

TRAFFIC IMPACT STUDY THE PROMENADE



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- A TRAFFIC VOLUME DATA
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1 INTRODUCTION

Background

Plans are being prepared for the Promenade, a multi-use development bound by Robie Street, College Street and Carlton Street in Halifax, Nova Scotia (see Figure 1).

In 2016, SNC-Lavalin completed a Traffic Impact Statement for the proposed multi-use development. Since completing the original Traffic Impact Statement in 2016, two nearby developments are expected to be constructed, therefore, an updated Traffic Impact Study (TIS) has been requested in order to fully evaluate the impacts of the proposed development in combination with the other approved developments in the area.

WSP Canada Inc. has been retained to complete a revised TIS for the proposed multi-use development (see Figure 2). This TIS follows the required plan amendments outlined in HRM’s Additional Information Request, dated November 26, 2019.

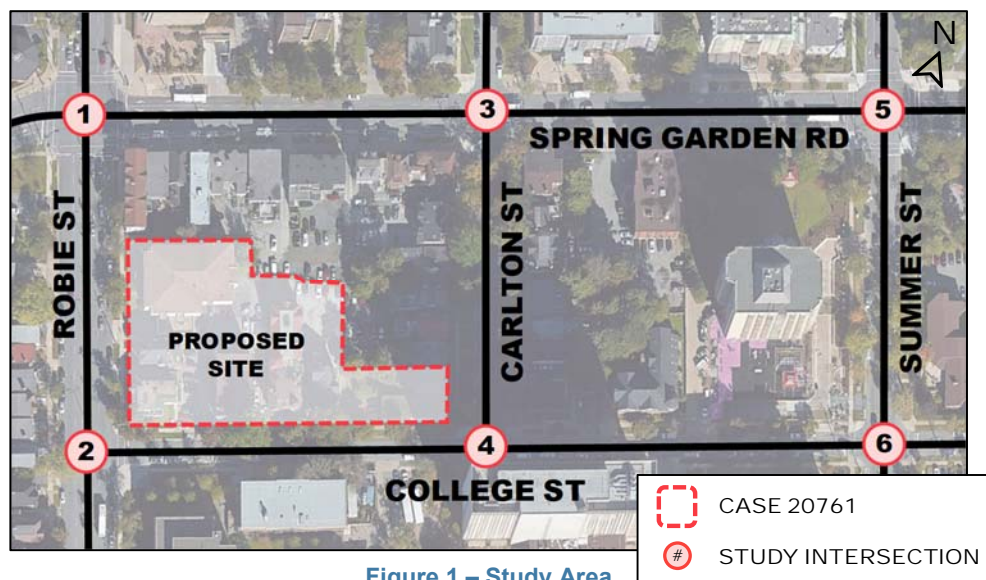


Figure 1 – Study Area

A Traffic Impact Study Usually Considers Four Questions

A TIS usually consists of determining answers for the following questions:

1. **What is the existing transportation situation** adjacent to the study site? How have volumes changed historically?
2. **What transportation changes are expected** at key Study Area locations? How many vehicle and active mode trips are expected to be generated by the proposed development during weekday peak hours? What routes are the trips expected to use to travel within and through the Study Area?
3. **What transportation impacts will occur** on Study Area roads, sidewalks, and intersections?
4. **What transportation improvements are required** to mitigate project impacts on Study Area travel? Are there transportation modifications that should be made to improve the travel experience for all users?



**Study
Objectives**

1. Establish existing traffic conditions in the Study Area.
2. Estimate the number of AM and PM vehicles trips that are expected to be generated by the two nearby developments identified by HRM.
3. Develop projected 2024 background weekday AM and PM peak hourly volumes for Study Area roads that include trips generated by the background developments but do not include trips generated by the Promenade site development.
4. Estimate the number of weekday AM and PM peak hour trips that will be generated by the Promenade.
5. Distribute and assign site generated trips to Study Intersections to project 2024 peak hourly volumes that include site generated trips.
6. Evaluate impacts of site generated traffic on the performance of Study Intersections.
7. Complete warrant analyses, as necessary, for Study Intersections and recommend improvements that may be needed at study intersections to mitigate the impacts of site development.



Figure 2 - Site Layout

2 STUDY AREA DESCRIPTIONS

Description of Existing Site

The existing site is occupied by six (6) residential properties. There are three (3) buildings that front College Street:

- 5977 College Street (PID 00135517) is a 4-storey residential building with 12 dwelling units (see Photo 1);
- 5969 College Street (PID 00135509) is a 3-storey designated “Heritage Building” with 17 dwelling units (see Photo 2);
- 5963 College Street (PID 00135491) is a 3-storey residential building with 4 dwelling units (see Photo 3); and,

There are two (2) properties that front Robie Street:

- 1389 Robie Street (PID 00135541) is a 3-storey residential building with 24 dwelling units (see Photo 4); and,
- 1377 Robie Street (PID 00135533) is a 2-storey residential building with 4 dwelling units (see Photo 5).

There is one (1) property on the corner of Robie Street and College Street:

- 5993 College Street (PID 00135525) is a 3-storey residential building with 4 dwelling units (see Photo 6).



Photo 1 – 5977 College Street



Photo 2 – 5969 College Street



Photo 3 – 5963 College Street



Photo 4 – 1389 Robie Street



Photo 5 – 1377 Robie Street



Photo 6 – 5993 College Street



Description of Proposed Redevelopment

The proposed multi-use development will be bound by Robie Street, College Street and Carlton Street in Halifax, Nova Scotia (see Figure 2). The Promenade is expected to be developed in two (2) phases. Phase 1 is planned to include 34 mid-rise apartments on the corner of Carlton Street and College Street (PID 00135475 and 00135483). Phase 2 is expected to include 577 high-rise apartment units, approximately 12,500 ft² of retail space, approximately 30,500 ft² of optional underground commercial space, and an underground parking garage consisting of 511 parking spots. The proposed redevelopment will include the demolition of five (5) of the existing six (6) buildings on the site and the relocation of the designated “Heritage Building” within the boundaries of Phase 1. Completion of the redevelopment is anticipated by 2024.

Proposed Site Access

Full vehicular access to the proposed underground parking garage is expected to be located approximately at 5953 College Street. Sight distance appears adequate at the proposed (see Photo 7 and Photo 8). It is expected that an additional access accommodating right-in and right-out (RIRO) maneuvers only will be provided on Robie Street as a drop off driveway.



Photo 7 – Looking Left (East) on College Street towards Carlton Street



Photo 8 - Looking Right (West) on College Street towards Robie Street

Existing Road Descriptions

Robie Street is a major collector street that runs north-south approximately 5.5 km between the North End and South End of Halifax. In the vicinity of the proposed development, Robie Street has two traffic lanes in each direction divided by a median and sidewalks on both sides. The posted speed limit is 50 km/h and metered parking is provided on both sides of Robie Street.

College Street is a local road that runs east-west approximately 500 m between Robie Street and Cathedral Lane. College Street consists of one lane in each direction with sidewalks on both sides and the posted speed limit is 50 km/h. Metered parking is provided on the south side of College Street.

Carlton Street is a local road that runs north-south approximately 250 m between the Camp Hill Cemetery and College Street. Carlton Street consists of one lane in each direction with sidewalks on both sides and the posted speed limit is 50 km/h.

Spring Garden Road is an undivided local collector street that runs east-west approximately 1.2 km between Robie Street and Barrington Street. Spring Garden Road consists of numerous residential and commercial properties, access driveways, bus stop locations and metered parking. There are sidewalks on both sides as this corridor is used heavily by pedestrians. The posted speed limit is 50 km/h.

Summer Street is a local street that runs north-south approximately 900 m between Bell Road and University Avenue. In the vicinity of the proposed development, Summer Street has one lane in each direction divided by a median and sidewalks on both sides. The posted speed limit is 50 km/h.

Intersection 1 – Robie Street and Spring Garden Road/Coburg Road is a 4-leg signalized intersection with pedestrian crosswalks on all approaches (see Photo 9). The northbound and southbound approaches consists of one through/left-turn lane, one through lane and a right-turn lane. The eastbound approach (Coburg Road) consists of one left turn lane and a through/right-turn lane and the westbound approach (Spring Garden Road) consists of one through/left-turn lane and a through/right-turn lane.



Photo 9 – Robie Street at Spring Garden Road and Coburg Road

Intersection 2 – Robie Street and College Street is a 3-leg stop-controlled intersection with free flow on the Robie Street (see Photo 10). The northbound approach consists of one through lane and one through/right-turn lane the southbound approach consists of one through lane and one through/left-turn lane. The eastbound approach (College Street) consists of one lane with pedestrian crossing consisting of parallel bars.



