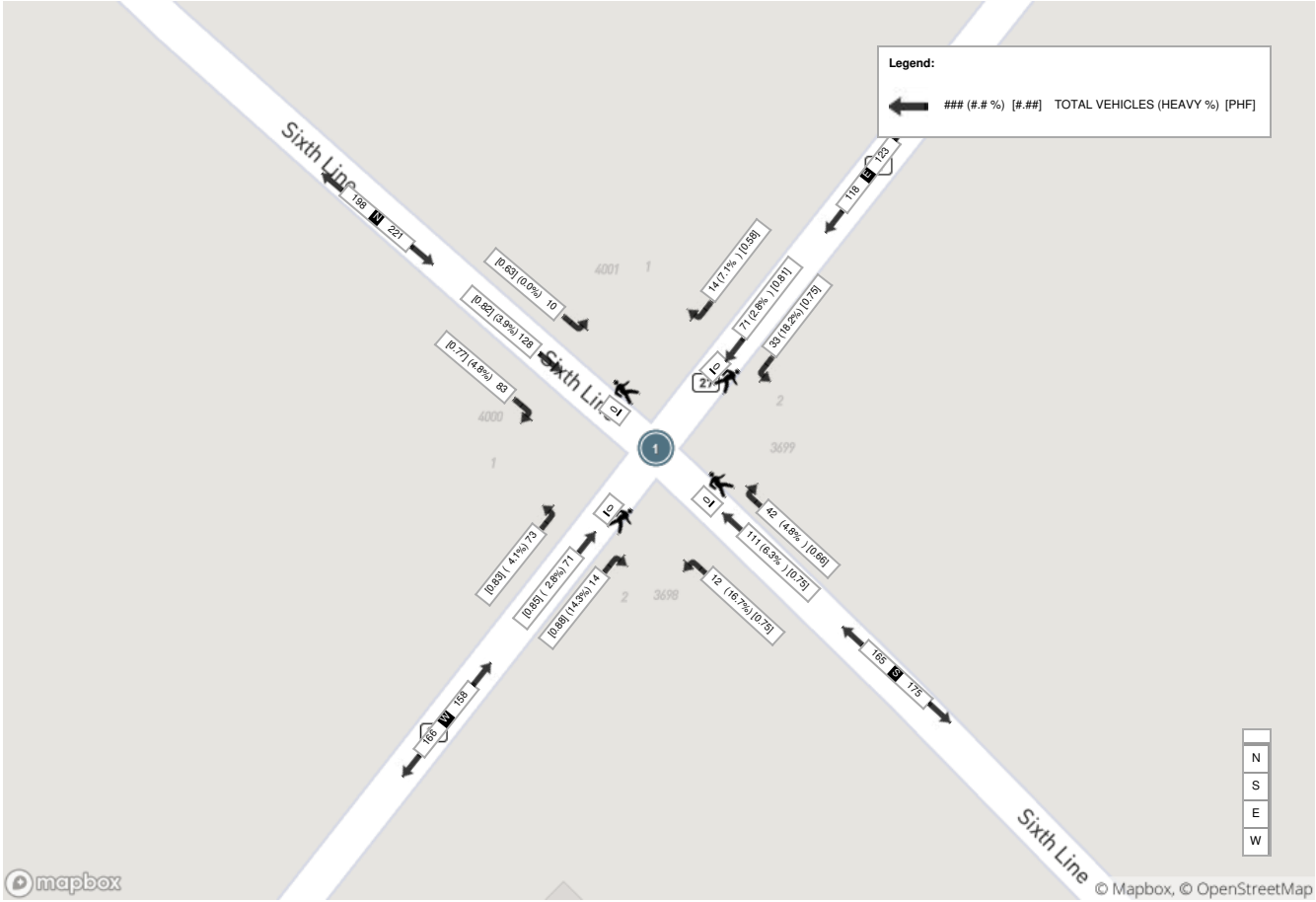
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (14.05 °C)

Start Time	N Approach SIXTH LINE						E Approach BURNHAMTHORPE RD						S Approach SIXTH LINE						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	28	61	2	0	0	91	7	36	10	0	0	53	15	42	3	0	0	60	0	17	26	0	0	43	247
16:45:00	21	51	7	0	0	79	6	29	7	0	0	42	5	41	4	0	0	50	2	24	27	0	0	53	224
17:00:00	23	47	5	0	0	75	4	23	17	0	0	44	13	55	5	0	0	73	3	18	29	0	0	50	242
17:15:00	27	48	5	0	0	80	4	35	11	0	0	50	16	43	1	0	0	60	3	26	22	0	0	51	241
Grand Total	99	207	19	0	0	325	21	123	45	0	0	189	49	181	13	0	0	243	8	85	104	0	0	197	**954**
Approach%	30.5%	63.7%	5.8%	0%		-	11.1%	65.1%	23.8%	0%		-	20.2%	74.5%	5.3%	0%		-	4.1%	43.1%	52.8%	0%		-	-
Totals %	10.4%	21.7%	2%	0%		34.1%	2.2%	12.9%	4.7%	0%		19.8%	5.1%	19%	1.4%	0%		25.5%	0.8%	8.9%	10.9%	0%		20.6%	-
PHF	0.88	0.85	0.68	0		0.89	0.75	0.85	0.66	0		0.89	0.77	0.82	0.65	0		0.83	0.67	0.82	0.9	0		0.93	-
Heavy	3	2	2	0		7	1	0	0	0		1	1	2	0	0		3	0	0	0	0		0	-
Heavy %	3%	1%	10.5%	0%		2.2%	4.8%	0%	0%	0%		0.5%	2%	1.1%	0%	0%		1.2%	0%	0%	0%	0%		0%	-
Lights	94	200	17	0		311	20	122	45	0		187	48	165	13	0		226	7	85	103	0		195	-
Lights %	94.9%	96.6%	89.5%	0%		95.7%	95.2%	99.2%	100%	0%		98.9%	98%	91.2%	100%	0%		93%	87.5%	100%	99%	0%		99%	-
Single-Unit Trucks	2	1	1	0		4	1	0	0	0		1	1	1	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	2%	0.5%	5.3%	0%		1.2%	4.8%	0%	0%	0%		0.5%	2%	0.6%	0%	0%		0.8%	0%	0%	0%	0%		0%	-
Buses	1	0	1	0		2	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	1%	0%	5.3%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0.5%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	2	5	0	0		7	0	1	0	0		1	0	14	0	0		14	1	0	1	0		2	-
Bicycles on Road %	2%	2.4%	0%	0%		2.2%	0%	0.8%	0%	0%		0.5%	0%	7.7%	0%	0%		5.8%	12.5%	0%	1%	0%		1%	-

Turning Movement Count
Location Name: SIXTH LINE & BURNHAMTHORPE RD
Date: Wed, Apr 07, 2021 Deployment Lead: Theo Daglis

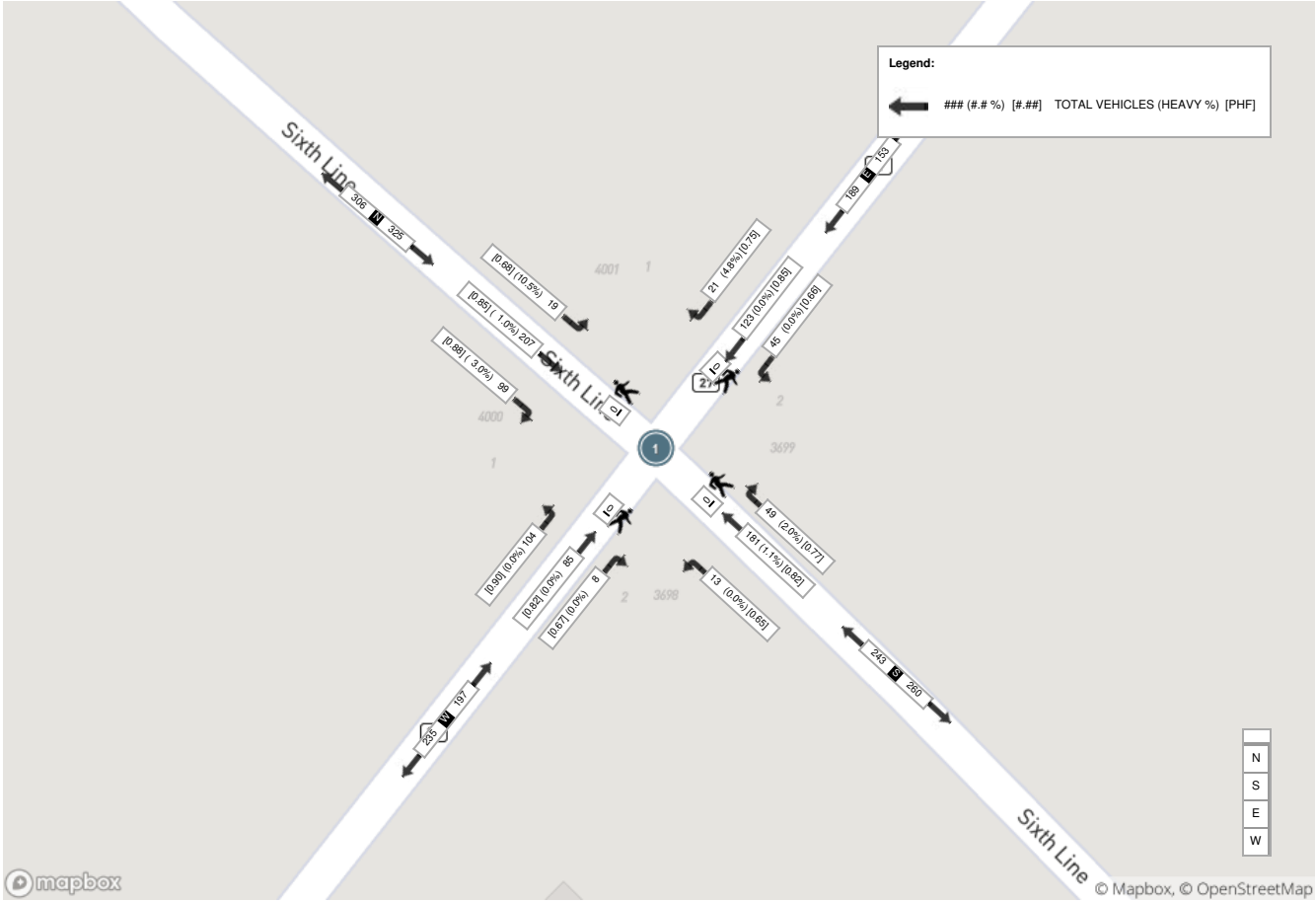
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (6.02 °C)



NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (14.05 °C)



Appendix D

Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	97	94	18	44	94	18	15	148	55	13	170	110
Future Volume (vph)	97	94	18	44	94	18	15	148	55	13	170	110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	101	98	19	46	98	19	16	154	57	14	177	115

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	218	163	227	306
Volume Left (vph)	101	46	16	14
Volume Right (vph)	19	19	57	115
Hadj (s)	0.12	0.12	-0.03	-0.15
Departure Headway (s)	5.8	5.9	5.5	5.3
Degree Utilization, x	0.35	0.27	0.35	0.45
Capacity (veh/h)	563	542	592	635
Control Delay (s)	11.9	11.1	11.5	12.5
Approach Delay (s)	11.9	11.1	11.5	12.5
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
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)	125	103	8	54	149	24	15	220	58	22	252	120
Future Volume (vph)	125	103	8	54	149	24	15	220	58	22	252	120
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	129	106	8	56	154	25	15	227	60	23	260	124

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	243	235	302	407
Volume Left (vph)	129	56	15	23
Volume Right (vph)	8	25	60	124
Hadj (s)	0.09	-0.01	-0.09	-0.13
Departure Headway (s)	6.9	6.8	6.4	6.1
Degree Utilization, x	0.46	0.44	0.54	0.69
Capacity (veh/h)	461	461	512	548
Control Delay (s)	15.6	15.1	16.5	21.7
Approach Delay (s)	15.6	15.1	16.5	21.7
Approach LOS	C	C	C	C

Intersection Summary			
Delay	17.9		
Level of Service	C		
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

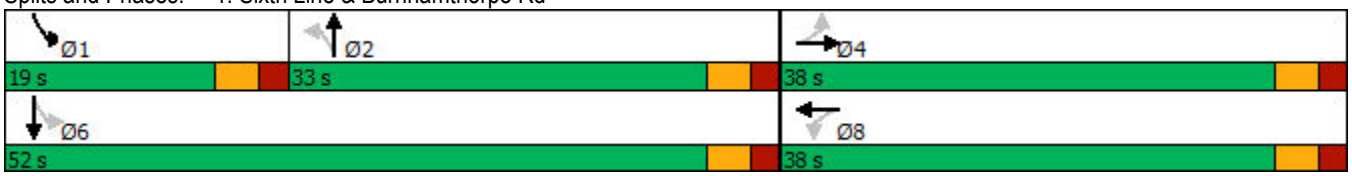
1: Sixth Line & Burnhamthorpe Rd

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	163	189	102	241	177	656	64	520
Future Volume (vph)	163	189	102	241	177	656	64	520
Lane Group Flow (vph)	170	241	106	291	184	816	67	680
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	10.0	31.0
Total Split (s)	38.0	38.0	38.0	38.0	33.0	33.0	19.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	36.7%	36.7%	21.1%	57.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.70	0.46	0.42	0.54	0.68	0.56	0.18	0.38
Control Delay	37.6	21.1	25.1	23.2	36.4	17.8	9.7	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	21.1	25.1	23.2	36.4	17.8	9.7	9.1
Queue Length 50th (m)	19.7	24.0	11.1	30.7	18.7	39.2	3.3	19.0
Queue Length 95th (m)	40.8	43.2	24.4	53.0	#65.2	78.3	11.4	43.0
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	458	978	474	996	285	1523	531	2511
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.25	0.22	0.29	0.65	0.54	0.13	0.27

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 63.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	189	42	102	241	38	177	656	128	64	520	132
Future Volume (vph)	163	189	42	102	241	38	177	656	128	64	520	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	1779		1547	1817		1491	3254		1745	3284	
Flt Permitted	0.45	1.00		0.53	1.00		0.39	1.00		0.22	1.00	
Satd. Flow (perm)	839	1779		870	1817		617	3254		408	3284	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	170	197	44	106	251	40	184	683	133	67	542	138
RTOR Reduction (vph)	0	10	0	0	7	0	0	15	0	0	23	0
Lane Group Flow (vph)	170	231	0	106	284	0	184	801	0	67	657	0
Heavy Vehicles (%)	4%	3%	14%	18%	3%	7%	17%	6%	5%	0%	4%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.6	18.6		18.6	18.6		28.2	28.2		37.1	37.1	
Effective Green, g (s)	18.6	18.6		18.6	18.6		28.2	28.2		37.1	37.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.43	0.43		0.56	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	503		246	514		264	1396		309	1854	
v/s Ratio Prot		0.13			0.16			0.25		0.01	c0.20	
v/s Ratio Perm	c0.20			0.12			c0.30			0.11		
v/c Ratio	0.72	0.46		0.43	0.55		0.70	0.57		0.22	0.35	
Uniform Delay, d1	21.2	19.4		19.2	20.0		15.3	14.2		7.6	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	0.7		1.2	1.3		7.8	0.6		0.4	0.1	
Delay (s)	31.1	20.1		20.4	21.3		23.0	14.8		8.0	7.9	
Level of Service	C	C		C	C		C	B		A	A	
Approach Delay (s)		24.6			21.1			16.3			7.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	19	250	7	24	12	171	688	0	4	459	98
Future Volume (Veh/h)	12	19	250	7	24	12	171	688	0	4	459	98
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	21	272	8	26	13	186	748	0	4	499	107
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								258				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	1332	1680	303	1660	1734	374	606			748		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1293	1649	303	1628	1704	312	606			695		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	82	73	61	71	64	98	81			100		
cM capacity (veh/h)	73	79	699	28	73	674	982			889		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	13	293	8	39	186	499	249	4	333	273
Volume Left	13	0	8	0	186	0	0	4	0	0
Volume Right	0	272	0	13	0	0	0	0	0	107
cSH	73	447	28	104	982	1700	1700	889	1700	1700
Volume to Capacity	0.18	0.66	0.29	0.38	0.19	0.29	0.15	0.00	0.20	0.16
Queue Length 95th (m)	4.6	35.0	6.7	11.6	5.3	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	64.9	27.1	178.5	59.2	9.5	0.0	0.0	9.1	0.0	0.0
Lane LOS	F	D	F	F	A			A		
Approach Delay (s)	28.7		79.5		1.9			0.1		
Approach LOS	D		F							

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	51.7%	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)	5	374	2	1	342	10	34	0	3	30	0	6
Future Volume (Veh/h)	5	374	2	1	342	10	34	0	3	30	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	407	2	1	372	11	37	0	3	33	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	383			409			804	803	408	800	798	378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	383			332			755	754	331	751	749	378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			88	100	100	89	100	99
cM capacity (veh/h)	1187			1157			301	317	668	305	319	674

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	414	384	40	40
Volume Left	5	1	37	33
Volume Right	2	11	3	7
cSH	1187	1157	314	338
Volume to Capacity	0.00	0.00	0.13	0.12
Queue Length 95th (m)	0.1	0.0	3.3	3.0
Control Delay (s)	0.1	0.0	18.1	17.1
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.0	18.1	17.1
Approach LOS			C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	33.5%	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)	2	402	3	10	327	4	20	0	30	12	0	6
Future Volume (Veh/h)	2	402	3	10	327	4	20	0	30	12	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	437	3	11	355	4	22	0	33	13	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked												
vC, conflicting volume	359			440			828	824	438	854	823	357
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			440			828	824	438	854	823	357
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			92	100	95	95	100	99
cM capacity (veh/h)	1211			1131			287	307	623	264	307	692

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	442	370	55	20
Volume Left	2	11	22	13
Volume Right	3	4	33	7
cSH	1211	1131	424	336
Volume to Capacity	0.00	0.01	0.13	0.06
Queue Length 95th (m)	0.0	0.2	3.4	1.4
Control Delay (s)	0.1	0.3	14.8	16.4
Lane LOS	A	A	B	C
Approach Delay (s)	0.1	0.3	14.8	16.4
Approach LOS			B	C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	34.5%	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)	2	457	1	6	334	4	4	0	18	14	0	5
Future Volume (Veh/h)	2	457	1	6	334	4	4	0	18	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	497	1	7	363	4	4	0	20	15	0	5
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	367			498			886	882	498	900	881	365
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	367			498			886	882	498	900	881	365
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	97	94	100	99
cM capacity (veh/h)	1203			1076			264	285	577	251	285	685

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	500	374	24	20
Volume Left	2	7	4	15
Volume Right	1	4	20	5
cSH	1203	1076	482	298
Volume to Capacity	0.00	0.01	0.05	0.07
Queue Length 95th (m)	0.0	0.1	1.2	1.6
Control Delay (s)	0.1	0.2	12.9	18.0
Lane LOS	A	A	B	C
Approach Delay (s)	0.1	0.2	12.9	18.0
Approach LOS			B	C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	21	17	0	29	13	1
Future Volume (Veh/h)	21	17	0	29	13	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	18	0	32	14	1
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			41		64	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		64	32
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1581		947	1048

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	41	32	15
Volume Left	0	0	14
Volume Right	18	0	1
cSH	1700	1581	953
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	21	1	0	27	2	0
Future Volume (Veh/h)	21	1	0	27	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	1	0	29	2	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			24		52	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			24		52	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1604		961	1059

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	24	29	2
Volume Left	0	0	2
Volume Right	1	0	0
cSH	1700	1604	961
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	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	21	0	0	27	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	21	0	0	27	0	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	23	0	0	29	0	0	0	0	0	0	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	29			23			52	52	23	52	52	29
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	29			23			52	52	23	52	52	29
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1597			1605			952	843	1060	952	843	1052

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	29	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1597	1605	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	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	20	1	0	25	0	2	0	0	0	0	0
Future Volume (Veh/h)	0	20	1	0	25	0	2	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	1	0	27	0	2	0	0	0	0	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	27			23			50	50	22	50	50	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			23			50	50	22	50	50	27
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1600			1605			956	846	1060	956	845	1054

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	27	2	0
Volume Left	0	0	2	0
Volume Right	1	0	0	0
cSH	1600	1605	956	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	8.8	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	20	25	0	0	0
Future Volume (Veh/h)	0	20	25	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	27	0	0	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	27				49	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27				49	27
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1600				965	1054

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	22	27	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1600	1700	1700
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

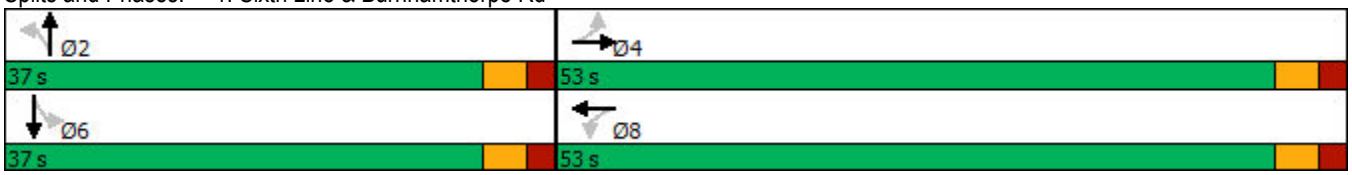
1: Sixth Line & Burnhamthorpe Rd

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	162	208	100	300	94	498	74	819
Future Volume (vph)	162	208	100	300	94	498	74	819
Lane Group Flow (vph)	167	252	103	344	97	669	76	1003
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	53.0	53.0	53.0	53.0	37.0	37.0	37.0	37.0
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.63	0.42	0.30	0.58	0.50	0.41	0.25	0.61
Control Delay	27.2	15.7	16.4	18.9	21.1	8.9	11.3	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	15.7	16.4	18.9	21.1	8.9	11.3	11.5
Queue Length 50th (m)	11.0	14.3	6.0	21.5	5.2	16.1	3.5	29.1
Queue Length 95th (m)	33.8	37.3	19.1	52.8	21.1	32.6	12.4	56.1
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	794	1737	1036	1742	267	2256	416	2272
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.15	0.10	0.20	0.36	0.30	0.18	0.44

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 49.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	208	37	100	300	34	94	498	151	74	819	154
Future Volume (vph)	162	208	37	100	300	34	94	498	151	74	819	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1878		1825	1882		1745	3365		1572	3401	
Flt Permitted	0.45	1.00		0.58	1.00		0.22	1.00		0.38	1.00	
Satd. Flow (perm)	858	1878		1120	1882		403	3365		625	3401	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	167	214	38	103	309	35	97	513	156	76	844	159
RTOR Reduction (vph)	0	10	0	0	7	0	0	25	0	0	14	0
Lane Group Flow (vph)	167	242	0	103	337	0	97	644	0	76	989	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	1%	2%	11%	1%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4		23.8	23.8		23.8	23.8	
Effective Green, g (s)	15.4	15.4		15.4	15.4		23.8	23.8		23.8	23.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.48	0.48		0.48	0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	587		350	589		194	1627		302	1645	
v/s Ratio Prot		0.13			0.18			0.19			c0.29	
v/s Ratio Perm	c0.19			0.09			0.24			0.12		
v/c Ratio	0.62	0.41		0.29	0.57		0.50	0.40		0.25	0.60	
Uniform Delay, d1	14.4	13.3		12.8	14.1		8.6	8.1		7.5	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	0.5		0.5	1.3		2.0	0.2		0.4	0.6	
Delay (s)	18.9	13.8		13.3	15.5		10.7	8.3		7.9	9.9	
Level of Service	B	B		B	B		B	A		A	A	
Approach Delay (s)		15.8			15.0			8.6			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	13	176	4	9	8	57	639	0	12	869	32
Future Volume (Veh/h)	8	13	176	4	9	8	57	639	0	12	869	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	14	191	4	10	9	62	695	0	13	945	35
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								258				
pX, platoon unblocked												
vC, conflicting volume	1474	1808	490	1516	1825	348	980			695		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1474	1808	490	1516	1825	348	980			695		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	88	81	64	90	86	99	91			99		
cM capacity (veh/h)	73	72	529	42	70	654	712			910		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	9	205	4	19	62	463	232	13	630	350
Volume Left	9	0	4	0	62	0	0	13	0	0
Volume Right	0	191	0	9	0	0	0	0	0	35
cSH	73	369	42	121	712	1700	1700	910	1700	1700
Volume to Capacity	0.12	0.56	0.10	0.16	0.09	0.27	0.14	0.01	0.37	0.21
Queue Length 95th (m)	3.1	24.6	2.3	4.1	2.2	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	61.2	26.3	99.3	40.1	10.5	0.0	0.0	9.0	0.0	0.0
Lane LOS	F	D	F	E	B			A		
Approach Delay (s)	27.8		50.4		0.9			0.1		
Approach LOS	D		F							

