R.V. Anderson Associates Limited
43 Church Street, Suite 104
St. Catharines ON L2R 7E1 Canada
T 905 685 5049 **F** 855 833 4022
rvanderson.com

TECHNICAL MEMORANDUM

To:	Ben Pattenick - Mattamy Homes	RVA:	215876
From:	Matthew DiMaria, CET – R.V. Anderson Associates Limited (RVA) Becca Conrod, EIT - RVA		
Date:	January 23, 2025		
Subject:	5520 & 5552 Eighth Line Residential Development – Traffic Impact Study Addendum		

1.0 Introduction

The following Technical Memorandum is an Addendum to the previous 5520 & 5552 Eighth Line Residential Development Traffic Impact Study report completed July 29, 2024. The purpose of this Addendum is to address comments received from review agencies:

- The 10% of trips to/from the south via Wellington Road 52 in Table 4.3 is significantly more than the 38% in the Transportation Tomorrow Survey data. This should be revised.
- Similarly, the 33% of trips to/from the south via Wellington Road 124 in Table 4.3 is a lot lower than the 11% in the Transportation Tomorrow Survey data. This should be revised.
- An update to address the comments on this Submission is recommended.

1.1 Scope of Work

Based on the comments received noted above, the following tasks were undertaken as part of this Addendum:

- Redistribute site generated traffic volumes for both the Mattamy and Empire developments based on the requested percentages;
- Re-establish future (2034) background and future (2034) total traffic volumes.
- Reanalyse the future background and future total signal warrants.
- Reanalyse the future background and future total left turn lane warrants.
- Update intersection operational analysis for the 2034 horizon year.

2.0 Redistribution of Site Generated Traffic Volumes

Table 1 presents the revised trip distribution percentages for assigning the Mattamy and Erin site generated traffic based on the comments received from the Town. The updated site traffic volume figures are provided in **Appendix B** along with the revised future background 2034 and future total 2034 volumes for the weekday a.m. and p.m. peak hours.

Table 1 – Trip Distribution

Direction	Distribution Percentages
Wellington Road 124 (S/W)	11%
Wellington Road 124 (N/E)	20%
Wellington Road 52 (S)	38%
Trafalgar Road (North)	6%
Trafalgar Road (South)	19%
Wellington Road 23 (North)	6%
Total	100%

3.0 Revised Signal Warrant

Signal warrant analysis was revised for all unsignalized study area intersections, using the same methodology as outlined in the original report dated July 29th, 2024. The warrant analysis sheets are provided in **Appendix C**.

Table 2 – Signal Warrant Analysis Results

Compliance % (MIN OF Warrant 1 / MIN OF Warrant 2)					Results
Intersection	2024 FB	2034 FB	2024 FT	2034 FT	
Trafalgar Road / Sideroad 17	108% / 75%	133% / 91%	120% / 80%	144% / 96%	Warranted in 2024 FB
Sideroad 17 / Street 'C'	-	-	-	60% / 7%	No
Sideroad 17 / Eighth Line	-	-	-	32% / 51%	No
Eighth Line / Street 'E'	-	-	-	37% / 11%	No
Eighth Line / Dundas Street West	-	-	-	2% / 5%	No
Eighth Line / Wellington Road 124	-	-	-	11% / 10%	No

Traffic signals are not warranted at any of the study area intersections except for the Trafalgar Road and Sideroad 17 intersection, which is consistent with the original report.

The subject site does not trigger the signalization of any intersection in the study area. The operational analysis for this intersection was completed using the proposed signalization and lane configurations as the original report dated July 29, 2024.

4.0 Revised Left Turn Lane Warrant Analysis

Left-turn lane warrants were also revised for 2-way stop controlled intersections within the study area using the same methodology as the original report dated July 29th, 2024. The following section presents the results of the warrant analysis. All MTO left-turn lane warrants sheets are provided in **Appendix D**.

4.1 Sideroad 17 & Eighth Line

Left-turn lanes are warranted in the westbound direction as a result of the background traffic in 2034. In this scenario, the intersection volumes warrant a 15-metre westbound left turn lane as a result of the background traffic. With the addition of the site generated traffic, the intersection continues to warrant a left turn lane. In the 2034 horizon year, a 25-metre left turn lane is warranted. This is unchanged from the original report dated July 29th, 2024.

4.2 Eighth Line & WR 124

Left-turn lanes are warranted in the eastbound and westbound directions as a result of existing conditions. In this scenario, the intersection volumes warrant a 15-metre left turn lane in each direction. With the addition of the background traffic, the intersection warrants 25-metre left turn lanes in each direction. With the addition of the site generated traffic, the intersection continues to warrant a left turn lane with 25m of storage. This is unchanged from the original report dated July 29th, 2024.

4.3 Sideroad 17 & Street “C”

A 15-metre westbound left-turn lane is warranted in the 2034 horizon years in the future total scenario. This lane should be implemented by the build out year to support the subject site generated traffic. This is unchanged from the original report dated July 29th, 2024.

4.4 Eighth Line & Street “E” / Erin Heights Drive

Southbound left turn lanes are not warranted at the Eighth Line intersection with Street “E” and Erin Heights Drive in any of the horizon years. During the 2029 and 2034 horizon years, the northbound left turn lane warrants a 15m left turn lane. This is changed from the original report dated July 29th, 2024.

5.0 Revised Intersection Operational Analysis

The industry standard Synchro macroscopic traffic analysis software was utilized to analyze the intersections for the various horizon years using the same methodology as the original report dated July 29th, 2024. **Table 3** and **4** present the revised intersection capacity analysis results for all the study area intersections under future background 2034 and future total 2034 traffic conditions. Analysis for only these scenarios (background and total) were completed to confirm the operations of the ultimate horizon year for the study (worst-case scenario). The intersection of Main Street and Shamrock Road was not re-analyzed as part of this work as it was not affected by the change in site traffic distribution.

Detailed Highway Capacity Manual (HCM 2000) output reports from the Synchro software are provided in **Appendix E**.

Table 3 – Intersection Operational Analysis Results, 2034 Future Background

INTERSECTION	MOVE.	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			STORAGE LENGTH
		V/C	LOS	95TH % QUEUE (M)	V/C	LOS	95TH % QUEUE (M)	
Eighth Line & Street E/ Erin Heights Drive	WBLR	0.02	A	1	0.02	B	1	
	SBLT	0.00	A	0	0.02	A	1	
	Overall	0.20	A	-	0.31	A	-	-
Eighth Line & Sideroad 17	WBLT	0.02	A	0	0.05	A	1	
	NBLR	0.21	B	6	0.42	C	15	
	Overall	0.38	A	-	0.62	A	-	-
Eighth Line & Dundas Street W	WBLT	0.00	A	0	0.01	A	0	
	NBLR	0.02	A	1	0.01	B	0	
	Overall	0.16	A	-	0.28	A	-	-
Eighth Line & Wellington Road 124	EBLT	0.00	A	0	0.00	A	0	
	WBLT	0.01	A	0	0.02	A	0	
	NBLTR	0.03	B	1	0.13	C	3	35m
	SBLTR	0.03	C	1	0.04	C	1	
	Overall	0.40	A	-	0.52	A	-	-
Trafalgar Road (WR 24) & Sideroad 17	EBL	0.03	B	4	0.05	B	6	15m
	EBTR	0.10	A	10	0.11	B	13	
	WBL	0.13	B	12	0.24	B	25	35m
	WBTR	0.30	A	15	0.43	B	34	
	NBL	0.03	B	3	0.05	B	5	15m
	NBT	0.25	B	25	0.53	B	56	
	NBR	0.18	A	8	0.29	A	10	15m
	SBL	0.30	B	21	0.70	C	47	50m
	SBT	0.31	B	30	0.40	B	40	
	SBR	0.03	A	1	0.02	A	0	15m

INTERSECTION	MOVE.	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			STORAGE LENGTH
		V/C	LOS	95TH % QUEUE (M)	V/C	LOS	95TH % QUEUE (M)	
	Overall	0.29	A	-	0.53	A	-	-
Main Street (WR 124) & Dundas Street W	EBLTR	0.44	B	18	0.55	C	32	
	WBLTR	0.22	B	12	0.49	C	30	
	NBL	0.06	A	5	0.32	B	16	35m
	NBTR	0.49	A	52	0.76	B	115	
	SBL	0.09	A	6	0.14	A	7	40m
	SBTR	0.41	A	41	0.70	B	96	
	Overall	0.42	A	-	0.63	B	-	-

As shown in **Table 3**, the study area intersections are projected to operate well with an overall LOS 'B' or better during weekday a.m. and p.m. peak hours into the 2034 future background horizon year. With regard to individual movements, the intersections are projected to operate with a LOS 'C' or better during both peak hours and with reserve capacity and no anticipated queuing issues.

Table 4 – Intersection Operational Analysis Results, 2034 Future Total

INTERSECTION	MOVE.	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			STORAGE LENGTH
		V/C	LOS	95TH % QUEUE (M)	V/C	LOS	95TH % QUEUE (M)	
Eighth Line & Street E/ Erin Heights Drive	WBLR	0.01	A	0	0.05	A	1	
	SBLT	0.23	B	7	0.27	C	8	
	Overall	0.37	A	-	0.67	A	-	-
Eighth Line & Sideroad 17	WBLT	0.03	A	1	0.09	A	2	
	NBLR	0.28	B	9	0.57	D	25	
	Overall	0.48	A	-	0.69	A	-	-
Eighth Line & Dundas Street W	WBLT	0.00	A	0	0.01	A	0	
	NBLR	0.02	B	1	0.02	B	0	
	Overall	0.23	A	-	0.32	A	-	-
Eighth Line & Wellington Road 124	EBLT	0.00	A	0	0.00	A	0	
	WBLT	0.01	A	0	0.02	A	0	
	NBLTR	0.03	B	1	0.14	D	4	35m
	SBLTR	0.02	C	1	0.04	C	1	
	Overall	0.42	A	-	0.54	A	-	-
Trafalgar Road (WR 24) & Sideroad 17	EBL	0.03	B	4	0.05	B	7	15m
	EBTR	0.10	A	10	0.11	B	14	
	WBL	0.24	B	20	0.32	B	34	35m
	WBTR	0.32	A	15	0.45	B	37	
	NBL	0.03	B	3	0.05	B	5	15m
	NBT	0.25	B	25	0.52	B	55	

INTERSECTION	MOVE.	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			STORAGE LENGTH
		V/C	LOS	95TH % QUEUE (M)	V/C	LOS	95TH % QUEUE (M)	
	NBR	0.21	A	9	0.35	A	11	15m
	SBL	0.31	B	22	0.74	C	52	50m
	SBT	0.31	B	30	0.39	B	40	
	SBR	0.03	A	1	0.02	A	0	15m
	Overall	0.29	A	-	0.55	A	-	-
Main Street (WR 124) & Dundas Street W	EBLTR	0.48	A	22	0.69	C	63	
	WBLTR	0.78	D	59	0.78	D	67	
	NBL	0.21	B	15	0.85	D	69	35m
	NBTR	0.66	B	82	0.75	B	97	
	SBL	0.14	B	9	0.15	A	6	40m
	SBTR	0.55	B	64	0.69	B	87	
	Overall	0.48	A	-	0.85	C	22.8	-

As shown in **Table 4**, the study area intersections are projected to operate well with an overall LOS 'C' or better during weekday a.m. and p.m. peak hours into the 2034 horizon year with the addition of site generated traffic. Regarding individual movements, the intersections are projected to operate with a LOS 'D' or better during both peak hours and with reserve capacity. The northbound left queues at Main Street and Dundas Street W are identified to exceed the existing storage area but will fit within the taper, which will not block the through traffic. If a permissive-protective phase were added to this movement, the queuing could be reduced further.

6.0 Conclusions

Based on the completion of the traffic impact study addendum for the 5520 & 5552 Eighth Line Residential Development, most of the recommendations from the original report dated July 2024 are unchanged. The following conclusions are in addition or replace the conclusions from the original report.

- Per the left turn lane warrant analysis, the northbound left movement at the intersection of Eighth Line & Street "E" / Erin Heights Drive warrants a 15m left turn lane during the 2029 horizon year.
- Per the intersection capacity analysis, the study area intersections are projected to operate well with an overall LOS 'B' or better during weekday a.m. and p.m. peak hours into the 2034 future background horizon year.
- Per the intersection capacity analysis, the study area intersections are projected to operate well with an overall LOS 'C' or better during weekday a.m. and p.m. peak hours with the addition of site generated traffic.

7.0 Recommendations

Based on the findings of the original report dated July 2024 and this addendum, the following improvements are recommended.

The following improvements are recommended due to the subject site. There are no additional geometric improvements recommended at the study area intersections based on the addition of site generated traffic.

- A 15-metre auxiliary left-turn lane is warranted at the Sideroad 17 and Street 'C' intersection for the westbound left-turn movement.
- A 15-metre auxiliary left-turn lane is warranted at the Eighth Line & Street "E" / Erin Heights Drive intersection for the northbound left-turn movement.

The subject site does not trigger the signalization of any intersection in the study area. Any of the improvements outside of those noted above are not warranted due to the site generated traffic. The remaining improvements are warranted by the area background developments, which may vary in terms of site and opening dates in the future. The Town/County may consider monitoring operations and volumes at the location of these improvements to determine when these improvements should occur.

A median at the intersection of Eighth Line, Street "E", and Erin Heights Drive is being considered by the developer to limit the vehicle through movements from the proposed site into the Erin Heights Neighborhood. Although the median would have the desired effect to restrict through movements into Erin Heights, it would also restrict all left-turning movements from all approaches. The proposed median would effectively render Erin heights Drive and Street "E" as right-in right-out only streets. This is acceptable from an access management perspective; however, it would impact all residents in these two developments by causing detours potentially up to 2km long.

APPENDIX A

Transportation Tomorrow Survey

Mon Feb 28 2022 11:17:01 GMT-0500 (Eastern Standard Time) - Run Time: 1160ms

Cross Tabulation Query Form - Person - 2016 v1.1

Row: Planning district of household - pd_hhld
Column: Regional municipality of employment - region_emp

RowG:(79)
ColG:
TblG:

Filters:
No Filters

Persons 2016
Table:

	Toronto	York	Peel	Halton	Hamilton	Waterloo	Guelph	Wellington	Orangeville	Simcoe	Dufferin	
1	614	21	1844	721	34	202	152	1708	96	113	71	5576
	11%	0%	33%	13%	1%	4%	3%	31%	2%	2%	1%	100%

ROUTES	
124 NW	20%
Trafalgar S	19%
124 SE	11%
Trefalgar N	5%
HWY 23N	6%
HWY 52 S	38%
	100%