Photo 10 – Robie Street and College Street



**Intersection
Descriptions
(Continued)**

Intersection 3 – Spring Garden Road and Carlton Street is a 4-leg stop-controlled intersection with free flow on Spring Garden Road (see Photo 11). All approaches consist of single lanes and there is an RA-5 pedestrian crossing located on the crossing the east leg.



Photo 11 – Spring Garden Road and Carlton Street

Intersection 4 – College Street and Carlton Street is a 3-leg stop-controlled intersection with free flow on the College Street (see Photo 12). All approaches consist of single lanes and there are no marked pedestrian crosswalks.



Photo 12 – College Street and Carlton Street

Intersection 5 – Spring Garden Road and Summer Street is a 4-leg signalized intersection with pedestrian crosswalks on all approaches (see Photo 13). The westbound approach consists of one through/left-turn lane and a right-turn lane that is supplemented with a transit priority signal. The eastbound approach consists of one through/left-turn lane and a through/right-turn lane. The southbound approach consists of one through/left-turn lane and a right-turn lane, right turns are prohibited during red lights at this approach.



Photo 13 – Spring Garden Road and Summer Street



Intersection Descriptions (Continued)

Intersection 6 – College Street and Summer Street is a 4-leg stop-controlled intersection with free flow on Summer Street (see Photo 14). All approaches consist of single lanes and there are marked crosswalks crossing the east, west and north legs of the intersection.



Photo 14 – College Street and Summer Street

Turning Movement Counts

Turning movement counts were collected during morning and evening peak periods at the existing Study Intersections by WSP on Tuesday, March 3 through Thursday, March 5, 2020. The turning movement counts have been tabulated in Tables A-1 to A-6, Appendix A, with peak hour volumes indicated by shaded areas.

Observed Traffic Volumes

Observed 2020 AM and PM peak hour volumes are shown diagrammatically in Figure A-1, Appendix A. It should be noted that the observed volumes have been rounded to the nearest multiple of 5.

Active Transportation & Transit

The proposed site has good accessibility for pedestrians. There are sidewalks on both sides of all corridors in the Study Area and marked crosswalks at all Study Intersections.

HRM Transit currently operates several routes near the proposed redevelopment site (see Figure 3), with a number of bus stops located on Robie Street and Spring Garden Road. Currently there is no transit route that runs directly past the proposed site.



Figure 3 – HRM Transit Routes

3 BACKGROUND TRAFFIC

Other Anticipated Developments in the Study Area

HRM requested inclusion of two (2) approved developments in the Study Area as the background growth. One of the background developments is expected to be located adjacent to the proposed redevelopment site (Case 20218) and the other background development is expected to be located at 5885 Spring Garden Road (Killam Property) (see Figure 4).

Both of the background developments considered are currently occupied by other existing properties. The adjacent property is currently occupied by several residential and commercial properties. Case 20218 is expected to consist of 250 mid-rise apartment units, 61,000 ft² of office space and 21,000 ft² of commercial space. The Killam Property is currently occupied by a 201-unit mid-rise apartment building and the redeveloped property is expected to consist of a 305-unit mid-rise apartment building.

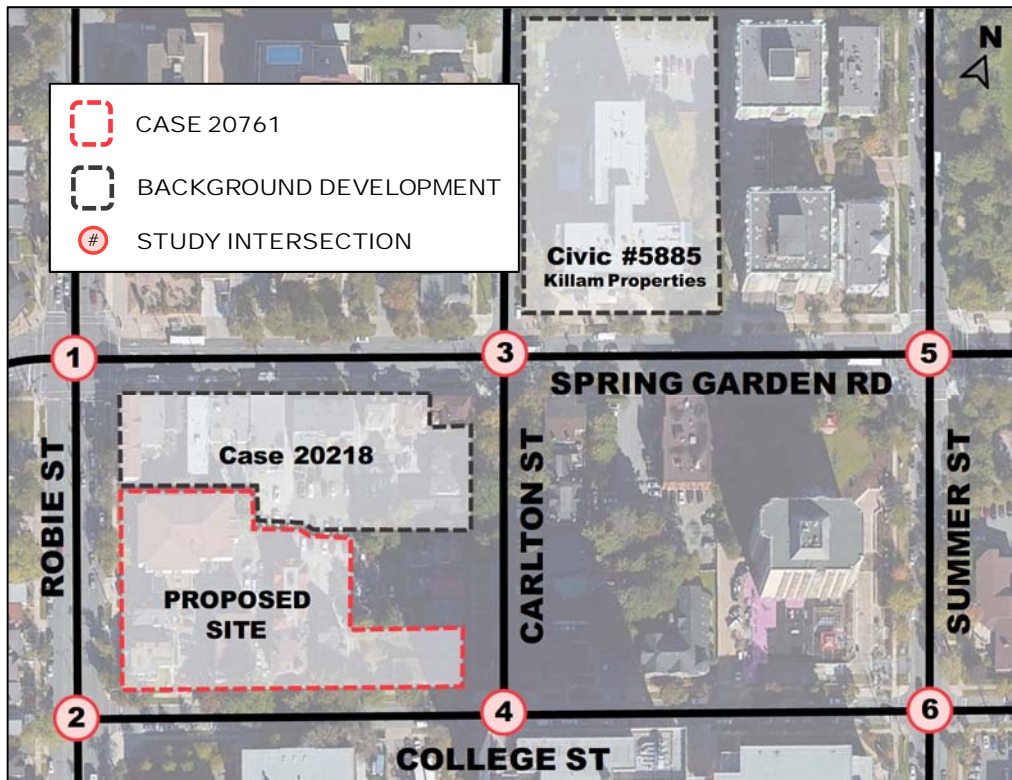


Figure 4 – Locations of Background Developments

Annual Growth

This updated Traffic Impact Study accounts for the adjacent developments as the background growth of traffic in the area, therefore, no annual growth factor was applied to the traffic volumes.



4 TRIP GENERATION, DISTRIBUTION, AND ASSIGNMENT

Anticipated Land Use for Proposed Redevelopment

Phase 1 of the Promenade is expected to include 34 Mid-Rise Apartment units. Phase 2 is planned to include 577 High-Rise Apartment units and 43,000 ft² of Commercial Space consisting of Speciality Retail and High-Turnover (Sit-Down) Restaurants.

Anticipated Land Use for Background Developments

Case 20218 is planned to include 250 Mid-Rise Apartment units, 61,000 ft² of General Office and 21,000 ft² of Speciality Retail. The redeveloped Killam Property is expected to consist of 305 Mid-Rise Apartment Units.

Estimation of Site Generated Trips (Background Developments and Proposed Site)

When using the published rates in *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, Washington, 2017) the transportation engineer's objective should be to provide a realistic estimate of the number of trips that will be generated.

Generated trips for Mid-Rise Apartments (Land Use 221) and High-Rise Apartments (Land Use 222) are estimated for the AM and PM peak hours of traffic by the number of units. Trips generated for Specialty Retail (Land Use 826), High-Turnover (Sit-Down) Restaurants (Land Use 932) and General Office (Land Use 710) and are estimated for the AM and PM peak hours of traffic by leasable square footage available.

The 10th Edition of the Trip Generation Manual was used to estimate trips for Mid-Rise/High-Rise Apartment units, General Office space and High-Turnover (Sit-Down) Restaurants. The estimates for Speciality Retail trips were prepared using published rates from *Trip Generation Manual, 9th Edition* (Institute of Transportation Engineers, Washington, 2012). Speciality Retail is no longer listed as a potential land usage in the 10th Edition, instead more specific retail descriptions are provided (e.g. supermarket, apparel store, pet supply store, etc.). Due to the unknown use of the commercial space, speciality retail was used.

Trips Generated from Case 20218

The adjacent property is currently occupied by numerous residential properties and commercial destinations. It was estimated that the proposed commercial development will approximately occupy the same leasable square footage and consist of similar land usages (e.g. coffee shops, restaurants, salons, etc.) as the existing site. The trip generation estimates of the proposed site and the vehicle trip credits for the existing site were assumed to be equivalent, therefore, the trips generated by the commercial development are captured in the traffic counts collected between March 3-5, 2020 by WSP.

In addition, the expected number of units/square footage for each land use for this property was increased by 15%, as request by HRM. The trip generation estimate for Case 20218 is summarized in Table 1.

It is estimated that Case 20218 will generate:

- 62 new two-way trips during the AM peak hour (33 entering and 29 exiting); and,
- 70 new two-way trips during the PM peak hour (30 entering and 40 exiting).