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	49.9%	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)	13	414	6	3	410	30	19	0	2	20	0	4
Future Volume (Veh/h)	13	414	6	3	410	30	19	0	2	20	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	450	7	3	446	33	21	0	2	22	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	479			457			954	966	454	952	954	462
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	479			396			922	935	393	920	922	462
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			91	100	100	91	100	99
cM capacity (veh/h)	1094			1109			234	249	624	236	253	603

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	471	482	23	26
Volume Left	14	3	21	22
Volume Right	7	33	2	4
cSH	1094	1109	248	260
Volume to Capacity	0.01	0.00	0.09	0.10
Queue Length 95th (m)	0.3	0.1	2.3	2.5
Control Delay (s)	0.4	0.1	21.0	20.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.4	0.1	21.0	20.4
Approach LOS			C	C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	40.9%	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)	6	421	9	33	428	12	11	0	19	8	0	4
Future Volume (Veh/h)	6	421	9	33	428	12	11	0	19	8	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	458	10	36	465	13	12	0	21	9	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked												
vC, conflicting volume	478			468			1024	1027	463	1042	1026	472
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478			468			1024	1027	463	1042	1026	472
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			94	100	97	95	100	99
cM capacity (veh/h)	1095			1104			208	227	603	196	228	596

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	475	514	33	13
Volume Left	7	36	12	9
Volume Right	10	13	21	4
cSH	1095	1104	356	247
Volume to Capacity	0.01	0.03	0.09	0.05
Queue Length 95th (m)	0.1	0.8	2.3	1.3
Control Delay (s)	0.2	0.9	16.1	20.4
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.9	16.1	20.4
Approach LOS			C	C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	53.0%	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)	6	445	4	21	485	13	3	0	12	9	0	3
Future Volume (Veh/h)	6	445	4	21	485	13	3	0	12	9	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	484	4	23	527	14	3	0	13	10	0	3
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	541			488			1083	1087	486	1093	1082	534
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	541			488			1083	1087	486	1093	1082	534
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			98	100	98	95	100	99
cM capacity (veh/h)	1038			1086			191	212	585	185	213	550

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	495	564	16	13
Volume Left	7	23	3	10
Volume Right	4	14	13	3
cSH	1038	1086	422	219
Volume to Capacity	0.01	0.02	0.04	0.06
Queue Length 95th (m)	0.2	0.5	0.9	1.4
Control Delay (s)	0.2	0.6	13.9	22.5
Lane LOS	A	A	B	C
Approach Delay (s)	0.2	0.6	13.9	22.5
Approach LOS			B	C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	18	15	0	13	25	0
Future Volume (Veh/h)	18	15	0	13	25	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	16	0	14	27	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			36		42	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			36		42	28
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1588		974	1053

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	36	14	27
Volume Left	0	0	27
Volume Right	16	0	0
cSH	1700	1588	974
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	16	2	0	11	2	0
Future Volume (Veh/h)	16	2	0	11	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	2	0	12	2	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			19		30	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			19		30	18
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1611		989	1066

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	19	12	2
Volume Left	0	0	2
Volume Right	2	0	0
cSH	1700	1611	989
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	13.3%	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	16	0	0	11	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	16	0	0	11	0	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	0	0	12	0	0	0	0	0	0	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	12			17			29	29	17	29	29	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			17			29	29	17	29	29	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1620			1613			985	868	1068	985	868	1074

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	12	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1620	1613	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	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	14	2	0	10	0	1	0	0	0	0	0
Future Volume (Veh/h)	0	14	2	0	10	0	1	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	2	0	11	0	1	0	0	0	0	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	11			17			27	27	16	27	28	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			17			27	27	16	27	28	11
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1621			1613			988	870	1069	988	869	1076

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	11	1	0
Volume Left	0	0	1	0
Volume Right	2	0	0	0
cSH	1621	1613	988	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	8.6	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	14	10	0	0	0
Future Volume (Veh/h)	0	14	10	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	11	0	0	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	11				26	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	11				26	11
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1621				995	1076

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	15	11	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1621	1700	1700
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

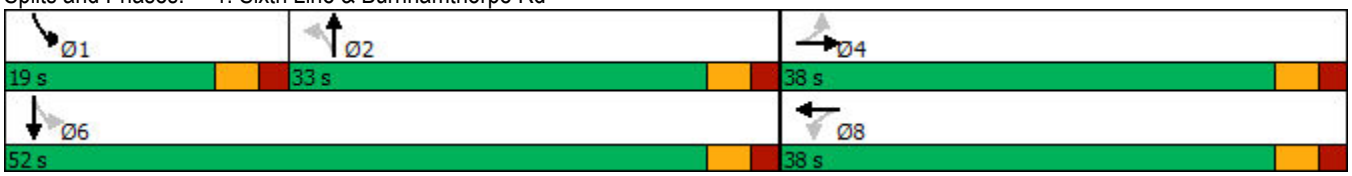
1: Sixth Line & Burnhamthorpe Rd

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	171	212	105	245	177	678	64	533
Future Volume (vph)	171	212	105	245	177	678	64	533
Lane Group Flow (vph)	178	265	109	295	184	839	67	704
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	10.0	31.0
Total Split (s)	38.0	38.0	38.0	38.0	33.0	33.0	19.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	36.7%	36.7%	21.1%	57.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.71	0.49	0.45	0.53	0.70	0.59	0.19	0.39
Control Delay	38.0	21.5	26.0	22.7	39.4	18.8	10.2	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	21.5	26.0	22.7	39.4	18.8	10.2	9.7
Queue Length 50th (m)	20.9	27.1	11.6	31.3	19.3	41.7	3.4	20.4
Queue Length 95th (m)	42.9	47.6	25.6	53.5	#66.9	83.1	11.8	46.2
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	452	971	438	986	276	1504	518	2478
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.27	0.25	0.30	0.67	0.56	0.13	0.28

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 64.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Future Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	1787		1547	1818		1491	3256		1745	3280	
Flt Permitted	0.45	1.00		0.50	1.00		0.38	1.00		0.21	1.00	
Satd. Flow (perm)	836	1787		813	1818		603	3256		387	3280	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	178	221	44	109	255	40	184	706	133	67	555	149
RTOR Reduction (vph)	0	9	0	0	7	0	0	14	0	0	25	0
Lane Group Flow (vph)	178	256	0	109	288	0	184	825	0	67	679	0
Heavy Vehicles (%)	4%	3%	14%	18%	3%	7%	17%	6%	5%	0%	4%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.4	19.4		19.4	19.4		28.3	28.3		37.2	37.2	
Effective Green, g (s)	19.4	19.4		19.4	19.4		28.3	28.3		37.2	37.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.42	0.42		0.56	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	243	520		236	529		256	1383		295	1832	
v/s Ratio Prot		0.14			0.16			0.25		0.01	c0.21	
v/s Ratio Perm	c0.21			0.13			c0.31			0.11		
v/c Ratio	0.73	0.49		0.46	0.54		0.72	0.60		0.23	0.37	
Uniform Delay, d1	21.3	19.5		19.3	19.9		15.9	14.7		8.1	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.8	0.7		1.4	1.1		9.3	0.7		0.4	0.1	
Delay (s)	32.1	20.3		20.8	21.0		25.1	15.4		8.4	8.3	
Level of Service	C	C		C	C		C	B		A	A	
Approach Delay (s)		25.0			21.0			17.2			8.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	19	250	31	24	31	171	688	30	29	459	98
Future Volume (Veh/h)	12	19	250	31	24	31	171	688	30	29	459	98
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	21	272	34	26	34	186	748	33	32	499	107
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								258				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1410	1770	303	1732	1806	390	606			781		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1333	1711	303	1672	1749	265	606			675		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	78	69	61	0	60	95	81			96		
cM capacity (veh/h)	60	68	699	24	65	705	982			884		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	13	293	34	60	186	499	282	32	333	273
Volume Left	13	0	34	0	186	0	0	32	0	0
Volume Right	0	272	0	34	0	0	33	0	0	107
cSH	60	421	24	133	982	1700	1700	884	1700	1700
Volume to Capacity	0.22	0.70	1.42	0.45	0.19	0.29	0.17	0.04	0.20	0.16
Queue Length 95th (m)	5.6	39.5	32.4	15.3	5.3	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	80.8	31.0	576.6	52.5	9.5	0.0	0.0	9.2	0.0	0.0
Lane LOS	F	D	F	F	A			A		
Approach Delay (s)	33.1		242.0		1.8			0.5		
Approach LOS	D		F							

Intersection Summary			
Average Delay	17.4		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Future Volume (Veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	430	2	1	378	11	37	0	3	33	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	389			432			838	836	431	834	832	384
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			334			778	775	333	772	770	384
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			87	100	100	89	100	99
cM capacity (veh/h)	1181			1133			285	301	654	289	303	668

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	439	390	40	41
Volume Left	7	1	37	33
Volume Right	2	11	3	8
cSH	1181	1133	297	325
Volume to Capacity	0.01	0.00	0.13	0.13
Queue Length 95th (m)	0.1	0.0	3.5	3.2
Control Delay (s)	0.2	0.0	19.0	17.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.0	19.0	17.7
Approach LOS			C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	35.4%	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)	11	415	3	10	331	4	20	0	30	12	0	8
Future Volume (Veh/h)	11	415	3	10	331	4	20	0	30	12	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	451	3	11	360	4	22	0	33	13	0	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	364			454			870	862	452	894	862	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364			446			865	858	444	889	857	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	100	95	95	100	99
cM capacity (veh/h)	1206			1116			267	289	613	246	289	687

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	466	375	55	22
Volume Left	12	11	22	13
Volume Right	3	4	33	9
cSH	1206	1116	403	334
Volume to Capacity	0.01	0.01	0.14	0.07
Queue Length 95th (m)	0.2	0.2	3.6	1.6
Control Delay (s)	0.3	0.3	15.3	16.5
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.3	15.3	16.5
Approach LOS			C	C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	36.8%	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)	15	457	1	6	334	56	4	0	18	29	0	9
Future Volume (Veh/h)	15	457	1	6	334	56	4	0	18	29	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	497	1	7	363	61	4	0	20	32	0	10
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	424			498			947	968	498	957	938	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			498			947	968	498	957	938	394
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	100	97	86	100	98
cM capacity (veh/h)	1146			1076			236	251	577	227	261	660

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	514	431	24	42
Volume Left	16	7	4	32
Volume Right	1	61	20	10
cSH	1146	1076	465	270
Volume to Capacity	0.01	0.01	0.05	0.16
Queue Length 95th (m)	0.3	0.1	1.2	4.1
Control Delay (s)	0.4	0.2	13.2	20.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.4	0.2	13.2	20.8
Approach LOS			B	C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	17	1	72	13	2
Future Volume (Veh/h)	76	17	1	72	13	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	18	1	78	14	2
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			101		172	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		172	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1504		822	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	101	79	16
Volume Left	0	1	14
Volume Right	18	0	2
cSH	1700	1504	838
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.4
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	77	1	2	71	2	9
Future Volume (Veh/h)	77	1	2	71	2	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	1	2	77	2	10
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			85		166	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			85		166	84
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1524		829	980

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	79	12
Volume Left	0	2	2
Volume Right	1	0	10
cSH	1700	1524	951
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.2	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	15.3%	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)	58	28	0	0	50	6	0	0	0	6	0	23
Future Volume (Veh/h)	58	28	0	0	50	6	0	0	0	6	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	30	0	0	54	7	0	0	0	7	0	25
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	61			30			238	217	30	214	214	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	61			30			238	217	30	214	214	58
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	100	99	100	98
cM capacity (veh/h)	1555			1596			681	657	1050	724	660	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	61	0	32
Volume Left	63	0	0	7
Volume Right	0	7	0	25
cSH	1555	1596	1700	933
Volume to Capacity	0.04	0.00	0.00	0.03
Queue Length 95th (m)	1.0	0.0	0.0	0.8
Control Delay (s)	5.1	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	5.1	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	21.4%	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)	7	20	7	3	28	0	8	55	4	0	10	20
Future Volume (Veh/h)	7	20	7	3	28	0	8	55	4	0	10	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	22	8	3	30	0	9	60	4	0	11	22
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	30			30			106	78	26	112	82	30
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			30			106	78	26	112	82	30
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	93	100	100	99	98
cM capacity (veh/h)	1596			1596			847	811	1056	814	806	1050

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	33	73	33
Volume Left	8	3	9	0
Volume Right	8	0	4	22
cSH	1596	1596	825	954
Volume to Capacity	0.01	0.00	0.09	0.03
Queue Length 95th (m)	0.1	0.0	2.2	0.8
Control Delay (s)	1.6	0.7	9.8	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	1.6	0.7	9.8	8.9
Approach LOS			A	A

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	20	25	0	0	6
Future Volume (Veh/h)	4	20	25	0	0	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	22	27	0	0	7
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	27				57	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27				57	27
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1600				953	1054

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	27	7
Volume Left	4	0	0
Volume Right	0	0	7
cSH	1600	1700	1054
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (m)	0.1	0.0	0.2
Control Delay (s)	1.1	0.0	8.4
Lane LOS	A		A
Approach Delay (s)	1.1	0.0	8.4
Approach LOS			A

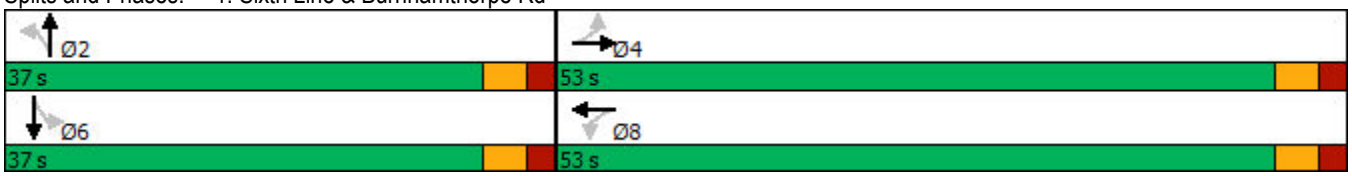
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	171	212	105	245	177	678	64	533
Future Volume (vph)	171	212	105	245	177	678	64	533
Lane Group Flow (vph)	178	265	109	295	184	839	67	704
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	53.0	53.0	53.0	53.0	37.0	37.0	37.0	37.0
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.77	0.53	0.48	0.58	0.58	0.46	0.22	0.38
Control Delay	41.4	20.4	24.9	22.0	21.2	9.5	10.8	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	20.4	24.9	22.0	21.2	9.5	10.8	8.5
Queue Length 50th (m)	17.1	21.9	9.6	25.4	11.0	23.0	3.1	17.6
Queue Length 95th (m)	36.3	39.3	21.7	44.3	#46.1	48.6	12.2	38.2
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	706	1488	689	1513	316	1815	305	1835
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.18	0.16	0.19	0.58	0.46	0.22	0.38

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 58.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Future Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	1787		1547	1818		1491	3256		1745	3280	
Flt Permitted	0.46	1.00		0.51	1.00		0.36	1.00		0.30	1.00	
Satd. Flow (perm)	850	1787		831	1818		571	3256		552	3280	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	178	221	44	109	255	40	184	706	133	67	555	149
RTOR Reduction (vph)	0	12	0	0	9	0	0	12	0	0	19	0
Lane Group Flow (vph)	178	253	0	109	286	0	184	827	0	67	685	0
Heavy Vehicles (%)	4%	3%	14%	18%	3%	7%	17%	6%	5%	0%	4%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9		32.2	32.2		32.2	32.2	
Effective Green, g (s)	15.9	15.9		15.9	15.9		32.2	32.2		32.2	32.2	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.55	0.55		0.55	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	489		227	497		316	1804		305	1817	
v/s Ratio Prot		0.14			0.16			0.25			0.21	
v/s Ratio Perm	c0.21			0.13			c0.32			0.12		
v/c Ratio	0.77	0.52		0.48	0.57		0.58	0.46		0.22	0.38	
Uniform Delay, d1	19.4	17.8		17.6	18.2		8.5	7.7		6.6	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.1	0.9		1.6	1.6		2.7	0.2		0.4	0.1	
Delay (s)	33.5	18.8		19.2	19.8		11.2	7.9		6.9	7.4	
Level of Service	C	B		B	B		B	A		A	A	
Approach Delay (s)		24.7			19.6			8.5			7.4	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	19	250	31	24	31	171	688	30	29	459	98
Future Volume (Veh/h)	12	19	250	31	24	31	171	688	30	29	459	98
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	21	272	34	26	34	186	748	33	32	499	107
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								258				
pX, platoon unblocked												
vC, conflicting volume	1410	1770	303	1732	1806	390	606			781		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1410	1770	303	1732	1806	390	606			781		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	76	68	61	0	58	94	81			96		
cM capacity (veh/h)	54	66	699	22	62	614	982			845		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	13	293	34	60	186	499	282	32	333	273
Volume Left	13	0	34	0	186	0	0	32	0	0
Volume Right	0	272	0	34	0	0	33	0	0	107
cSH	54	414	22	127	982	1700	1700	845	1700	1700
Volume to Capacity	0.24	0.71	1.53	0.47	0.19	0.29	0.17	0.04	0.20	0.16
Queue Length 95th (m)	6.3	40.9	33.3	16.3	5.3	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	92.0	32.2	640.8	56.4	9.5	0.0	0.0	9.4	0.0	0.0
Lane LOS	F	D	F	F	A			A		
Approach Delay (s)	34.8		267.8		1.8			0.5		
Approach LOS	D		F							

Intersection Summary			
Average Delay	18.9		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Future Volume (Veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	430	2	1	378	11	37	0	3	33	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	389			432			838	836	431	834	832	384
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			340			781	779	339	776	774	384
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			87	100	100	89	100	99
cM capacity (veh/h)	1181			1133			284	301	652	289	303	668

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	439	390	40	41
Volume Left	7	1	37	33
Volume Right	2	11	3	8
cSH	1181	1133	297	325
Volume to Capacity	0.01	0.00	0.13	0.13
Queue Length 95th (m)	0.1	0.0	3.5	3.3
Control Delay (s)	0.2	0.0	19.0	17.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.0	19.0	17.7
Approach LOS			C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	35.4%	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)	11	415	3	10	331	4	20	0	30	12	0	8
Future Volume (Veh/h)	11	415	3	10	331	4	20	0	30	12	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	451	3	11	360	4	22	0	33	13	0	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked												
vC, conflicting volume	364			454			870	862	452	894	862	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364			454			870	862	452	894	862	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	100	95	95	100	99
cM capacity (veh/h)	1206			1117			267	289	611	246	289	687

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	466	375	55	22
Volume Left	12	11	22	13
Volume Right	3	4	33	9
cSH	1206	1117	403	334
Volume to Capacity	0.01	0.01	0.14	0.07
Queue Length 95th (m)	0.2	0.2	3.6	1.6
Control Delay (s)	0.3	0.3	15.3	16.5
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.3	15.3	16.5
Approach LOS			C	C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	36.8%	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)	15	457	1	6	334	56	4	0	18	29	0	9
Future Volume (Veh/h)	15	457	1	6	334	56	4	0	18	29	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	497	1	7	363	61	4	0	20	32	0	10
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	424			498			947	968	498	957	938	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			498			947	968	498	957	938	394
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	100	97	86	100	98
cM capacity (veh/h)	1146			1076			236	251	577	227	261	660

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	514	431	24	42
Volume Left	16	7	4	32
Volume Right	1	61	20	10
cSH	1146	1076	465	270
Volume to Capacity	0.01	0.01	0.05	0.16
Queue Length 95th (m)	0.3	0.1	1.2	4.1
Control Delay (s)	0.4	0.2	13.2	20.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.4	0.2	13.2	20.8
Approach LOS			B	C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	17	1	72	13	2
Future Volume (Veh/h)	76	17	1	72	13	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	18	1	78	14	2
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			101		172	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		172	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1504		822	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	101	79	16
Volume Left	0	1	14
Volume Right	18	0	2
cSH	1700	1504	838
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.4
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	77	1	2	71	2	9
Future Volume (Veh/h)	77	1	2	71	2	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	1	2	77	2	10
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			85		166	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			85		166	84
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1524		829	980

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	79	12
Volume Left	0	2	2
Volume Right	1	0	10
cSH	1700	1524	951
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.2	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	15.3%	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)	58	28	0	0	50	6	0	0	0	6	0	23
Future Volume (Veh/h)	58	28	0	0	50	6	0	0	0	6	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	30	0	0	54	7	0	0	0	7	0	25
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	61			30			238	217	30	214	214	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	61			30			238	217	30	214	214	58
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	100	99	100	98
cM capacity (veh/h)	1555			1596			681	657	1050	724	660	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	61	0	32
Volume Left	63	0	0	7
Volume Right	0	7	0	25
cSH	1555	1596	1700	933
Volume to Capacity	0.04	0.00	0.00	0.03
Queue Length 95th (m)	1.0	0.0	0.0	0.8
Control Delay (s)	5.1	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	5.1	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	21.4%	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)	7	20	7	3	28	0	8	55	4	0	10	20
Future Volume (Veh/h)	7	20	7	3	28	0	8	55	4	0	10	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	22	8	3	30	0	9	60	4	0	11	22
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	30			30			106	78	26	112	82	30
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			30			106	78	26	112	82	30
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	93	100	100	99	98
cM capacity (veh/h)	1596			1596			847	811	1056	814	806	1050

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	33	73	33
Volume Left	8	3	9	0
Volume Right	8	0	4	22
cSH	1596	1596	825	954
Volume to Capacity	0.01	0.00	0.09	0.03
Queue Length 95th (m)	0.1	0.0	2.2	0.8
Control Delay (s)	1.6	0.7	9.8	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	1.6	0.7	9.8	8.9
Approach LOS			A	A

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	20	25	0	0	6
Future Volume (Veh/h)	4	20	25	0	0	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	22	27	0	0	7
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	27				57	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27				57	27
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1600				953	1054

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	27	7
Volume Left	4	0	0
Volume Right	0	0	7
cSH	1600	1700	1054
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (m)	0.1	0.0	0.2
Control Delay (s)	1.1	0.0	8.4
Lane LOS	A		A
Approach Delay (s)	1.1	0.0	8.4
Approach LOS			A