APPENDIX B

Traffic Volumes

1.0 Existing

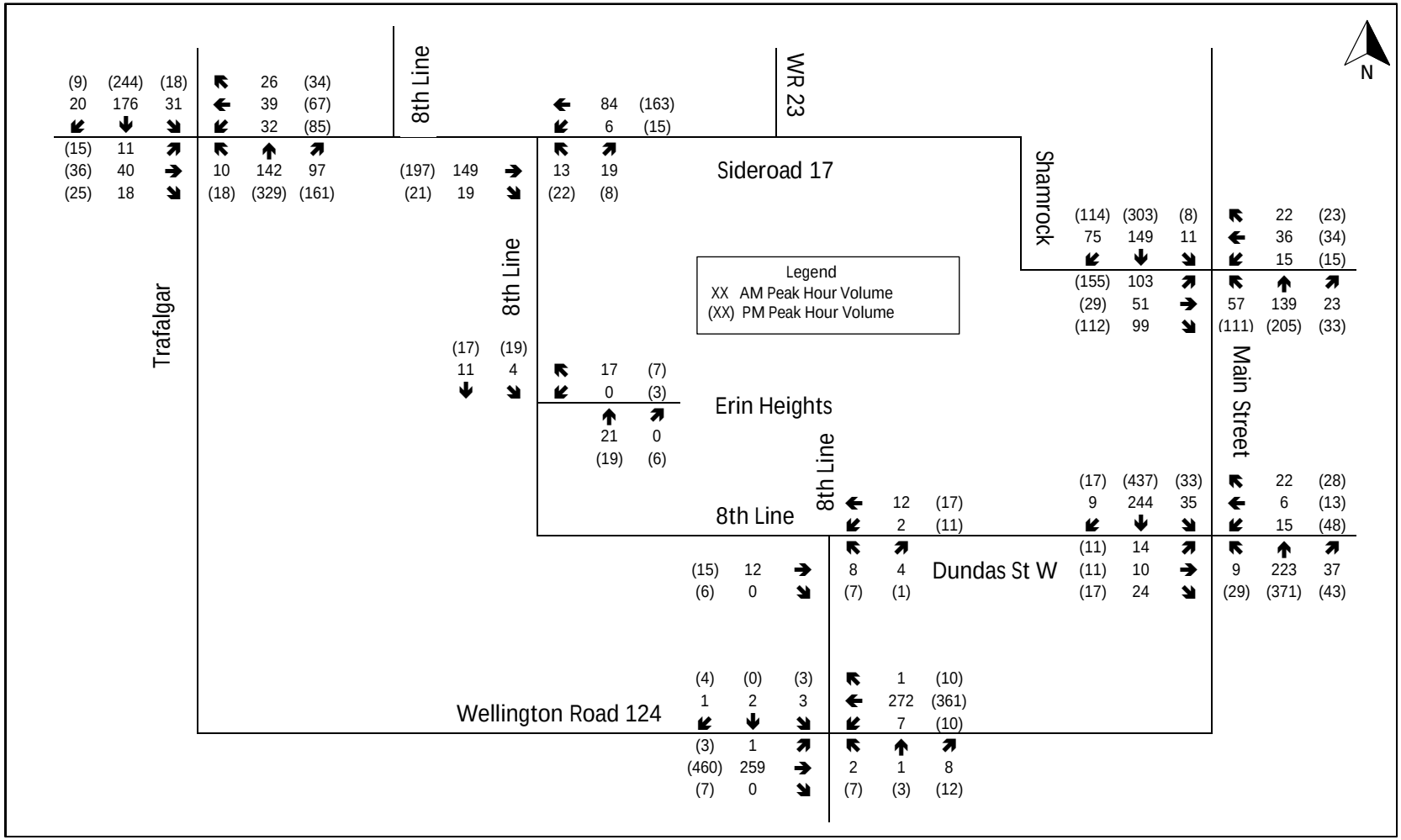


Figure 1: Existing (2022) Traffic Volumes

2.0 Future Background Growth

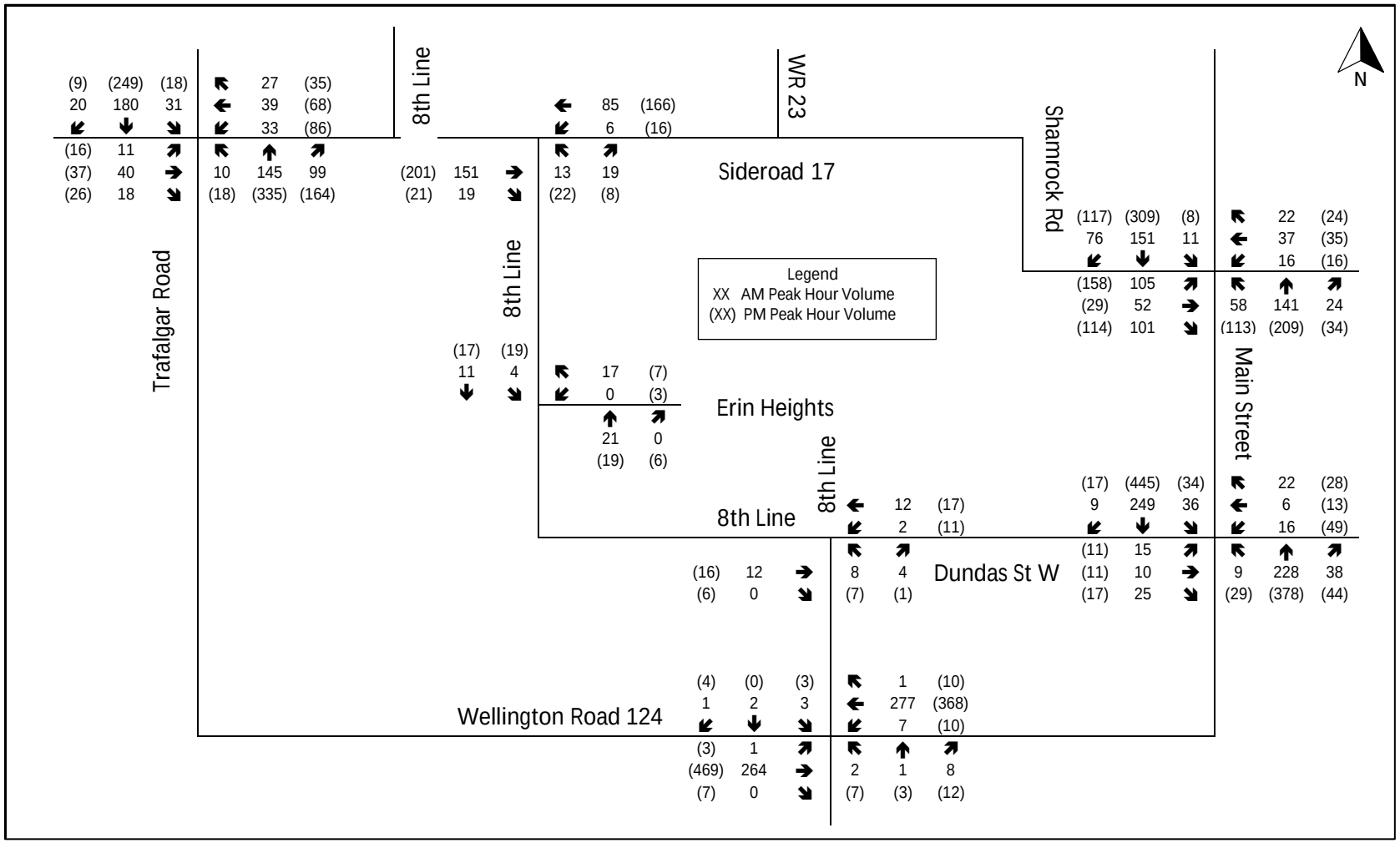


Figure 2: Future (2024) Background Growth Traffic Volumes

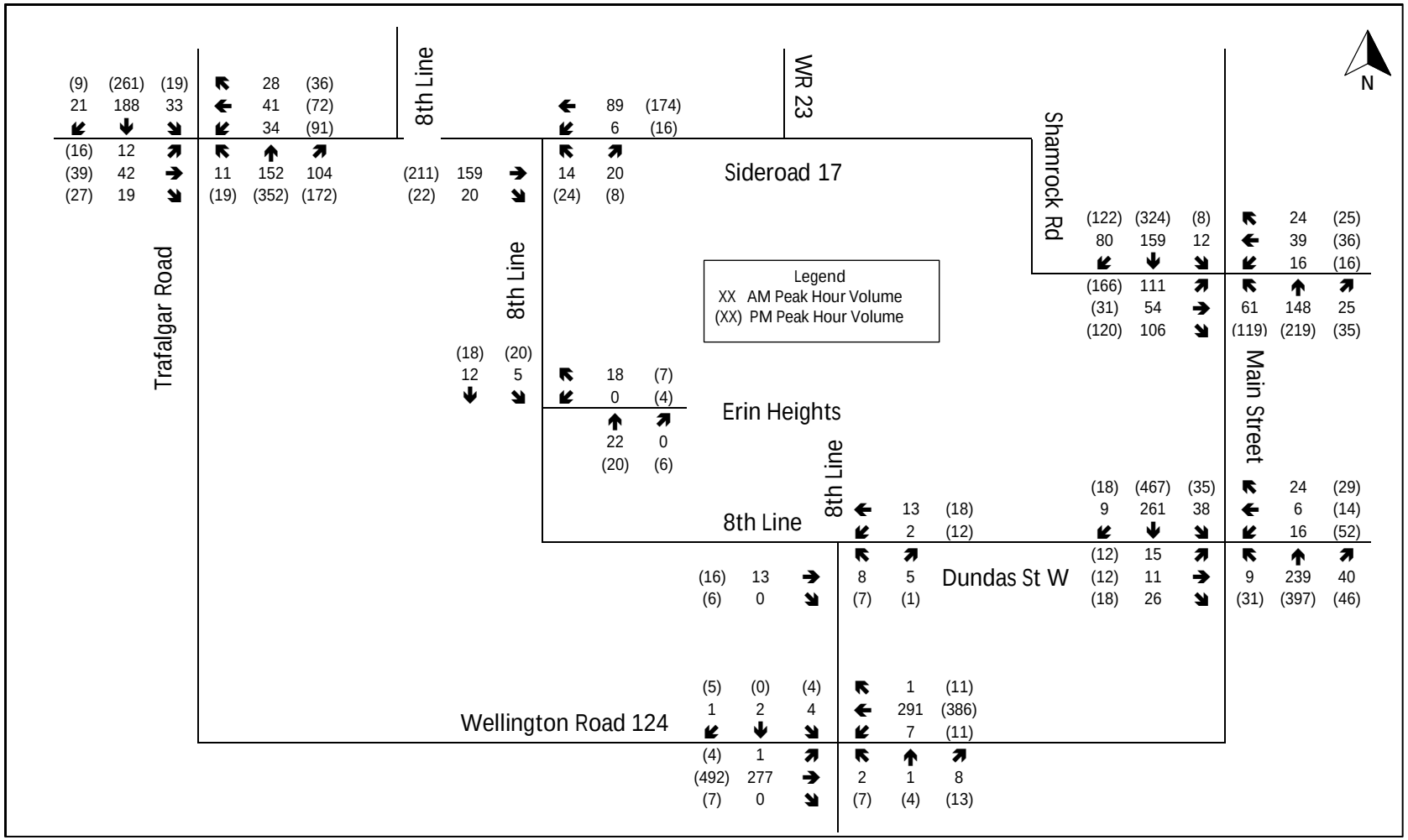


Figure 3: Future (2029) Background Growth Traffic Volumes

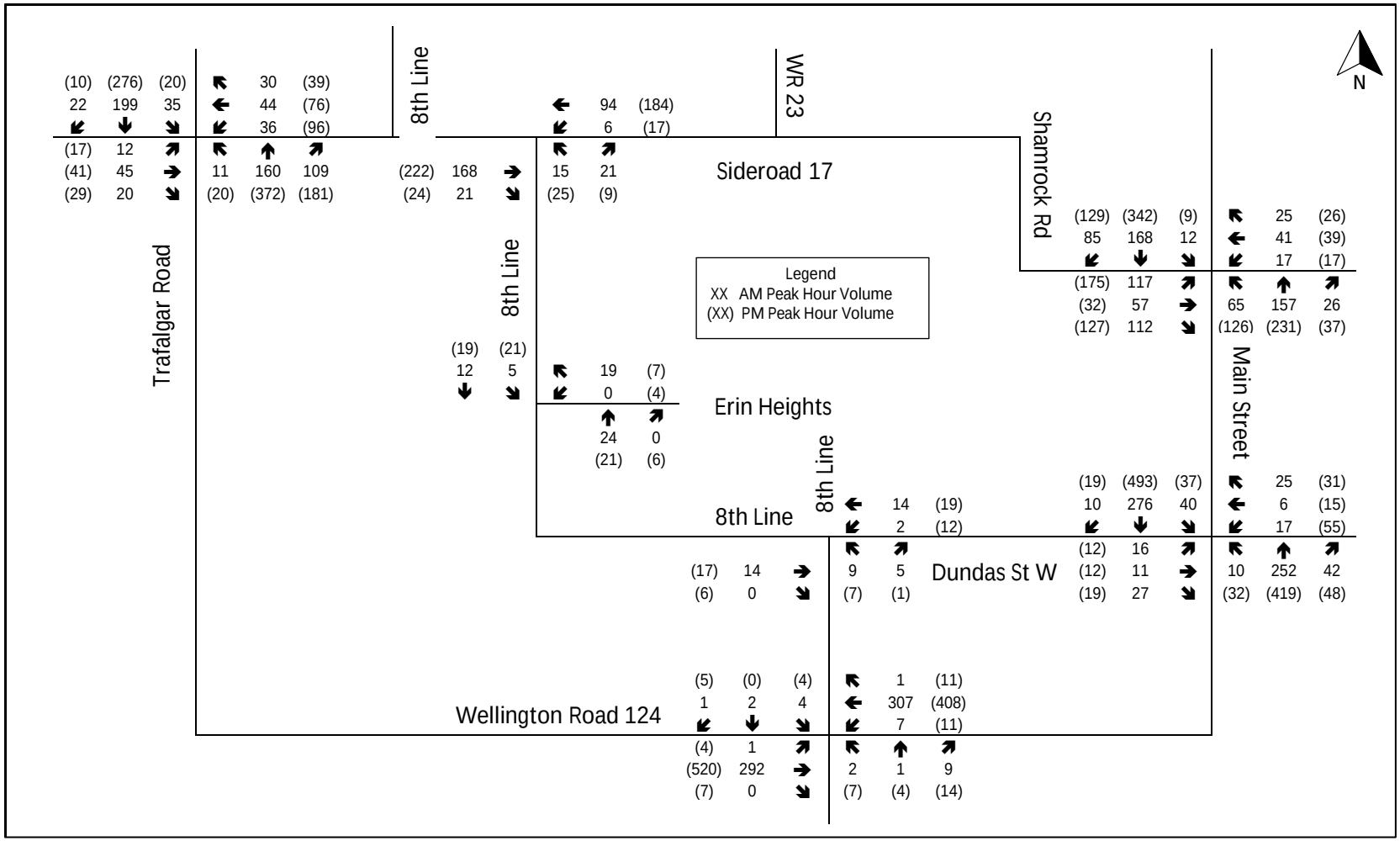


Figure 4: Future (2034) Background Growth Traffic Volumes

3.0 Background Developments

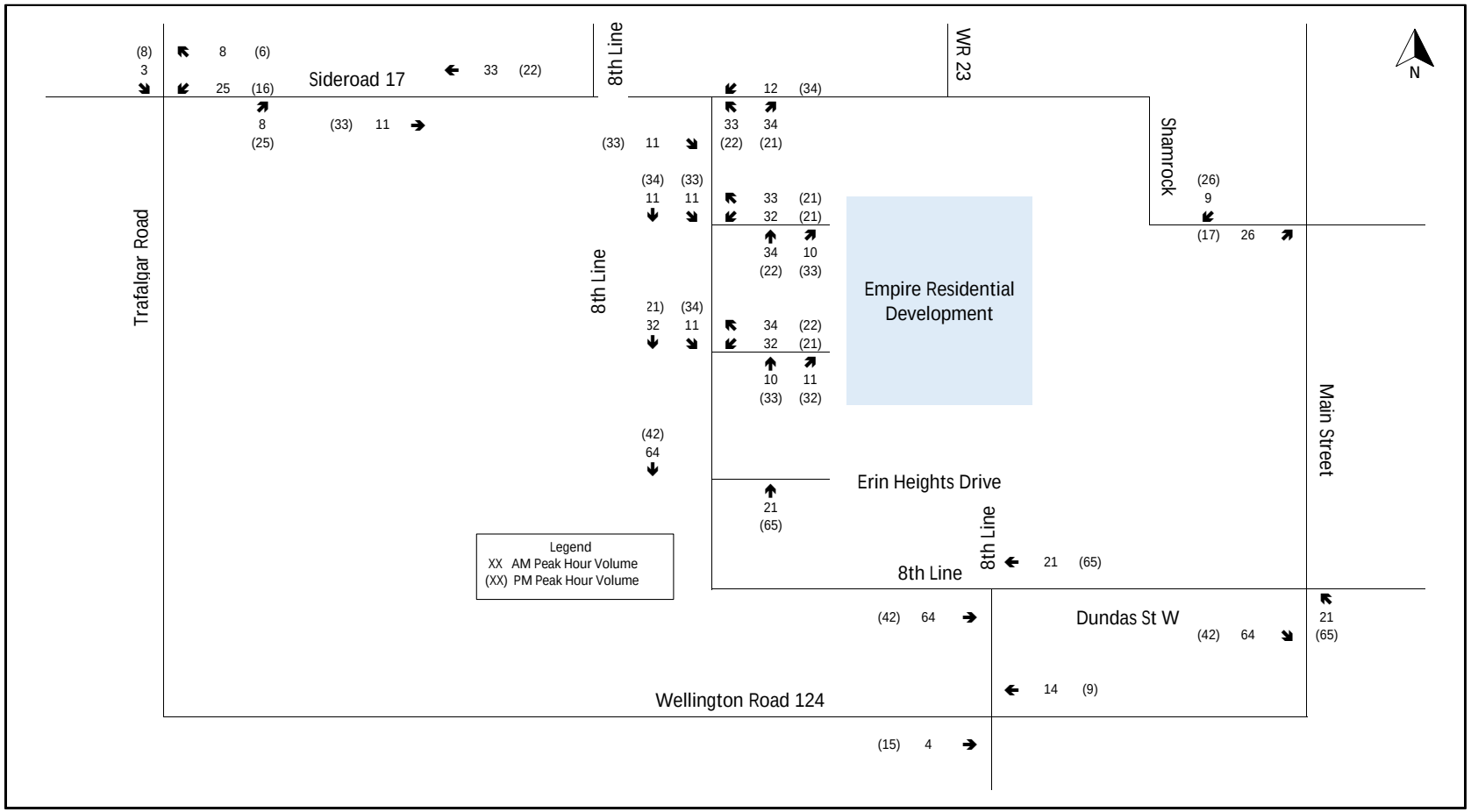


Figure 5: Empire Development Site Generated Traffic Volumes

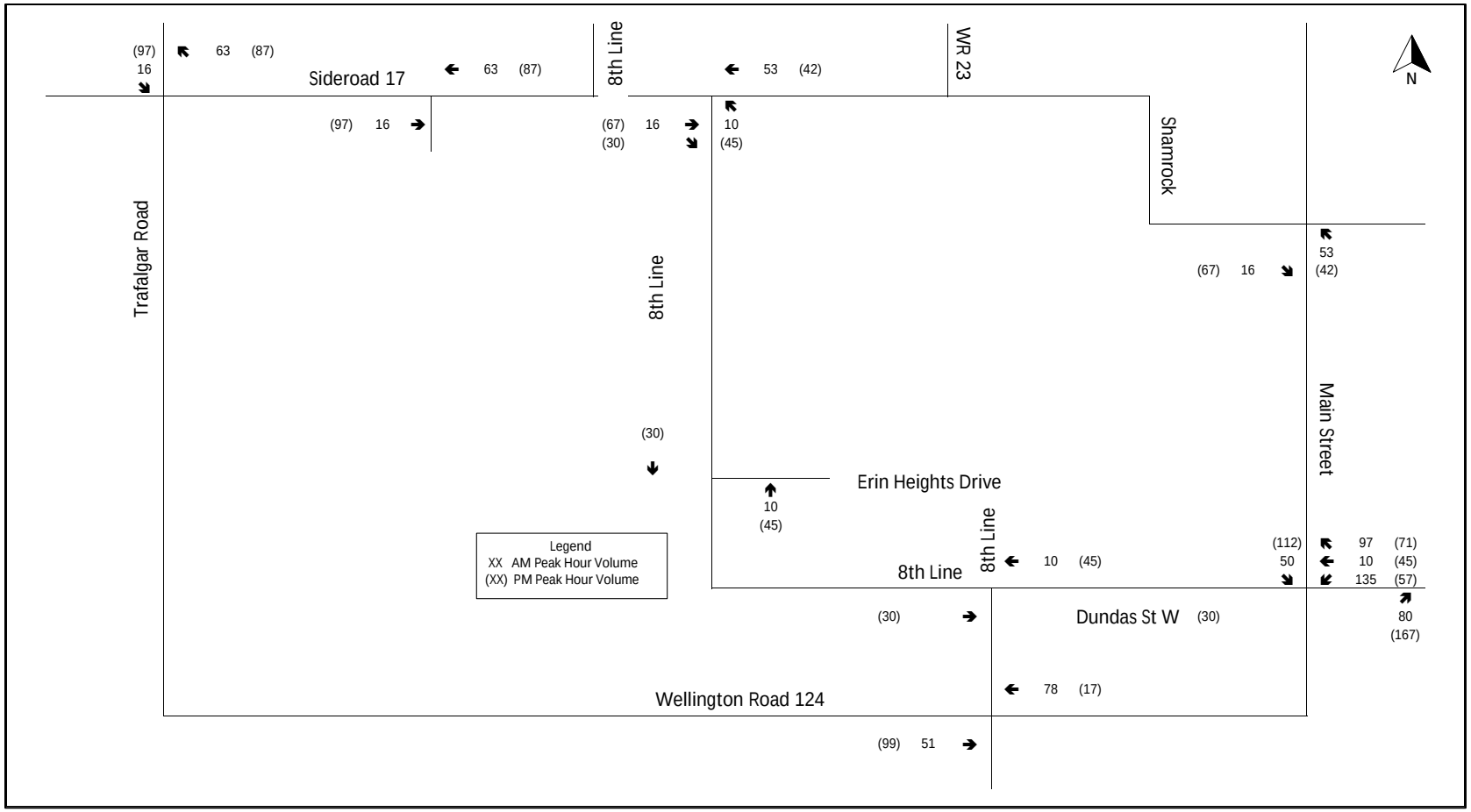


Figure 6: Solmar Development Site Generated Traffic Volumes (Phase 1)