Trips Generated from Killam Property

The existing Killam Property located at 5885 Spring Garden Road consists of a Mid-Rise Apartment with 201 units, therefore, a credit was applied to the trip generation estimate in order to determine the number of new trips generated by the redevelopment. The trip generation estimate for the redeveloped Killam Property is summarized in Table 2.

It is estimated that the Killam Property will generate:

- 14 new two-way trips during the AM peak hour (4 entering and 10 exiting); and,
- 17 new two-way trips during the PM peak hour (10 entering and 7 exiting).



Table 1 – Trip Generation Estimates for Case 20218

Land Use ¹	Units ²	Trip Generation Rates ³				Trip Generation Estimates ³			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
Adjacent Site (Case 20218)									
Mid-Rise Apartments (Land Use 221)	288 Units ⁴	Equations from Pages 74 and 75 (Residential - Land Uses 200 - 299)				25	72	73	47
General Office (Land Use 710)	69.0 KGLA ⁴	1.00	0.16	0.18	0.97	69	11	13	67
Specialty Retail ⁵ (Land Use 826)	24.2 KGLA ⁴	No change between existing and proposed.				0	0	0	0
Trip Generation Estimates					94	83	86	114	
60% Reduction for Non-Auto Trips⁶					56	50	52	68	
5% Reduction for On-Site Synergies⁷					5	4	4	6	
Primary Trip Estimate for Proposed Adjacent Site					33	29	30	40	
NOTES: 1. Land Use Code 221 and 710 are from Trip Generation, 10th Edition, (Institute of Transportation Engineers, Washington, 2017) and Land Use Code 826 is from Trip Generation, 9th Edition, (Institute of Transportation Engineers, Washington, 2012). 2. 'Number of Residential Units' for Mid-Rise Apartment. 'Gross Leasable Area x 1000 SF' for General Office and Specialty Retail. 3. Rates are 'vehicles per hour per unit'; trips generated are 'vehicles per hour for peak hours'. 4. The expected number of units/square footage for each land use was increased by 15%, as request by HRM. 5. It was estimated that the proposed commercial development will approximately occupy the same leasable square footage and consist of similar land usages (e.g. coffee shops, restaurants, salons) as the existing site. The trip generation estimates of the proposed site and the vehicle trip credits for the existing site were assumed to be equivalent, therefore, the trips generated by the commercial development are captured in the traffic counts collected between March 3-5, 2020 by WSP. 6. Since high pedestrian / cycling / transit usage is expected in the Study Area, a 60% reduction has been applied to site generated trip estimates. This reduction considers the IMP target for non-auto (60%) and the 2011 Census data (50%) for nonauto trips for this area. 7. It was assumed that very few trips would be made internally, therefore, only 5% of trips were considered as on-site synergies.									

Table 2 – Trip Generation Estimates for Redeveloped Killam Property

Land Use ¹	Units ²	Trip Generation Rates ³				Trip Generation Estimates ³			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
Killam Site (5885 Spring Garden Road)									
Mid-Rise Apartments (Land Use 221)	305 Units	Equations from Pages 74 and 75 (Residential - Land Uses 200 - 299)				27	75	79	51
Removal of Mid-Rise Apartments (Land Use 221)	201 Units	Equations from Pages 74 and 75 (Residential - Land Uses 200 - 299)				-18	-50	-53	-34
Trip Generation Estimates					9	25	26	17	
60% Reduction for Non-Auto Trips⁴					5	15	16	10	
Primary Trip Estimate for Proposed Killiam Site					4	10	10	7	
NOTES: 1. Land Use Code 221 is from Trip Generation, 10th Edition, (Institute of Transportation Engineers, Washington, 2017). 2. 'Number of Residential Units' for Mid-Rise Apartment. 3. Rates are 'vehicles per hour per unit'; trips generated are 'vehicles per hour for peak hours'. 4. Since high pedestrian / cycling / transit usage is expected in the Study Area, a 60% reduction has been applied to site generated trip estimates. This reduction considers the IMP target for non-auto (60%) and the 2011 Census data (50%) for nonauto trips for this area.									



Trips Generated from the Promenade

It was estimated that Phase 1 will approximately occupy the same number of apartment units as the existing site. The trip generation estimates of the proposed site and the vehicle trip credits for the existing site were assumed to be equivalent, therefore, the trips generated by Phase 1 are captured in the traffic counts collected between March 3-5, 2020 by WSP.

The site planned for Phase 2 is currently occupied by six (6) residential properties totalling 95 dwelling units. The proposed redevelopment will include the demolition of five (5) of the existing buildings on the site and the designated “Heritage Building” will be relocated with five (5) remaining units. A credit was applied to the trip generation estimate for the removal of 90 dwelling units (*SNC Lavalin, 2016*) in order to determine the number of new trips generated by the redevelopment. In addition, the expected number of units/square footage for each land use for this property was increased by 12.5%, as requested. The trip generation estimate for The Promenade is summarized in Table 3.

It is estimated that the Promenade will generate:

- 146 two-way trips during the AM peak hour (58 entering and 88 exiting); and,
- 188 two-way trips during the PM peak hour (111 entering and 77 exiting).

Table 3 – Trip Generation Estimates for the Promenade

Land Use ¹	Units ²	Trip Generation Rates ³				Trip Generation Estimates ³			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
The Promenade									
High-Rise Apartments (Land Use 222)	650 Units ⁴	Equations from Pages 153 and 154 (Residential - Land Uses 200 - 299)				47	148	163	104
High-Turnover (Sit-Down) Restaurant ⁵ (Land Use 932)	15.3 KGLA	5.47	4.47	6.06	3.71	83	68	92	57
Specialty Retail ⁶ (Land Use 826) ⁶	27.8 KGLA ⁷	0.76	0.60	1.19	1.52	21	17	33	42
Removal of Existing Land Use ⁸	90 Units	SNC Lavalin (August 2016)				-6	-13	-11	-10
Trip Generation Estimates					145	220	277	193	
60% Reduction for Non-Auto Trips⁹					87	132	166	116	
Primary Trip Estimate for Proposed Subject Site					58	88	111	77	
<p>NOTES:</p> <ol style="list-style-type: none"> 1. Land Use Code 221 and 932 is from Trip Generation, 10th Edition, (Institute of Transportation Engineers, Washington, 2017) and Land Use Code 826 is from Trip Generation, 9th Edition, (Institute of Transportation Engineers, Washington, 2012). 2. 'Number of Residential Units' for Mid-Rise Apartment. 'Gross Leasable Area x 1000 SF' for High-Turnover (Sit-Down) Restaurant and Specialty Retail. 3. Rates are 'vehicles per hour per unit'; trips generated are 'vehicles per hour for peak hours'. 4. The expected number of residential units was increased by 12.5%, as requested. 5. Commercial uses associated with the optional underground space have yet to be identified, therefore, it was assumed that 50% would resemble high-turnover restaurants (15,250 ft²) with sit-down facilities and 50% would resemble general retail (15,250 ft²). establishments. 6. The Specialty Retail (ITE Land Use 826) rate for 'Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 PM has been used. Since there is no published rate for the AM peak hour of adjacent street traffic for this land use, and since AM peak hour trips to specialty retail are generally low, AM trip rates have been assumed to be 50% of the PM rate with reversal of the directional split. 7. The Specialty Retail includes the 12,500 ft² expected on the ground level and 50% of the optional underground commercial space (15,250 ft²). 8. Credits for the existing land use of the subject site were extracted from the Traffic Impact Statement completed by SNC Lavalin (August 2016). 9. Since high pedestrian / cycling / transit usage is expected in the Study Area, a 60% reduction has been applied to site generated trip estimates. This reduction considers the IMP target for non-auto (60%) and the 2011 Census data (50%) for nonauto trips for this area. 									



**Trip
Distribution
and
Assignment**

Trips generated by the background developments and proposed development were assigned to the roadway network based on WSP’s collected turning movement counts and local knowledge of the area considering major trip origins and destinations in the region.

North	60%	(Halifax Commons, Hospital, North End Halifax, Bedford, Dartmouth/Burnside/Fall River via McKay Bridge or Macdonald Bridge)
East	10%	(Downtown Halifax various possible destinations)
South	20%	(South End Halifax, Dalhousie University, St. Mary’s University, Hospital, etc.)
West	10%	(Halifax Shopping Centre, Bayers Lake, Highway 102, Armdale Roundabout, etc.)

**Projected
2024 Traffic
Volumes with
Background
Developments
and without
the
Promenade**

Trips generated by the background developments have been added to the observed 2020 volumes (Figure A-1, Appendix A) to provide projected 2024 AM and PM peak hourly volumes that do not include The Promenade site generated trips. The 2024 traffic volumes with the background developments taken into consideration are illustrated diagrammatically in Figure A-2, Appendix A.