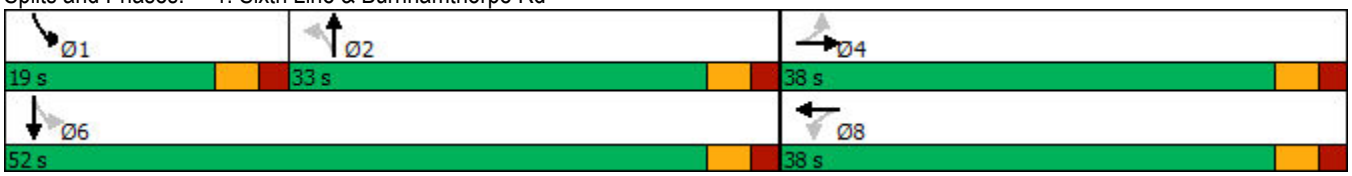
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	171	212	105	245	177	678	64	533
Future Volume (vph)	171	212	105	245	177	678	64	533
Lane Group Flow (vph)	178	265	109	295	184	839	67	704
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	10.0	31.0
Total Split (s)	38.0	38.0	38.0	38.0	33.0	33.0	19.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	36.7%	36.7%	21.1%	57.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.72	0.49	0.45	0.54	0.69	0.58	0.19	0.39
Control Delay	39.0	21.6	26.2	22.8	38.7	18.7	10.3	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	21.6	26.2	22.8	38.7	18.7	10.3	9.7
Queue Length 50th (m)	20.9	27.1	11.6	31.3	19.4	42.1	3.4	20.6
Queue Length 95th (m)	43.1	47.4	25.7	53.5	#67.3	83.4	11.9	46.4
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	438	950	427	965	270	1473	514	2473
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.28	0.26	0.31	0.68	0.57	0.13	0.28

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 65.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Future Volume (vph)	171	212	42	105	245	38	177	678	128	64	533	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	1787		1547	1818		1491	3256		1745	3280	
Flt Permitted	0.45	1.00		0.50	1.00		0.38	1.00		0.21	1.00	
Satd. Flow (perm)	830	1787		807	1818		603	3256		390	3280	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	178	221	44	109	255	40	184	706	133	67	555	149
RTOR Reduction (vph)	0	9	0	0	7	0	0	14	0	0	25	0
Lane Group Flow (vph)	178	256	0	109	288	0	184	825	0	67	679	0
Heavy Vehicles (%)	4%	3%	14%	18%	3%	7%	17%	6%	5%	0%	4%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.6	19.6		19.6	19.6		29.0	29.0		38.0	38.0	
Effective Green, g (s)	19.6	19.6		19.6	19.6		29.0	29.0		38.0	38.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.43	0.43		0.56	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	518		233	527		258	1396		299	1843	
v/s Ratio Prot		0.14			0.16			0.25		0.01	c0.21	
v/s Ratio Perm	c0.21			0.14			c0.31			0.11		
v/c Ratio	0.74	0.49		0.47	0.55		0.71	0.59		0.22	0.37	
Uniform Delay, d1	21.7	19.9		19.7	20.2		15.9	14.8		8.0	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.7	0.7		1.5	1.2		9.0	0.7		0.4	0.1	
Delay (s)	33.4	20.6		21.2	21.4		24.9	15.4		8.4	8.3	
Level of Service	C	C		C	C		C	B		A	A	
Approach Delay (s)		25.8			21.4			17.1			8.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	12	19	31	24	171	688	29	459
Future Volume (vph)	12	19	31	24	171	688	29	459
Lane Group Flow (vph)	13	293	34	60	186	781	32	606
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	20.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	24.0	24.0	26.0	26.0	26.0	26.0
Total Split (s)	24.0	24.0	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.07	0.63	0.27	0.22	0.35	0.36	0.07	0.27
Control Delay	20.7	10.7	26.6	13.7	7.9	5.6	5.4	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	10.7	26.6	13.7	7.9	5.6	5.4	4.7
Queue Length 50th (m)	1.3	2.1	3.5	2.6	6.9	14.9	1.0	9.7
Queue Length 95th (m)	4.6	17.8	9.1	9.8	23.2	32.9	4.7	22.5
Internal Link Dist (m)		162.7		157.0		233.7		937.9
Turn Bay Length (m)	30.0		30.0		30.0		75.0	
Base Capacity (vph)	413	686	271	551	535	2188	429	2212
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.43	0.13	0.11	0.35	0.36	0.07	0.27

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Sixth Line & Driveway/Loyalist Tr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	19	250	31	24	31	171	688	30	29	459	98
Future Volume (vph)	12	19	250	31	24	31	171	688	30	29	459	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.4	3.4	3.3	3.4	3.7
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.92		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1654		1825	1758		1825	3317		1745	3327	
Flt Permitted	0.72	1.00		0.47	1.00		0.42	1.00		0.36	1.00	
Satd. Flow (perm)	1379	1654		904	1758		812	3317		653	3327	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	21	272	34	26	34	186	748	33	32	499	107
RTOR Reduction (vph)	0	233	0	0	29	0	0	3	0	0	21	0
Lane Group Flow (vph)	13	60	0	34	31	0	186	778	0	32	585	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.5	8.5		8.5	8.5		39.5	39.5		39.5	39.5	
Effective Green, g (s)	8.5	8.5		8.5	8.5		39.5	39.5		39.5	39.5	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.66	0.66		0.66	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	195	234		128	249		534	2183		429	2190	
v/s Ratio Prot		0.04			0.02			c0.23			0.18	
v/s Ratio Perm	0.01			c0.04			0.23			0.05		
v/c Ratio	0.07	0.25		0.27	0.12		0.35	0.36		0.07	0.27	
Uniform Delay, d1	22.3	22.9		23.0	22.5		4.5	4.6		3.7	4.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		1.1	0.2		1.8	0.5		0.3	0.3	
Delay (s)	22.5	23.5		24.1	22.7		6.3	5.0		4.0	4.5	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		23.5			23.2			5.3			4.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Future Volume (Veh/h)	6	396	2	1	348	10	34	0	3	30	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	430	2	1	378	11	37	0	3	33	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	389			432			838	836	431	834	832	384
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			332			777	774	331	771	769	384
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			87	100	100	89	100	99
cM capacity (veh/h)	1181			1133			285	301	654	289	303	668

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	439	390	40	41
Volume Left	7	1	37	33
Volume Right	2	11	3	8
cSH	1181	1133	297	325
Volume to Capacity	0.01	0.00	0.13	0.13
Queue Length 95th (m)	0.1	0.0	3.5	3.2
Control Delay (s)	0.2	0.0	19.0	17.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.0	19.0	17.7
Approach LOS			C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	35.4%	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)	11	415	3	10	331	4	20	0	30	12	0	8
Future Volume (Veh/h)	11	415	3	10	331	4	20	0	30	12	0	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	451	3	11	360	4	22	0	33	13	0	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked				0.99			0.99	0.99	0.99	0.99	0.99	
vC, conflicting volume	364			454			870	862	452	894	862	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364			443			863	856	441	887	855	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	100	95	95	100	99
cM capacity (veh/h)	1206			1116			267	289	614	246	289	687

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	466	375	55	22
Volume Left	12	11	22	13
Volume Right	3	4	33	9
cSH	1206	1116	404	334
Volume to Capacity	0.01	0.01	0.14	0.07
Queue Length 95th (m)	0.2	0.2	3.6	1.6
Control Delay (s)	0.3	0.3	15.3	16.5
Lane LOS	A	A	C	C
Approach Delay (s)	0.3	0.3	15.3	16.5
Approach LOS			C	C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	36.8%	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)	15	457	1	6	334	56	4	0	18	29	0	9
Future Volume (Veh/h)	15	457	1	6	334	56	4	0	18	29	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	497	1	7	363	61	4	0	20	32	0	10
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	424			498			947	968	498	957	938	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			498			947	968	498	957	938	394
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	100	97	86	100	98
cM capacity (veh/h)	1146			1076			236	251	577	227	261	660

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	514	431	24	42
Volume Left	16	7	4	32
Volume Right	1	61	20	10
cSH	1146	1076	465	270
Volume to Capacity	0.01	0.01	0.05	0.16
Queue Length 95th (m)	0.3	0.1	1.2	4.1
Control Delay (s)	0.4	0.2	13.2	20.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.4	0.2	13.2	20.8
Approach LOS			B	C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	17	1	72	13	2
Future Volume (Veh/h)	76	17	1	72	13	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	83	18	1	78	14	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	181					
pX, platoon unblocked						
vC, conflicting volume			101		172	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		172	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1504		822	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	101	79	16
Volume Left	0	1	14
Volume Right	18	0	2
cSH	1700	1504	838
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.4
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	77	1	2	71	2	9
Future Volume (Veh/h)	77	1	2	71	2	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	1	2	77	2	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	364					
pX, platoon unblocked						
vC, conflicting volume			85		166	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			85		166	84
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1524		829	980

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	79	12
Volume Left	0	2	2
Volume Right	1	0	10
cSH	1700	1524	951
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.2	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	15.3%	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)	58	28	0	0	50	6	0	0	0	6	0	23
Future Volume (Veh/h)	58	28	0	0	50	6	0	0	0	6	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	30	0	0	54	7	0	0	0	7	0	25
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	61			30			238	217	30	214	214	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	61			30			238	217	30	214	214	58
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	100	99	100	98
cM capacity (veh/h)	1555			1596			681	657	1050	724	660	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	61	0	32
Volume Left	63	0	0	7
Volume Right	0	7	0	25
cSH	1555	1596	1700	933
Volume to Capacity	0.04	0.00	0.00	0.03
Queue Length 95th (m)	1.0	0.0	0.0	0.8
Control Delay (s)	5.1	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	5.1	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	21.4%	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)	7	20	7	3	28	0	8	55	4	0	10	20
Future Volume (Veh/h)	7	20	7	3	28	0	8	55	4	0	10	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	22	8	3	30	0	9	60	4	0	11	22
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	30			30			106	78	26	112	82	30
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			30			106	78	26	112	82	30
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	93	100	100	99	98
cM capacity (veh/h)	1596			1596			847	811	1056	814	806	1050

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	33	73	33
Volume Left	8	3	9	0
Volume Right	8	0	4	22
cSH	1596	1596	825	954
Volume to Capacity	0.01	0.00	0.09	0.03
Queue Length 95th (m)	0.1	0.0	2.2	0.8
Control Delay (s)	1.6	0.7	9.8	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	1.6	0.7	9.8	8.9
Approach LOS			A	A

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	20	25	0	0	6
Future Volume (Veh/h)	4	20	25	0	0	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	22	27	0	0	7
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	27				57	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27				57	27
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1600				953	1054

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	27	7
Volume Left	4	0	0
Volume Right	0	0	7
cSH	1600	1700	1054
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (m)	0.1	0.0	0.2
Control Delay (s)	1.1	0.0	8.4
Lane LOS	A		A
Approach Delay (s)	1.1	0.0	8.4
Approach LOS			A

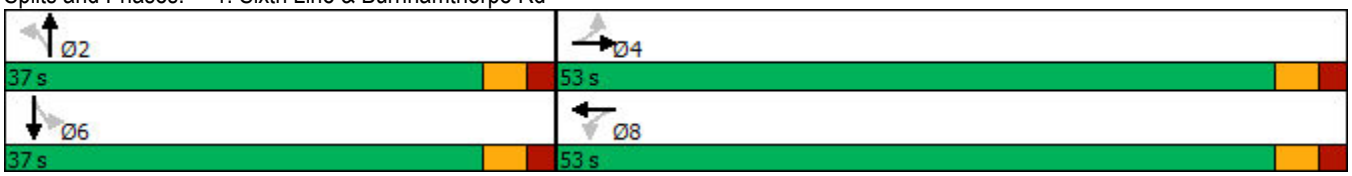
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	163	210	106	308	94	502	74	839
Future Volume (vph)	163	210	106	308	94	502	74	839
Lane Group Flow (vph)	168	254	109	353	97	674	76	1053
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	53.0	53.0	53.0	53.0	37.0	37.0	37.0	37.0
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.66	0.43	0.32	0.60	0.54	0.41	0.25	0.63
Control Delay	30.1	16.2	17.2	19.8	24.4	9.0	11.3	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	16.2	17.2	19.8	24.4	9.0	11.3	11.9
Queue Length 50th (m)	12.3	16.0	7.1	24.5	5.4	16.6	3.6	31.7
Queue Length 95th (m)	#36.0	37.6	20.1	54.5	#26.7	33.5	12.6	60.9
Internal Link Dist (m)		1205.8		152.1		910.2		233.7
Turn Bay Length (m)	75.0		75.0		75.0		75.0	
Base Capacity (vph)	752	1716	1008	1719	239	2203	402	2212
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.15	0.11	0.21	0.41	0.31	0.19	0.48

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 50.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sixth Line & Burnhamthorpe Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	210	37	106	308	34	94	502	151	74	839	182
Future Volume (vph)	163	210	37	106	308	34	94	502	151	74	839	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.4	3.4	3.3	3.4	3.4
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1878		1825	1883		1745	3366		1572	3389	
Flt Permitted	0.43	1.00		0.58	1.00		0.20	1.00		0.37	1.00	
Satd. Flow (perm)	824	1878		1105	1883		368	3366		619	3389	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	168	216	38	109	318	35	97	518	156	76	865	188
RTOR Reduction (vph)	0	10	0	0	6	0	0	25	0	0	16	0
Lane Group Flow (vph)	168	244	0	109	347	0	97	649	0	76	1037	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	1%	2%	11%	1%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		24.7	24.7		24.7	24.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		24.7	24.7		24.7	24.7	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.49	0.49		0.49	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	587		345	589		179	1646		302	1657	
v/s Ratio Prot		0.13			0.18			0.19			c0.31	
v/s Ratio Perm	c0.20			0.10			0.26			0.12		
v/c Ratio	0.65	0.42		0.32	0.59		0.54	0.39		0.25	0.63	
Uniform Delay, d1	15.0	13.7		13.2	14.6		9.0	8.2		7.5	9.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.5		0.5	1.5		3.3	0.2		0.4	0.7	
Delay (s)	20.8	14.2		13.8	16.1		12.3	8.3		8.0	10.2	
Level of Service	C	B		B	B		B	A		A	B	
Approach Delay (s)		16.8			15.6			8.8			10.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	13	52	9	57	639	22	869
Future Volume (vph)	8	13	52	9	57	639	22	869
Lane Group Flow (vph)	9	205	57	61	62	700	24	980
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	26.0	26.0	26.0	26.0
Total Split (s)	23.0	23.0	23.0	23.0	37.0	37.0	37.0	37.0
Total Split (%)	38.3%	38.3%	38.3%	38.3%	61.7%	61.7%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.04	0.59	0.31	0.19	0.19	0.31	0.05	0.45
Control Delay	19.1	19.3	24.9	9.6	7.5	6.0	5.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	19.3	24.9	9.6	7.5	6.0	5.8	6.9
Queue Length 50th (m)	0.9	11.0	5.6	1.0	2.3	15.0	0.8	23.3
Queue Length 95th (m)	3.6	25.0	13.0	8.3	8.9	29.2	3.8	44.2
Internal Link Dist (m)		154.3		157.0		233.7		937.9
Turn Bay Length (m)	30.0		30.0		30.0		75.0	
Base Capacity (vph)	390	536	326	512	333	2227	450	2200
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.38	0.17	0.12	0.19	0.31	0.05	0.45

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Sixth Line & Driveway/Loyalist Tr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	13	176	52	9	47	57	639	5	22	869	32
Future Volume (vph)	8	13	176	52	9	47	57	639	5	22	869	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.4	3.4	3.3	3.4	3.7
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.87		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1653		1825	1680		1825	3491		1745	3444	
Flt Permitted	0.72	1.00		0.60	1.00		0.27	1.00		0.39	1.00	
Satd. Flow (perm)	1378	1653		1151	1680		522	3491		708	3444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	14	191	57	10	51	62	695	5	24	945	35
RTOR Reduction (vph)	0	80	0	0	43	0	0	1	0	0	3	0
Lane Group Flow (vph)	9	125	0	57	18	0	62	699	0	24	977	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.7	9.7		9.7	9.7		38.3	38.3		38.3	38.3	
Effective Green, g (s)	9.7	9.7		9.7	9.7		38.3	38.3		38.3	38.3	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.64	0.64		0.64	0.64	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	222	267		186	271		333	2228		451	2198	
v/s Ratio Prot		c0.08			0.01			0.20			c0.28	
v/s Ratio Perm	0.01			0.05			0.12			0.03		
v/c Ratio	0.04	0.47		0.31	0.07		0.19	0.31		0.05	0.44	
Uniform Delay, d1	21.2	22.8		22.2	21.3		4.5	4.9		4.1	5.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.3		0.9	0.1		1.2	0.4		0.2	0.7	
Delay (s)	21.3	24.1		23.1	21.4		5.7	5.3		4.3	6.1	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		24.0			22.2			5.3			6.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	416	6	3	421	30	19	0	2	20	0	7
Future Volume (Veh/h)	13	416	6	3	421	30	19	0	2	20	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	452	7	3	458	33	21	0	2	22	0	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		176										
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	491			459			972	980	456	966	968	474
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	491			394			939	948	390	933	934	474
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			91	100	100	90	100	99
cM capacity (veh/h)	1083			1106			226	244	624	230	248	594

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	473	494	23	30
Volume Left	14	3	21	22
Volume Right	7	33	2	8
cSH	1083	1106	239	275
Volume to Capacity	0.01	0.00	0.10	0.11
Queue Length 95th (m)	0.3	0.1	2.4	2.8
Control Delay (s)	0.4	0.1	21.7	19.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.4	0.1	21.7	19.7
Approach LOS			C	C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	41.1%	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)	7	422	9	33	437	12	11	0	19	11	0	6
Future Volume (Veh/h)	7	422	9	33	437	12	11	0	19	11	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	459	10	36	475	13	12	0	21	12	0	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		369										
pX, platoon unblocked												
vC, conflicting volume	488			469			1040	1040	464	1054	1038	482
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	488			469			1040	1040	464	1054	1038	482
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			94	100	97	94	100	99
cM capacity (veh/h)	1086			1103			201	223	602	192	223	589

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	477	524	33	19
Volume Left	8	36	12	12
Volume Right	10	13	21	7
cSH	1086	1103	349	256
Volume to Capacity	0.01	0.03	0.09	0.07
Queue Length 95th (m)	0.2	0.8	2.4	1.8
Control Delay (s)	0.2	0.9	16.4	20.2
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.9	16.4	20.2
Approach LOS			C	C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	52.6%	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)	7	448	4	21	485	25	3	0	12	52	0	12
Future Volume (Veh/h)	7	448	4	21	485	25	3	0	12	52	0	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	487	4	23	527	27	3	0	13	57	0	13
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	554			491			1104	1105	489	1104	1094	540
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554			491			1104	1105	489	1104	1094	540
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			98	100	98	69	100	98
cM capacity (veh/h)	1026			1083			181	206	583	182	210	545

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	499	577	16	70
Volume Left	8	23	3	57
Volume Right	4	27	13	13
cSH	1026	1083	412	207
Volume to Capacity	0.01	0.02	0.04	0.34
Queue Length 95th (m)	0.2	0.5	0.9	10.7
Control Delay (s)	0.2	0.6	14.1	31.0
Lane LOS	A	A	B	D
Approach Delay (s)	0.2	0.6	14.1	31.0
Approach LOS			B	D

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	33	15	3	100	25	0
Future Volume (Veh/h)	33	15	3	100	25	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	16	3	109	27	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)	181					
pX, platoon unblocked						
vC, conflicting volume			52		159	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			52		159	44
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1567		835	1032

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	52	112	27
Volume Left	0	3	27
Volume Right	16	0	0
cSH	1700	1567	835
Volume to Capacity	0.03	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.8
Control Delay (s)	0.0	0.2	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.5
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	31	2	5	101	2	1
Future Volume (Veh/h)	31	2	5	101	2	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	2	5	110	2	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	364					
pX, platoon unblocked						
vC, conflicting volume			36		155	35
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			36		155	35
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1588		839	1044

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	36	115	3
Volume Left	0	5	2
Volume Right	2	0	1
cSH	1700	1588	897
Volume to Capacity	0.02	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.1
Control Delay (s)	0.0	0.3	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	9.0
Approach LOS			A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	19.4%	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)	15	17	0	0	58	0	0	0	0	18	0	48
Future Volume (Veh/h)	15	17	0	0	58	0	0	0	0	18	0	48
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	18	0	0	63	0	0	0	0	20	0	52
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	63			18			165	113	18	113	113	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			18			165	113	18	113	113	63
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	98	100	95
cM capacity (veh/h)	1553			1612			757	773	1066	862	773	1007

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	63	0	72
Volume Left	16	0	0	20
Volume Right	0	0	0	52
cSH	1553	1612	1700	962
Volume to Capacity	0.01	0.00	0.00	0.07
Queue Length 95th (m)	0.2	0.0	0.0	1.8
Control Delay (s)	3.5	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	3.5	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	19.0%	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)	1	14	20	7	17	0	1	13	0	0	27	40
Future Volume (Veh/h)	1	14	20	7	17	0	1	13	0	0	27	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	15	22	8	18	0	1	14	0	0	29	43
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	18			37			120	62	26	69	73	18
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			37			120	62	26	69	73	18
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	98	100	100	96	96
cM capacity (veh/h)	1612			1587			800	828	1056	912	817	1066

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	26	15	72
Volume Left	1	8	1	0
Volume Right	22	0	0	43
cSH	1612	1587	826	949
Volume to Capacity	0.00	0.01	0.02	0.08
Queue Length 95th (m)	0.0	0.1	0.4	1.9
Control Delay (s)	0.2	2.3	9.4	9.1
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	2.3	9.4	9.1
Approach LOS			A	A

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	14	10	0	0	14
Future Volume (Veh/h)	0	14	10	0	0	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	11	0	0	15
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	11				26	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	11				26	11
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1621				995	1076

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	15	11	15
Volume Left	0	0	0
Volume Right	0	0	15
cSH	1621	1700	1076
Volume to Capacity	0.00	0.01	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	8.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.4
Approach LOS			A

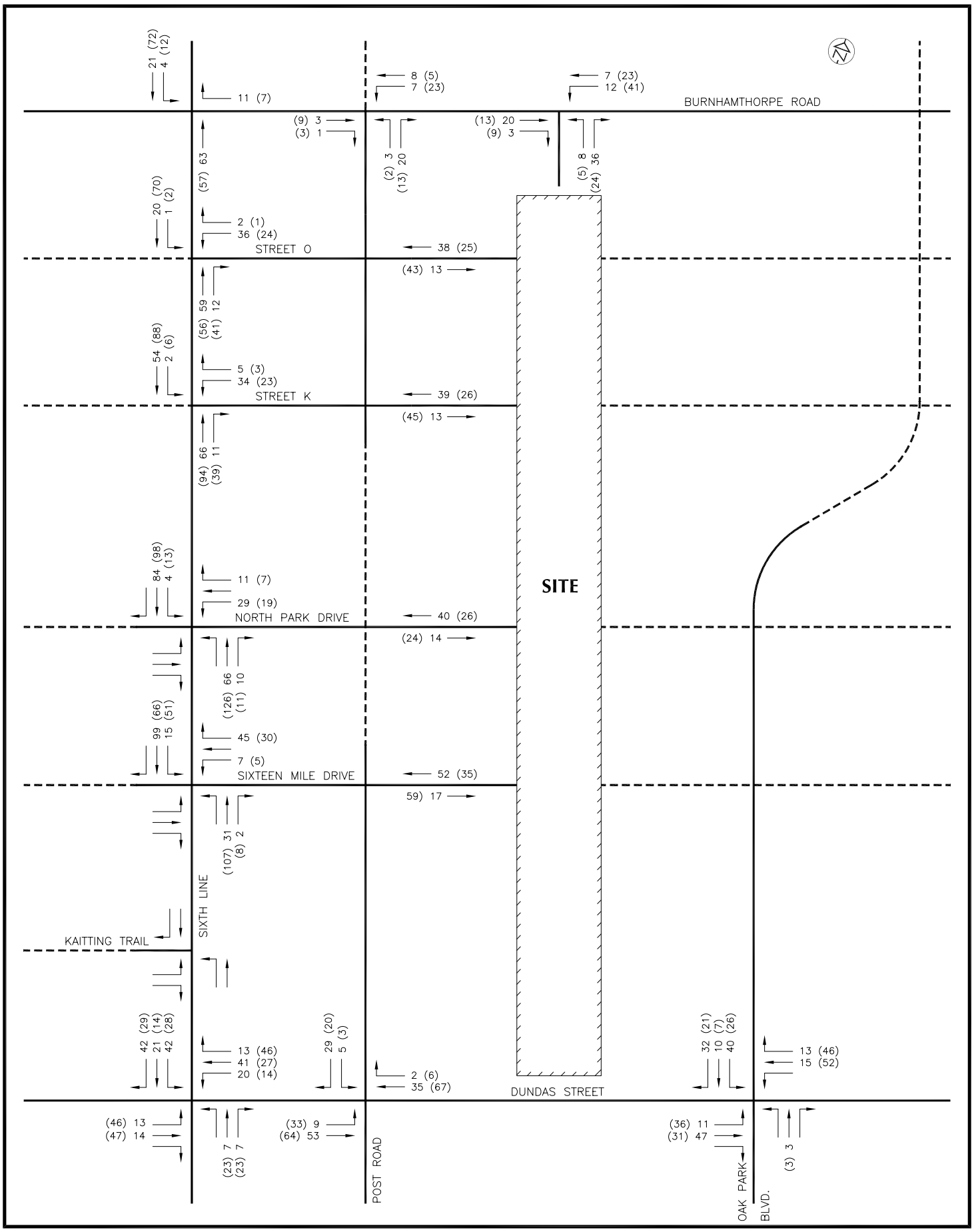
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E