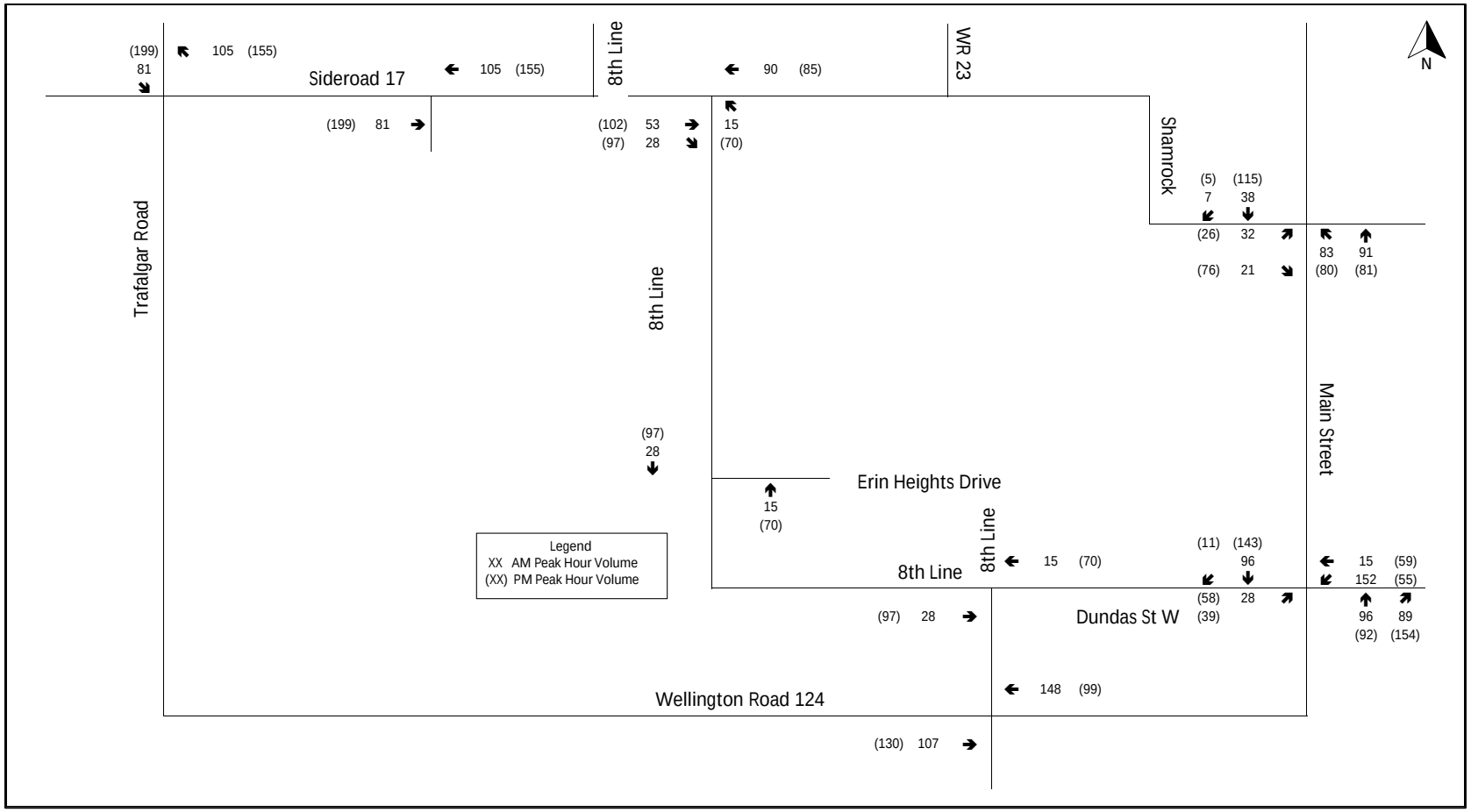


Figure 7: Solmar Development Site Generated Traffic Volumes (Total)