**Projected
2024 Traffic
Volumes with
Background
Developments
and the
Promenade**

Trips generated by the proposed site (Figure A-3, Appendix A) have been added to the 2024 traffic volumes with the background developments (Figure A-2, Appendix A) to provide projected 2024 AM and PM peak hourly volumes that include The Promenade site generated trips. The 2024 traffic volumes with the background developments and the proposed site are illustrated diagrammatically in Figure A-4, Appendix A.

5 INTERSECTION OPERATIONAL ANALYSIS

Intersection Capacity Analysis

Intersection capacity analysis was completed to estimate how the Study Intersections may be expected to operate in the future without and with site generated trips.

Synchro 10.0 software was used to evaluate the performance of the Study Intersections for the following scenarios:

- A. Observed 2020 AM and PM peak hour volumes (rounded to the nearest 5);
- B. Projected 2024 AM and PM peak hour volumes with background developments; and,
- C. Projected 2024 AM and PM peak hour volumes with proposed site and background developments.

The following subsections identify each study intersection and summarize the results of the operational analysis. Detailed results of the analyses are included in Appendix B.

Intersection Capacity Analysis Results

Intersection 1 – Robie Street and Spring Garden Road/Coburg Road (Table 4) – The existing intersection is expected to operate under capacity during the AM and PM peak hours. It should be noted that during the evening peak the eastbound left turn movement is currently approaching capacity ($v/c = 0.89$). With the background developments and the Promenade, all movements are expected to remain operating under capacity. The overall performance of the intersection is expected to be satisfactory both without and with the addition of site generated trips.

Intersection 2 – Robie Street and College Street (Table 5) – The existing intersection is expected to operate well under capacity during the AM and PM peak hours. With the background developments, all movements are expected to operate within HRM acceptable limits in each scenario. Negligible changes in the operational performance of this intersection are expected with the addition of the Promenade.

Intersection 3 – Spring Garden Road and Carlton Street (Table 6) – The existing intersection is expected to operate well under capacity during the AM and PM peak hours. With the background developments, all movements are expected to operate within HRM acceptable limits in each scenario. Negligible changes in the operational performance of this intersection are expected with the addition of the Promenade.

Intersection 4 – College Street and Carlton Street (Table 7) – The existing intersection is expected to operate well under capacity during the AM and PM peak hours. With the background developments, all movements are expected to operate within HRM acceptable limits in each scenario. Negligible changes in the operational performance of this intersection are expected with the addition of the Promenade.

Intersection 5 – Spring Garden Road and Summer Street (Table 8) – The existing intersection is expected to operate under capacity during the AM and PM peak hours. It should be noted that during the morning peak the southbound lane for through and left-turning vehicles is currently approaching capacity ($v/c = 0.83$). With the background developments and the Promenade, all movements are expected to remain operating under capacity and within HRM acceptable limits. Negligible changes in the operational performance of this intersection are expected with the addition of the proposed site.

Intersection 6 – College Street and Summer Street (Table 9) – The existing intersection is expected to operate under capacity during the AM and PM peak hours. With the background developments, all movements are expected to operate within HRM acceptable limits in each scenario. Negligible changes in the operational performance of this intersection are expected with the addition of the Promenade.



Table 4 – Intersection Capacity Analysis for Robie Street at Spring Garden Road/Coburg Road

Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th %ile Queue (m) by Intersection Movement							Overall Intersection Delay
	Coburg Road		Spring Garden Road	Robie Street				
	EB-L	EB-TR	WB-LTR	NB-LT	NB-R	SB-LT	SB-R	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-1)								
Delay	36.9	48.2	36.5	6.6	1.0	11.6	1.9	17.6
v/c	0.30	0.74	0.67	0.28	0.05	0.66	0.07	
Queue	18.2	53.6	29.6	32.9	2.3	105.5	5.0	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-8)								
Delay	92.9	36.1	22.4	8.6	0.0	7.4	2.3	16.3
v/c	0.89	0.54	0.63	0.51	0.03	0.37	0.05	
Queue	38.2	44.4	26.1	75.5	0.0	33.7	4.3	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-15)								
Delay	36.6	48.1	38.3	6.9	1.4	12.5	2.0	18.7
v/c	0.30	0.75	0.72	0.28	0.05	0.68	0.07	
Queue	18.1	55.6	32.3	34.0	3.0	112.3	5.2	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-22)								
Delay	96.4	36.5	22.6	8.9	0.0	7.7	2.4	16.9
v/c	0.90	0.56	0.64	0.52	0.03	0.38	0.05	
Queue	38.8	46.8	27.0	77.1	0.0	35.0	4.4	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-29)								
Delay	37.4	50.6	40.9	7.0	1.2	12.7	1.8	19.3
v/c	0.31	0.78	0.74	0.31	0.05	0.70	0.07	
Queue	18.6	58.6	34.0	35.1	2.8	109.0	4.7	
2024 PM Peak Hour with Proposed Site and Background Developments (Page B-36)								
Delay	93.6	37.4	22.8	9.1	0.0	7.7	2.1	16.9
v/c	0.89	0.60	0.65	0.54	0.03	0.40	0.05	
Queue	42.0	51.5	28.4	74.7	0.0	33.2	4.0	



Table 5 – Intersection Capacity Analysis for Robie Street at College Street

Criteria	Control Delay (sec/veh), v/c Ratio, and 95th %ile Queue (m) by Intersection Movement					Overall Intersection Delay
	College Street	Robie Street				
	WB-LR	NB-T	NB-TR	SB-LT	SB-T	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-2)						
Delay	14.6	0.0	0.0	2.2	0.0	1.0
v/c	0.14	0.23	0.13	0.48	0.46	
Queue	3.9	0.0	0.0	2.0	0.0	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-9)						
Delay	14.6	0.0	0.0	1.9	0.0	1.0
v/c	0.17	0.37	0.19	0.26	0.18	
Queue	4.9	0.0	0.0	1.0	0.0	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-16)						
Delay	14.6	0.0	0.0	2.2	0.0	1.0
v/c	0.14	0.23	0.13	0.49	0.46	
Queue	3.8	0.0	0.0	2.0	0.0	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-23)						
Delay	14.6	0.0	0.0	1.9	0.0	1.0
v/c	0.17	0.37	0.19	0.26	0.18	
Queue	4.9	0.0	0.0	1.0	0.0	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-30)						
Delay	14.9	0.0	0.0	2.7	0.0	1.4
v/c	0.22	0.23	0.14	0.51	0.46	
Queue	7.0	0.0	0.0	2.5	0.0	
2024 PM Peak Hour with Proposed Site and Background Developments (Page B-37)						
Delay	16.5	0.0	0.0	3.5	0.0	1.7
v/c	0.28	0.37	0.21	0.31	0.18	
Queue	8.9	0.0	0.0	2.1	0.0	



Table 6 – Intersection Capacity Analysis for Spring Garden Road at Carlton Street

Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th %ile Queue (m) by Intersection Movement				Overall Intersection Delay
	Spring Garden Road		Carlton Street		
	EB-LTR	WB-LTR	NB-LTR	SB-LTR	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-3)					
Delay	0.6	0.6	13.2	13.5	1.7
v/c	0.24	0.30	0.07	0.07	
Queue	0.3	0.4	1.7	1.8	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-10)					
Delay	0.6	0.6	13.5	14.8	2.0
v/c	0.33	0.26	0.07	0.12	
Queue	0.4	0.3	1.8	3.2	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-17)					
Delay	0.6	0.6	13.8	14.2	1.9
v/c	0.26	0.31	0.07	0.10	
Queue	0.3	0.4	1.9	2.7	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-24)					
Delay	0.6	0.5	12.8	16.3	2.3
v/c	0.35	0.28	0.10	0.14	
Queue	0.4	0.3	2.8	4.0	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-31)					
Delay	0.6	0.6	13.8	14.2	1.9
v/c	0.26	0.31	0.07	0.10	
Queue	0.3	0.4	1.9	2.7	
2024 PM Peak Hour with Proposed Site and Background Developments (Page B-38)					
Delay	0.6	0.5	12.8	16.2	2.3
v/c	0.35	0.28	0.10	0.14	
Queue	0.4	0.3	2.8	4.0	