Background Developments and Road Network Improvements

SITE PLAN

FIGURE 2



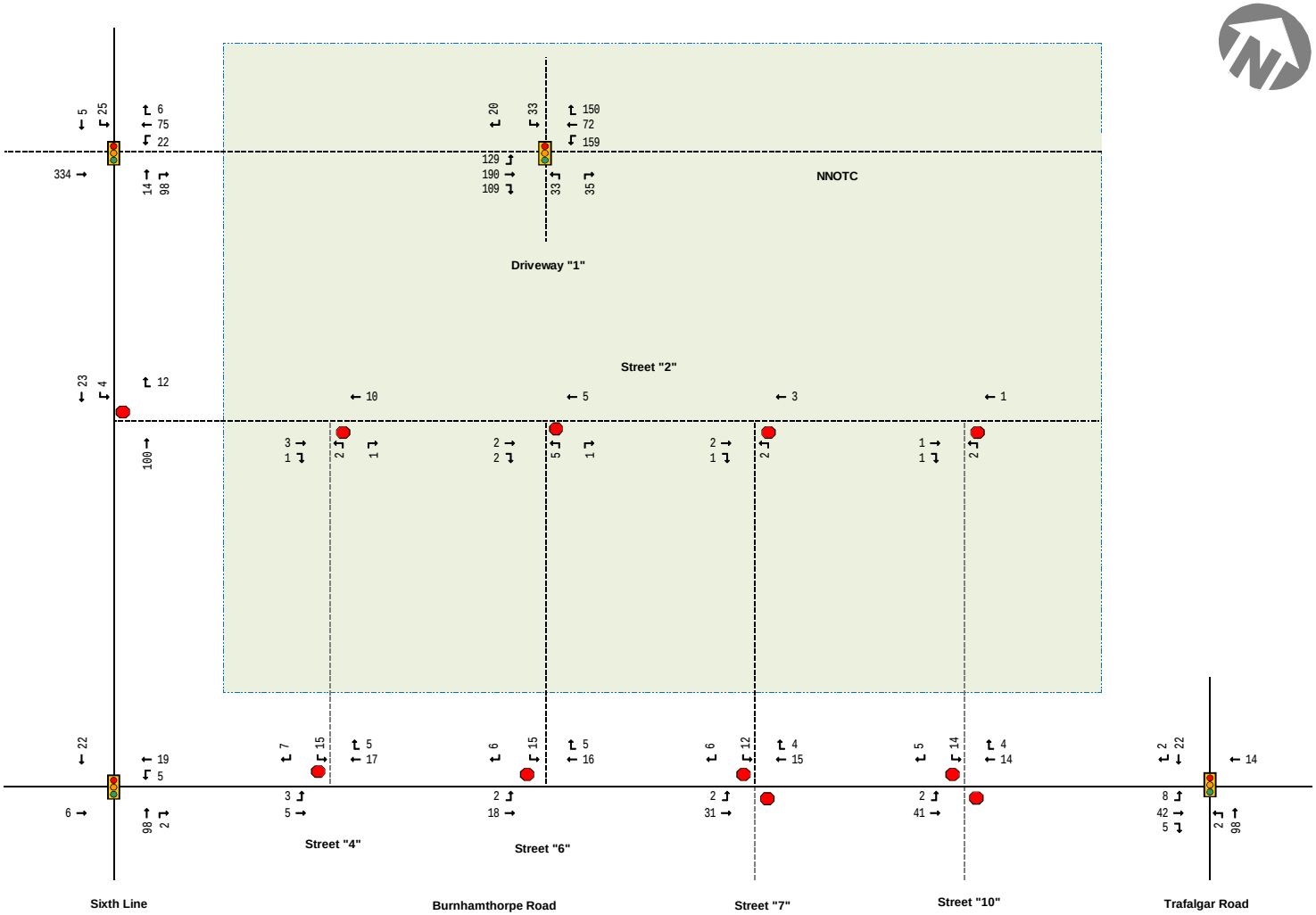
LEGEND

48 A.M. PEAK HOUR VOLUME

(11) P.M. PEAK HOUR VOLUME

SITE TRAFFIC

FIGURE 5



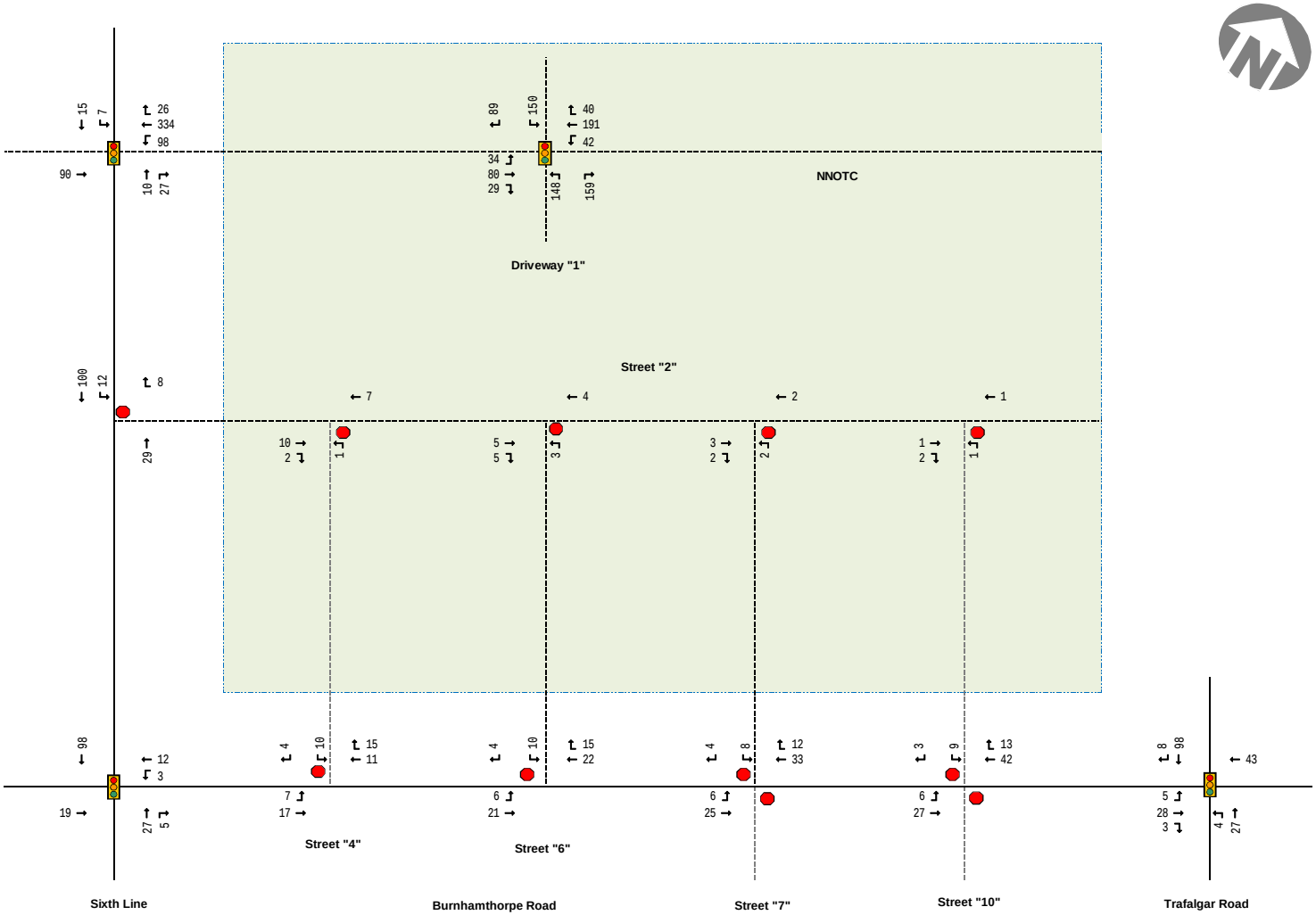
Proposed Star Oak Developments
Northeast of Burnhamthorpe Road East/Sixth Line Intersection, Oakville, Ontario

FIGURE: 5-3
2028 FUTURE TOTAL SITE TRAFFIC VOLUMES - Total
Weekday AM Peak Hour

LEGEND
Stop Sign
Traffic Signal
Subject Lands
Laning
Existing Road Network
Proposed Road Network

Time: 9:33 Date: 17-Apr-13 Column 80 Not To Scale
N:\Traffic\Documents\2013\33016930 - Star Oak Development, Oakville\07-Analysis and Volumes\02-TMD\[TMD_2013-04-17_UpdateOrgTD.xlsm]V_ft28

URS



Proposed Star Oak Developments
Northeast of Burnhamthorpe Road East/Sixth Line Intersection, Oakville, Ontario

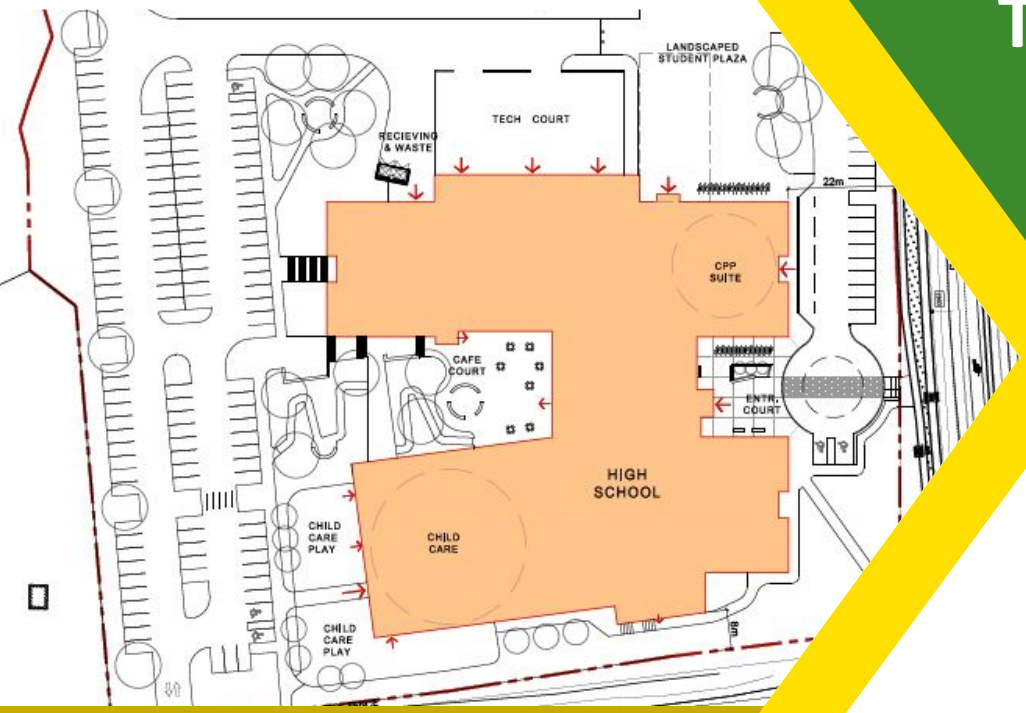
FIGURE: 5-4
2028 FUTURE TOTAL SITE TRAFFIC VOLUMES - Total
Weekday PM Peak Hour

LEGEND
Stop Sign
Traffic Signal
Subject Lands
Laning
Existing Road Network
Proposed Road Network

Time: 9:34 Date: 17-Apr-13 Column 81 Not To Scale
N:\Traffic\Documents\2013\33016930 - Star Oak Development, Oakville\07-Analysis and Volumes\02-TMD\[TMD_2013-04-17_UpdateOrgTD.xlsm]V_ft28

Sixth Oak Inc.

North Oakville School & Commercial Development



Transportation Impact Study

CGH TRANSPORTATION

Sixth Oak Inc. School and Employment Lands Transportation Impact Study

Prepared for:

Sixth Oak Inc.
145 Reynolds Street, Suite 400
Oakville, ON L6J 0A7

Prepared by:

CGH TRANSPORTATION

628 Haines Road
Newmarket, ON L3Y 6V5

June 2022

PN: 2021-113

Figure 1: Site Context

1 Introduction

This Transportation Impact Study (TIS) has been prepared to support the official plan amendment, zoning by-law amendment and draft plan of subdivision applications for Sixth Oak Inc. properties in North Oakville. The proposed development includes two blocks and a large natural heritage area. Block 1 is designated for employment lands. The site is anticipated to be able to accommodate one or more single storey employment buildings with a total gross floor area of 281,600 square feet. Block 2 is proposed to include a secondary school. The secondary school is comprised of 80 classrooms sufficient to support 1614 students, and an 8,000 square feet childcare facility.

The school and childcare centre will be located at the northwest corner of the intersection of Burnhamthorpe Road and Sixth Line and have accesses on both, while the single-storey employment lands will be located along the south side of William Halton Parkway. Access to the employment lands will be guided by the Halton Region Access Management Guidelines. The developments are surrounded by residential developments such as those proposed as part of Neighbourhood 9, 10, and 11. Figure 1 illustrates the site context. Figure 2 illustrates the proposed development demonstration plan. Figure 3 illustrates the detailed site plan for the proposed secondary school. Please note that this demonstration plan has been prepared to support the official plan and zoning bylaw amendment and draft plan of subdivision process and that each of Block 1 and Block 2 would be subject to a subsequent site plan approval process that will further refine the plans for each site. The intent and goal of this study is to evaluate the access locations and network adequacy. Commentary will be provided on some site design aspects, but this is subject to change at a later stage of development approvals.

The site currently resides within an Existing Development (ED) zone. It is located next to other existing development zones to its west and south, and a neighbourhood Centre (NC), a general urban (GU), and a service area employment (SA) zone on the east side of Sixth Line.

The scope of this TIS has been confirmed with transportation staff from the Town of Oakville and Halton Region. Email correspondence has been included in Appendix A. Comments from the Town received on March 25, 2022, on the first submission are also included in Appendix A.