4.0 Future Background Traffic

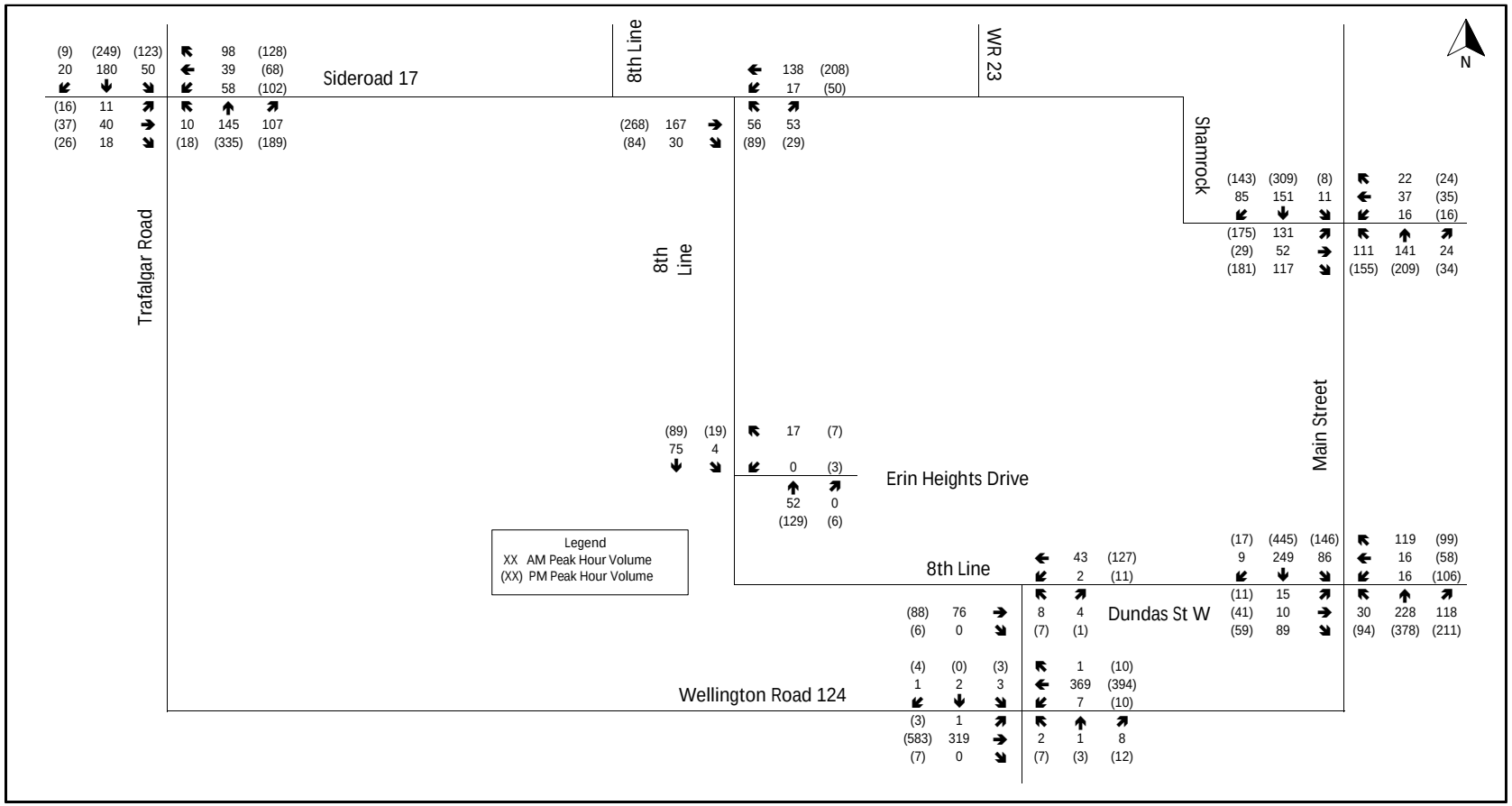


Figure 8: Future (2024) Background Traffic Volumes

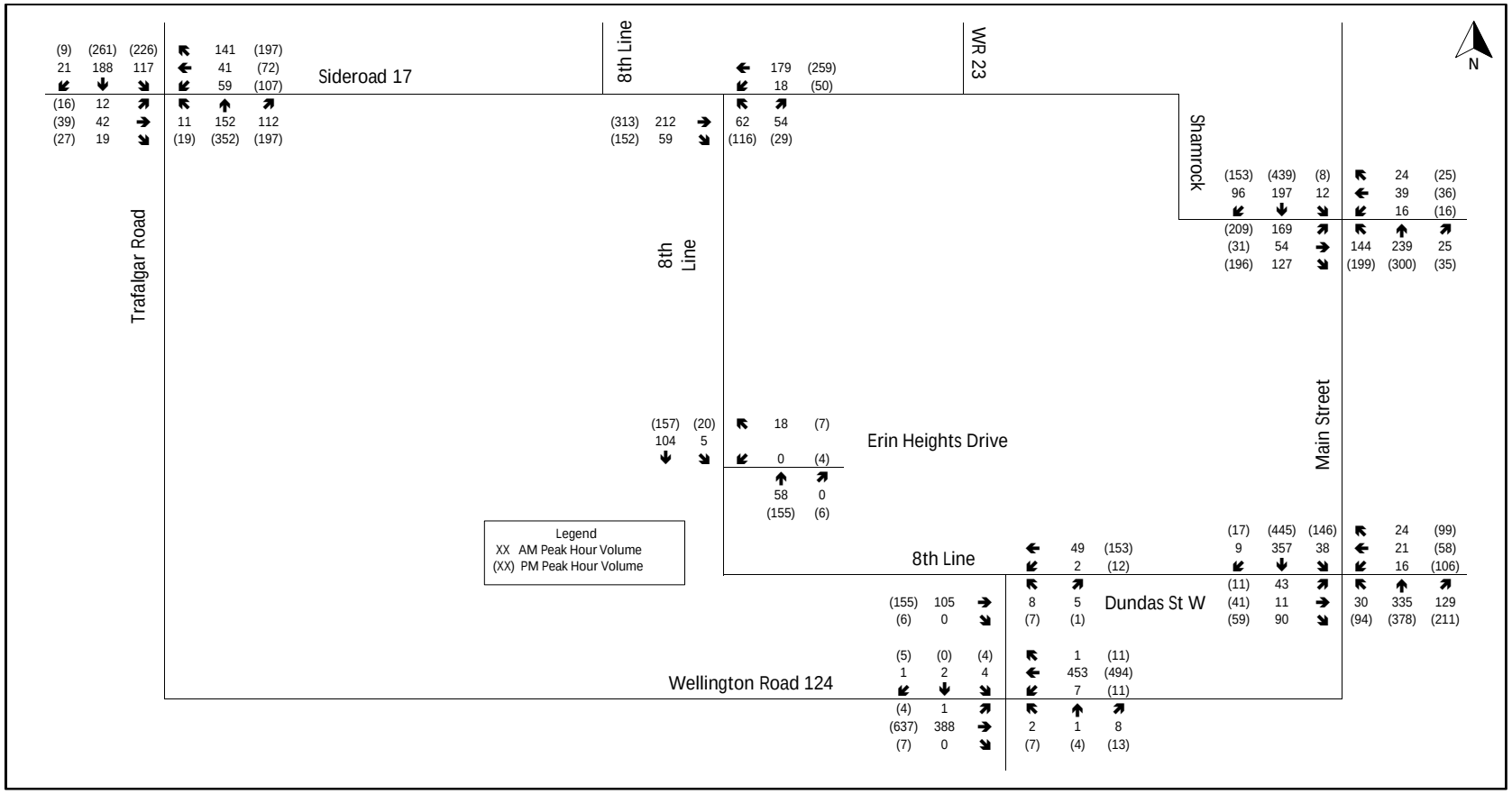


Figure 9: Future (2029) Background Traffic Volumes

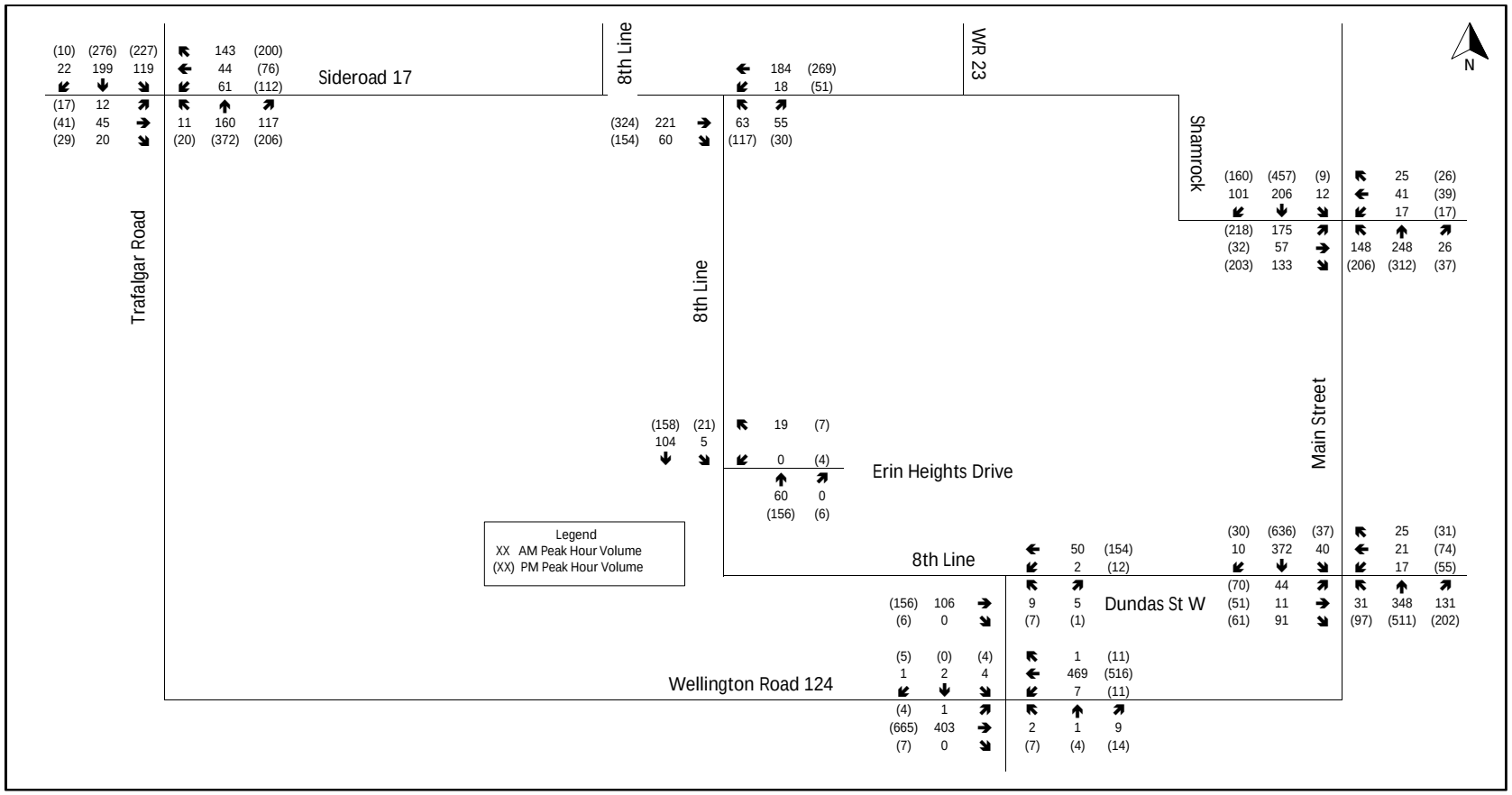


Figure 10: Future (2034) Background Traffic Volumes

5.0 Site Generated Traffic Volumes

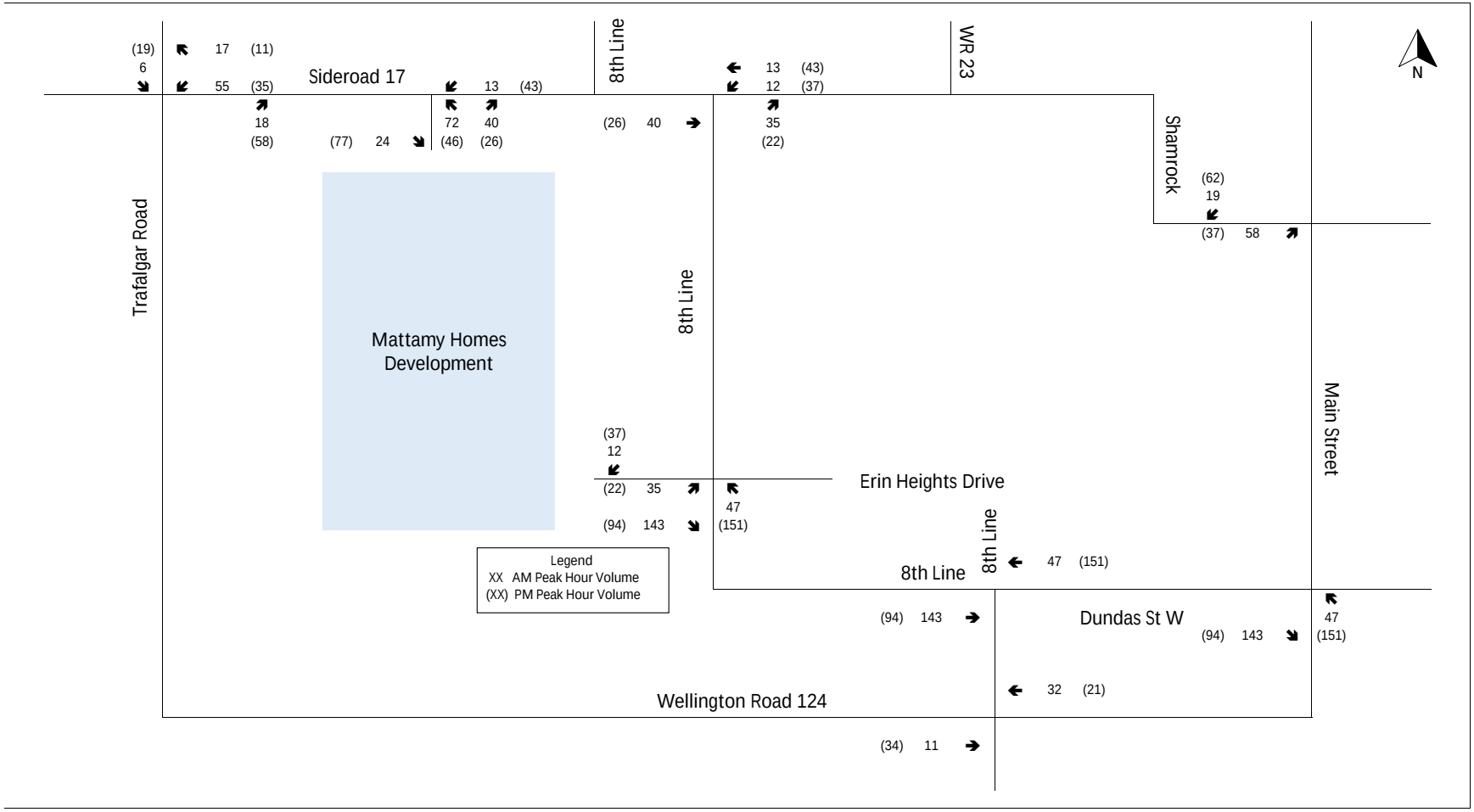


Figure 11: Mattamy Development Site Generated Traffic Volumes

6.0 Future Total Traffic Volumes

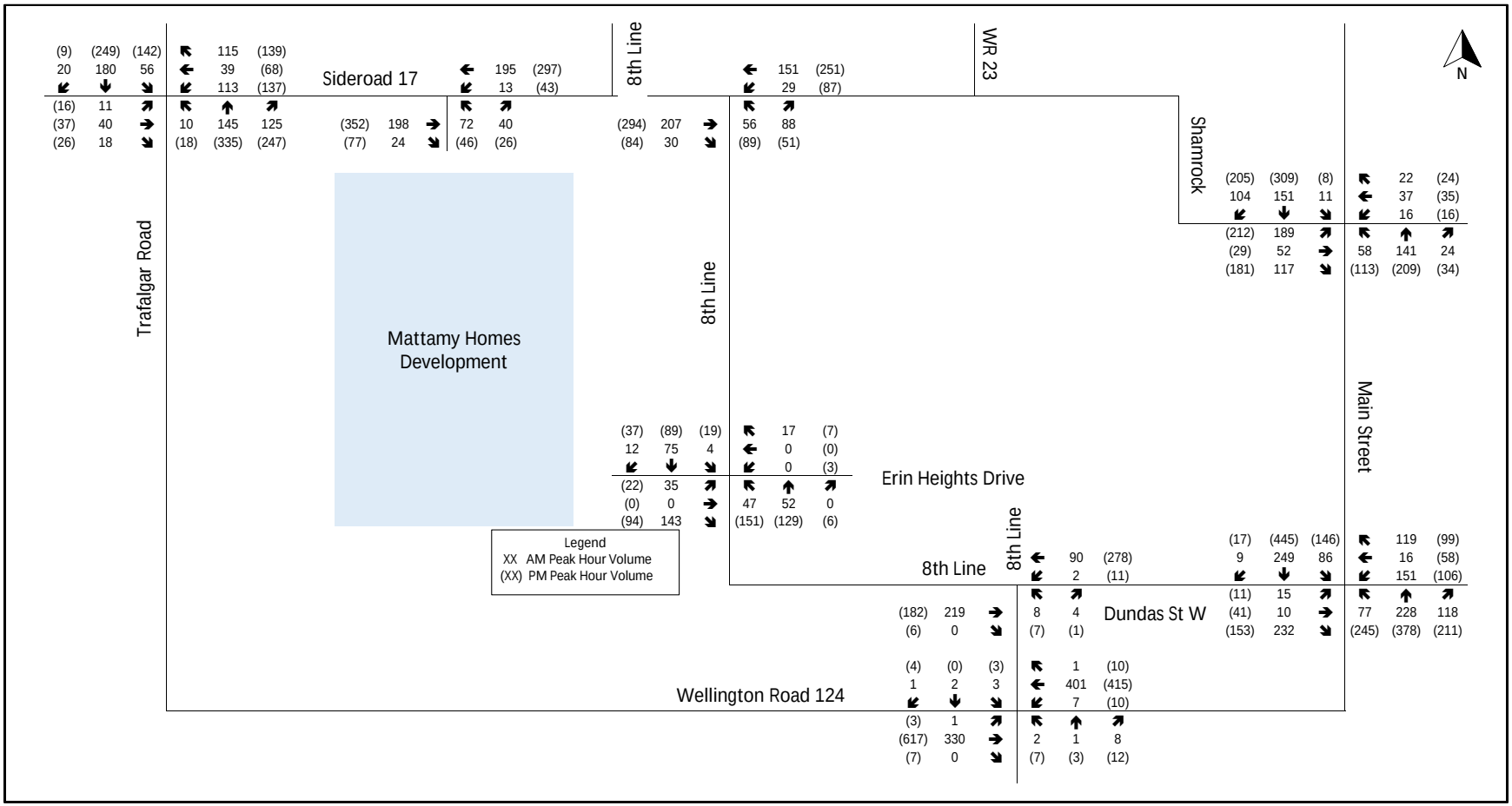


Figure 12: Future (2024) Total Traffic Volumes

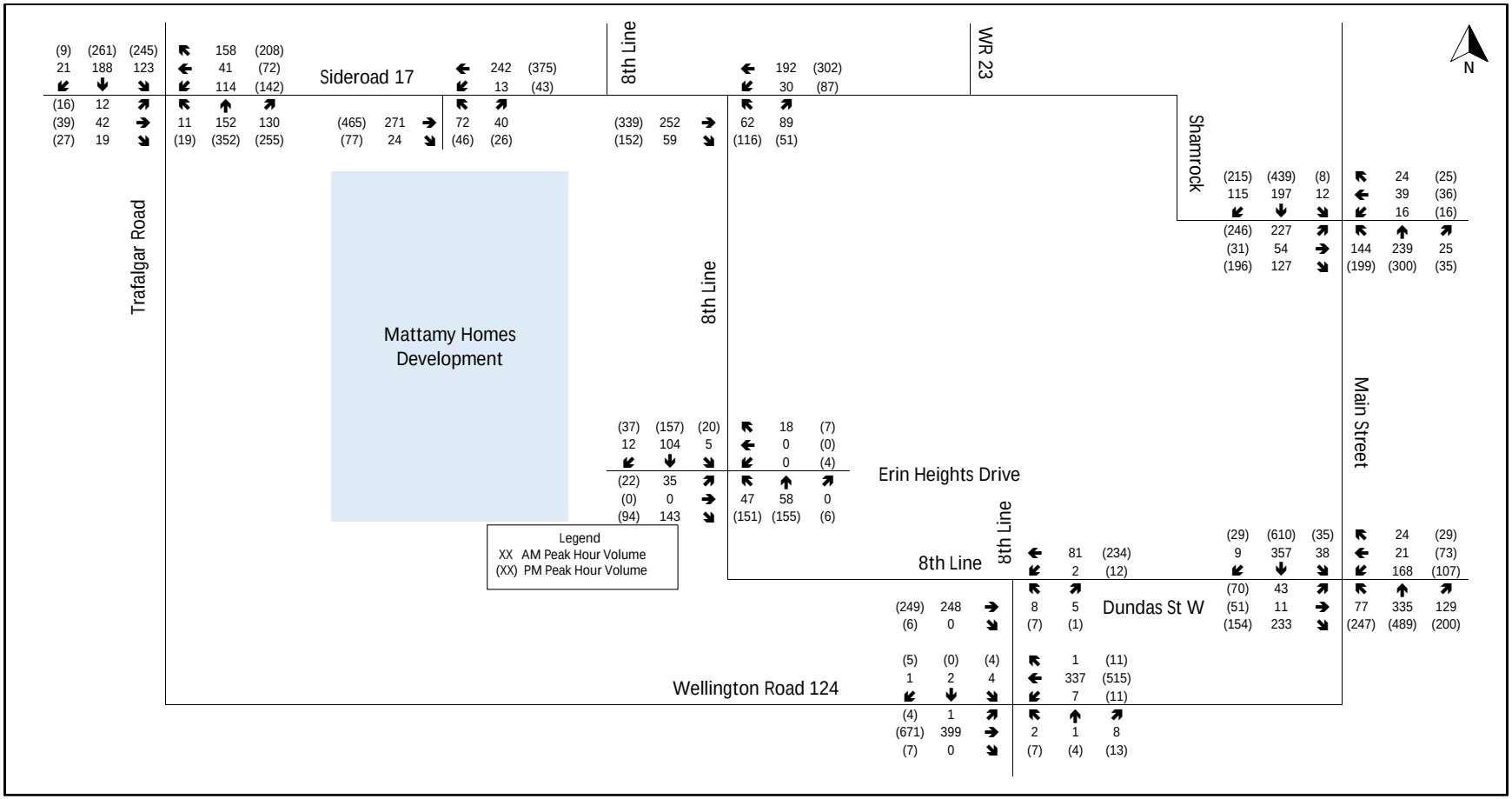


Figure 13: Future (2029) Total Traffic Volumes

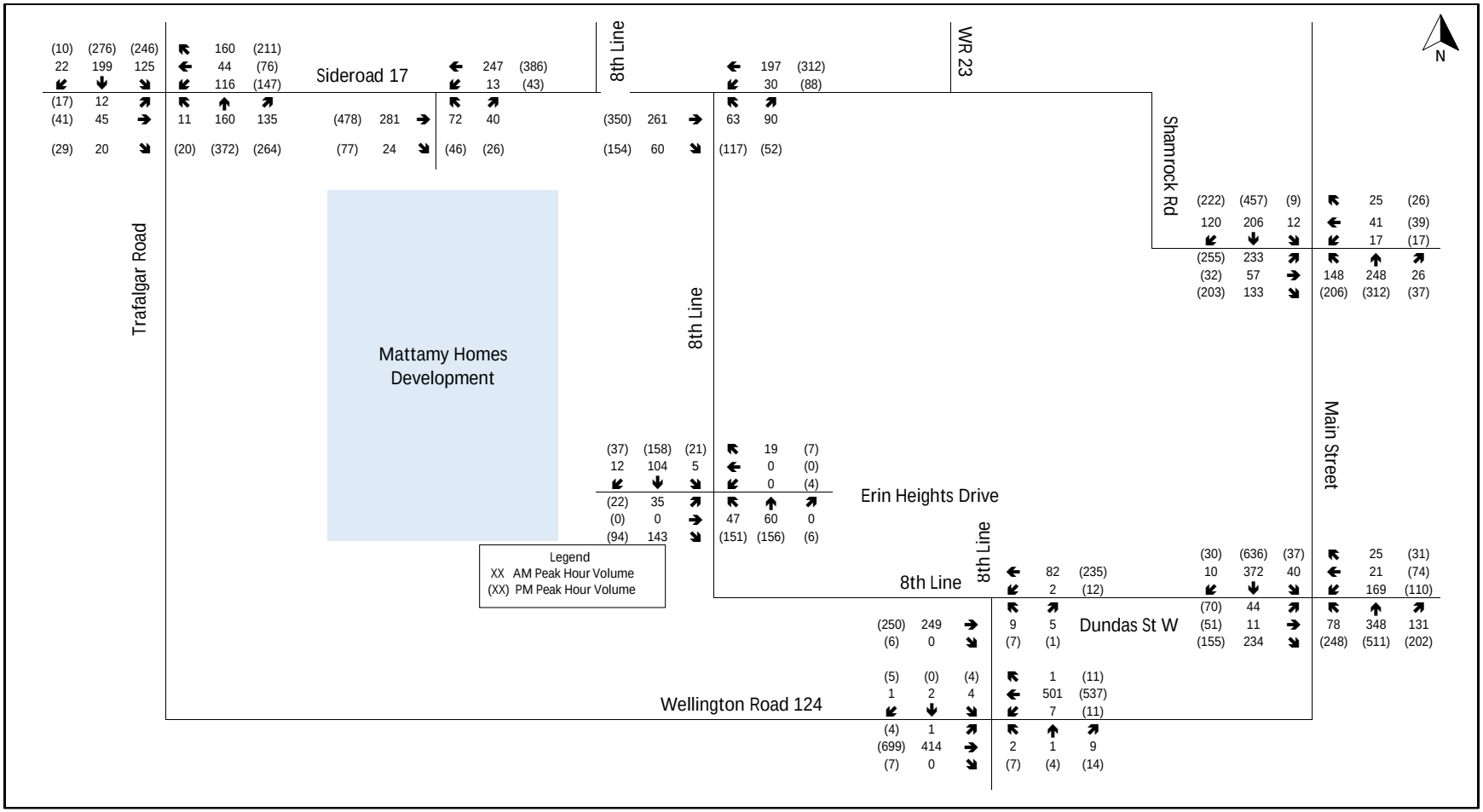


Figure 14: Future (2034) Total Traffic Volumes

APPENDIX C

Signal Warrants

Trafalgar Road/Sideroad 17 - (peak hour signal warrant) - FB 2024

Signal Warrant			Description	Minimum Requirement for Two-Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	108%	108%	100% Yes
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	120	134%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	75%	75%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	50	148%		

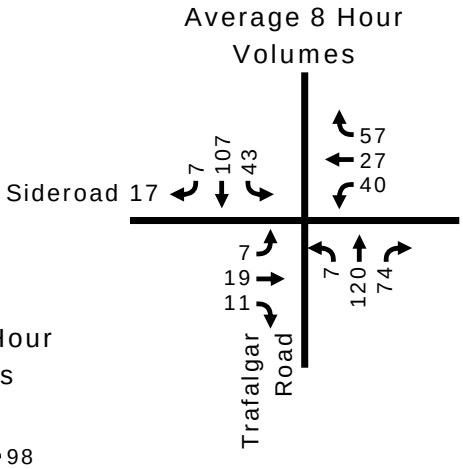
Notes

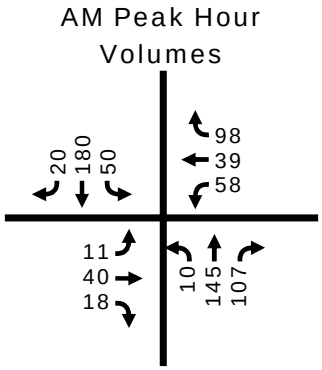
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

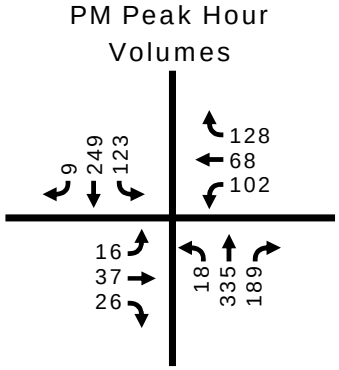
2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — No







Trafalgar Road/Sideroad 17 - (peak hour signal warrant) - FB 2034

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	133%	133%	100% Yes
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	120	167%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	91%	91%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	50	160%		