Table 7 – Intersection Capacity Analysis College Street at Carlton Street

Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th %ile Queue (m) by Intersection Movement			Overall Intersection Delay
	College Street		Carlton Street	
	EB-LT	WB-TR	SB-LR	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-4)				
Delay	1.8	0.0	9.3	2.6
v/c	0.06	0.03	0.04	
Queue	0.3	0.0	0.9	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-11)				
Delay	2.3	0.0	9.2	2.7
v/c	0.04	0.05	0.04	
Queue	0.3	0.0	1.1	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-18)				
Delay	1.8	0.0	9.3	2.6
v/c	0.06	0.03	0.04	
Queue	0.3	0.0	0.9	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-25)				
Delay	2.3	0.0	9.2	2.7
v/c	0.04	0.05	0.04	
Queue	0.3	0.0	1.1	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-32)				
Delay	1.2	0.0	9.7	1.8
v/c	0.10	0.05	0.04	
Queue	0.4	0.0	1.0	
2024 PM Peak Hour with Proposed Site and Background Developments (Page B-39)				
Delay	1.2	0.0	9.8	1.6
v/c	0.08	0.09	0.05	
Queue	0.0	0.0	1.2	



Table 8 – Intersection Capacity Analysis for Spring Garden Road at Summer Street

Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th %ile Queue (m) by Intersection Movement							Overall Intersection Delay
	Spring Garden Road				Summer Street			
	EB-LTR	WB-LT	WB-TRANSIT LANE	WB-R	NB-LTR	SB-LT	SB-R	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-5 & 6)								
Delay	15.9	16.8	13.0	3.0	20.0	36.3	17.5	23.1
v/c	0.24	0.14	0.03	0.07	0.46	0.83	0.27	
Queue	29.0	25.1	4.1	4.9	40.4	69.2	23.3	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-12 & 13)								
Delay	15.7	17.4	12.6	3.1	32.3	22.0	17.6	22.3
v/c	0.22	0.25	0.04	0.07	0.79	0.48	0.25	
Queue	26.8	43.0	5.2	4.9	84.9	34.0	21.8	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-19 & 20)								
Delay	16.0	16.8	13.0	3.0	20.0	36.3	17.7	23.0
v/c	0.25	0.16	0.03	0.07	0.46	0.83	0.28	
Queue	30.1	27.3	4.1	4.9	40.4	69.2	24.0	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-26 & 27)								
Delay	16.2	17.8	12.9	3.1	32.0	21.4	17.4	22.0
v/c	0.25	0.27	0.04	0.07	0.80	0.47	0.26	
Queue	29.6	46.3	5.3	4.9	84.7	33.2	22.2	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-33 & 34)								
Delay	17.4	18.3	14.2	3.2	19.2	35.4	16.2	23.1
v/c	0.26	0.17	0.03	0.07	0.48	0.84	0.26	
Queue	31.2	28.9	4.3	5.0	43.8	72.1	22.6	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-40 & 41)								
Delay	17.6	19.5	14.1	3.3	30.6	21.0	15.9	22.1
v/c	0.26	0.30	0.05	0.07	0.80	0.51	0.24	
Queue	30.7	49.5	5.5	5.1	87.4	38.6	20.9	



Table 9 – Intersection Capacity Analysis for College Street at Summer Street

Criteria	Control Delay (sec/veh), v/c Ratio, and 95 th %ile Queue (m) by Intersection Movement				Overall Intersection Delay
	College Street		Summer Street		
	EB-LTR	WB-LTR	NB-LTR	SB-LTR	
2020 AM Peak Hour without Proposed Site or Background Developments (Page B-7)					
Delay	14.0	12.1	0.6	0.9	4.5
v/c	0.15	0.24	0.13	0.24	
Queue	4.1	7.5	0.2	0.6	
2020 PM Peak Hour without Proposed Site or Background Developments (Page B-14)					
Delay	16.8	13.2	0.4	1.4	4.0
v/c	0.19	0.21	0.29	0.16	
Queue	5.4	6.2	0.3	0.6	
2024 AM Peak Hour without Proposed Site and with Background Developments (Page B-21)					
Delay	14.0	12.1	0.6	0.9	4.5
v/c	0.15	0.24	0.13	0.24	
Queue	4.1	7.5	0.2	0.6	
2024 PM Peak Hour without Proposed Site and with Background Developments (Page B-28)					
Delay	17.0	13.2	0.4	1.4	4.0
v/c	0.19	0.21	0.29	0.16	
Queue	5.4	6.3	0.3	0.6	
2024 AM Peak Hour with Proposed Site and Background Developments (Page B-35)					
Delay	16.2	12.7	0.6	0.9	5.4
v/c	0.28	0.26	0.13	0.27	
Queue	9.0	8.2	0.2	0.6	
2024 PM Peak Hour with Proposed Site and Background Developments (Page B-42)					
Delay	21.2	14.2	0.4	1.1	5.2
v/c	0.35	0.24	0.31	0.21	
Queue	12.4	7.5	0.3	0.6	



6 SUMMARY AND CONCLUSIONS

6.1 SUMMARY

Description of the Proposed Redevelopment	1. Plans are being prepared for the development of a multi-use development bound by Robie Street, College Street and Carlton Street in Halifax, Nova Scotia. The proposed development is expected to include 577 high-rise apartment units, approximately 12,500 ft ² of retail space, approximately 30,500 ft ² of optional underground commercial space, and an underground parking garage consisting of 511 parking spots. Completion of this development is anticipated by 2024.
Proposed Site Access	2. Full vehicular access to the proposed site is expected to be located approximately at 5953 College Street and a right-in/right-out driveway will be provided on Robie Street as a drop off driveway.
Study Area Roads	<p>3. Robie Street is a major collector street that runs north-south approximately 5.5 km between the North End and South End of Halifax. In the vicinity of the proposed development, Robie Street has two traffic lanes in each direction divided by a median and sidewalks on both sides.</p> <p>College Street is a local road that runs east-west approximately 500 m between Robie Street and Cathedral Lane. College Street consists of one lane in each direction with sidewalks on both sides.</p> <p>Carlton Street is a local road that runs north-south approximately 250 m between the Camp Hill Cemetery and College Street. Carlton Street consists of one lane in each direction with sidewalks on both sides.</p> <p>Spring Garden Road is an undivided local collector street that runs east-west approximately 1.2 km between Robie Street and Barrington Street. Spring Garden Road consists of numerous residential and commercial properties, access driveways, bus stop locations and metered parking. There are sidewalks on both sides as this corridor is used heavily by pedestrians.</p> <p>Summer Street is a local street that runs north-south approximately 900 m between Bell Road and University Avenue. In the vicinity of the proposed development, Summer Street has one lane in each direction divided by a median and sidewalks on both sides.</p>
Other Anticipated Developments in the Study Area	4. Two (2) approved developments in the Study Area were considered as the background growth, Case 20218 adjacent to the proposed site and Killam Property at 5885 Spring Garden Road.
Estimation of Site Generated Trips	<p>5. Trip generation estimates were prepared using rates published in <i>Trip Generation, 10th Edition</i> (Institute of Transportation Engineers, Washington, 2017) and <i>Trip Generation, 9th Edition</i> (Institute of Transportation Engineers, Washington, 2012).</p> <p>It is estimated that the Promenade will generate:</p> <ul style="list-style-type: none">• 146 two-way trips during the AM peak hour (58 entering and 88 exiting)• 188 two-way trips during the PM peak hour (111 entering and 77 exiting)

Trip Distribution and Assignment

6. Trips generated by the proposed development were assigned to the roadway network based on WSP's collected turning movement counts and local knowledge of the area considering major trip origins and destinations in the region. Trips were distributed to the North (60%), East (10%), South (20%) and West (10%).

Summary – Intersection Capacity Analysis

7. **Robie Street and Spring Garden Road/Coburg Road** – during the evening peak hour the eastbound left turn movement is currently approaching capacity ($v/c = 0.89$). With the addition of the background developments and The Promenade, there is a negligible impact to the v/c and all movements are expected to operate within HRM acceptable limits.

Robie Street and College Street – with the addition of the background developments and The Promenade, all movements are expected to operate within HRM acceptable limits.

Spring Garden Road and Carlton Street – with the addition of the background developments and The Promenade, all movements are expected to operate within HRM acceptable limits.

College Street and Carlton Street – with the addition of the background developments and The Promenade, all movements are expected to operate within HRM acceptable limits.

Spring Garden Road and Summer Street – during the morning peak hour the southbound lane for through and left-turning vehicles is currently approaching capacity ($v/c = 0.83$). With the addition of the background developments and the Promenade, there is a minimal impact to this v/c and all movements are expected to operate within HRM acceptable limits.

College Street and Summer Street – with the addition of the background developments and The Promenade, all movements are expected to operate within HRM acceptable limits.