Figure 26: 2025 Secondary School Site Trip Generation

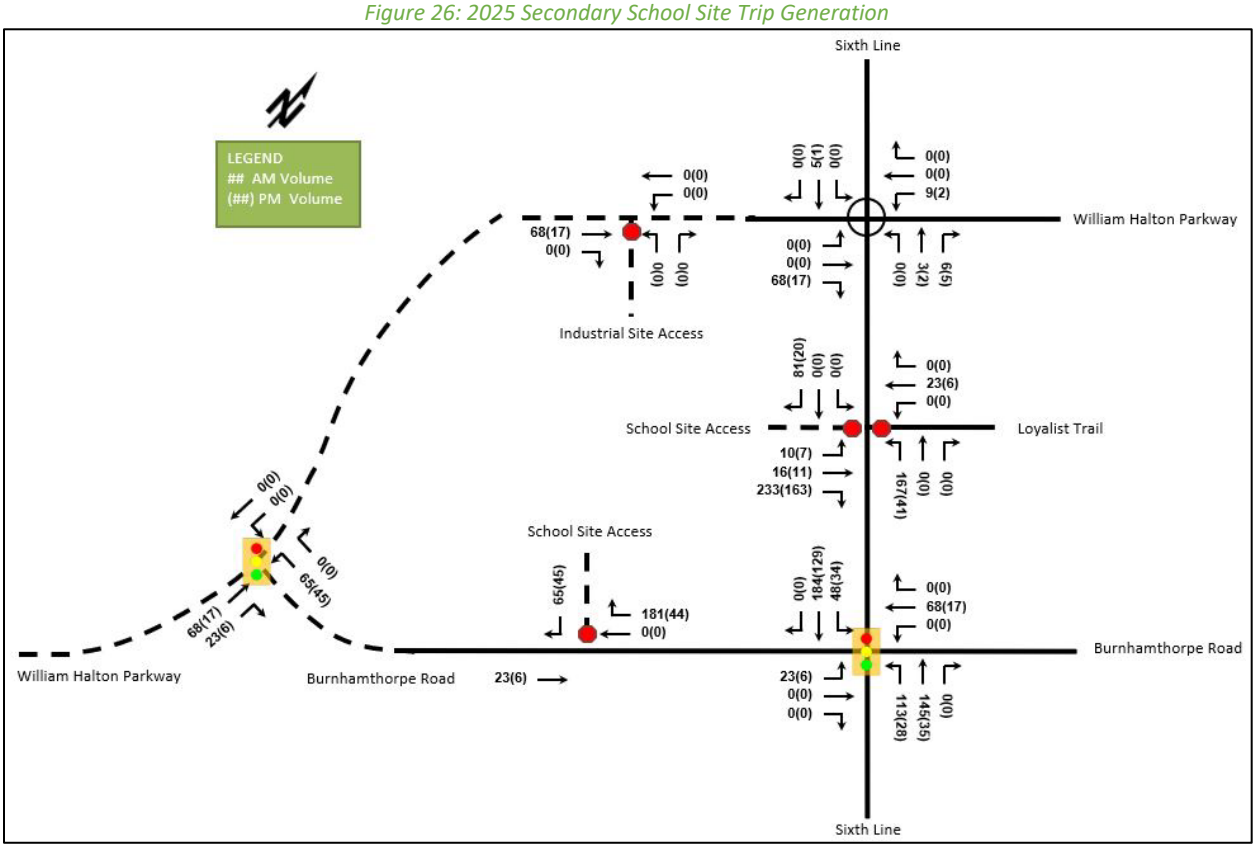


Figure 27: 2030 Secondary School Site Trip Generation

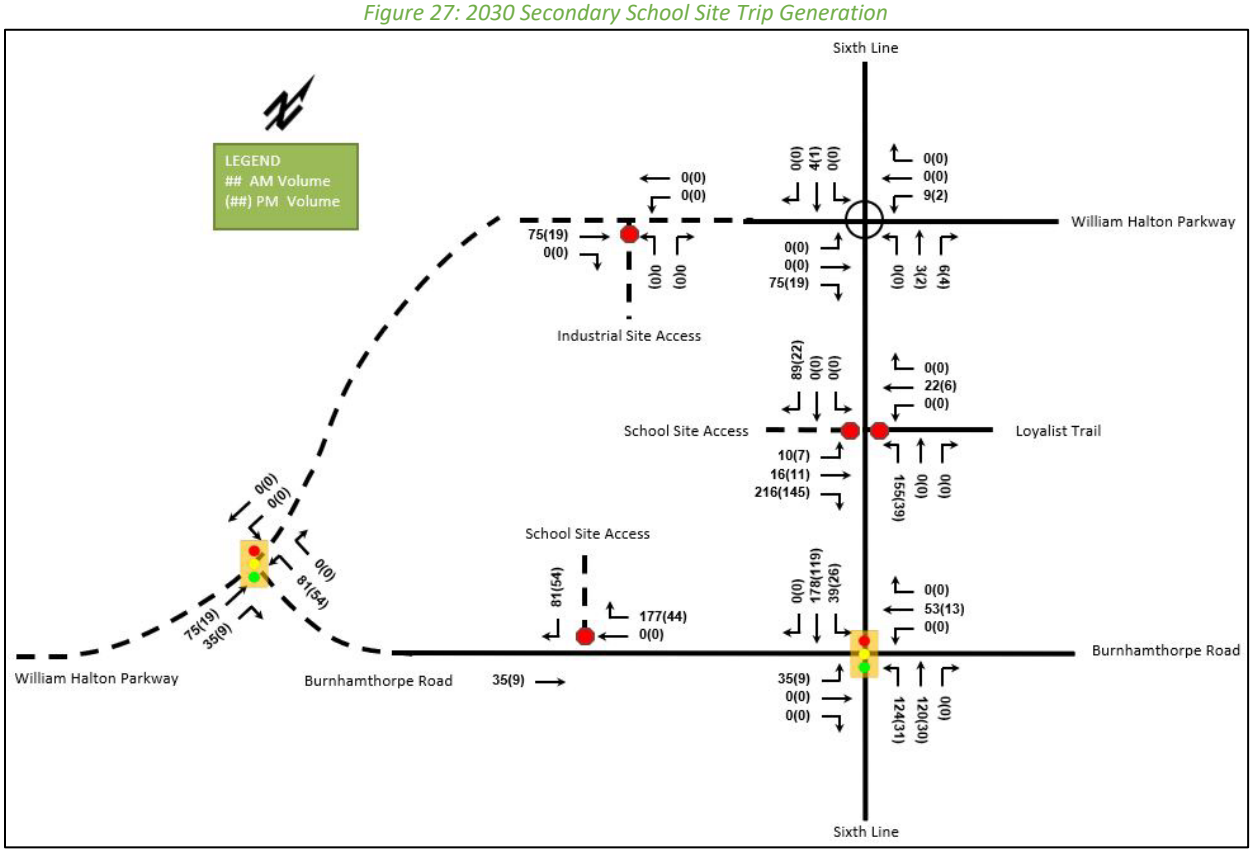


Figure 28: Childcare 2025 and 2030 Site Trip Generation

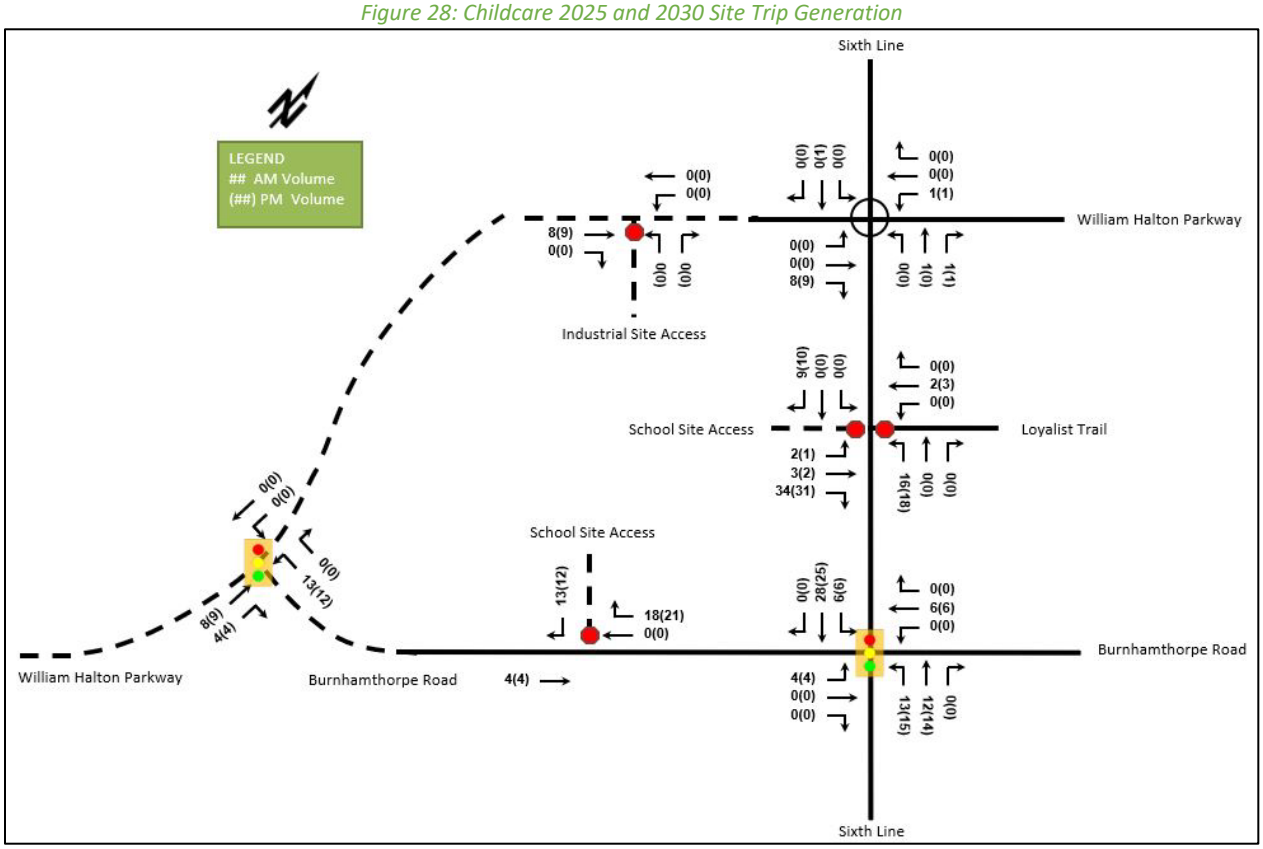


Figure 29: 2025 Industrial Site Trip Generation

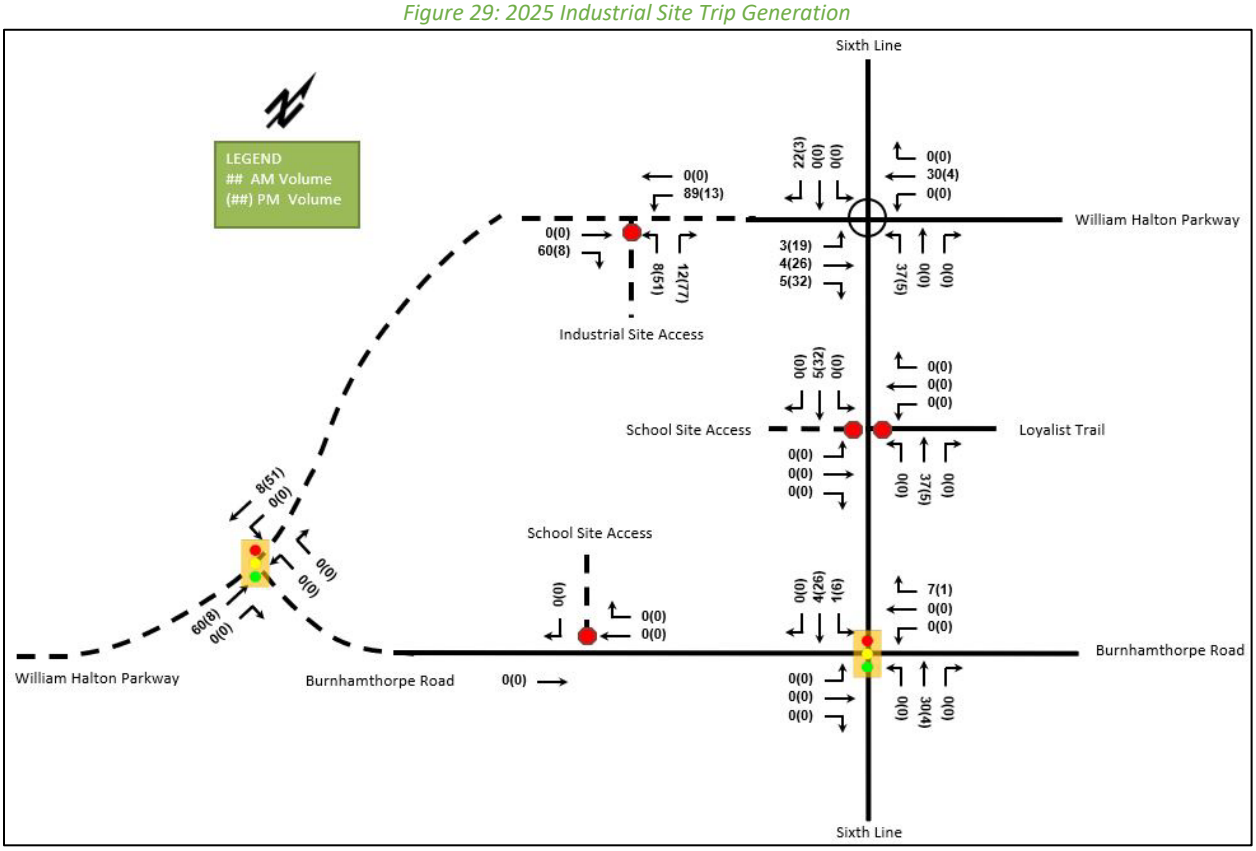


Figure 30: 2030 Industrial Site Trip Generation

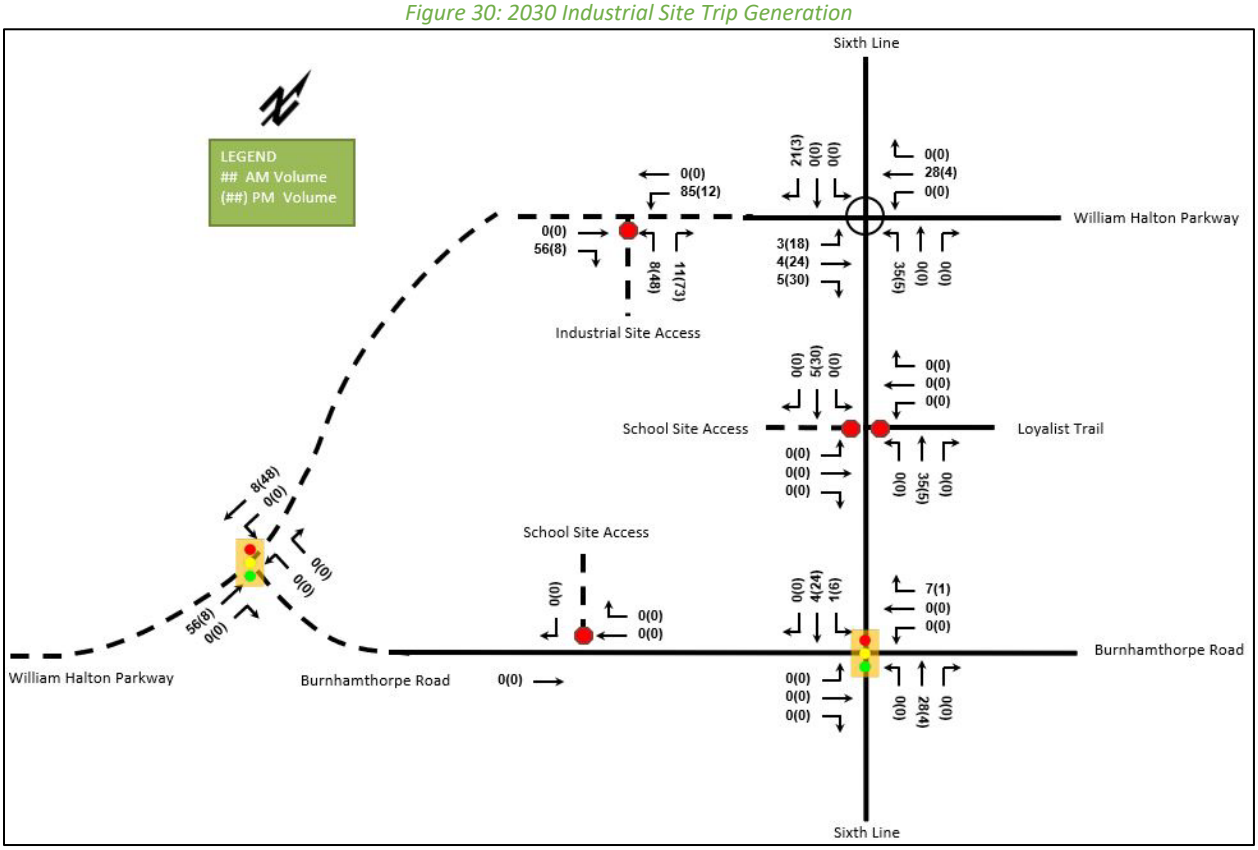


Figure 31: 2025 Total Site Trip Generation

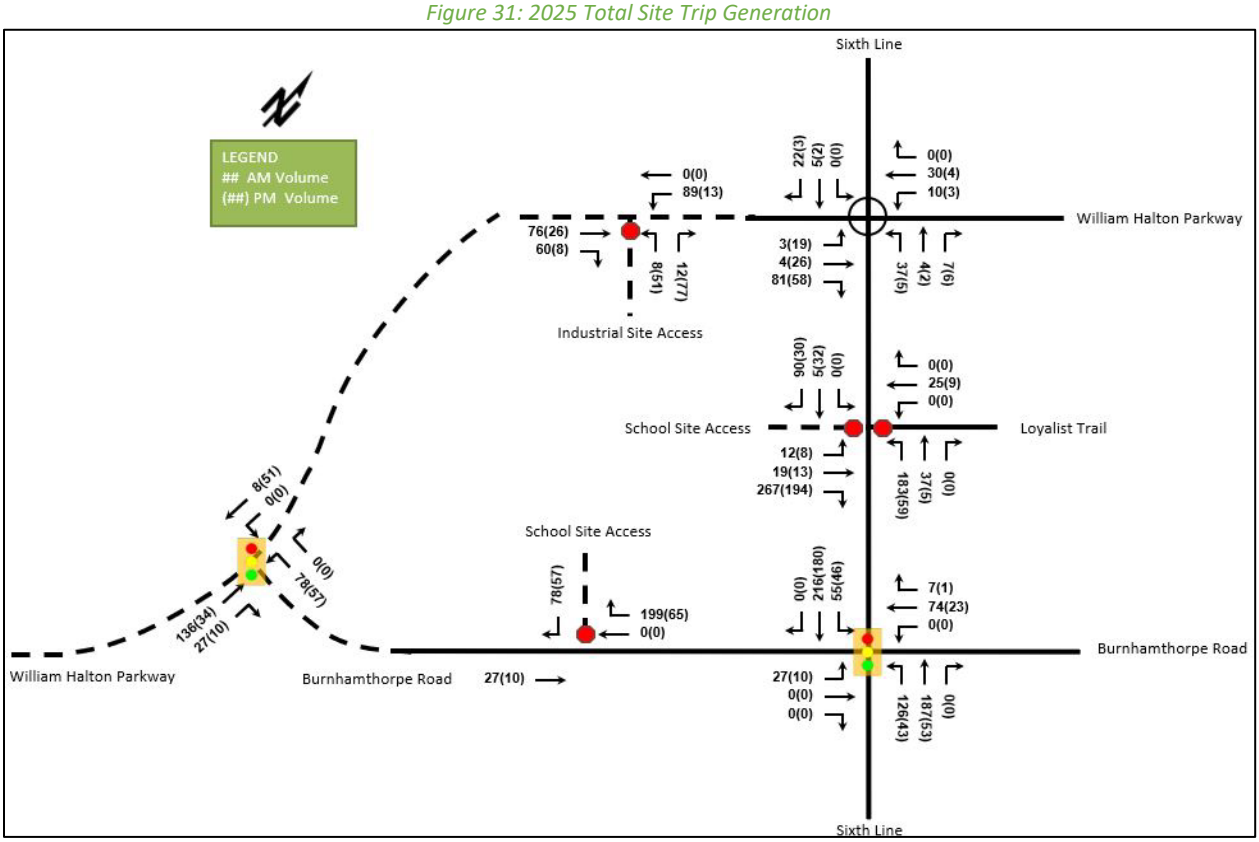
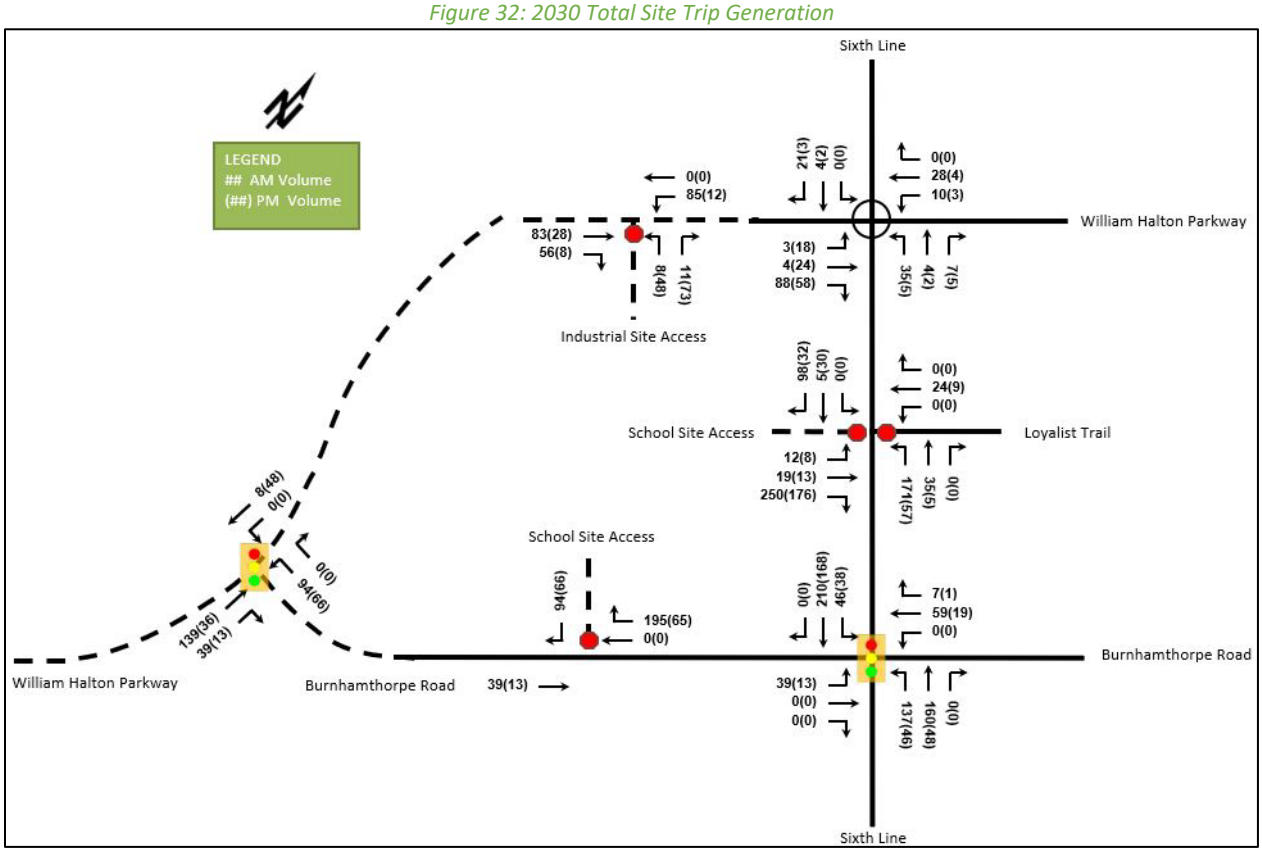


Figure 32: 2030 Total Site Trip Generation



4.1.4 Pedestrian and Cyclist Trip Assignment

Since one of the land uses in the proposed development is a secondary school, the active modes of walking and cycling account for a large portion of total trip generation. The pedestrian and cyclist trips have been distributed in similar manner as the vehicle trips, with further consideration in the distance. The pedestrians from the transit were not considered in this case given that the school bus would stop within the school site, rather than stopping by the street, and few trips would be generated by public transit. Figure 33 and Figure 34 illustrate the pedestrian and cyclist trips generated by the secondary school in 2025 and 2030.

Neighbourhood 9/10/11 Transportation Impact Study

Prepared for:

Neighbourhood 9/10/11 Landowners' Group

Prepared by:

CGH TRANSPORTATION

628 Haines Road
Newmarket, ON
L3Y 6V5

April 2019

PN: 2018-23

1 Introduction

This Transportation Impact Study (TIS) has been prepared to support the proposed developments in the Neighbourhood 9/10/11 areas of North Oakville. This area is being developed by a group of companies including:

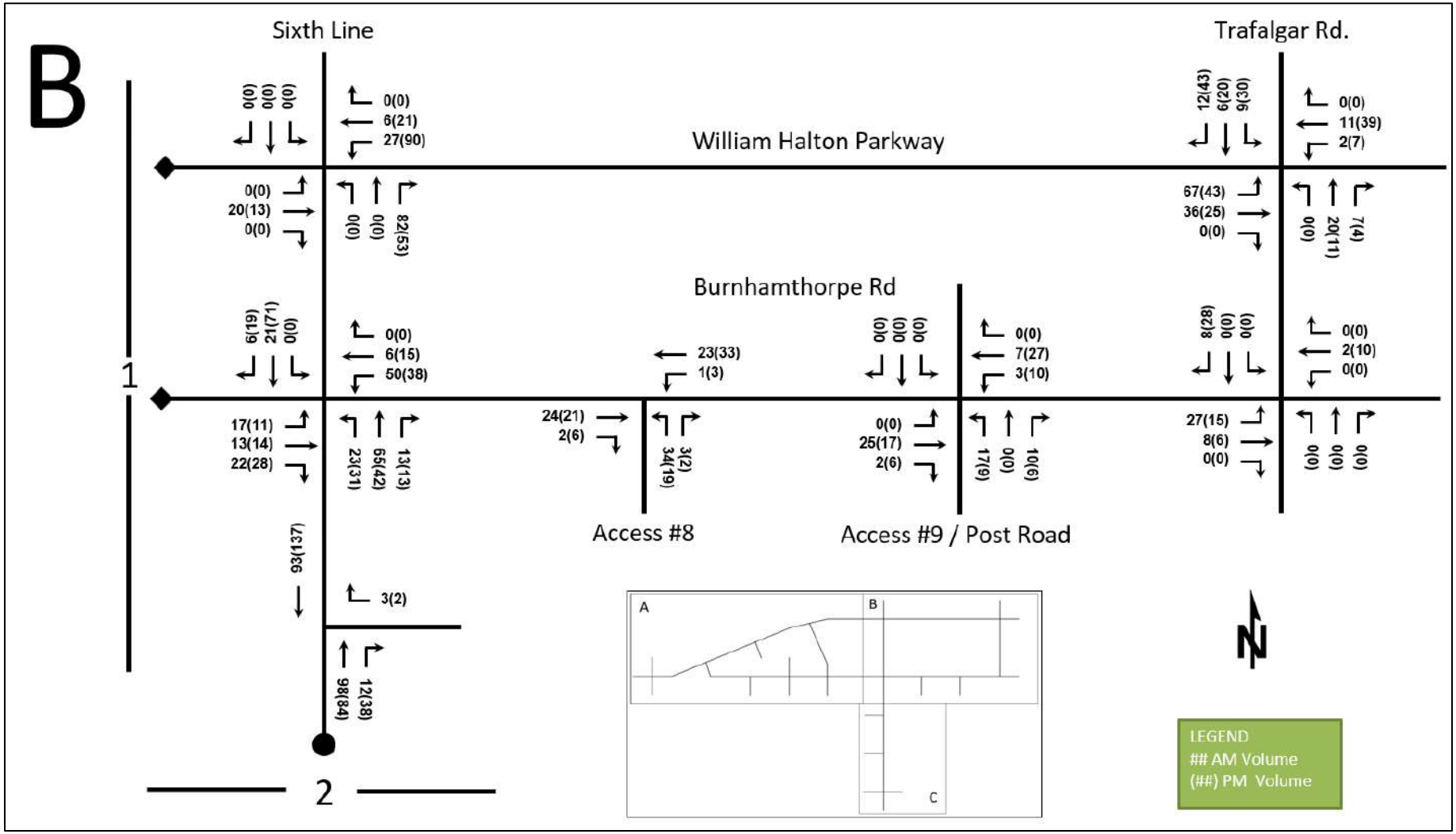
- Argo (West Morrison Creek) Limited
- Crosstrail Estates Inc.
- Digram Developments Oakville Inc.
- Docasa Group Ltd.
- G.C. Family Investments
- Mattamy Homes (Hulme/SGGC)
- Mattamy Homes (Preserve North)
- Star Oak Developments Limited
- Timsin Holding Corp.
- TWKD Developments Inc.

The combined development includes a total of 788 single detached homes, 1003 townhouses, and 175 mid-rise units. The subject site is a vacant greenfield with existing farm residences, which will be removed as part of the subject development. The development is anticipated to build out over the next 5 to 10 years. As a conservative estimate of the build-out of the proposed developments, it has been assumed that the development could be complete by 2024. Therefore, the analysis horizons will include 2019 existing conditions, 2024 full build out and future background conditions, and 2030 full build out and future background conditions. The phasing and timing of each phase is not known at this time, but each landowner will build out their properties individually. Figure 1 illustrates the site context. Figure 2 illustrates the proposed site plan.

Figure 1: Site Context

The proposed development will have a total of ten accesses to serve the combined developments. This will include four accesses on Sixth Line, five accesses on Burnhamthorpe Road, and a single access onto the future William Halton Parkway. All accesses are proposed as full movement intersections, with no turn restrictions. The scope of this TIS has been confirmed with transportation staff from the Town of Oakville and Halton Region. E-mail correspondence discussing the scope is included in Appendix A.

Figure 26: 2030 Traffic Assignment (Sheet B)



ARGO Trafalgar
Transportation Impact Study

Prepared for:

ARGO Trafalgar Corporation
4900 Palladium Way, Suite 105
Burlington, ON, L7M 0W7

Prepared by:

CGH TRANSPORTATION
628 Haines Road
Newmarket, ON L3Y 6V5

June 2023

PN: 2022-035

1 Introduction

This Transportation Impact Study (TIS) has been prepared to support the official plan amendment application for the developments by ARGO Trafalgar Corporation in the Trafalgar Urban Core in North Oakville. The two properties are west of Trafalgar Road and start just north of William Halton Parkway and continue to the south to Burnhamthorpe Road East. The proposed developments would include multiple mixed-use buildings.

Currently the development is estimated to contain 3,000 residential units among which approximately 10% would be townhouses and approximately 90% would be apartments, along with 13,200 square metres of retail and 19,700 square metres of employment distributed throughout the lands. The townhouse and apartment unit counts, and GFAs of the employment and commercial areas as part of the mixed-use buildings are still being refined and subject to change at the Draft Plan stage and the Zoning By-Law stage. Accesses to the development will be guided by the Halton Region Access Management Guidelines.