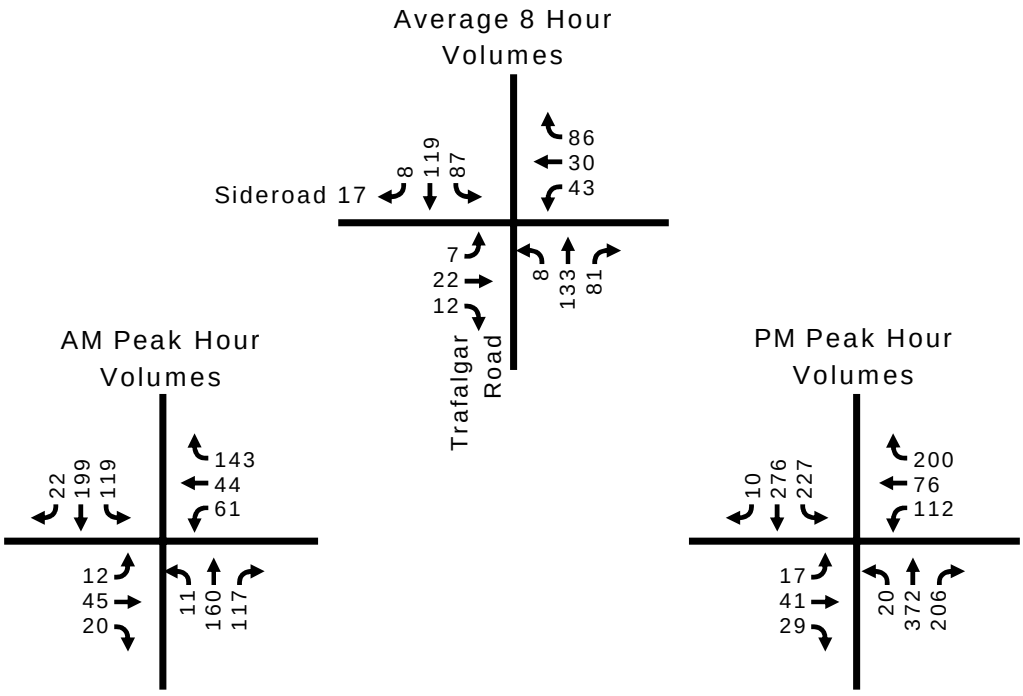
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — No



Trafalgar Road/Sideroad 17 - (peak hour signal warrant) - FT 2024

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	120%	120%	100% Yes
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	120	158%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	80%	80%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	50	194%		

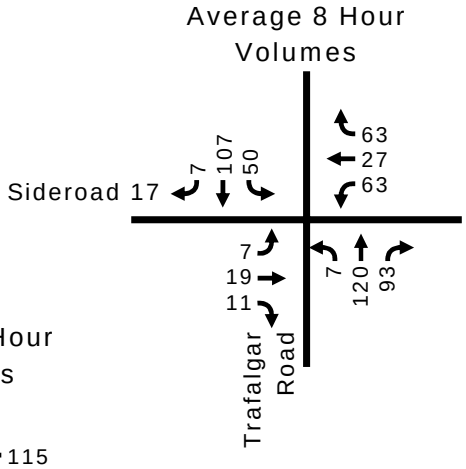
Notes

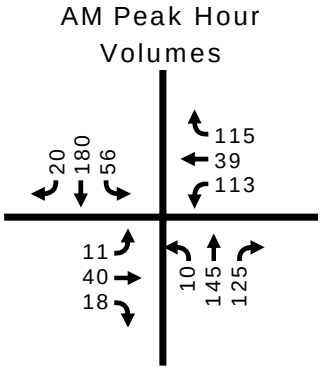
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

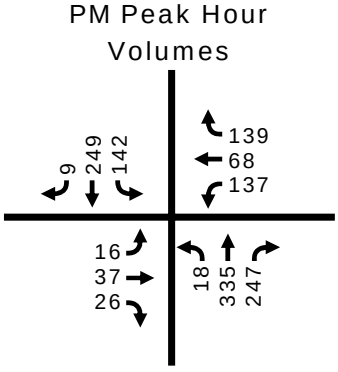
2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — No







Trafalgar Road/Sideroad 17 - (peak hour signal warrant) - FT 2034

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	144%	144%	100% Yes
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	120	192%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	96%	96%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	50	206%		

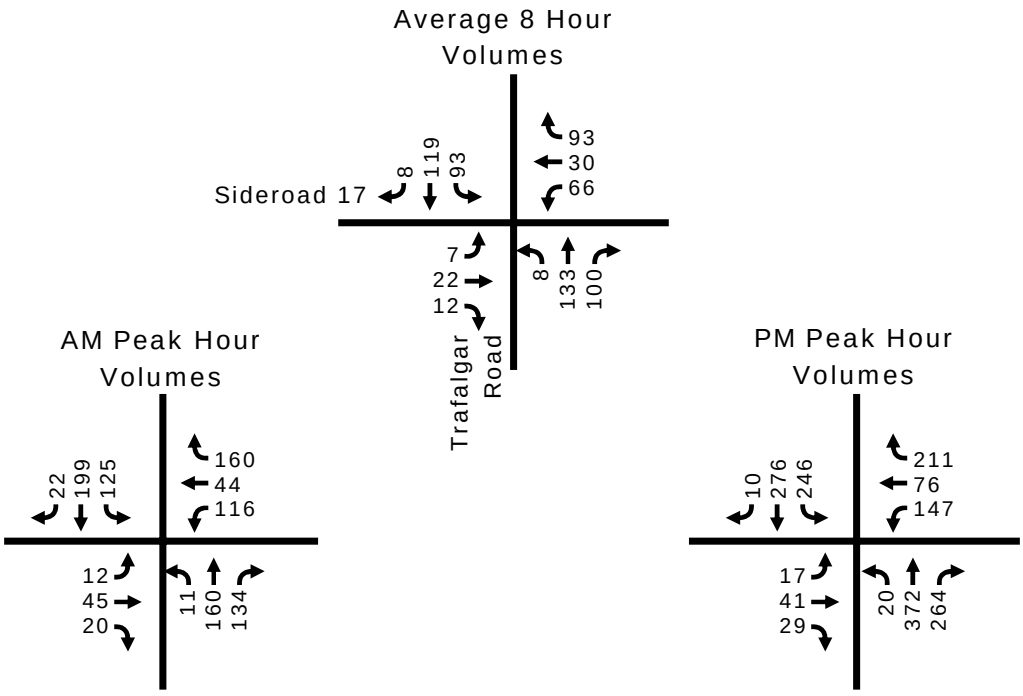
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — No



Sideroad 17 / Street C - (peak hour signal warrant) - FT 2034

Signal Warrant			Description	Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	60%	60%	60% No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	152%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	7%	7%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	272%		

Notes

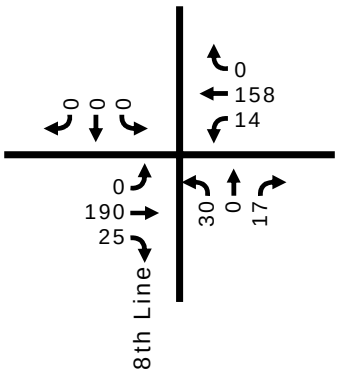
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

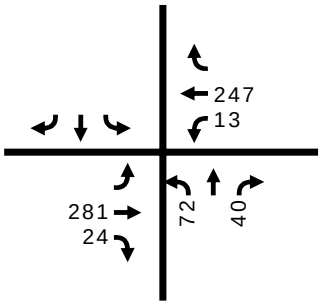
3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — Yes

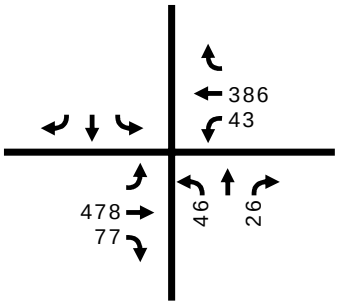
Average 8 Hour Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



8th Line / Sideroad 17 - (peak hour signal warrant) - FT 2034

Signal Warrant			Description	Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	62%	32%	51% No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	32%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	51%	51%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	60%		

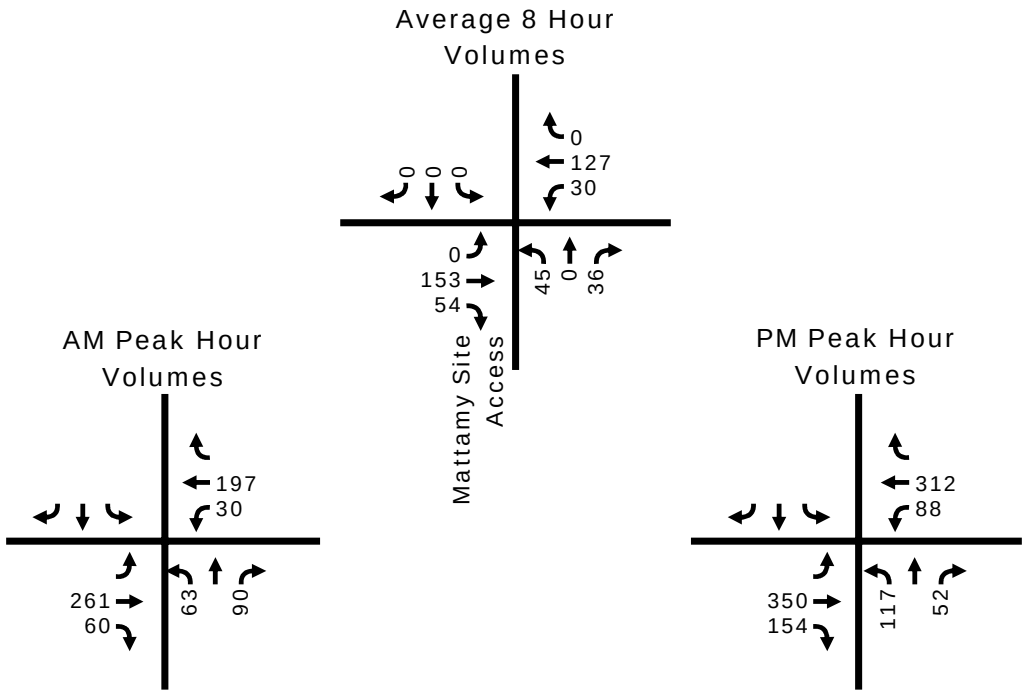
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — Yes



8th Line / Street E - (peak hour signal warrant) - FT 2034

Signal Warrant			Description	Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	37%	37%	37% No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	75%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	11%	11%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	164%		

Notes

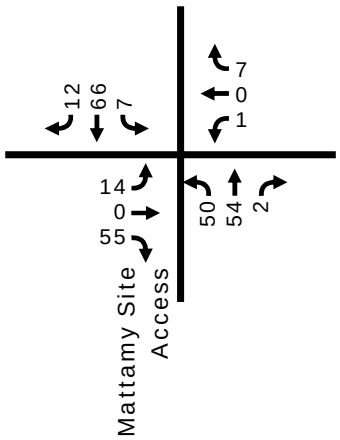
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

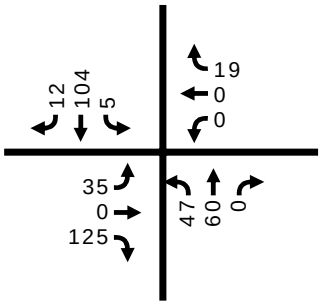
3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — Yes

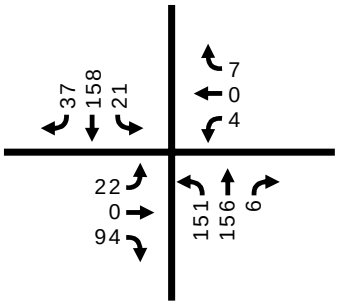
Average 8 Hour Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



8th Line / Dundas - (peak hour signal warrant) - FT 2034

Signal Warrant			Description	Minimum Requirement for Two-Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	720	29%	2%	5 % No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	2%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	720	28%	5%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	5%		

Notes

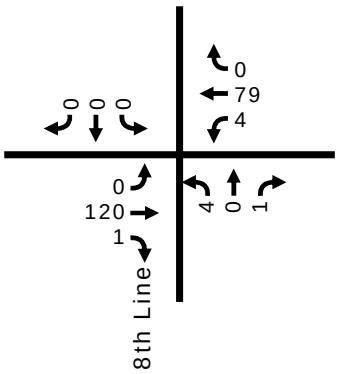
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

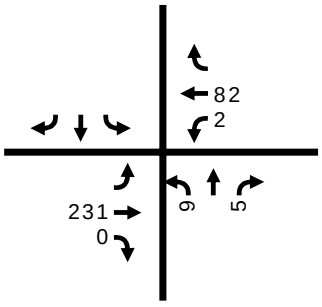
3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — Yes

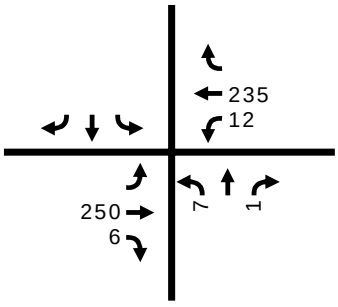
Average 8 Hour Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



8th Line / WR 124 - (peak hour signal warrant) - FT 2034

Signal Warrant		Description		Minimum Requirement for Two-Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	117%	11%	11% No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	120	11%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	114%	10%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	50	10%		

Notes

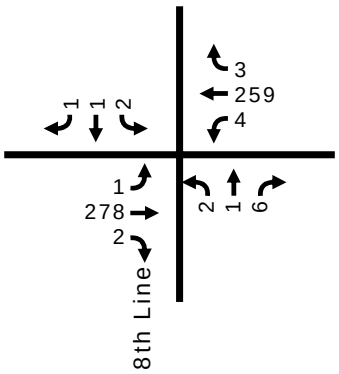
1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* — No

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

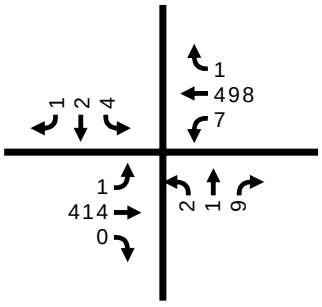
3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* — No

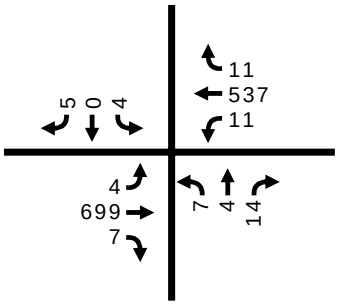
Average 8 Hour Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



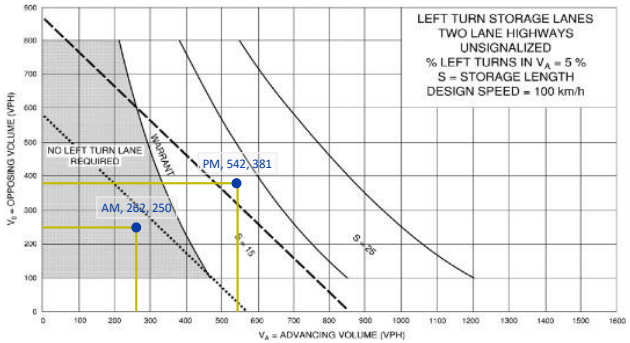
APPENDIX D

Left Turn Lane Warrants

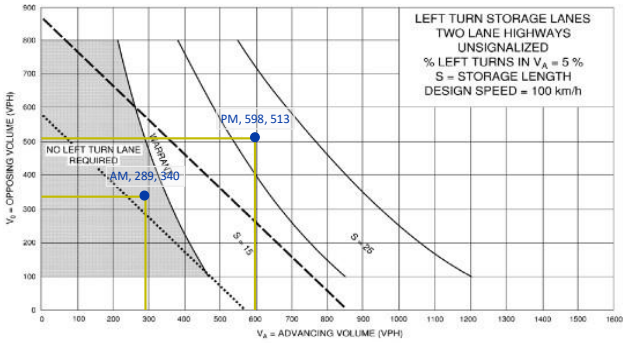
Intersection	Left-Turn Warrant	Advancing Traffic		Opposing Traffic		Left Turn Traffic		% of Left Turning		Warrant	LENGTH (m)
		AM	PM	AM	PM	AM	PM	AM	PM		
Trafalgar Road/Sideroad 17 (FB 2024)	NBL	262	542	250	381	10	18	4%	3%	Yes	15
Trafalgar Road/Sideroad 17 (FB 2034)	NBL	289	598	340	513	11	20	4%	3%	Yes	25
Trafalgar Road/Sideroad 17 (FT 2024)	NBL	280	600	256	400	10	18	4%	3%	Yes	25
Trafalgar Road/Sideroad 17 (FT 2034)	NBL	307	656	346	532	11	20	4%	3%	Yes	25
Trafalgar Road/Sideroad 17 (FB 2024)	SBL	250	381	262	542	50	123	20%	32%	Yes	30
Trafalgar Road/Sideroad 17 (FB 2034)	SBL	340	513	289	598	119	227	35%	44%	Yes	50
Trafalgar Road/Sideroad 17 (FT 2024)	SBL	256	400	280	600	56	142	22%	35%	Yes	40
Trafalgar Road/Sideroad 17 (FT 2034)	SBL	346	532	307	656	125	246	36%	46%	Yes	55