6.2 CONCLUSIONS

Impacts to Vehicular Traffic

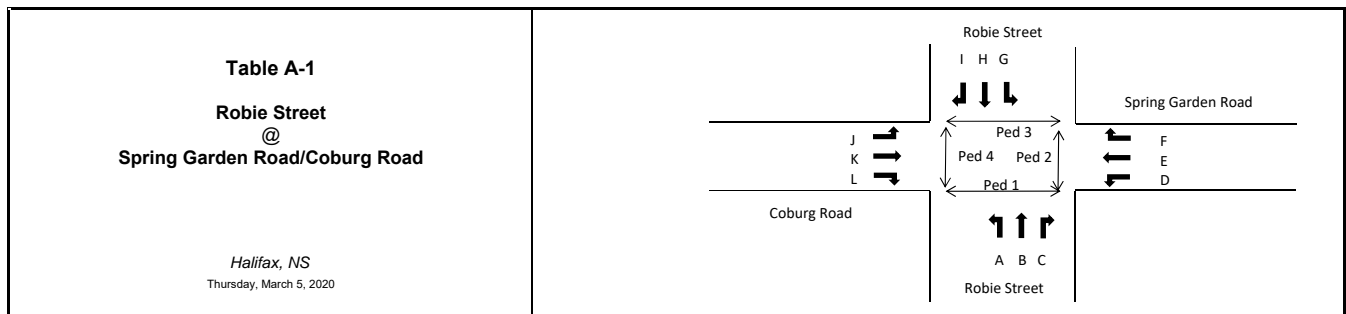
8. The overall performance of the Study Intersections are expected to be satisfactory without and with the addition of site generated trips. Negligible impacts to vehicular traffic are expected at the Study Intersections as a result of the proposed multi-use development.
-

APPENDIX

A

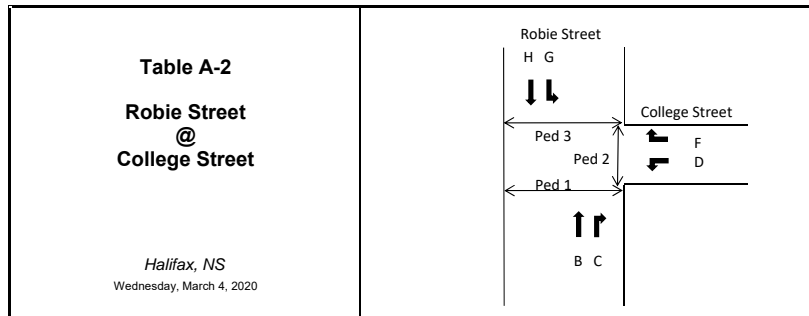
TRAFFIC VOLUME DATA





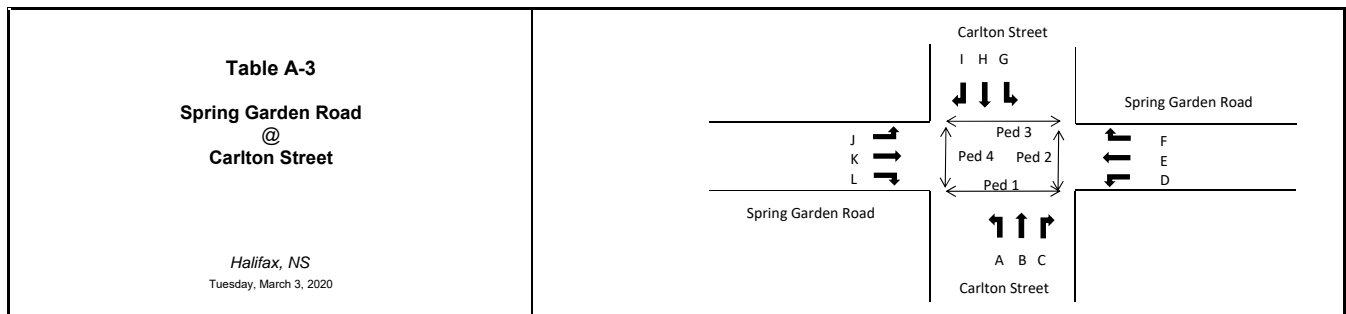
AM Peak Period Volume Data														
Time	Robie Street Northbound Approach			Spring Garden Road Westbound Approach			Robie Street Southbound Approach			Coburg Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
07:30	07:45	8	78	6	8	22	12	27	188	12	4	30	3	398
07:45	08:00	9	115	12	10	26	24	48	213	15	6	26	3	507
08:00	08:15	6	102	16	8	23	16	46	251	16	8	32	4	528
08:15	08:30	11	116	5	14	30	14	51	246	18	9	39	11	564
08:30	08:45	8	130	9	20	42	26	44	195	15	12	36	9	546
08:45	09:00	11	109	11	12	33	25	36	206	18	14	58	11	544
09:00	09:15	6	104	3	16	33	24	30	168	11	11	40	11	457
09:15	09:30	5	114	8	7	20	18	37	151	12	7	25	3	407
AM Peak Hour		36	457	41	54	128	81	177	898	67	43	165	35	2182
07:30	08:30	34	411	39	40	101	66	172	898	61	27	127	21	1997
08:30	09:30	30	457	31	55	128	93	147	720	56	44	159	34	1954
		Ped 1			Ped 2			Ped 3			Ped 4			Total Peds
07:30	08:30	86			90			100			45			321
08:30	09:30	121			123			144			78			466
PM Peak Period Volume Data														
Time	Robie Street Northbound Approach			Spring Garden Road Westbound Approach			Robie Street Southbound Approach			Coburg Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
16:00	16:15	21	240	9	8	56	48	26	83	15	37	44	3	590
16:15	16:30	31	209	7	7	45	38	26	91	11	18	31	5	519
16:30	16:45	19	240	3	4	47	42	25	90	7	22	43	3	545
16:45	17:00	17	173	6	10	29	35	23	118	13	16	37	5	482
17:00	17:15	15	189	6	11	43	39	28	116	13	12	37	3	512
17:15	17:30	21	183	6	9	47	27	30	114	15	14	32	3	501
17:30	17:45	14	156	13	14	42	25	19	80	16	14	38	2	433
17:45	18:00	17	149	5	7	34	27	30	91	10	14	41	4	429
PM Peak Hour		88	862	25	29	177	163	100	382	46	93	155	16	2136
16:00	17:00	88	862	25	29	177	163	100	382	46	93	155	16	2136
17:00	18:00	67	677	30	41	166	118	107	401	54	54	148	12	1875
		Ped 1			Ped 2			Ped 3			Ped 4			Total Peds
16:00	17:00	172			198			199			90			659
17:00	18:00	157			146			202			77			582

* Count completed by WSP



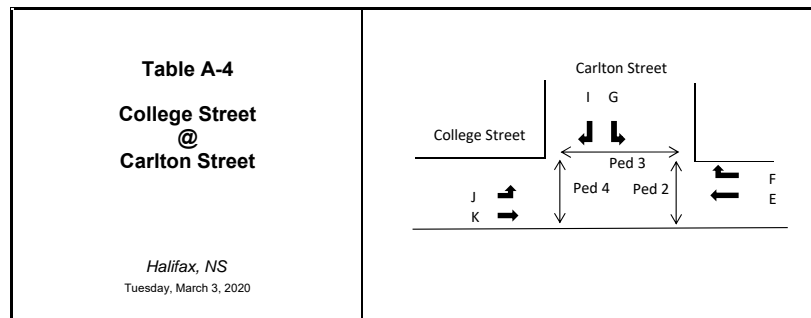
AM Peak Period Volume Data								
Time		Robie Street Northbound Approach		College Street Westbound Approach		Robie Street Southbound Approach		Total Vehicles
		B	C	D	F	G	H	
07:00	07:15	83	0	0	3	7	151	244
07:15	07:30	83	1	1	5	3	169	262
07:30	07:45	77	3	0	12	13	218	323
07:45	08:00	95	3	0	15	17	222	352
08:00	08:15	144	7	2	7	18	247	425
08:15	08:30	106	6	5	11	22	249	399
08:30	08:45	119	5	0	12	14	235	385
08:45	09:00	129	8	1	9	17	234	398
AM Peak Hour		498	26	8	39	71	965	1607
07:00	08:00	338	7	1	35	40	760	1181
08:00	09:00	498	26	8	39	71	965	1607
		Ped 1		Ped 2		Ped 3		Total Peds
07:00	08:00	5		30		4		39
08:00	09:00	4		108		4		116
PM Peak Period Volume Data								
Time		Robie Street Northbound Approach		College Street Westbound Approach		Robie Street Southbound Approach		Total Vehicles
		B	C	D	F	G	H	
15:30	15:45	217	3	5	10	5	122	362
15:45	16:00	214	5	1	19	10	107	356
16:00	16:15	246	1	2	20	7	106	382
16:15	16:30	215	2	1	13	4	90	325
16:30	16:45	213	3	3	12	5	108	344
16:45	17:00	196	3	1	11	10	104	325
17:00	17:15	186	3	2	14	9	109	323
17:15	17:30	185	5	0	16	13	116	335
PM Peak Hour		892	11	9	62	26	425	1425
15:30	16:30	892	11	9	62	26	425	1425
16:30	17:30	780	14	6	53	37	437	1327
		Ped 1		Ped 2		Ped 3		Total Peds
15:30	16:30	3		104		3		110
16:30	17:30	3		102		9		114