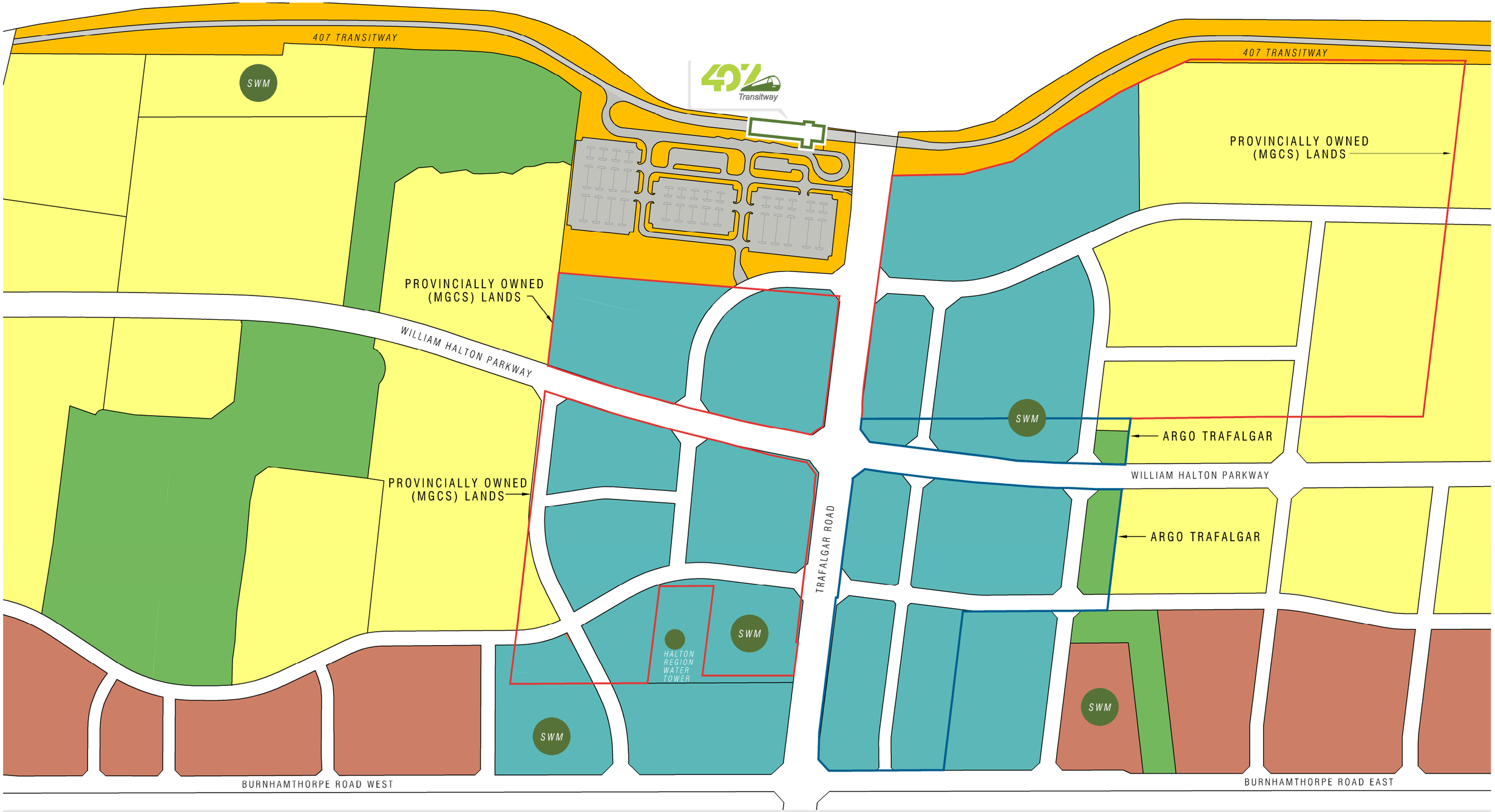
Figure 1 illustrates the site context. The Study Area of this report, as indicated by the white lines, is bounded by Sixth Line to the west, William Halton Parkway to the north, and Burnhamthorpe Road to the south. The scope of this TIS has been confirmed with transportation staff from the Town of Oakville and Halton Region. Email correspondence has been included in Appendix A.

Figure 2 illustrates the concept plan showing the subject ARGO Trafalgar lands enclosed by the blue lines. Please note that this demonstration plan has been prepared to support the official plan amendment. It would be subject to subsequent draft plan of subdivision and site plan approval processes that will further refine the plans for each site. The intent and goal of this study is to evaluate the network adequacy on a large scale. Commentary will be provided on some site design aspects, but this is subject to change at a later stage of development approvals.

The site currently resides within a Future Development (FD) zone. The surrounding zones are also designated as Future Development (FD) zones.

Figure 1: Site Context

Figure 2: Demonstration Plan



DRAFT

- TRANSITWAY
- TRAFALGAR ROAD URBAN CORE AREA
- TRANSITIONAL AREA
- EMPLOYMENT AREA
- NATURAL HERITAGE SYSTEM AREA
- STORM WATER MANAGEMENT FACILITY (LOCATION TBD)

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.

GERRARD DESIGN

TRAFALGAR I & II | Oakville, Ontario

PRELIMINARY LAND USE PLAN

MAY 26, 2023
PROJECT 1912
SCALE 1:5000

Halton Region Access Guidelines. This assumption has been confirmed by the Region. Without further details, the trips are assigned on the premise that all land uses are evenly distributed. The percentage using each access primarily depends on the percentage of area relative to the entire ARGO Trafalgar lands as detailed design is not available to determine the exact unit counts and GFAs at each block. The proximity of a land use to a given access was not considered in the assignment. The turning restrictions at these accesses will cause some people to reroute and take different paths during the AM and PM peak hours. There is one access on Burnhamthorpe Road that is not part of the ARGO Trafalgar Properties but will likely be used by the proposed development. It is assumed to be a full-movement access as this segment of the road has been transferred to Town of Oakville and will not be restricted by the spacing requirements in the Halton Region Access Guidelines. All traffic to / from the lands north of William Halton Parkway is assumed to be accommodated by the right-in / right-out access and the signalized full-moves access onto William Halton Parkway. The site trip generation of the residential buildings, offices, and retails based on the auto driver volumes in Table 11, are illustrated in Figure 45, Figure 46, and Figure 47, respectively. The trip generation will be the same for all future horizons for each land use. The total site trip generation for all land uses is summarized in Figure 48.

Figure 45: Residential Site Trip Generation

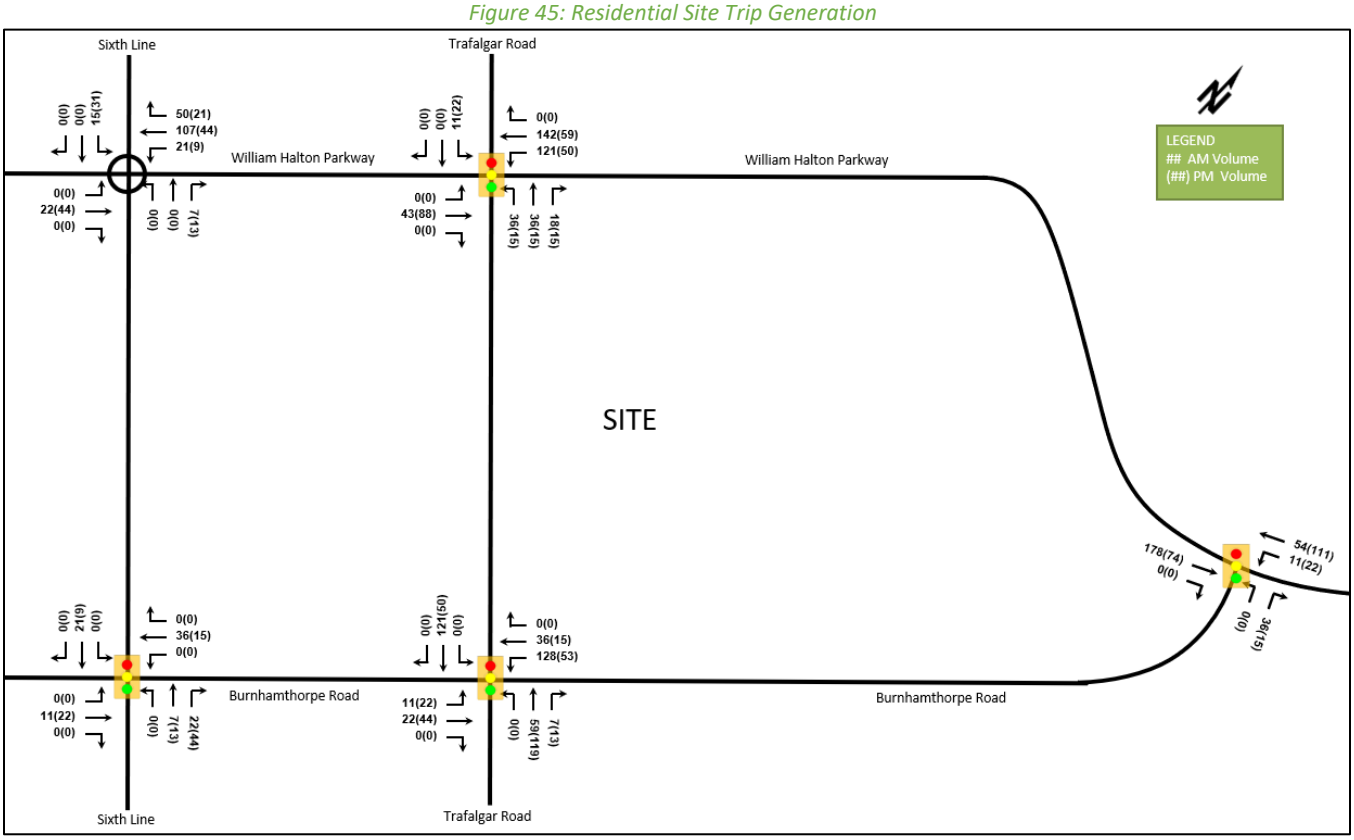


Figure 46: Office Site Trip Generation

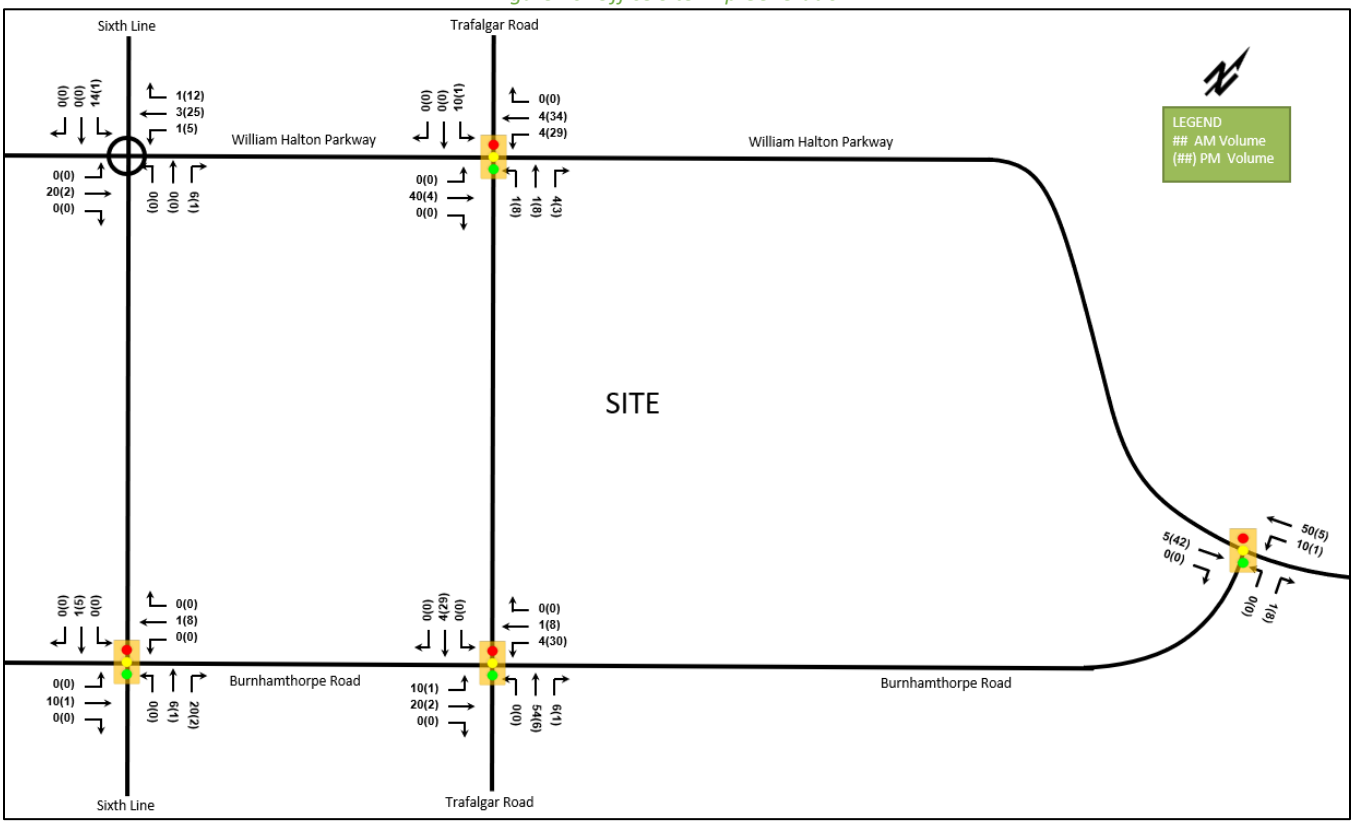


Figure 47: Retail Site Trip Generation

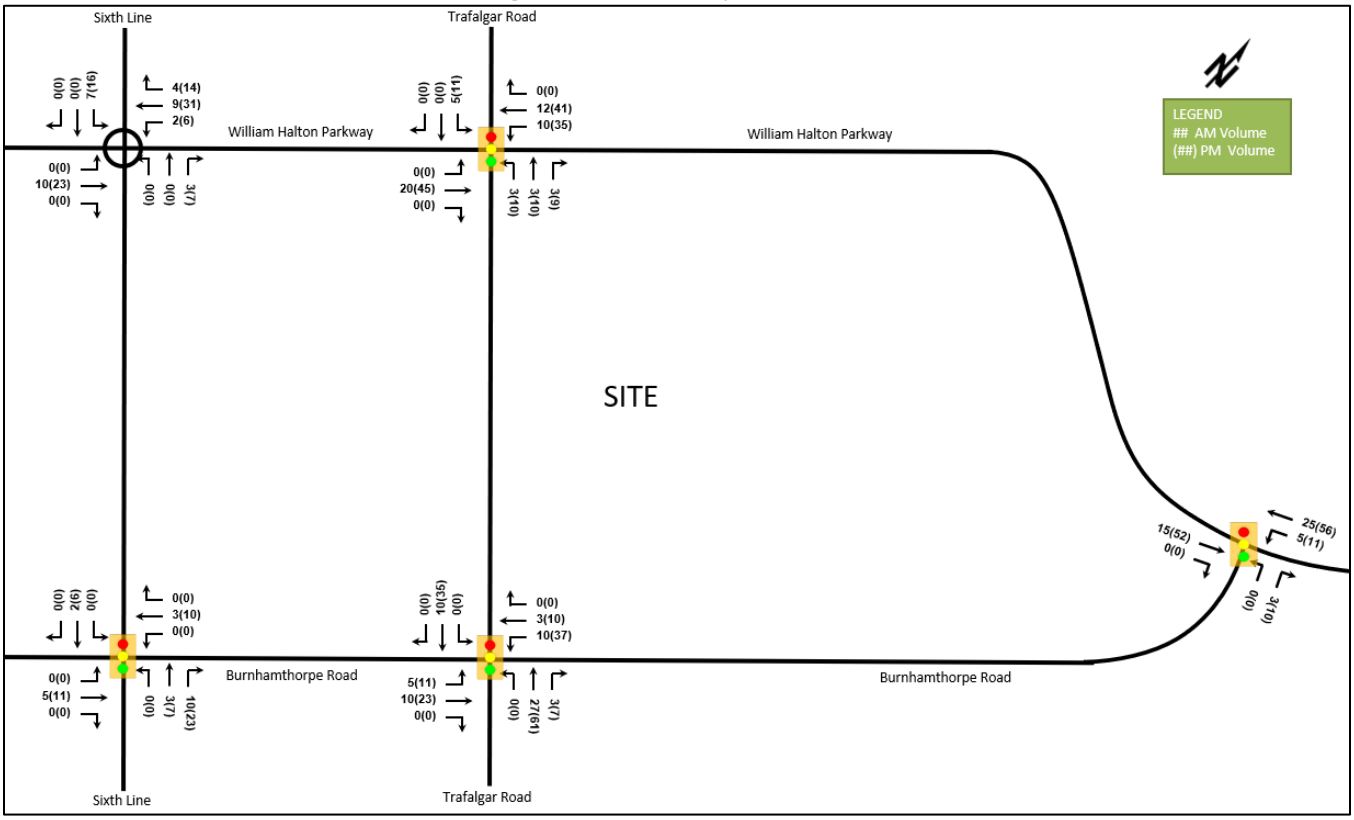
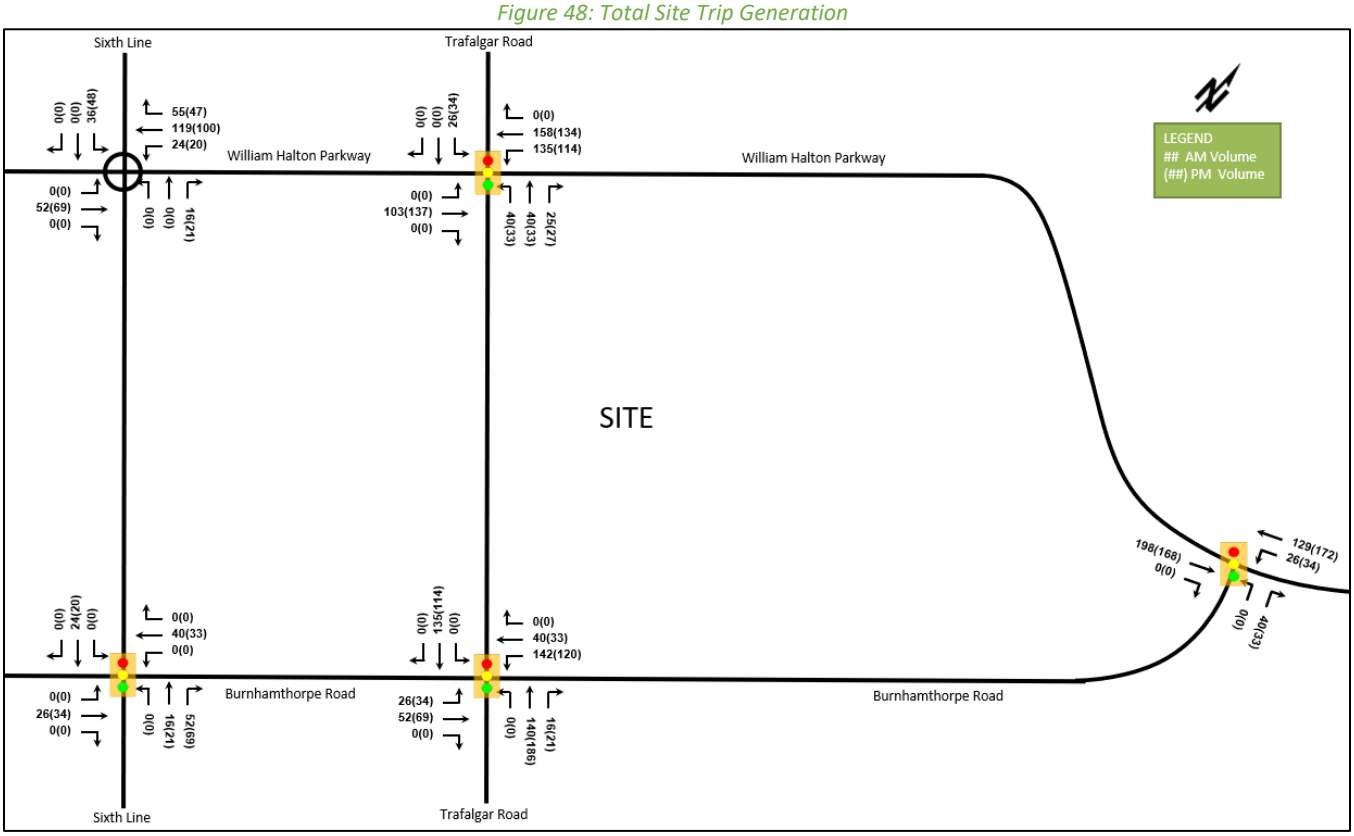


Figure 48: Total Site Trip Generation



5.1.4 Future Total Travel Demands

The site generated vehicle traffic has been combined with the 2031, 2036, and 2041 Future Background traffic volumes to estimate the Future Total traffic volumes. Figure 49, Figure 50, and Figure 51 illustrate the 2031, 2036, and 2041 Future Total traffic volumes, respectively.

Remington Eno Transportation Impact Study

Prepared for:

Eno Investments Limited

Prepared by:

CGH TRANSPORTATION

628 Haines Road
Newmarket, ON
L3Y 6V5

June 2023

PN: 2020-60

1 Introduction

This Transportation Impact Study (TIS) has been prepared to support the proposed development in North Oakville, located approximately 400 metres east of Burnhamthorpe Road at Neyagawa Boulevard. This area is being developed by Eno Investments. The proposed development includes a mix of 290 single detached houses, 307 townhouses, and several multi-storey mid-rise buildings with a total of approximately 1700 apartment units and a total of approximately 15,000 square feet of retail space. However, the landowner of this property is contemplating moving forward with only one building (295 units) within the buildout horizon of this report, based on the Regional allocation available for these lands. For the purposes of this TIS, all other apartment buildings will be considered beyond the horizons of this study and will be further studied at the time that allotment is received, and those buildings can proceed. The property is currently a greenfield area that is bordered by Burnhamthorpe Road to the north. This section of Burnhamthorpe Road will ultimately become part of the future William Halton Parkway. For the purposes of this TIS, the projected full build-out and occupancy horizon is 2026, and the plus five-year horizon is 2031. Figure 1 illustrates the site context. Figure 2 illustrates the proposed site plan.

Figure 1: Site Context

Access to the site will be accommodated via Carding Mill Trail, which runs north-south and connects to Burnhamthorpe Road (future William Halton Parkway), as well as Settlers Road West, which runs east-west and will connect the proposed site to Neyagawa Boulevard, and Sixth Line once the adjacent developments are built. Currently, there are no turn restrictions at the Carding Mill Trail at Burnhamthorpe Road intersection, and it is anticipated that a full movement access will remain upon completion of William Halton Parkway. Additionally, one intersection within the proposed development (Carding Mill Trail at Settlers Road West) will be analyzed and is proposed as full-movement intersection with no turn restrictions. The scope of this TIS has been confirmed with transportation staff from the Town of Oakville and the Halton Region. E-mail correspondence discussing the scope is included in Appendix A.