NBL

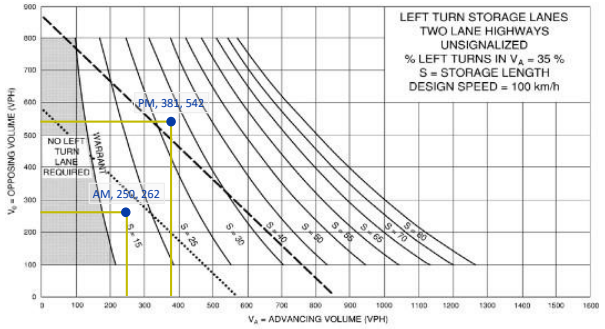
2024 FB

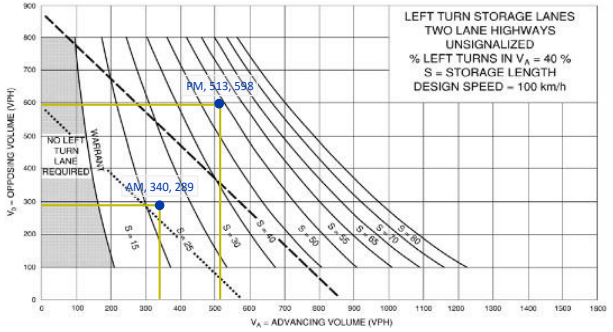


2034 FB

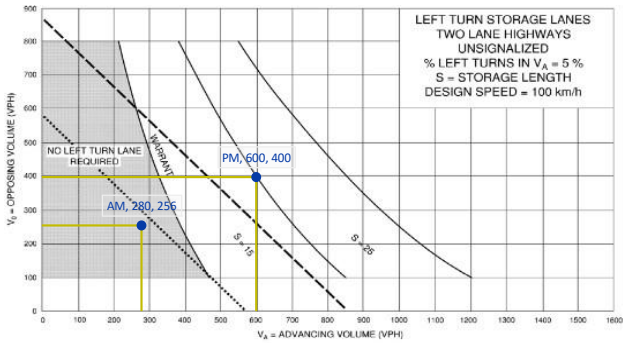


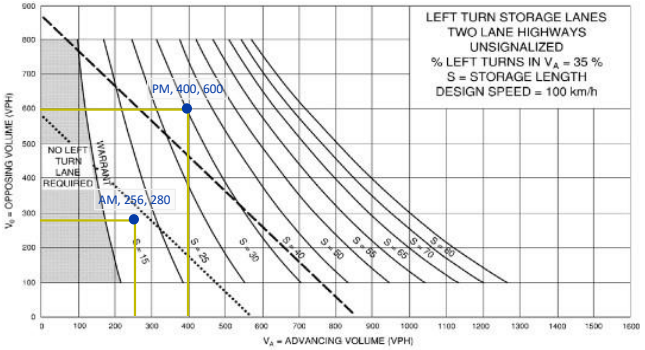
SBL



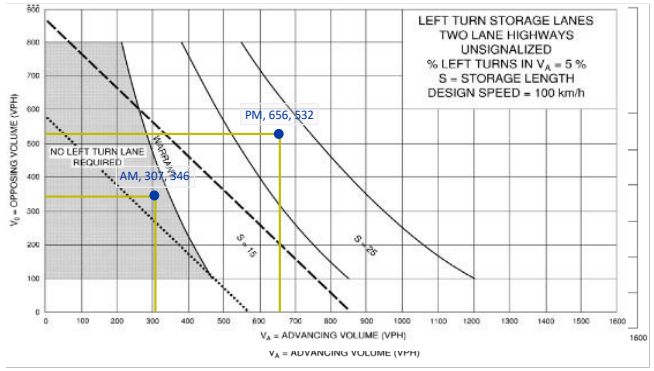


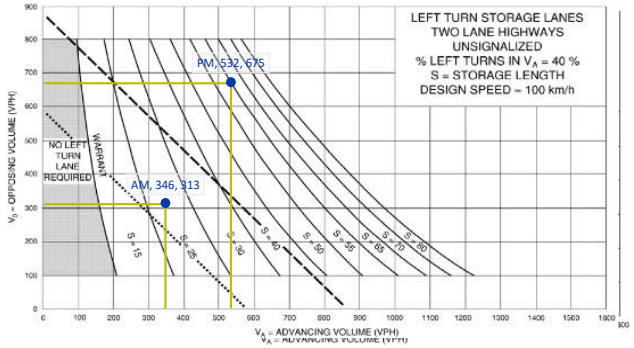
2024 FT





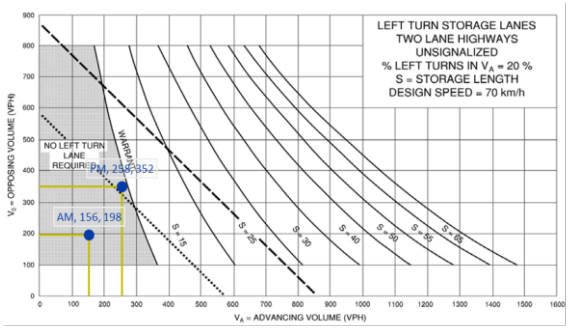
2034 FT



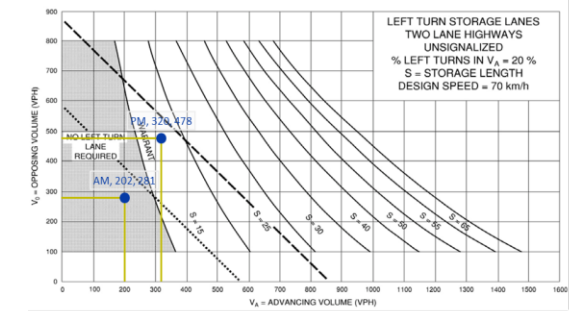


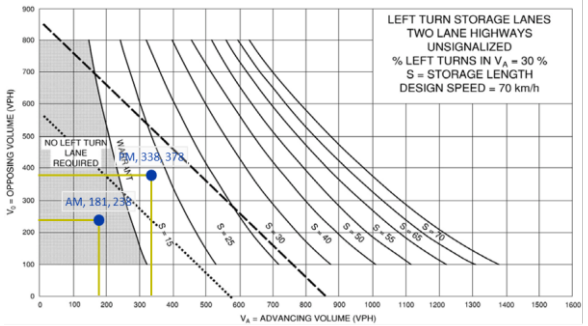
Intersection	Left-Turn Warrant	Advancing Traffic		Opposing Traffic		Left Turn Traffic		% of Left Turning		Warrant	LENGTH (m)
		AM	PM	AM	PM	AM	PM	AM	PM		
Sideroad 17 & 8th Line (FB 2024)	WBL	156	258	198	352	17	50	11%	19%	No	-
Sideroad 17 & 8th Line (FB 2034)	WBL	202	320	281	478	18	51	9%	16%	Yes	15
Sideroad 17 & 8th Line (FT 2024)	WBL	181	338	238	378	29	87	16%	26%	Yes	15
Sideroad 17 & 8th Line (FT 2034)	WBL	227	400	321	504	30	88	13%	22%	Yes	25

2024 FB

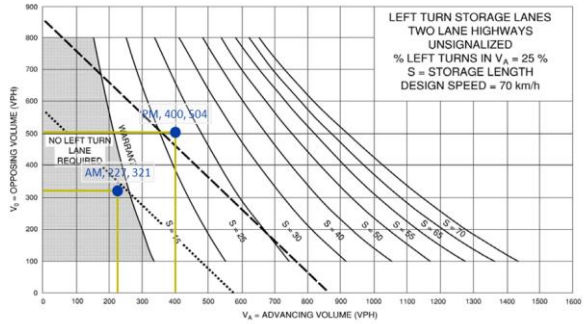


2034 FB





2034 FT

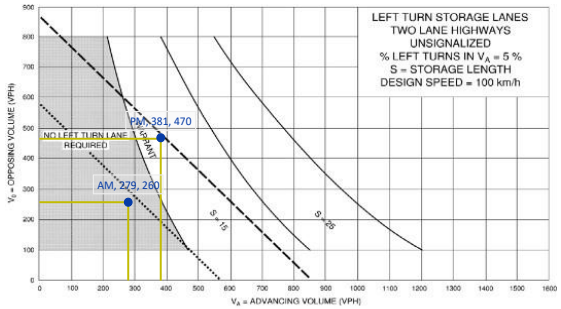


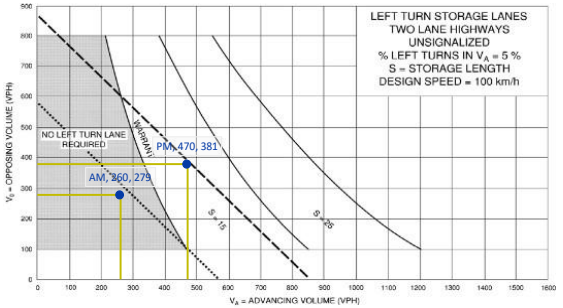
Intersection	Left-Turn Warrant	Advancing Traffic		Opposing Traffic		Left Turn Traffic		% of Left Turning		Warrant	LENGTH (m)
		AM	PM	AM	PM	AM	PM	AM	PM		
WR 124 & 8th Line (Existing)	WBL	279	381	260	470	7	10	2%	3%	Yes	15
WR 124 & 8th Line (2034 FB)	WBL	478	538	404	676	7	11	2%	2%	Yes	25
WR 124 & 8th Line (2034 FT)	WBL	510	559	415	710	7	11	1%	2%	Yes	25
WR 124 & 8th Line (Existing)	EBL	260	470	279	381	1	3	0%	1%	Yes	15
WR 124 & 8th Line (2034 FB)	EBL	404	676	478	538	1	4	0%	1%	Yes	25
WR 124 & 8th Line (2034 FT)	EBL	415	710	510	559	1	4	0%	1%	Yes	25

WBL

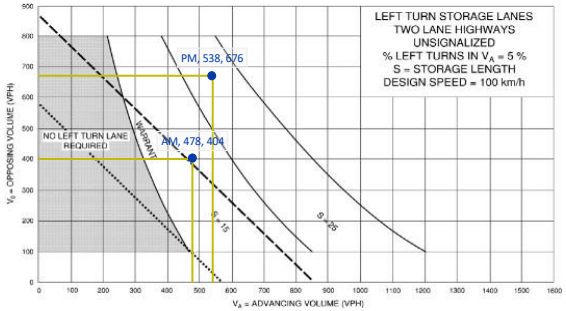
EBL

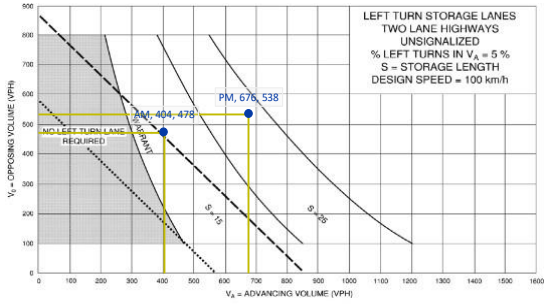
Existing



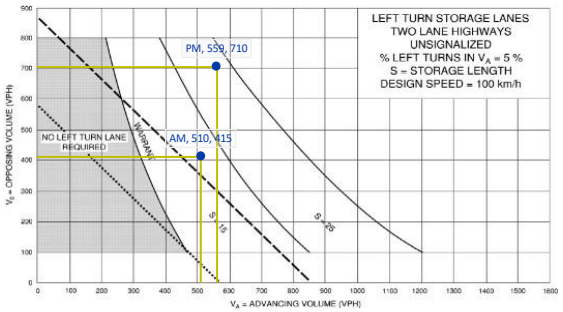


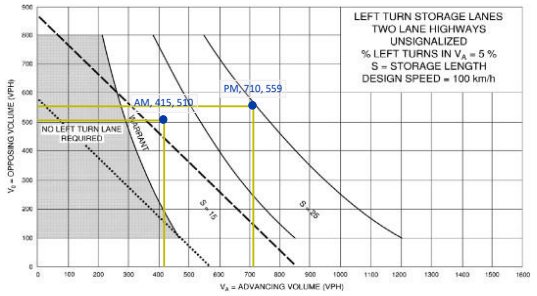
2034 FB





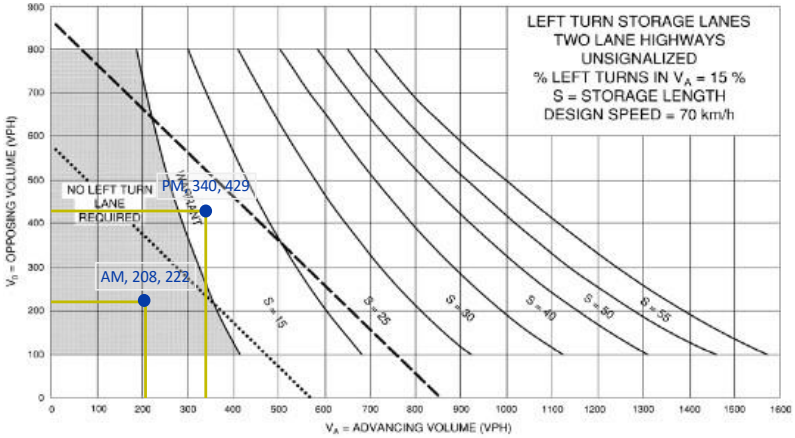
2034 FT



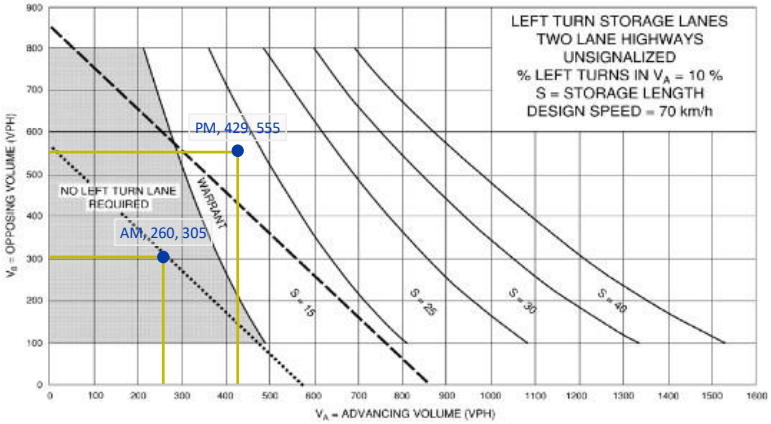


Intersection	Left-Turn Warrant	Advancing Traffic Volume (VA)		Opposing Traffic Volume (VO)		Left Turn Traffic Volume (VL)		% of Left Turning Traffic		Warrant	Length (M)
		AM	PM	AM	PM	AM	PM	AM	PM		
Sideroad 17 Site Access (FT 2024)	WBL	208	340	222	429	13	43	6%	13%	Yes	15
Sideroad 17 Site Access (FT 2034)	WBL	260	429	305	555	13	43	5%	10%	Yes	15

2024



2034

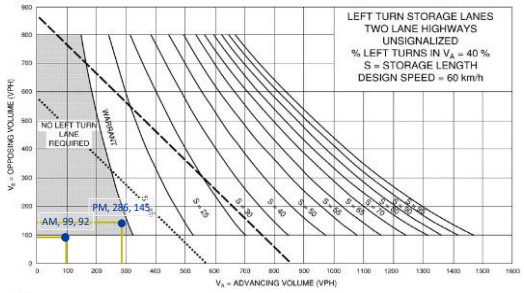


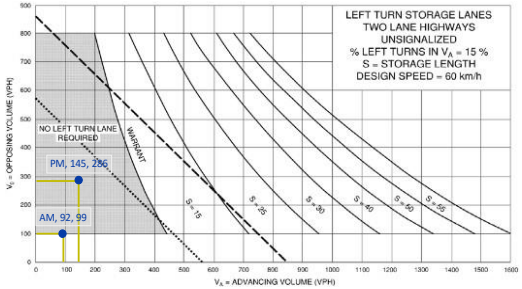
Intersection	Left-Turn Warrant	Advancing Traffic Volume (VA)		Opposing Traffic Volume (VO)		Left Turn Traffic Volume (VL)		% of Left Turning Traffic		Warrant
		AM	PM	AM	PM	AM	PM	AM	PM	
8th Line & Site Access/ Erin Heights Drive (2024 FT)	NBL	99	286	92	145	47	151	47%	53%	No
8th Line & Site Access/ Erin Heights Drive (2029 FT)	NBL	105	312	120	214	47	151	45%	48%	15
8th Line & Site Access/ Erin Heights Drive (2034 FT)	NBL	107	313	121	216	47	151	44%	48%	15
8th Line & Site Access/ Erin Heights Drive (2024 FT)	SBL	92	145	99	286	4	19	5%	13%	No
8th Line & Site Access/ Erin Heights Drive (2029 FT)	SBL	120	214	105	312	5	20	4%	9%	No
8th Line & Site Access/ Erin Heights Drive (2034 FT)	SBL	121	216	107	313	5	21	4%	10%	No

NBL

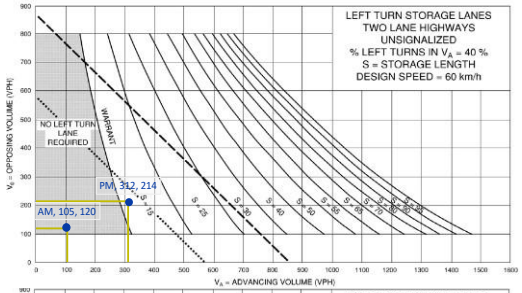
SBL

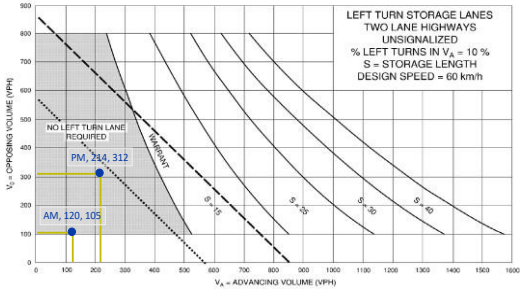
2024 FT



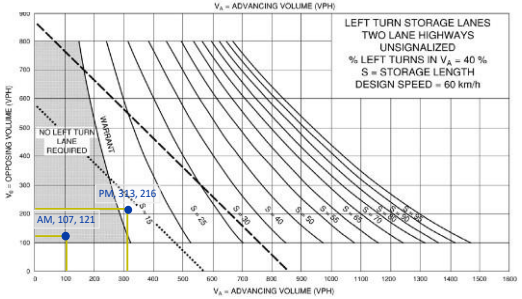


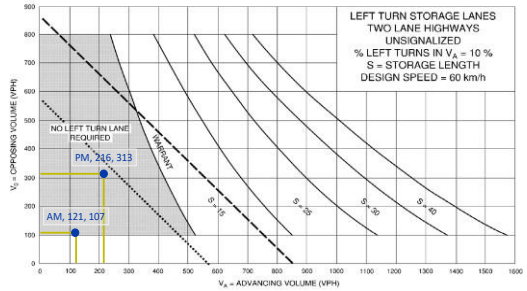
2029 FT





2034 FT





APPENDIX E

Synchro Analysis Software Outputs

APPENDIX E-1

Future (2034) Background Results

AM

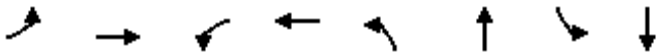
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	221	184	63
Future Volume (vph)	221	184	63
Lane Group Flow (vph)	305	220	128
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 38.2%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	221	60	18	184	63	55
Future Volume (Veh/h)	221	60	18	184	63	55
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)	240	65	20	200	68	60
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			305		512	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			305		512	272
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		87	92
cM capacity (veh/h)			1267		517	771