* Count completed by WSP



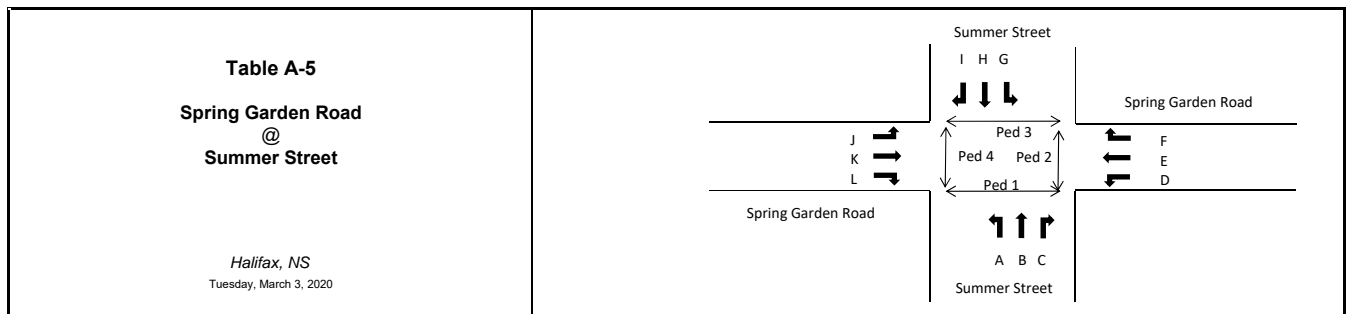
AM Peak Period Volume Data														
Time	Carlton Street Northbound Approach			Spring Garden Road Westbound Approach			Carlton Street Southbound Approach			Spring Garden Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
07:00 - 07:15	0	0	1	2	31	5	2	0	0	1	26	0	68	
07:15 - 07:30	0	1	1	4	22	5	6	0	3	0	27	5	74	
07:30 - 07:45	2	0	3	2	46	8	0	0	2	0	42	2	107	
07:45 - 08:00	2	0	3	4	52	5	0	0	0	1	50	1	118	
08:00 - 08:15	3	1	6	6	85	2	2	0	3	4	50	3	165	
08:15 - 08:30	2	0	4	6	77	6	5	0	5	4	52	3	164	
08:30 - 08:45	5	0	4	1	54	5	7	0	2	3	63	3	147	
08:45 - 09:00	6	0	1	5	71	7	3	2	4	2	55	4	160	
AM Peak Hour	16	1	15	18	287	20	17	2	14	13	220	13	636	
07:00 - 08:00	4	1	8	12	151	23	8	0	5	2	145	8	367	
08:00 - 09:00	16	1	15	18	287	20	17	2	14	13	220	13	636	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
07:00 - 08:00	53			1			36			40			130	
08:00 - 09:00	155			2			78			137			372	
PM Peak Period Volume Data														
Time	Carlton Street Northbound Approach			Spring Garden Road Westbound Approach			Carlton Street Southbound Approach			Spring Garden Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
15:30 - 15:45	1	3	5	4	70	6	9	0	2	6	82	3	191	
15:45 - 16:00	3	0	7	5	54	6	14	0	3	0	82	5	179	
16:00 - 16:15	6	0	8	6	61	5	15	0	4	9	91	2	207	
16:15 - 16:30	2	0	12	2	49	3	3	0	4	5	80	8	168	
16:30 - 16:45	5	0	4	4	53	7	5	1	3	1	80	1	164	
16:45 - 17:00	3	0	10	4	50	9	7	0	2	3	92	7	187	
17:00 - 17:15	1	0	10	1	49	4	8	0	1	4	79	2	159	
17:15 - 17:30	3	0	1	3	54	2	5	0	4	4	63	4	143	
PM Peak Hour	12	3	32	17	234	20	41	0	13	20	335	18	745	
15:30 - 16:30	12	3	32	17	234	20	41	0	13	20	335	18	745	
16:30 - 17:30	12	0	25	12	206	22	25	1	10	12	314	14	653	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
15:30 - 16:30	267			16			191			207			681	
16:30 - 17:30	205			6			161			119			491	

* Count completed by WSP



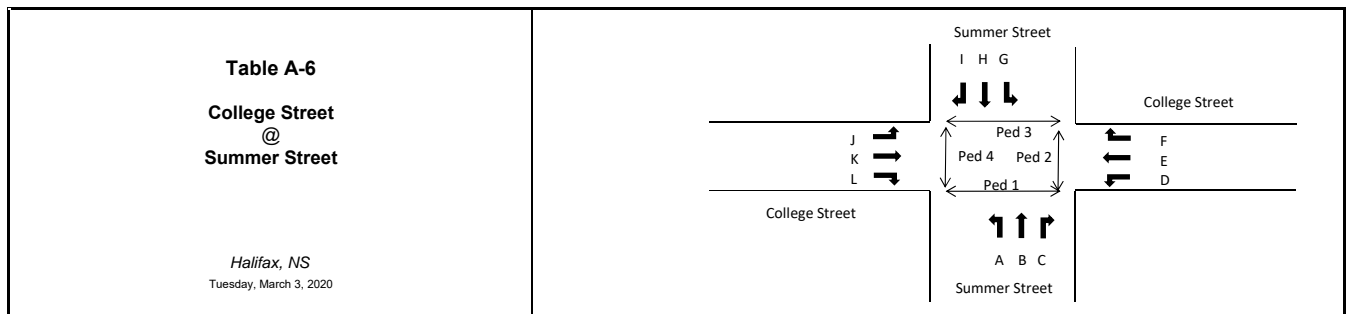
AM Peak Period Volume Data								
Time		College Street Westbound Approach		Carlton Street Southbound Approach		College Street Eastbound Approach		Total Vehicles
		E	F	G	I	J	K	
07:00	07:15	3	0	2	3	2	8	18
07:15	07:30	3	2	3	0	3	5	16
07:30	07:45	9	1	7	1	1	2	21
07:45	08:00	7	0	2	5	0	17	31
08:00	08:15	10	1	5	2	2	13	33
08:15	08:30	10	5	7	3	5	16	46
08:30	08:45	6	5	2	3	6	22	44
08:45	09:00	7	3	5	4	6	13	38
AM Peak Hour		33	14	19	12	19	64	161
07:00	08:00	22	3	14	9	6	32	86
08:00	09:00	33	14	19	12	19	64	161
		Ped 2		Ped 3		Ped 4		Total Peds
07:00	08:00	42		14		25		81
08:00	09:00	121		13		66		200
PM Peak Period Volume Data								
Time		College Street Westbound Approach		Carlton Street Southbound Approach		College Street Eastbound Approach		Total Vehicles
		E	F	G	I	J	K	
15:30	15:45	18	7	7	6	2	6	46
15:45	16:00	17	9	3	2	4	6	41
16:00	16:15	11	15	9	3	6	9	53
16:15	16:30	11	4	3	4	2	8	32
16:30	16:45	10	4	3	2	4	7	30
16:45	17:00	10	5	3	6	2	4	30
17:00	17:15	16	2	2	5	9	7	41
17:15	17:30	14	2	1	1	3	6	27
PM Peak Hour		57	35	22	15	14	29	172
15:30	16:30	57	35	22	15	14	29	172
16:30	17:30	50	13	9	14	18	24	128
		Ped 2		Ped 3		Ped 4		Total Peds
15:30	16:30	133		23		76		232
16:30	17:30	90		24		52		166