Figure 26: New Site Generated Auto Volumes - 2026

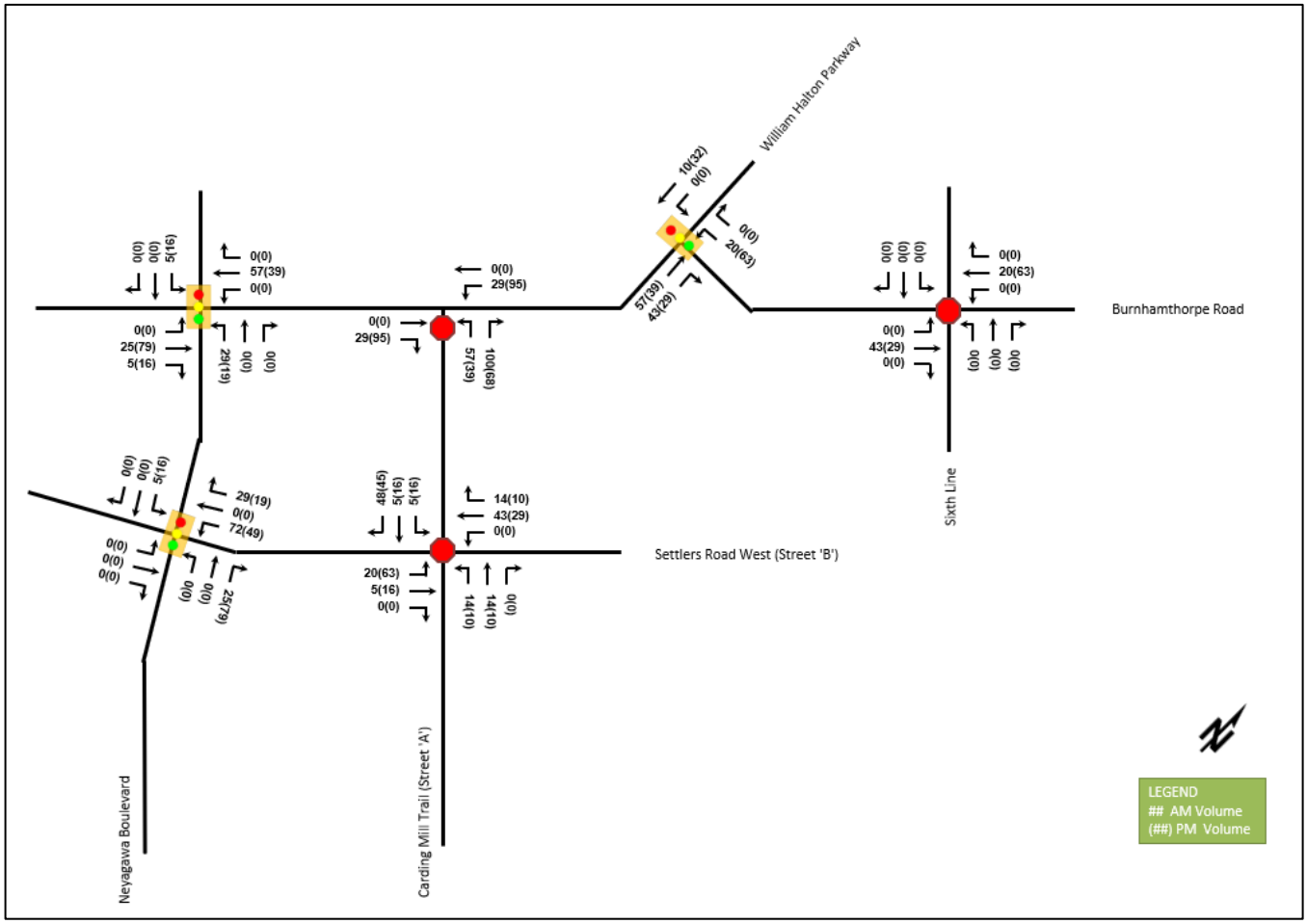
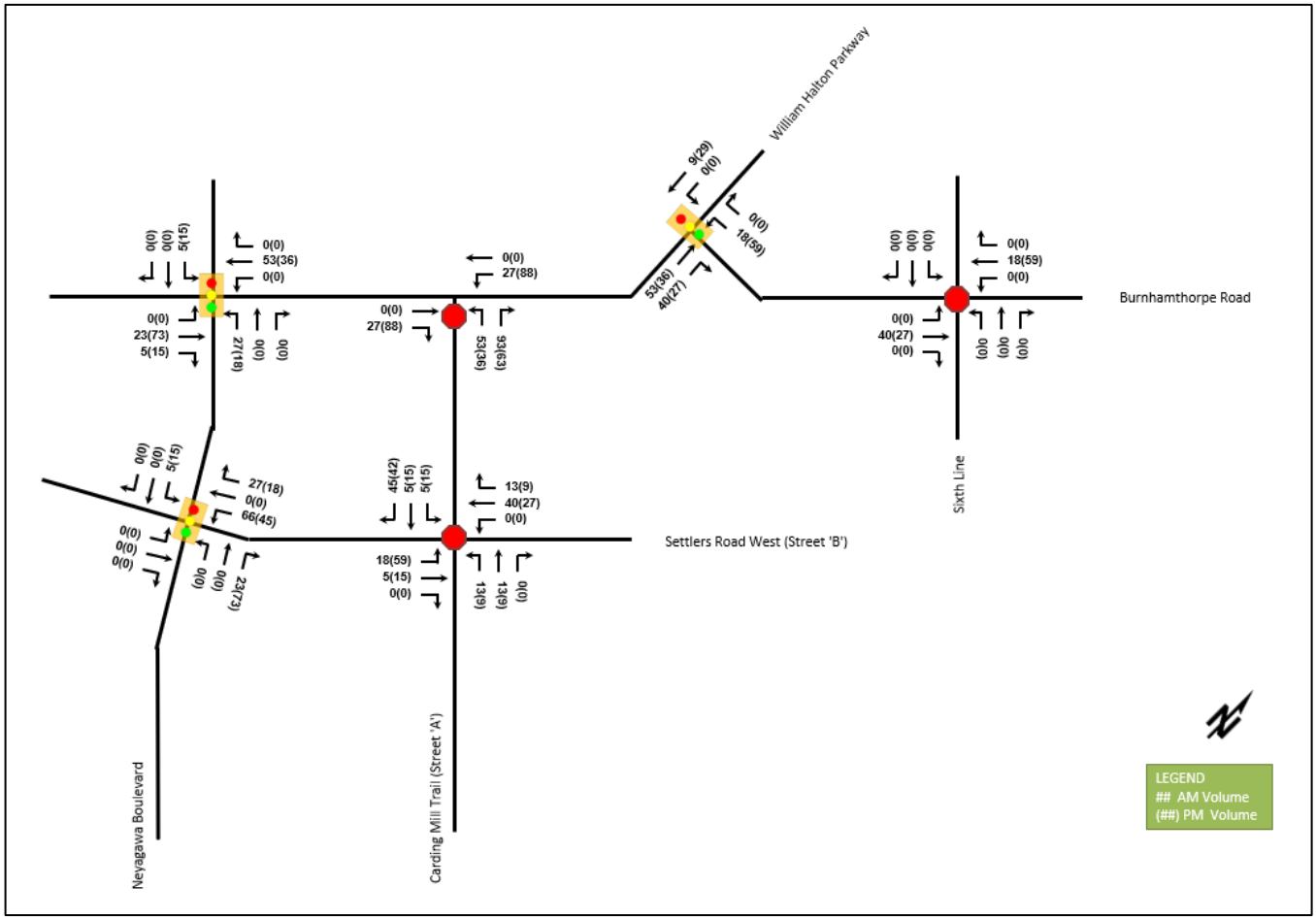


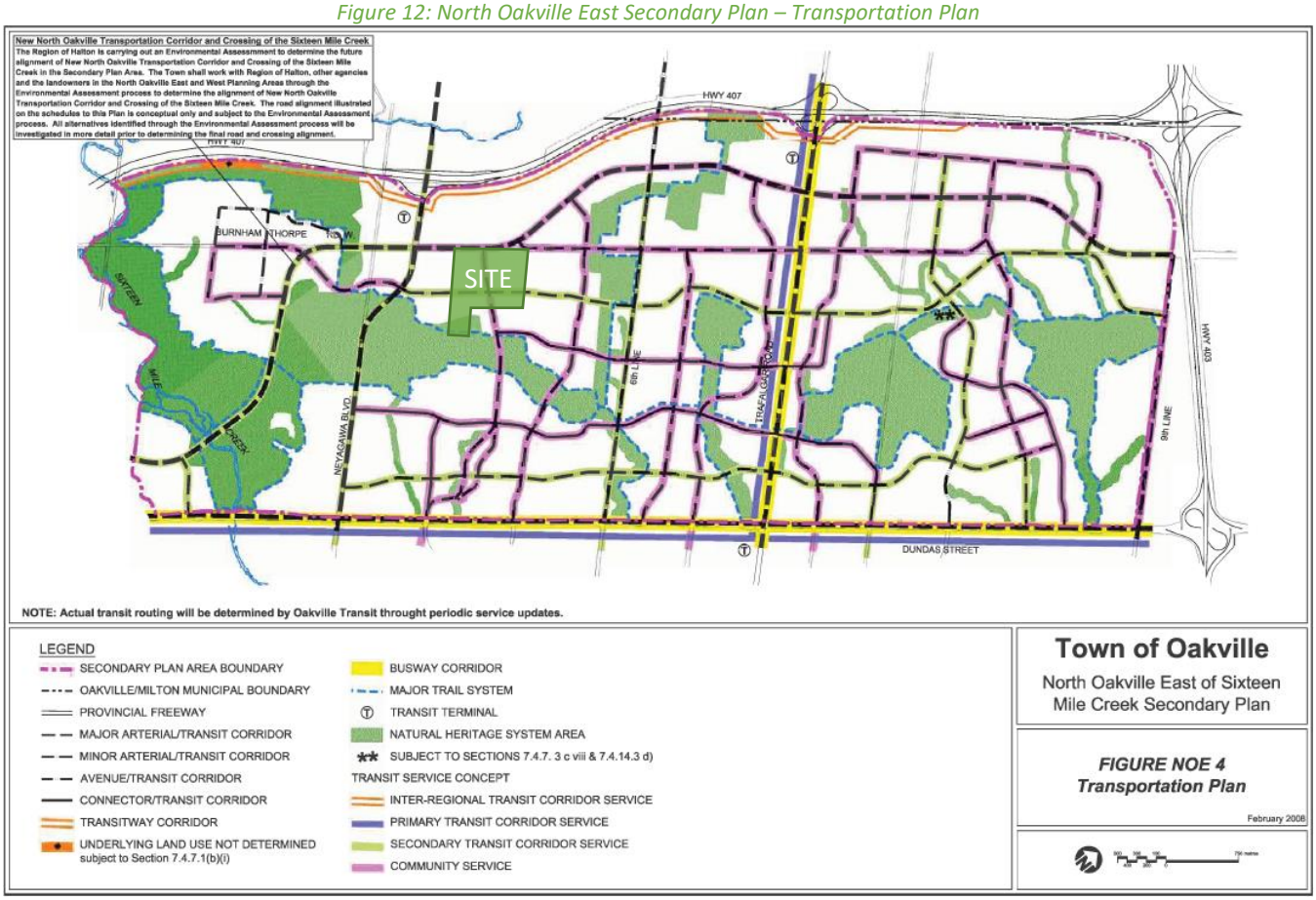
Figure 27: New Site Generated Auto Volumes - 2031



4.4 Future Total Travel Demands

The site generated traffic has been combined with the 2026 and 2031 Future Background traffic volumes to estimate the Future Total traffic volumes. The 2026 and 2031 total future traffic volumes are illustrated in Figure 28 and Figure 29, respectively.

Figure 12: North Oakville East Secondary Plan – Transportation Plan



3.2 Other Study Area Developments

West and south of the proposed development and along Sixth Line are several ongoing developments. The TISs for those developments have been reviewed to determine the amount of background traffic that would be added to the Study Area road network as a result of those developments. The following nearby developments will be considered as part of the background traffic growth:

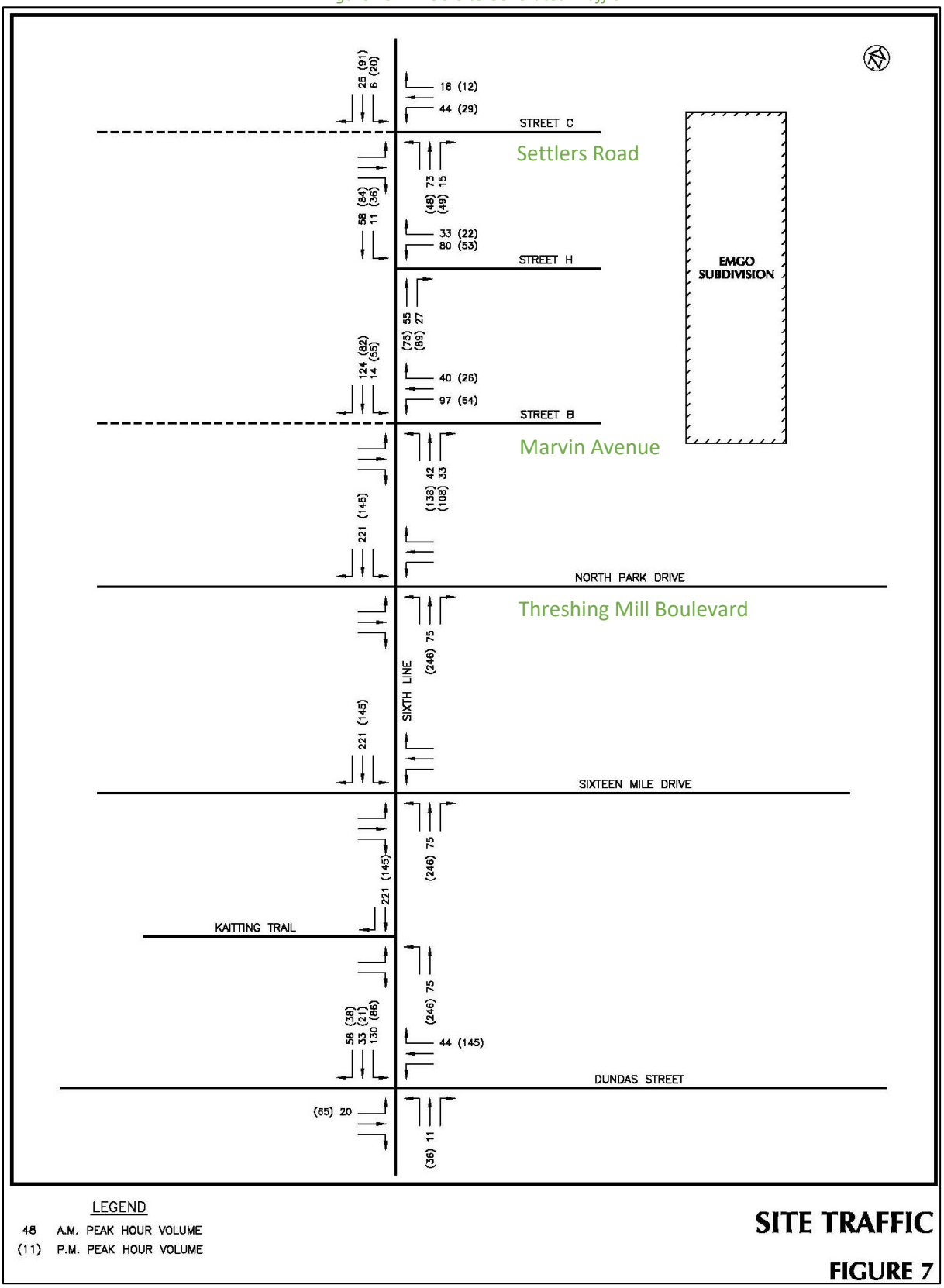
- EMGO North Oakville
- Petgor
- Sixth Line Corporation (NE Corner of Sixth Line at Dundas Street)
- Star Oak (NE Corner of Burnhamthorpe Road at Sixth Line)
- Landowner's Group Neighborhood 9/10/11
- Sherborne Lodge

Each background development, and the traffic associated with it, has been summarized in the subsections below.

3.2.1 EMGO North Oakville

The EMGO North Oakville development is located along Sixth Line between Dundas Street and Burnhamthorpe Road. This development includes 618 residential units with a mix of detached single-family units, and townhouse type units. Access to this development will be via three accesses on Sixth Line. The traffic generated by the EMGO development is summarized in Figure 13, commentary in green has been added to denote the updated name of the streets for ease of reference.

Figure 13: EMGO Site Generated Traffic



Reference: Traffic Impact Study EMGO Draft Plan North Oakville; Reed, Voorhees & Associates; September 2012

Appendix B.6 – Future (2031) AM and PM Peak Hours - HCM Report

Signalized Intersection

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.967			0.954			0.934			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1821	0	1706	1808	0	1825	3357	0	1789	3378	0
Flt Permitted	0.539			0.358			0.465			0.121		
Satd. Flow (perm)	1005	1821	0	643	1808	0	893	3357	0	228	3378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			28			233			23	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		567.6			690.8			451.7			612.3	
Travel Time (s)		34.1			41.4			20.3			27.6	
Volume (vph)	159	293	83	142	157	69	36	523	411	235	443	56
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	2%	2%	7%	2%	0%	0%	2%	1%	2%	6%	8%
Adj. Flow (vph)	162	299	85	145	160	70	37	534	419	240	452	57
Lane Group Flow (vph)	162	384	0	145	230	0	37	953	0	240	509	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		1	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		10.0	30.0	
Total Split (s)	38.0	38.0	0.0	38.0	38.0	0.0	33.0	33.0	0.0	19.0	52.0	0.0
Total Split (%)	42.2%	42.2%	0.0%	42.2%	42.2%	0.0%	36.7%	36.7%	0.0%	21.1%	57.8%	0.0%
Maximum Green (s)	33.0	33.0		33.0	33.0		28.0	28.0		14.0	47.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		None	Min	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0			15.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	21.5	21.5		21.5	21.5		25.2	25.2		40.8	40.8	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.36	0.36		0.58	0.58	
v/c Ratio	0.53	0.68		0.74	0.40		0.12	0.71		0.63	0.26	
Control Delay	27.8	27.2		46.3	19.4		20.7	19.5		21.3	8.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.8	27.2		46.3	19.4		20.7	19.5		21.3	8.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		D	B		C	B		C	A	
Approach Delay		27.4			29.8			19.6			12.7	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	16.8	40.2		16.3	19.8		3.2	41.1		14.5	14.7	
Queue Length 95th (m)	38.0	75.8		#41.3	41.6		11.6	82.5		46.0	32.1	
Internal Link Dist (m)		543.6			666.8			427.7			588.3	
Turn Bay Length (m)	75.0			75.0			75.0			75.0		
Base Capacity (vph)	418	768		267	768		355	1474		448	2103	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.50		0.54	0.30		0.10	0.65		0.54	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 70.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 20.7 Intersection LOS: C
Intersection Capacity Utilization 82.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Burnhamthorpe Rd W & 6 Line

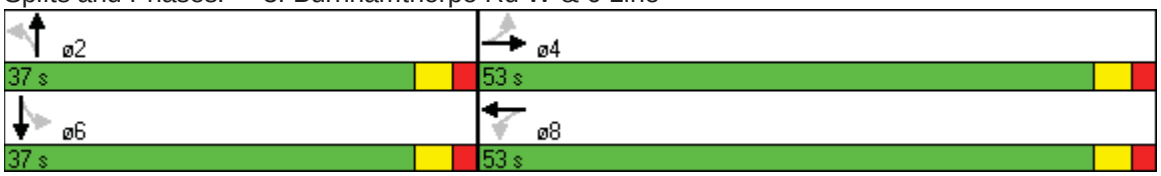
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.944			0.962			0.952			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1778	0	1706	1821	0	1825	3417	0	1789	3378	0
Flt Permitted	0.290			0.576			0.254			0.344		
Satd. Flow (perm)	541	1778	0	1034	1821	0	488	3417	0	648	3378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			30			96			18	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		567.6			690.8			451.7			612.3	
Travel Time (s)		34.1			41.4			20.3			27.6	
Volume (vph)	98	151	89	323	440	148	72	377	175	85	617	80
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	2%	2%	7%	2%	0%	0%	2%	1%	2%	6%	8%
Adj. Flow (vph)	100	154	91	330	449	151	73	385	179	87	630	82
Lane Group Flow (vph)	100	245	0	330	600	0	73	564	0	87	712	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phases	4	4		8	8		2	2		6	6	
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (s)	53.0	53.0	0.0	53.0	53.0	0.0	37.0	37.0	0.0	37.0	37.0	0.0
Total Split (%)	58.9%	58.9%	0.0%	58.9%	58.9%	0.0%	41.1%	41.1%	0.0%	41.1%	41.1%	0.0%
Maximum Green (s)	48.0	48.0		48.0	48.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	26.3	26.3		26.3	26.3		24.3	24.3		24.3	24.3	
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.41	0.41		0.41	0.41	
v/c Ratio	0.41	0.30		0.72	0.73		0.36	0.39		0.33	0.51	
Control Delay	16.6	8.5		22.6	17.8		23.4	13.0		20.7	16.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	8.5		22.6	17.8		23.4	13.0		20.7	16.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	A		C	B		C	B		C	B	
Approach Delay		10.8			19.5			14.2			17.0	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	6.0	10.6		23.5	40.8		4.9	16.1		5.7	25.9	
Queue Length 95th (m)	20.7	28.6		63.0	94.2		22.5	44.8		24.1	67.1	
Internal Link Dist (m)		543.6			666.8			427.7			588.3	
Turn Bay Length (m)	75.0			75.0			75.0			75.0		
Base Capacity (vph)	330	1104		631	1122		242	1744		321	1686	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.22		0.52	0.53		0.30	0.32		0.27	0.42	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 59.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 90.1% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Burnhamthorpe Rd W & 6 Line



A brief description of the design alternatives is discussed below:

Alternative 1 – Do Nothing – Existing 2 Lane Rural Cross-Section

Continuation of existing conditions and would involve no change to the existing roadway (For comparison purposes only).

Alternative 2 – Widening About Existing Centre Line

Widen Sixth Line on both the west and east sides of the existing centreline to accommodate 4 lanes (2 per direction).

Alternative 3 – Widening About the Centre Line and To The East Along Natural Heritage System

Widen Sixth Line on both the west and east sides of the existing centreline and shifting towards the east along the Natural Heritage System to accommodate 4 lanes (2 per direction).

Alternative 4 – Use of Roundabouts at Intersections

Implement roundabouts at the Sixth Line intersections as part of the intersection improvements solution.

Based on the evaluation of the alternative design concepts and consultations, the Preliminary Preferred Design is widening Sixth Line along the existing centreline and shifting to the east along the Natural Heritage System (Alternative 3) to minimize impacts to properties, cultural heritage resources and natural heritage features including existing vegetation. The design also provides an opportunity to provide enhanced landscaping and streetscaping features to the corridor.

The Preliminary Preferred Design was presented to the agencies, utilities and the public as part of Public Information Centre #2 for review and comment. All input received during Phase 3 was taken into consideration and was used to refine the Preliminary Preferred Design, where appropriate.

H. Project Description

The Preferred Design widens the road about the centerline between Dundas Street and Future Street “D”, minimizing property impacts to the property owners on both sides of the road. Between Future Street “D” and Burnhamthorpe Road, the widening shifts east to mitigate impacts to the Natural Heritage System located to the south-west of the Sixth Line and Burnhamthorpe Road intersection. The alignment then shifts back to the existing centreline between Burnhamthorpe Road to Highway 407 ETR.

The key elements of the Preliminary Preferred Design are as follows:

- Sixth Line widened to four lanes from Dundas Street to Highway 407 (ETR);
- Left turn lanes provided throughout the corridor;
- The signalization of intersections;

- The provision of sidewalks and on-street bicycle lanes and potential for on street parking layby's in front of Neighbourhood Centre and Park lands;
- The provision of continuous medians to enhance the streetscape and landscaping features; and
- Culvert structure replacements.

Typical Cross-Section

The typical sections have been developed to implement the *North Oakville East Secondary Plan's* "Avenue/Transit Corridor" classification for Sixth Line, which permits on-street parking outside the Natural Heritage System areas and encourages transit supportive development and the *Active Transportation Master Plan's* recommended on-road bike lanes.

Three typical cross-sections are proposed for Sixth Line which are comprised of an urban cross-section with no on-street parking, an urban cross-section with on-street parking for use in front Neighbourhood Centre and Neighbourhood Park Areas and an urban cross-section for the shifted alignment at the Natural Heritage System. Common elements to all include a 31.0m right-of-way, 3.35m through lanes, 1.66m on-street bike lanes and a 4.50m landscaped median. At the intersections, a 3.25m left turn lane and 1.25m raised median are provided instead of the landscaped median.

Pavement Structure Design

Considering the traffic requirements and subgrade conditions, the recommended pavement design for Sixth Line is detailed in the following table:

Recommended Pavement Design for Sixth Line

Pavement Structure	Reconstruction and New Construction (mm)
HL3 Asphaltic Concrete	50
HL8 Asphaltic Concrete	100
Granular 'A' or 20mm Crusher Run Limestone	150
Granular 'B' or 50mm Crusher Run Limestone	450

Pedestrian and Cyclist Facilities

Provisions for cyclists and pedestrians have been included in the preferred design for the widening of Sixth Line through the use of both sidewalks and on-street bike lanes as per the Town of Oakville's *Active Transportation Master Plan*. The preferred alternative includes a minimum 2.0m wide sidewalk along both sides of Sixth Line throughout the corridor. The sidewalks are generally separated from the travel lanes by means of a minimum 2.15m wide boulevard or 2.20m wide parking layby's depending on the location. On-street bike lanes are also proposed along both sides of Sixth Line with a minimum width of 1.66m. The on-street bike lanes are currently separated from the travel lanes through the use of a mountable curb and

gutter. This separation of the bike lanes and travel lanes will be further examined during the detailed design stage.