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	305	220	128
Volume Left	0	20	68
Volume Right	65	0	60
cSH	1700	1267	611
Volume to Capacity	0.18	0.02	0.21
Queue Length 95th (m)	0.0	0.4	6.0
Control Delay (s)	0.0	0.8	12.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	12.4
Approach LOS			B

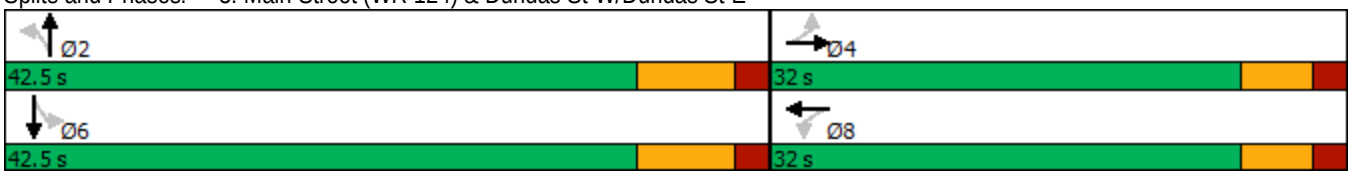
Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		38.2%	ICU Level of Service A
Analysis Period (min)		15	

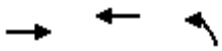


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	44	11	17	21	31	348	40	372
Future Volume (vph)	44	11	17	21	31	348	40	372
Lane Group Flow (vph)	0	163	0	71	35	538	45	429
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	24.0	24.0	24.0	24.0
Minimum Split (s)	27.0	27.0	27.0	27.0	31.5	31.5	31.5	31.5
Total Split (s)	32.0	32.0	32.0	32.0	42.5	42.5	42.5	42.5
Total Split (%)	43.0%	43.0%	43.0%	43.0%	57.0%	57.0%	57.0%	57.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5
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
Total Lost Time (s)		6.0		6.0	7.5	7.5	7.5	7.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)		9.0		9.0	30.2	30.2	30.2	30.2
Actuated g/C Ratio		0.19		0.19	0.62	0.62	0.62	0.62
v/c Ratio		0.44		0.22	0.06	0.49	0.09	0.41
Control Delay		12.4		13.9	6.2	8.8	6.5	8.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		12.4		13.9	6.2	8.8	6.5	8.2
LOS		B		B	A	A	A	A
Approach Delay		12.4		13.9		8.6		8.1
Approach LOS		B		B		A		A
Queue Length 50th (m)		4.2		2.9	1.2	23.4	1.6	18.7
Queue Length 95th (m)		18.2		12.0	4.7	51.9	5.7	40.9
Internal Link Dist (m)		1308.1		285.1		328.5		907.9
Turn Bay Length (m)					35.0		40.0	
Base Capacity (vph)		878		884	767	1351	659	1318
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.19		0.08	0.05	0.40	0.07	0.33

Intersection Summary			
Cycle Length: 74.5			
Actuated Cycle Length: 48.4			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 56.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street (WR 124) & Dundas St W/Dundas St E





Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	106	50	9
Future Volume (vph)	106	50	9
Lane Group Flow (vph)	133	66	17
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 15.6%		ICU Level of Service A
Analysis Period (min) 15		

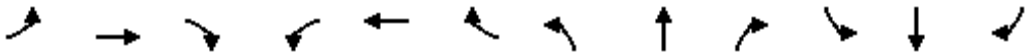
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	106	0	2	50	9	5
Future Volume (Veh/h)	106	0	2	50	9	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	132	0	2	62	11	6
Pedestrians						
Lane Width (m)						
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			132		198	132
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			132		198	132
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	99
cM capacity (veh/h)			1466		794	923

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	132	64	17
Volume Left	0	2	11
Volume Right	0	0	6
cSH	1700	1466	835
Volume to Capacity	0.08	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.2	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.4
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	15.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	403	469	1	1	2
Future Volume (vph)	403	469	1	1	2
Lane Group Flow (vph)	430	506	1	13	7
Sign Control	Free	Free		Stop	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 40.3%		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)	1	403	0	7	469	1	2	1	9	4	2	1
Future Volume (Veh/h)	1	403	0	7	469	1	2	1	9	4	2	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	429	0	7	499	1	2	1	10	4	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)												
pX, platoon unblocked												
vC, conflicting volume	500			429			946	945	429	954	944	499
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			429			946	945	429	954	944	499
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			99	100	98	98	99	100
cM capacity (veh/h)	1075			1141			240	262	630	235	262	576

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	430	0	506	1	13	7
Volume Left	1	0	7	0	2	4
Volume Right	0	0	0	1	10	1
cSH	1075	1700	1141	1700	464	265
Volume to Capacity	0.00	0.00	0.01	0.00	0.03	0.03
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.7	0.6
Control Delay (s)	0.0	0.0	0.2	0.0	13.0	19.0
Lane LOS	A		A		B	C
Approach Delay (s)	0.0		0.2		13.0	19.0
Approach LOS					B	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	0	60	104
Future Volume (vph)	0	60	104
Lane Group Flow (vph)	21	65	118
Sign Control	Stop	Free	Free

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 19.5%		ICU Level of Service A
Analysis Period (min) 15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	60	0	5	104
Future Volume (Veh/h)	0	19	60	0	5	104
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	65	0	5	113
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	188	65			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188	65			65	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	803	1005			1550	

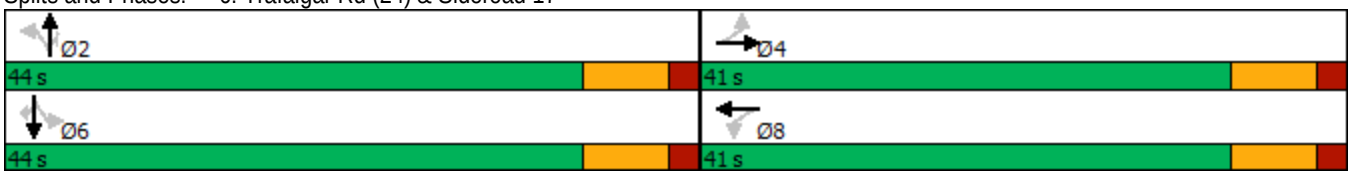
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	65	118
Volume Left	0	0	5
Volume Right	21	0	0
cSH	1005	1700	1550
Volume to Capacity	0.02	0.04	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	8.7	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		

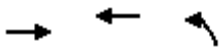
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	12	45	61	44	11	160	117	119	199	22
Future Volume (vph)	12	45	61	44	11	160	117	119	199	22
Lane Group Flow (vph)	13	68	64	195	11	167	122	124	207	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Total Split (s)	41.0	41.0	41.0	41.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	48.2%	48.2%	48.2%	48.2%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%
Yellow Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
All-Red Time (s)	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.03	0.10	0.13	0.30	0.03	0.25	0.18	0.30	0.31	0.03
Control Delay	12.6	10.0	13.6	5.7	12.5	14.7	3.8	16.1	15.3	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	10.0	13.6	5.7	12.5	14.7	3.8	16.1	15.3	1.0
LOS	B	A	B	A	B	B	A	B	B	A
Approach Delay		10.4		7.6		10.2			14.7	
Approach LOS		B		A		B			B	
Queue Length 50th (m)	0.9	3.4	4.7	3.3	0.8	12.9	0.0	9.8	16.4	0.0
Queue Length 95th (m)	3.8	10.0	11.5	14.5	3.4	24.8	8.4	21.0	30.2	1.2
Internal Link Dist (m)		194.8		1266.2		613.3			593.1	
Turn Bay Length (m)	25.0		25.0		25.0		45.0	55.0		35.0
Base Capacity (vph)	648	984	707	859	629	1002	944	635	1011	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.09	0.23	0.02	0.17	0.13	0.20	0.20	0.02

Intersection Summary			
Cycle Length: 85			
Actuated Cycle Length: 63			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Trafalgar Rd (24) & Sideroad 17



PM



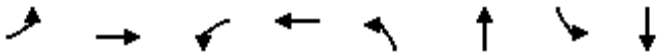
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	324	268	116
Future Volume (vph)	324	268	116
Lane Group Flow (vph)	508	339	154
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 61.5%		ICU Level of Service B
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	324	153	51	268	116	29
Future Volume (Veh/h)	324	153	51	268	116	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	345	163	54	285	123	31
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			508		820	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			508		820	426
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		63	95
cM capacity (veh/h)			1067		330	632

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	508	339	154
Volume Left	0	54	123
Volume Right	163	0	31
cSH	1700	1067	365
Volume to Capacity	0.30	0.05	0.42
Queue Length 95th (m)	0.0	1.2	15.4
Control Delay (s)	0.0	1.8	21.9
Lane LOS		A	C
Approach Delay (s)	0.0	1.8	21.9
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

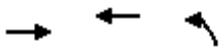


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	70	51	54	73	97	510	37	636
Future Volume (vph)	70	51	54	73	97	510	37	636
Lane Group Flow (vph)	0	189	0	164	101	741	39	693
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	24.0	24.0	24.0	24.0
Minimum Split (s)	27.0	27.0	27.0	27.0	31.5	31.5	31.5	31.5
Total Split (s)	32.0	32.0	32.0	32.0	42.5	42.5	42.5	42.5
Total Split (%)	43.0%	43.0%	43.0%	43.0%	57.0%	57.0%	57.0%	57.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5
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
Total Lost Time (s)		6.0		6.0	7.5	7.5	7.5	7.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)		11.7		11.7	31.3	31.3	31.3	31.3
Actuated g/C Ratio		0.21		0.21	0.55	0.55	0.55	0.55
v/c Ratio		0.55		0.49	0.32	0.76	0.14	0.70
Control Delay		23.3		23.9	11.2	16.5	8.6	14.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		23.3		23.9	11.2	16.5	8.6	14.3
LOS		C		C	B	B	A	B
Approach Delay		23.3		23.9		15.9		14.0
Approach LOS		C		C		B		B
Queue Length 50th (m)		15.0		14.3	4.9	48.1	1.7	44.4
Queue Length 95th (m)		31.5		29.5	16.2	#114.7	6.9	95.8
Internal Link Dist (m)		1308.1		285.1		328.5		907.9
Turn Bay Length (m)					35.0		40.0	
Base Capacity (vph)		737		735	356	1107	313	1137
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.26		0.22	0.28	0.67	0.12	0.61

Intersection Summary	
Cycle Length: 74.5	
Actuated Cycle Length: 56.7	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 90.7%	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: Main Street (WR 124) & Dundas St W/Dundas St E



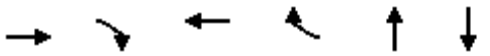
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	156	153	7
Future Volume (vph)	156	153	7
Lane Group Flow (vph)	191	194	9
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 27.9%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	156	6	12	153	7	1
Future Volume (Veh/h)	156	6	12	153	7	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	184	7	14	180	8	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			191		396	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			191		396	188
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	100
cM capacity (veh/h)			1395		607	860

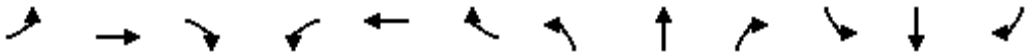
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	191	194	9
Volume Left	0	14	8
Volume Right	7	0	1
cSH	1700	1395	628
Volume to Capacity	0.11	0.01	0.01
Queue Length 95th (m)	0.0	0.2	0.3
Control Delay (s)	0.0	0.6	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.6	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	664	7	516	11	3	0
Future Volume (vph)	664	7	516	11	3	0
Lane Group Flow (vph)	766	8	606	13	26	8
Sign Control	Free		Free		Stop	Stop

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 51.8%		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)	3	664	7	11	516	11	7	3	13	3	0	4
Future Volume (Veh/h)	3	664	7	11	516	11	7	3	13	3	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	763	8	13	593	13	8	3	15	3	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	606			771			1393	1401	763	1404	1396	593
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	606			771			1393	1401	763	1404	1396	593
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			98			93	98	96	97	100	99
cM capacity (veh/h)	982			853			118	139	408	110	140	509

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	766	8	606	13	26	8
Volume Left	3	0	13	0	8	3
Volume Right	0	8	0	13	15	5
cSH	982	1700	853	1700	206	216
Volume to Capacity	0.00	0.00	0.02	0.01	0.13	0.04
Queue Length 95th (m)	0.1	0.0	0.4	0.0	3.2	0.9
Control Delay (s)	0.1	0.0	0.4	0.0	25.0	22.3
Lane LOS	A		A		D	C
Approach Delay (s)	0.1		0.4		25.0	22.3
Approach LOS					D	C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	51.8%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	WBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	3	156	157
Future Volume (vph)	3	156	157
Lane Group Flow (vph)	14	225	247
Sign Control	Stop	Free	Free

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 31.3%		ICU Level of Service A
Analysis Period (min) 15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	7	156	6	21	157
Future Volume (Veh/h)	3	7	156	6	21	157
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	4	10	217	8	29	218
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	497	221			225	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497	221			225	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	525	824			1356	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	14	225	247
Volume Left	4	0	29
Volume Right	10	8	0
cSH	708	1700	1356
Volume to Capacity	0.02	0.13	0.02
Queue Length 95th (m)	0.5	0.0	0.5
Control Delay (s)	10.2	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	17	41	112	76	20	372	206	227	276	10
Future Volume (vph)	17	41	112	76	20	372	206	227	276	10
Lane Group Flow (vph)	18	74	118	291	21	392	217	239	291	11
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Total Split (s)	33.0	33.0	33.0	33.0	52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	38.8%	38.8%	38.8%	38.8%	61.2%	61.2%	61.2%	61.2%	61.2%	61.2%
Yellow Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
All-Red Time (s)	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	24.1	24.1	24.1	24.1	26.9	26.9	26.9	26.9	26.9	26.9
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.05	0.11	0.24	0.43	0.05	0.53	0.29	0.70	0.40	0.02
Control Delay	16.2	10.9	17.7	10.2	11.6	17.6	3.0	28.4	15.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	10.9	17.7	10.2	11.6	17.6	3.0	28.4	15.5	0.0
LOS	B	B	B	B	B	B	A	C	B	A
Approach Delay		11.9		12.4		12.4			20.9	
Approach LOS		B		B		B			C	
Queue Length 50th (m)	1.3	3.1	9.0	10.0	1.5	34.9	0.0	23.3	24.2	0.0
Queue Length 95th (m)	6.0	12.8	24.9	34.0	4.9	55.8	9.9	46.9	40.3	0.0
Internal Link Dist (m)		194.8		1266.2		613.3			593.1	
Turn Bay Length (m)	25.0		25.0		25.0		45.0	55.0		35.0
Base Capacity (vph)	395	717	519	701	755	1225	1093	569	1214	1123
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.10	0.23	0.42	0.03	0.32	0.20	0.42	0.24	0.01

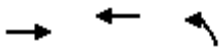
Intersection Summary			
Cycle Length: 85			
Actuated Cycle Length: 66.1			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Trafalgar Rd (24) & Sideroad 17

APPENDIX E-2

Future (2034) Total Results

AM Peak Hour



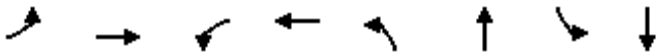
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	260	197	62
Future Volume (vph)	260	197	62
Lane Group Flow (vph)	348	246	165
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization	48.3%	ICU Level of Service A
Analysis Period (min)	15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	260	60	29	197	62	90
Future Volume (Veh/h)	260	60	29	197	62	90
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)	283	65	32	214	67	98
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			348		594	316
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			348		594	316
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		85	87
cM capacity (veh/h)			1222		459	730

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	348	246	165
Volume Left	0	32	67
Volume Right	65	0	98
cSH	1700	1222	589
Volume to Capacity	0.20	0.03	0.28
Queue Length 95th (m)	0.0	0.6	8.7
Control Delay (s)	0.0	1.3	13.5
Lane LOS		A	B
Approach Delay (s)	0.0	1.3	13.5
Approach LOS			B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

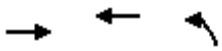


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	44	11	169	21	77	348	39	371
Future Volume (vph)	44	11	169	21	77	348	39	371
Lane Group Flow (vph)	0	324	0	241	87	538	44	427
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	24.0	24.0	24.0	24.0
Minimum Split (s)	27.0	27.0	27.0	27.0	31.5	31.5	31.5	31.5
Total Split (s)	32.0	32.0	32.0	32.0	42.5	42.5	42.5	42.5
Total Split (%)	43.0%	43.0%	43.0%	43.0%	57.0%	57.0%	57.0%	57.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5
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
Total Lost Time (s)		6.0		6.0	7.5	7.5	7.5	7.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)		19.3		19.3	28.5	28.5	28.5	28.5
Actuated g/C Ratio		0.31		0.31	0.46	0.46	0.46	0.46
v/c Ratio		0.48		0.78	0.21	0.66	0.14	0.55
Control Delay		7.0		37.7	13.0	17.7	12.5	16.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		7.0		37.7	13.0	17.7	12.5	16.1
LOS		A		D	B	B	B	B
Approach Delay		7.0		37.7		17.1		15.8
Approach LOS		A		D		B		B
Queue Length 50th (m)		4.5		21.7	5.7	42.8	2.8	33.7
Queue Length 95th (m)		22.2		#59.0	15.2	81.6	9.0	63.8
Internal Link Dist (m)		1308.1		285.1		328.5		907.9
Turn Bay Length (m)					35.0		40.0	
Base Capacity (vph)		830		426	521	1022	401	989
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.39		0.57	0.17	0.53	0.11	0.43