Intersections

The preferred design will maintain all existing intersections along Sixth Line with the following configurations:

- Sixth Line and Dundas Street – Signalized, exclusive left turn lanes on all approaches, eastbound exclusive right turn lane;
- Sixth Line and Kaiting Trail – Exclusive northbound and southbound left turn lanes;
- Sixth Line and Sixteen Mile Drive – Signalized, exclusive left turn lanes on all approaches; and
- Sixth Line and Burnhamthorpe Road - Signalized, exclusive northbound and southbound left turn lanes.

A total of 4 new intersections will be introduced along Sixth Line due to the Region of Halton's New North Oakville Transportation Corridor as well as adjacent development. The new identified intersections will have the following configurations:

- Sixth Line and North Park Drive – Signalized, exclusive left turn lanes on all approaches;
- Sixth Line and Future Street "C" – Signalized, exclusive northbound and southbound left turn lanes;
- Sixth Line and Future Street "D" – Signalized, exclusive northbound and southbound left turn lanes; and
- Sixth Line and New North Oakville Transportation Corridor – Two lane roundabout.

The traffic movements and configurations of the remaining intersections will be reviewed as part of the draft plan approval process during the detailed design stage.

Improvements at Sixth Line and Dundas Street

The Region of Halton, as part of its Dundas Street Rapid Bus Transit Corridor, is completing an Environmental Assessment for Dundas Street from Neyagawa Boulevard to Oak Park Boulevard to widen Dundas Street to six lanes including transit/HOV lanes. The Sixth Line and Dundas Street intersection is located within the project area. Due to the intersection's close proximity to the Munn's United Church and Munn's Cemetery, the widening of Dundas Street in this area will be shifted completely to the north. Coordination was undertaken with the Region of Halton who provided the intersection design which was implemented in the Sixth Line preferred design. The construction of the Sixth Line and Dundas Street intersection by the Region is scheduled to start in late 2016 to early 2017.

Improvements at Sixth Line and the New North Oakville Transportation Corridor

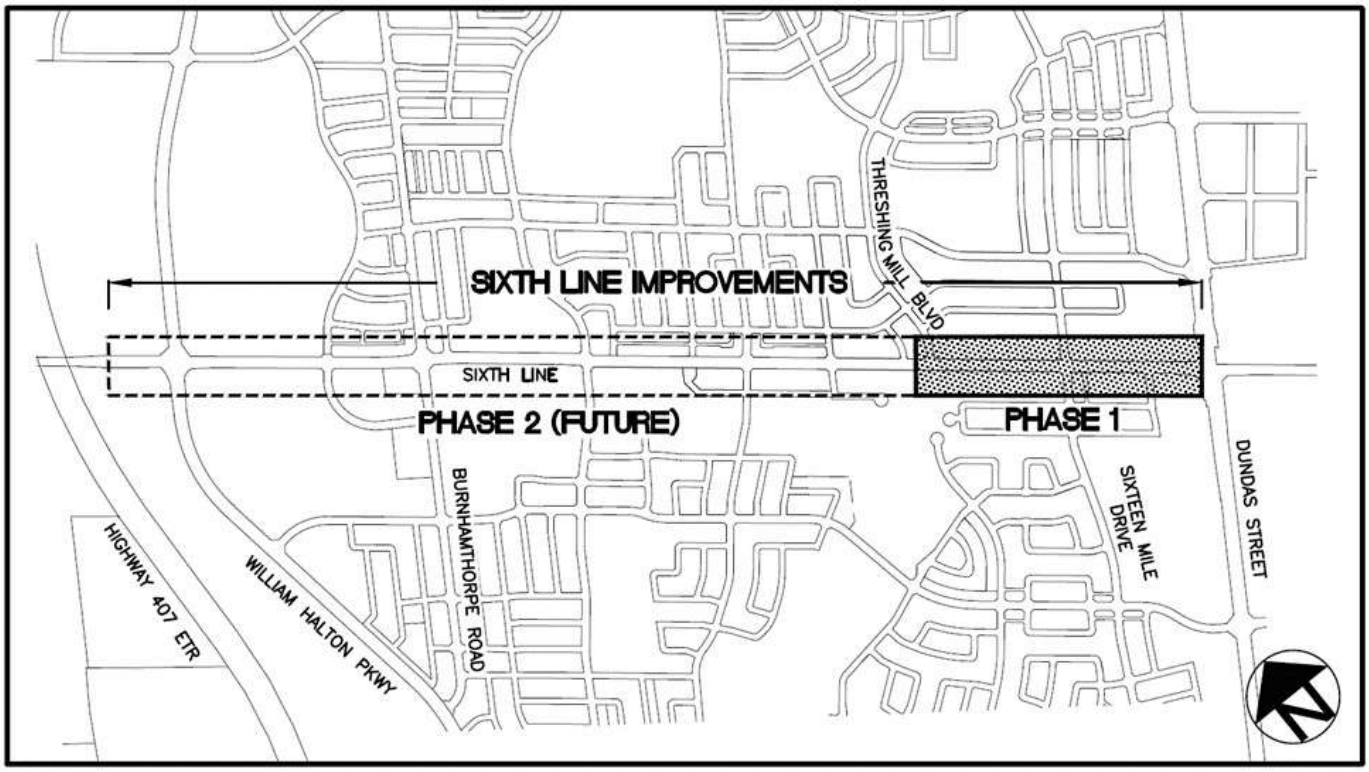
The Region of Halton is completing the detail design of the New North Oakville Transportation Corridor which involves the construction of a new four lane roadway to improve the transportation system capacity in north Oakville. The New North Oakville Transportation

Sixth Line Widening

We're improving Sixth Line

Sixth Line has been designated a north-south minor arterial roadway in the Town of Oakville's Official Plan (Livable Oakville) and plays a key role in the town's overall transportation system. As development occurs along the Sixth Line corridor, the importance of this roadway will increase by providing a critical north-south transportation link. The current two-lane rural cross-section is in need of upgrading to accommodate future travel demands and help motorists, cyclists and pedestrians get to work, school, retail and home every day.

Improvements will include the reconstruction of Sixth Line from its current two-lane rural cross-section to an urbanized four-lane road with a continuous left turn lane, centre median and on-road bike lanes and parking lay-by's.



What to expect

- Road widening to two lanes of traffic in each direction with centre median

- Bike lanes
- Parking lay-by areas
- New sidewalks, curb and gutter
- New storm sewer
- Culvert replacement
- New traffic signals
- New roadway lighting
- Driveway restoration
- Landscape restoration and planting

Project schedule

April – December 2021: Dundas Street to Threshing Mill Boulevard

- Road reconstruction/ widening to four lanes
- Sidewalk installations on both sides of road
- On-road bike lanes on both sides
- New bus shelters
- Utility relocations
- New traffic signals at Wheat Boom Drive and at Threshing Mill Boulevard
- Culvert replacement and watermain lowering south of Threshing Mill Boulevard

How do I keep informed?

Visit this web page for progress reports.

Send us your questions or comments to ServiceOakville at 905-845-6601 or sixthlinewidening@oakville.ca (mailto:sixthlinewidening@oakville.ca)

Traffic updates

Beginning spring 2021 - Dundas Street to Wheat Boom Drive - two lane of traffic (single lane each direction) will be maintained during construction. All entrance access will be maintained.

Check back here for current traffic updates, road closures and detours.

Background

In 2015, the town completed a Class Environmental Assessment (EA) for Sixth Line from Dundas

Street to Highway 407 ETR. The Schedule 'C' Class EA study was carried out to address the need to widen Sixth Line in three phases to correspond with development along the Sixth Line corridor.

The EA reviewed the long term demands of Sixth Line up to and beyond 2031. Issues addressed included land servicing, pedestrian, cycling and transit requirements along with operational and infrastructure deficiencies, street-lighting and natural feature impacts.

The preferred solution as determined by the EA study was to widen Sixth Line to four lanes with a continuous left turn lane at intersections and a landscaped median at mid-block locations all within a 31-metre right-of-way. Within this cross-section dedicated on-road bike lanes, two metre sidewalks on both sides and parking lay-by's where appropriate will also be provided.

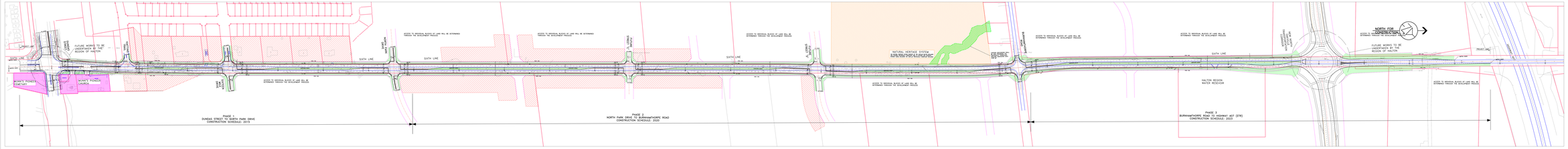
Review the Sixth Line Environmental Assessment Study Report (//www.oakville.ca/residents/eas-sixth-line.html).

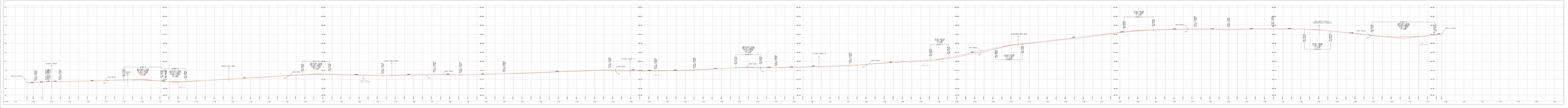
The EA preferred solution will be implemented in three phases starting at Dundas Street as follows:

- Phase 1 – Dundas Street to Threshing Mill Boulevard
- Phase 2 – Threshing Mill Boulevard to Burnhamthorpe Road
- Phase 3 – Burnhamthorpe Road to William Halton Parkway

There currently is only a minor storm sewer on the southerly most part of Sixth Line which extends from Kaitting Trail and ties into the ditch on the north side of Dundas Street. As part of these improvements, a new storm sewer is to be designed for Sixth Line from the culvert crossing just south of Threshing Mill Boulevard to Kaitting Trail.

The town is working with Oakville Hydro, Bell Canada and Cogeco to provide the required relocation of services.





LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING R.O.W.
- PROPOSED R.O.W.
- PROPOSED ALIGNMENT
- LANDSCAPED MEDIAN
- NEIGHBOURHOOD CENTRE AREA
- CULTURAL HERITAGE RESOURCE
- NATURAL HERITAGE SYSTEM
- PROVINCIALLY SIGNIFICANT WETLANDS

SIXTH LINE ENVIRONMENTAL ASSESSMENT (DUNDAS STREET TO HIGHWAY 407) – PRELIMINARY RECOMMENDED PLAN AND PROFILE DESIGN

MORRISON HERSHFIELD

OAKVILLE

SCALE: 1:5m 0 1:5m 1:10m

DATE: APRIL 30 2014

Appendix F

TTS Data

AM OUT

Row Labels	Sum of Distribution
BURNHAMTHORPE EB	59%
BURNHAMTHORPE WB	8%
SIXTH NB	25%
SIXTH SB	8%
Grand Total	**100%**

PM OUT

Row Labels	Sum of Distribution
BURNHAMTHORPE EB	50%
BURNHAMTHORPE WB	25%
SIXTH NB	19%
SIXTH SB	6%
Grand Total	**100%**

AM IN

Row Labels	Sum of Distribution
BURNHAMTHORPE EB	24%
BURNHAMTHORPE WB	58%
SIXTH NB	10%
SIXTH SB	9%
Grand Total	**100%**

PM IN

Row Labels	Sum of Distribution
BURNHAMTHORPE EB	8%
BURNHAMTHORPE WB	63%
SIXTH NB	5%
SIXTH SB	24%
Grand Total	**100%**

AM Inbound

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 700-1000
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of destination - gta06_dest In 3634 4024
and
Trip purpose of destination - purp_dest In w
and
Planning district of origin - pd_orig In 36 39

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 700-1000
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of destination - gta06_dest In 3634 4024
and
Trip purpose of destination - purp_dest In w
and
Planning district of origin - pd_orig Not In 36 39

TAZ/PD	Trips	Distributio	Direction	Assignment	PMOUT
3602	53	0.6%	NE	BURNHAMTHORPE WB	SIXTH NB
3603	47	0.5%	NE	BURNHAMTHORPE WB	SIXTH NB
3604	22	0.3%	NE	BURNHAMTHORPE WB	SIXTH NB
3612	10	0.1%	NE	BURNHAMTHORPE WB	SIXTH NB
3614	15	0.2%	SE	BURNHAMTHORPE WB	
3615	16	0.2%	NE	BURNHAMTHORPE WB	SIXTH NB
3616	31	0.4%	NE	BURNHAMTHORPE WB	SIXTH NB
3617	20	0.2%	NE	BURNHAMTHORPE WB	SIXTH NB
3618	14	0.2%	NE	BURNHAMTHORPE WB	SIXTH NB
3619	22	0.3%	NE	BURNHAMTHORPE WB	SIXTH NB
3622	16	0.2%	NE	BURNHAMTHORPE WB	SIXTH NB
3633	70	0.8%	SE	BURNHAMTHORPE WB	
3635	161	1.9%	E	BURNHAMTHORPE WB	
3636	51	0.6%	E	BURNHAMTHORPE WB	
3637	51	0.6%	NE	BURNHAMTHORPE WB	SIXTH NB
3638	25	0.3%	NE	BURNHAMTHORPE WB	SIXTH NB
3640	25	0.3%	SE	BURNHAMTHORPE WB	
3641	14	0.2%	SE	BURNHAMTHORPE WB	
3642	15	0.2%	SE	BURNHAMTHORPE WB	
3644	69	0.8%	SE	BURNHAMTHORPE WB	
3645	61	0.7%	SE	BURNHAMTHORPE WB	
3646	33	0.4%	SE	BURNHAMTHORPE WB	
3648	23	0.3%	SE	BURNHAMTHORPE WB	
3650	37	0.4%	SE	BURNHAMTHORPE WB	
3651	49	0.6%	SE	BURNHAMTHORPE WB	
3653	37	0.4%	SE	BURNHAMTHORPE WB	
3654	20	0.2%	SE	BURNHAMTHORPE WB	
3655	17	0.2%	E	BURNHAMTHORPE WB	
3657	60	0.7%	SE	BURNHAMTHORPE WB	
3659	46	0.5%	SE	BURNHAMTHORPE WB	
3662	50	0.6%	E	BURNHAMTHORPE WB	
3663	23	0.3%	E	BURNHAMTHORPE WB	
3664	84	1.0%	E	BURNHAMTHORPE WB	
3668	10	0.1%	E	BURNHAMTHORPE WB	
3669	33	0.4%	SE	BURNHAMTHORPE WB	
3670	16	0.2%	SE	BURNHAMTHORPE WB	
3671	35	0.4%	E	BURNHAMTHORPE WB	
3672	12	0.1%	E	BURNHAMTHORPE WB	
3673	17	0.2%	E	BURNHAMTHORPE WB	
3674	11	0.1%	E	BURNHAMTHORPE WB	
3676	140	1.6%	E	BURNHAMTHORPE WB	
3678	20	0.2%	E	BURNHAMTHORPE WB	
3679	20	0.2%	E	BURNHAMTHORPE WB	
3680	49	0.6%	E	BURNHAMTHORPE WB	
3681	9	0.1%	E	BURNHAMTHORPE WB	
3682	27	0.3%	E	BURNHAMTHORPE WB	
3684	41	0.5%	E	BURNHAMTHORPE WB	
3685	13	0.2%	E	BURNHAMTHORPE WB	
3686	17	0.2%	E	BURNHAMTHORPE WB	
3687	42	0.5%	E	BURNHAMTHORPE WB	
3688	30	0.4%	E	BURNHAMTHORPE WB	
3689	11	0.1%	E	BURNHAMTHORPE WB	
3690	31	0.4%	E	BURNHAMTHORPE WB	
3694	23	0.3%	NE	BURNHAMTHORPE WB	SIXTH NB
3716	73	0.9%	NE	BURNHAMTHORPE WB	SIXTH NB
3718	16	0.2%	NE	BURNHAMTHORPE WB	SIXTH NB
3719	65	0.8%	NE	BURNHAMTHORPE WB	SIXTH NB
3720	32	0.4%	NE	BURNHAMTHORPE WB	SIXTH NB
3722	26	0.3%	NE	BURNHAMTHORPE WB	

Corridor	Travel Direction	AM		PM	
		In	Out	In	Out
Burnhamthorpe Rd	EB	24%	59%	8%	50%
	WB	58%	8%	63%	25%
Sixth Line	NB	10%	25%	5%	19%
	SB	9%	8%	24%	6%
	TOTAL	100%	100%	100%	100%

AM Outbound

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 600-1000
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of origin - gta06_orig In 3634 4024
and
Trip purpose of origin - purp_orig In w

TAZ/PD	Trips	Distribution	Direction	Assignment
3619	7	3%	NE	SIXTH NB
3656	8	4%	E	BURNHAMTHORPE EB
3684	22	10%	E	BURNHAMTHORPE EB
3705	47	22%	NE	BURNHAMTHORPE EB
3707	45	21%	NE	SIXTH NB
3812	4	2%	E	BURNHAMTHORPE EB
4023	8	4%	SE	BURNHAMTHORPE EB
4024	36	17%	E	BURNHAMTHORPE EB
4038	18	8%	S	SIXTH SB
4078	17	8%	SW	BURNHAMTHORPE WB
	212	100%		

PM Inbound

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 1500-2000
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of destination - gta06_dest In 3634 4024
and
Trip purpose of destination - purp_dest In w

TAZ/PD	Trips	Distribution	Direction	Assignment
3355	17	5.6%	NE	BURNHAMTHORPE WB
3612	16	5.3%	NE	BURNHAMTHORPE WB
3622	21	7.0%	NE	BURNHAMTHORPE WB
3629	20	6.6%	NE	BURNHAMTHORPE WB
3635	54	17.9%	E	BURNHAMTHORPE WB
3638	12	4.0%	NE	BURNHAMTHORPE WB
3655	7	2.3%	E	BURNHAMTHORPE WB
3656	8	2.7%	E	BURNHAMTHORPE WB
3663	30	10.0%	E	BURNHAMTHORPE WB
3716	6	2.0%	NE	BURNHAMTHORPE WB
4023	6	2.0%	SE	SIXTH NB
4026	9	3.0%	SE	SIXTH NB
4108	15	5.0%	NE	SIXTH SB
4110	56	18.6%	NW	SIXTH SB
6007	24	8.0%	SW	BURNHAMTHORPE EB
TOTAL	**301**	**100%**		

PM Outbound

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of origin - gta06_orig In 3634 4024
and
Trip purpose of origin - purp_orig In w
and
Planning district of destination - pd_dest In 36 39

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(3634 4024)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Primary travel mode of trip - mode_prime In d
and
2006 GTA zone of origin - gta06 4024
and
Trip purpose of origin - purp_orig In w
and
Planning district of destination - 39

TAZ/PD	Trips	Distributio	Direction	Assignment
3602	29	0.3%	NE	SIXTH NB
3603	47	0.5%	NE	SIXTH NB
3604	22	0.2%	NE	SIXTH NB
3607	32	0.3%	NE	SIXTH NB
3610	20	0.2%	NE	BURNHAMTHORPE EB
3612	10	0.1%	NE	SIXTH NB
3614	15	0.2%	SE	BURNHAMTHORPE EB
3615	16	0.2%	NE	SIXTH NB
3616	81	0.8%	NE	SIXTH NB
3618	14	0.1%	NE	SIXTH NB
3619	22	0.2%	NE	SIXTH NB
3620	95	1.0%	NE	SIXTH NB
3622	16	0.2%	NE	SIXTH NB
3633	30	0.3%	SE	BURNHAMTHORPE EB
3634	19	0.2%	E	BURNHAMTHORPE EB
3635	36	0.4%	E	BURNHAMTHORPE EB
3636	51	0.5%	E	BURNHAMTHORPE EB
3637	60	0.6%	NE	SIXTH NB
3638	10	0.1%	NE	SIXTH NB
3639	45	0.5%	SE	BURNHAMTHORPE EB
3640	21	0.2%	SE	BURNHAMTHORPE EB
3641	14	0.1%	SE	BURNHAMTHORPE EB
3644	49	0.5%	SE	BURNHAMTHORPE EB
3645	32	0.3%	SE	BURNHAMTHORPE EB
3646	72	0.7%	SE	BURNHAMTHORPE EB
3648	23	0.2%	SE	BURNHAMTHORPE EB
3650	101	1.0%	SE	BURNHAMTHORPE EB
3651	43	0.4%	SE	BURNHAMTHORPE EB
3654	8	0.1%	SE	BURNHAMTHORPE EB
3657	60	0.6%	SE	BURNHAMTHORPE EB
3659	46	0.5%	SE	BURNHAMTHORPE EB
3662	81	0.8%	E	BURNHAMTHORPE EB
3665	15	0.2%	NE	SIXTH NB
3668	35	0.4%	E	BURNHAMTHORPE EB
3669	33	0.3%	SE	BURNHAMTHORPE EB
3670	16	0.2%	SE	BURNHAMTHORPE EB
3671	35	0.4%	E	BURNHAMTHORPE EB
3672	12	0.1%	E	BURNHAMTHORPE EB
3674	88	0.9%	E	BURNHAMTHORPE EB
3675	35	0.4%	E	BURNHAMTHORPE EB
3676	138	1.4%	E	BURNHAMTHORPE EB
3679	20	0.2%	E	BURNHAMTHORPE EB
3680	31	0.3%	E	BURNHAMTHORPE EB
3682	27	0.3%	E	BURNHAMTHORPE EB
3683	49	0.5%	NE	SIXTH NB
3684	19	0.2%	E	BURNHAMTHORPE EB
3685	13	0.1%	E	BURNHAMTHORPE EB
3686	17	0.2%	E	BURNHAMTHORPE EB
3687	42	0.4%	E	BURNHAMTHORPE EB
3688	49	0.5%	E	BURNHAMTHORPE EB
3689	11	0.1%	E	BURNHAMTHORPE EB
3690	46	0.5%	E	BURNHAMTHORPE EB
3691	30	0.3%	NE	SIXTH NB
3694	46	0.5%	NE	SIXTH NB
3701	9	0.1%	NE	BURNHAMTHORPE EB
3705	9	0.1%	NE	SIXTH NB
3709	38	0.4%	NE	SIXTH NB
3714	14	0.1%	NE	SIXTH NB
3716	73	0.8%	NE	SIXTH NB
3718	16	0.2%	NE	SIXTH NB

Appendix F

Signal Warrant Analysis

Signal Warrant Calculation

Major Street: Sixth Line

Minor Street: Loyalist Trail / Driveway

Comment FT

Number of Approaches: 1 [x] 2 [ ]

Tee Intersection Configuration: Yes [x] No [ ]

Flow Condition: Free Fw (Rural) [ ] Restricted Flow (Urban) [x]

VOLUME	AM	PM	FACTOR *	
1A - All	1,842	1,929	n/a	943
1B - Minor	367	305	25%	168
2A - Major	1,475	1,624	25%	775
2B - Crossi	67	73	25%	35

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [ ]	No [X]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	943
	% FULFILLED				131%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	180	255	180	255	168
	% FULFILLED				66%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	775
	% FULFILLED				108%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	50	75	35
	% FULFILLED				47%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.