Intersection Summary	
Cycle Length: 74.5	
Actuated Cycle Length: 61.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 98.2%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Main Street (WR 124) & Dundas St W/Dundas St E



Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	248	81	8
Future Volume (vph)	248	81	8
Lane Group Flow (vph)	310	104	15
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 23.1%		ICU Level of Service A
Analysis Period (min) 15		

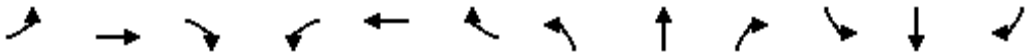
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	248	0	2	81	8	4
Future Volume (Veh/h)	248	0	2	81	8	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	310	0	2	101	10	5
Pedestrians						
Lane Width (m)						
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			310		415	310
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			310		415	310
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	99
cM capacity (veh/h)			1262		597	735

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	310	103	15
Volume Left	0	2	10
Volume Right	0	0	5
cSH	1700	1262	637
Volume to Capacity	0.18	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.2	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	414	501	1	1	2
Future Volume (vph)	414	501	1	1	2
Lane Group Flow (vph)	441	540	1	12	6
Sign Control	Free	Free		Stop	Stop

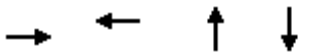
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	414	0	7	501	1	2	1	8	3	2	1
Future Volume (Veh/h)	1	414	0	7	501	1	2	1	8	3	2	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	440	0	7	533	1	2	1	9	3	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)												
pX, platoon unblocked												
vC, conflicting volume	534			440			991	990	440	998	989	533
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534			440			991	990	440	998	989	533
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			99	100	99	99	99	100
cM capacity (veh/h)	1044			1131			224	247	621	219	247	551

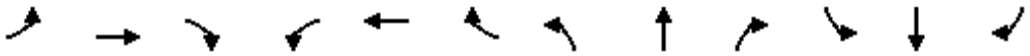
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	441	0	540	1	12	6
Volume Left	1	0	7	0	2	3
Volume Right	0	0	0	1	9	1
cSH	1044	1700	1131	1700	437	254
Volume to Capacity	0.00	0.00	0.01	0.00	0.03	0.02
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.6	0.5
Control Delay (s)	0.0	0.0	0.2	0.0	13.5	19.5
Lane LOS	A		A		B	C
Approach Delay (s)	0.0		0.2		13.5	19.5
Approach LOS					B	C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	0	0	59	104
Future Volume (vph)	0	0	59	104
Lane Group Flow (vph)	193	20	115	130
Sign Control	Stop	Stop	Free	Free

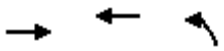
Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 36.5%		ICU Level of Service A
Analysis Period (min) 15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	0	143	0	0	18	47	59	0	4	104	12
Future Volume (Veh/h)	35	0	143	0	0	18	47	59	0	4	104	12
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)	38	0	155	0	0	20	51	64	0	4	113	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	314	294	120	448	300	64	126			64		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314	294	120	448	300	64	126			64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	83	100	100	98	97			100		
cM capacity (veh/h)	612	598	938	425	593	1006	1473			1551		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	193	20	115	130
Volume Left	38	0	51	4
Volume Right	155	20	0	13
cSH	849	1006	1473	1551
Volume to Capacity	0.23	0.02	0.03	0.00
Queue Length 95th (m)	6.6	0.5	0.8	0.1
Control Delay (s)	10.5	8.7	3.5	0.2
Lane LOS	B	A	A	A
Approach Delay (s)	10.5	8.7	3.5	0.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	36.5%	ICU Level of Service	A	
Analysis Period (min)	15			



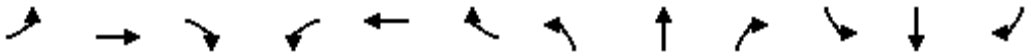
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	280	247	72
Future Volume (vph)	280	247	72
Lane Group Flow (vph)	330	282	121
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 36.7%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	280	24	13	247	72	40
Future Volume (Veh/h)	280	24	13	247	72	40
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)	304	26	14	268	78	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			330		613	317
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			330		613	317
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	94
cM capacity (veh/h)			1241		454	728

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	330	282	121
Volume Left	0	14	78
Volume Right	26	0	43
cSH	1700	1241	524
Volume to Capacity	0.19	0.01	0.23
Queue Length 95th (m)	0.0	0.3	6.7
Control Delay (s)	0.0	0.5	13.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	13.9
Approach LOS			B

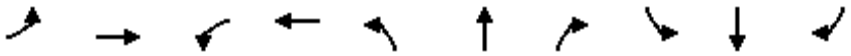
Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	413	0	7	497	1	2	1	9	4	2	1
Future Volume (Veh/h)	1	413	0	7	497	1	2	1	9	4	2	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	439	0	7	529	1	2	1	10	4	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)												
pX, platoon unblocked												
vC, conflicting volume	530			439			986	985	439	994	984	529
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530			439			986	985	439	994	984	529
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			99	100	98	98	99	100
cM capacity (veh/h)	1048			1132			226	248	622	220	249	554

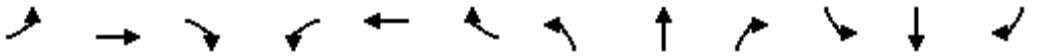
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	440	0	536	1	13	7
Volume Left	1	0	7	0	2	4
Volume Right	0	0	0	1	10	1
cSH	1048	1700	1132	1700	449	250
Volume to Capacity	0.00	0.00	0.01	0.00	0.03	0.03
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.7	0.7
Control Delay (s)	0.0	0.0	0.2	0.0	13.3	19.8
Lane LOS	A		A		B	C
Approach Delay (s)	0.0		0.2		13.3	19.8
Approach LOS					B	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	41.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	68	121	213	11	167	141	130	207	23
v/c Ratio	0.03	0.10	0.24	0.32	0.03	0.25	0.21	0.31	0.31	0.03
Control Delay	12.6	10.0	14.9	5.6	12.5	14.7	3.7	16.3	15.3	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	10.0	14.9	5.6	12.5	14.7	3.7	16.3	15.3	1.0
Queue Length 50th (m)	0.9	3.4	9.3	3.3	0.8	12.9	0.0	10.3	16.4	0.0
Queue Length 95th (m)	3.8	10.0	19.6	15.0	3.4	24.8	9.0	22.0	30.2	1.2
Internal Link Dist (m)		194.8		1266.2		613.3			593.1	
Turn Bay Length (m)	25.0		25.0		25.0		45.0	55.0		35.0
Base Capacity (vph)	638	984	707	864	629	1002	952	635	1011	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.17	0.25	0.02	0.17	0.15	0.20	0.20	0.02

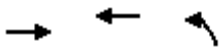
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	45	20	116	44	160	11	160	135	125	199	22
Future Volume (vph)	12	45	20	116	44	160	11	160	135	125	199	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5		7.5	7.5		7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1832		1772	1479		1644	1731	1541	1601	1746	1633
Flt Permitted	0.62	1.00		0.71	1.00		0.63	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1200	1832		1329	1479		1087	1731	1541	1098	1746	1633
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)	12	47	21	121	46	167	11	167	141	130	207	23
RTOR Reduction (vph)	0	13	0	0	103	0	0	0	87	0	0	14
Lane Group Flow (vph)	13	55	0	121	110	0	11	167	54	130	207	9
Heavy Vehicles (%)	0%	0%	0%	3%	6%	17%	11%	11%	6%	14%	10%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	7.5	7.5		7.5	7.5		7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	457	697		506	563		414	659	587	418	665	622
v/s Ratio Prot		0.03			0.07			0.10			c0.12	
v/s Ratio Perm	0.01			c0.09			0.01		0.03	0.12		0.01
v/c Ratio	0.03	0.08		0.24	0.19		0.03	0.25	0.09	0.31	0.31	0.01
Uniform Delay, d1	12.2	12.4		13.3	13.0		12.2	13.4	12.5	13.7	13.7	12.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0		0.2	0.2		0.0	0.2	0.1	0.4	0.3	0.0
Delay (s)	12.2	12.5		13.5	13.2		12.2	13.6	12.6	14.1	14.0	12.1
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		12.5			13.3			13.1			13.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

PM Peak Hour



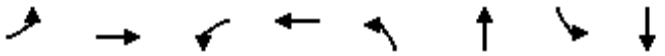
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	350	311	116
Future Volume (vph)	350	311	116
Lane Group Flow (vph)	535	425	177
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 68.5%		ICU Level of Service C
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	350	153	88	311	116	51
Future Volume (Veh/h)	350	153	88	311	116	51
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	372	163	94	331	123	54
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			535		972	454
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			535		972	454
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		52	91
cM capacity (veh/h)			1043		257	611

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	535	425	177
Volume Left	0	94	123
Volume Right	163	0	54
cSH	1700	1043	312
Volume to Capacity	0.31	0.09	0.57
Queue Length 95th (m)	0.0	2.3	25.0
Control Delay (s)	0.0	2.7	30.7
Lane LOS		A	D
Approach Delay (s)	0.0	2.7	30.7
Approach LOS			D

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

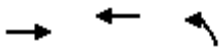


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	70	51	109	73	248	510	37	636
Future Volume (vph)	70	51	109	73	248	510	37	636
Lane Group Flow (vph)	0	286	0	222	258	741	39	693
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	24.0	24.0	24.0	24.0
Minimum Split (s)	27.0	27.0	27.0	27.0	31.5	31.5	31.5	31.5
Total Split (s)	22.0	22.0	22.0	22.0	53.0	53.0	53.0	53.0
Total Split (%)	29.3%	29.3%	29.3%	29.3%	70.7%	70.7%	70.7%	70.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5
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
Total Lost Time (s)		6.0		6.0	7.5	7.5	7.5	7.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)		15.7		15.7	36.8	36.8	36.8	36.8
Actuated g/C Ratio		0.24		0.24	0.56	0.56	0.56	0.56
v/c Ratio		0.69		0.78	0.85	0.75	0.15	0.69
Control Delay		29.2		46.8	39.9	15.7	8.1	14.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		29.2		46.8	39.9	15.7	8.1	14.3
LOS		C		D	D	B	A	B
Approach Delay		29.2		46.8		22.0		14.0
Approach LOS		C		D		C		B
Queue Length 50th (m)		25.4		26.8	24.2	58.9	2.1	55.3
Queue Length 95th (m)		#62.8		#66.5	#69.2	96.6	6.2	87.3
Internal Link Dist (m)		1308.1		285.1		328.5		907.9
Turn Bay Length (m)					35.0		40.0	
Base Capacity (vph)		430		299	385	1236	337	1271
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.67		0.74	0.67	0.60	0.12	0.55

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 66.3	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 98.8%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Main Street (WR 124) & Dundas St W/Dundas St E



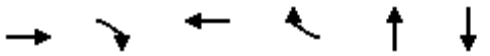
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	250	234	7
Future Volume (vph)	250	234	7
Lane Group Flow (vph)	301	289	9
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 32.1%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	250	6	12	234	7	1
Future Volume (Veh/h)	250	6	12	234	7	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	294	7	14	275	8	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			301		600	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			301		600	298
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1272		462	747

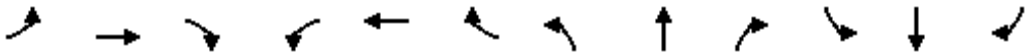
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	301	289	9
Volume Left	0	14	8
Volume Right	7	0	1
cSH	1700	1272	482
Volume to Capacity	0.18	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.4
Control Delay (s)	0.0	0.5	12.6
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	12.6
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	698	7	537	11	3	0
Future Volume (vph)	698	7	537	11	3	0
Lane Group Flow (vph)	805	8	630	13	26	8
Sign Control	Free		Free		Stop	Stop

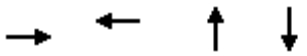
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 53.6%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	698	7	11	537	11	7	3	13	3	0	4
Future Volume (Veh/h)	3	698	7	11	537	11	7	3	13	3	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	802	8	13	617	13	8	3	15	3	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	630			810			1456	1464	802	1468	1459	617
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	630			810			1456	1464	802	1468	1459	617
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			98			92	98	96	97	100	99
cM capacity (veh/h)	962			825			106	127	387	99	128	494

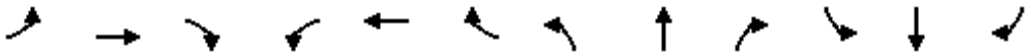
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	805	8	630	13	26	8
Volume Left	3	0	13	0	8	3
Volume Right	0	8	0	13	15	5
cSH	962	1700	825	1700	189	199
Volume to Capacity	0.00	0.00	0.02	0.01	0.14	0.04
Queue Length 95th (m)	0.1	0.0	0.4	0.0	3.6	1.0
Control Delay (s)	0.1	0.0	0.4	0.0	27.1	23.9
Lane LOS	A		A		D	C
Approach Delay (s)	0.1		0.4		27.1	23.9
Approach LOS					D	C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBT	WBT	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	0	0	156	157
Future Volume (vph)	0	0	156	157
Lane Group Flow (vph)	162	14	435	298
Sign Control	Stop	Stop	Free	Free

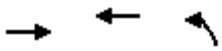
Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 46.8%		ICU Level of Service A
Analysis Period (min) 15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	0	94	3	0	7	151	156	6	21	157	37
Future Volume (Veh/h)	22	0	94	3	0	7	151	156	6	21	157	37
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Hourly flow rate (vph)	31	0	131	4	0	10	210	217	8	29	218	51
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	952	946	244	1074	968	221	269			225		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	952	946	244	1074	968	221	269			225		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	84	97	100	99	84			98		
cM capacity (veh/h)	205	216	800	144	210	824	1306			1356		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	162	14	435	298
Volume Left	31	4	210	29
Volume Right	131	10	8	51
cSH	515	351	1306	1356
Volume to Capacity	0.31	0.04	0.16	0.02
Queue Length 95th (m)	10.2	0.9	4.3	0.5
Control Delay (s)	15.2	15.7	4.8	0.9
Lane LOS	C	C	A	A
Approach Delay (s)	15.2	15.7	4.8	0.9
Approach LOS	C	C		

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			



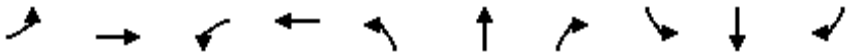
Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	478	385	46
Future Volume (vph)	478	385	46
Lane Group Flow (vph)	604	465	78
Sign Control	Free	Free	Stop

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization	66.6%	ICU Level of Service C
Analysis Period (min)	15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	478	77	43	385	46	26
Future Volume (Veh/h)	478	77	43	385	46	26
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)	520	84	47	418	50	28
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			604		1074	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			604		1074	562
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		79	95
cM capacity (veh/h)			984		234	530

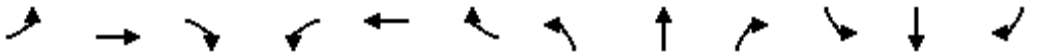
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	604	465	78
Volume Left	0	47	50
Volume Right	84	0	28
cSH	1700	984	293
Volume to Capacity	0.36	0.05	0.27
Queue Length 95th (m)	0.0	1.1	8.0
Control Delay (s)	0.0	1.4	21.7
Lane LOS		A	C
Approach Delay (s)	0.0	1.4	21.7
Approach LOS			C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	74	155	302	21	392	278	259	291	11
v/c Ratio	0.05	0.11	0.32	0.45	0.05	0.52	0.35	0.74	0.39	0.02
Control Delay	17.5	11.7	19.7	10.8	11.2	17.1	2.9	30.3	15.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	11.7	19.7	10.8	11.2	17.1	2.9	30.3	15.1	0.0
Queue Length 50th (m)	1.3	3.1	12.2	10.2	1.5	34.9	0.0	26.1	24.2	0.0
Queue Length 95th (m)	6.5	13.5	34.0	37.4	4.8	55.2	10.7	51.5	39.6	0.0
Internal Link Dist (m)		194.8		1266.2		613.3			593.1	
Turn Bay Length (m)	25.0		25.0		25.0		45.0	55.0		35.0
Base Capacity (vph)	375	706	511	696	743	1207	1100	562	1196	1107
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.10	0.30	0.43	0.03	0.32	0.25	0.46	0.24	0.01

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	41	29	147	76	211	20	372	264	246	276	10
Future Volume (vph)	17	41	29	147	76	211	20	372	264	246	276	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5		7.5	7.5		7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.89		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1706	1800		1798	1553		1825	1812	1512	1722	1795	1633
Flt Permitted	0.55	1.00		0.71	1.00		0.58	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	984	1800		1341	1553		1115	1812	1512	844	1795	1633
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	43	31	155	80	222	21	392	278	259	291	11
RTOR Reduction (vph)	0	20	0	0	108	0	0	0	162	0	0	6
Lane Group Flow (vph)	18	54	0	155	195	0	21	392	116	259	291	5
Confl. Peds. (#/hr)				3								
Heavy Vehicles (%)	7%	0%	0%	1%	2%	13%	0%	6%	8%	6%	7%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	24.2	24.2		24.2	24.2		28.0	28.0	28.0	28.0	28.0	28.0
Effective Green, g (s)	24.2	24.2		24.2	24.2		28.0	28.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	7.5	7.5		7.5	7.5		7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	354	648		482	559		464	755	630	351	747	680
v/s Ratio Prot		0.03			c0.13			0.22			0.16	
v/s Ratio Perm	0.02			0.12			0.02		0.08	c0.31		0.00
v/c Ratio	0.05	0.08		0.32	0.35		0.05	0.52	0.18	0.74	0.39	0.01
Uniform Delay, d1	14.0	14.2		15.6	15.7		11.7	14.6	12.4	16.5	13.6	11.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		0.4	0.4		0.0	0.6	0.1	7.9	0.3	0.0
Delay (s)	14.1	14.2		15.9	16.1		11.7	15.2	12.5	24.4	14.0	11.5
Level of Service	B	B		B	B		B	B	B	C	B	B
Approach Delay (s)		14.2			16.1			14.0			18.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group