* Count completed by WSP



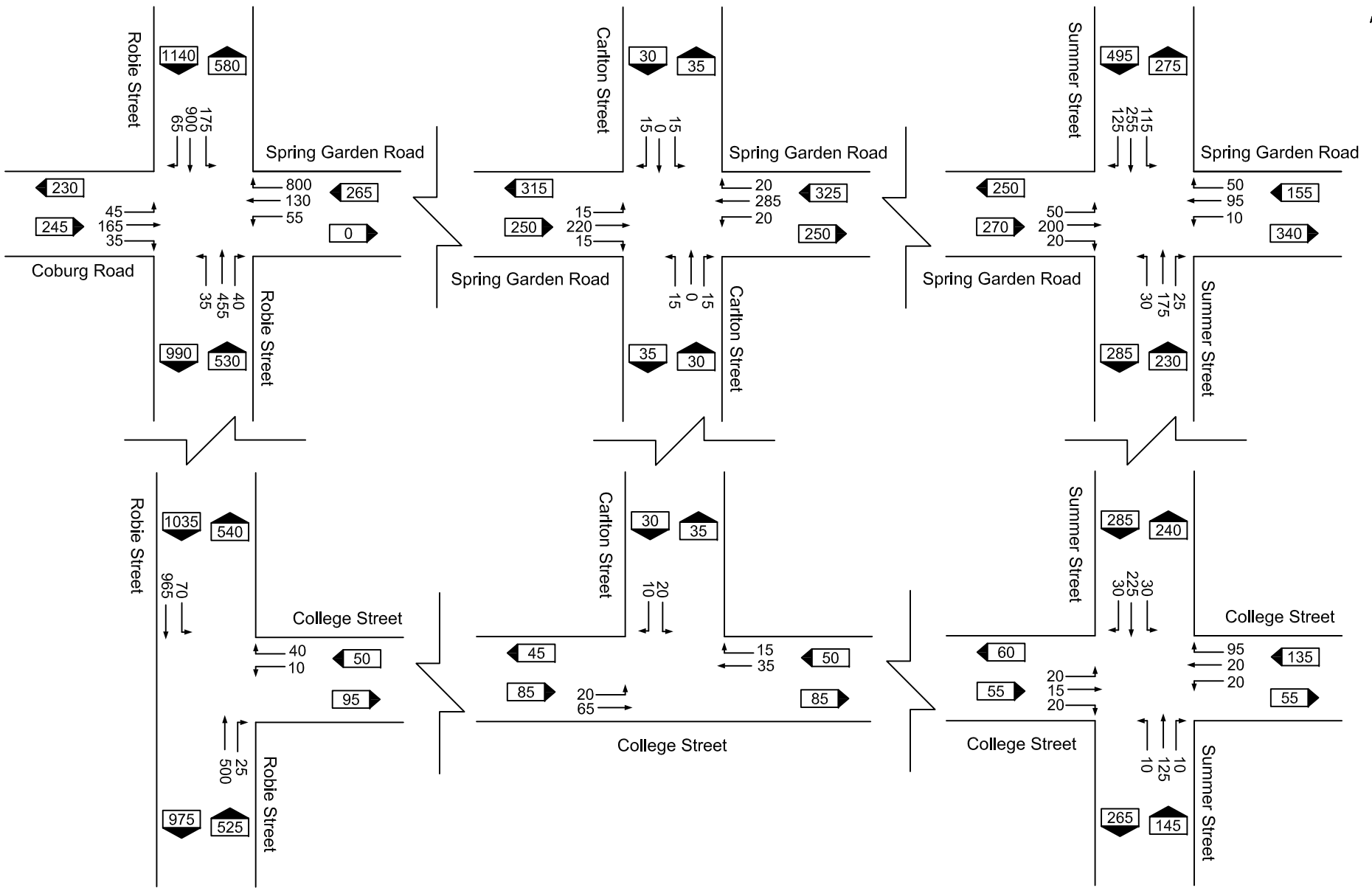
AM Peak Period Volume Data														
Time	Summer Street Northbound Approach			Spring Garden Road Westbound Approach			Summer Street Southbound Approach			Spring Garden Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
07:00 - 07:15	1	43	1	0	15	8	7	58	11	1	22	4	171	
07:15 - 07:30	2	29	0	1	13	11	13	60	18	4	19	3	173	
07:30 - 07:45	4	30	1	1	19	5	20	64	23	3	34	3	207	
07:45 - 08:00	2	27	3	1	25	11	38	72	36	2	38	4	259	
08:00 - 08:15	4	48	7	2	26	10	38	79	29	8	59	8	318	
08:15 - 08:30	9	40	9	1	17	17	34	53	34	8	65	6	293	
08:30 - 08:45	10	50	4	1	30	14	22	64	33	10	37	2	277	
08:45 - 09:00	6	39	4	4	24	9	23	61	28	22	38	5	263	
AM Peak Hour	29	177	24	8	97	50	117	257	124	48	199	21	1151	
07:00 - 08:00	9	129	5	3	72	35	78	254	88	10	113	14	810	
08:00 - 09:00	29	177	24	8	97	50	117	257	124	48	199	21	1151	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
07:00 - 08:00	59			93			69			98			319	
08:00 - 09:00	118			110			141			107			476	
PM Peak Period Volume Data														
Time	Summer Street Northbound Approach			Spring Garden Road Westbound Approach			Summer Street Southbound Approach			Spring Garden Road Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
15:30 - 15:45	15	77	5	2	41	15	19	33	24	10	43	8	292	
15:45 - 16:00	12	81	2	1	47	14	16	38	25	17	43	5	301	
16:00 - 16:15	18	97	5	2	41	10	16	21	27	15	44	8	304	
16:15 - 16:30	16	72	4	3	42	7	13	39	30	11	41	4	282	
16:30 - 16:45	13	97	1	2	42	20	15	36	25	13	43	3	310	
16:45 - 17:00	13	92	0	2	51	11	16	32	31	10	46	5	309	
17:00 - 17:15	9	65	2	1	37	10	16	40	27	10	38	4	259	
17:15 - 17:30	7	54	2	3	40	17	10	45	21	8	49	4	260	
PM Peak Hour	60	358	10	9	176	48	60	128	113	49	174	20	1205	
15:30 - 16:30	61	327	16	8	171	46	64	131	106	53	171	25	1179	
16:30 - 17:30	42	308	5	8	170	58	57	153	104	41	176	16	1138	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
15:30 - 16:30	220			172			195			118			705	
16:30 - 17:30	185			101			208			121			615	

* Count completed by WSP



AM Peak Period Volume Data														
Time	Summer Street Northbound Approach			College Street Westbound Approach			Summer Street Southbound Approach			College Street Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
07:00 - 07:15	2	38	1	4	3	4	12	49	1	1	2	3	120	
07:15 - 07:30	1	28	1	1	0	2	8	51	2	3	0	2	99	
07:30 - 07:45	1	27	0	0	4	5	10	53	7	3	2	3	115	
07:45 - 08:00	4	19	0	3	1	10	9	55	8	0	6	9	124	
08:00 - 08:15	3	28	2	3	8	23	8	70	8	8	7	2	170	
08:15 - 08:30	2	26	4	8	6	31	9	37	6	4	3	9	145	
08:30 - 08:45	1	35	2	3	3	27	8	57	10	3	4	8	161	
08:45 - 09:00	2	34	2	4	2	14	6	59	6	6	2	3	140	
AM Peak Hour	8	123	10	18	19	95	31	223	30	21	16	22	616	
07:00 - 08:00	8	112	2	8	8	21	39	208	18	7	10	17	458	
08:00 - 09:00	8	123	10	18	19	95	31	223	30	21	16	22	616	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
07:00 - 08:00	19			138			68			127			352	
08:00 - 09:00	43			86			170			183			482	
PM Peak Period Volume Data														
Time	Summer Street Northbound Approach			College Street Westbound Approach			Summer Street Southbound Approach			College Street Eastbound Approach			Total Vehicles	
	A	B	C	D	E	F	G	H	I	J	K	L		
15:30 - 15:45	3	80	3	0	8	27	2	34	7	5	0	6	175	
15:45 - 16:00	3	80	1	1	11	20	5	39	5	2	6	5	178	
16:00 - 16:15	8	85	1	1	5	15	5	29	1	7	3	6	166	
16:15 - 16:30	4	76	1	0	3	21	8	29	5	7	9	0	163	
16:30 - 16:45	2	98	0	1	4	17	8	30	2	4	3	8	177	
16:45 - 17:00	3	78	1	0	4	29	3	30	2	6	1	2	159	
17:00 - 17:15	2	56	1	2	8	15	7	35	4	5	2	6	143	
17:15 - 17:30	4	43	2	4	6	23	9	38	6	1	3	7	146	
PM Peak Hour	17	339	3	3	23	73	26	127	13	20	21	19	684	
15:30 - 16:30	18	321	6	2	27	83	20	131	18	21	18	17	682	
16:30 - 17:30	11	275	4	7	22	84	27	133	14	16	9	23	625	
	Ped 1			Ped 2			Ped 3			Ped 4			Total Peds	
15:30 - 16:30	36			146			185			275			642	
16:30 - 17:30	35			67			108			180			390	

* Count completed by WSP



AM Peak Hour

NOT TO SCALE

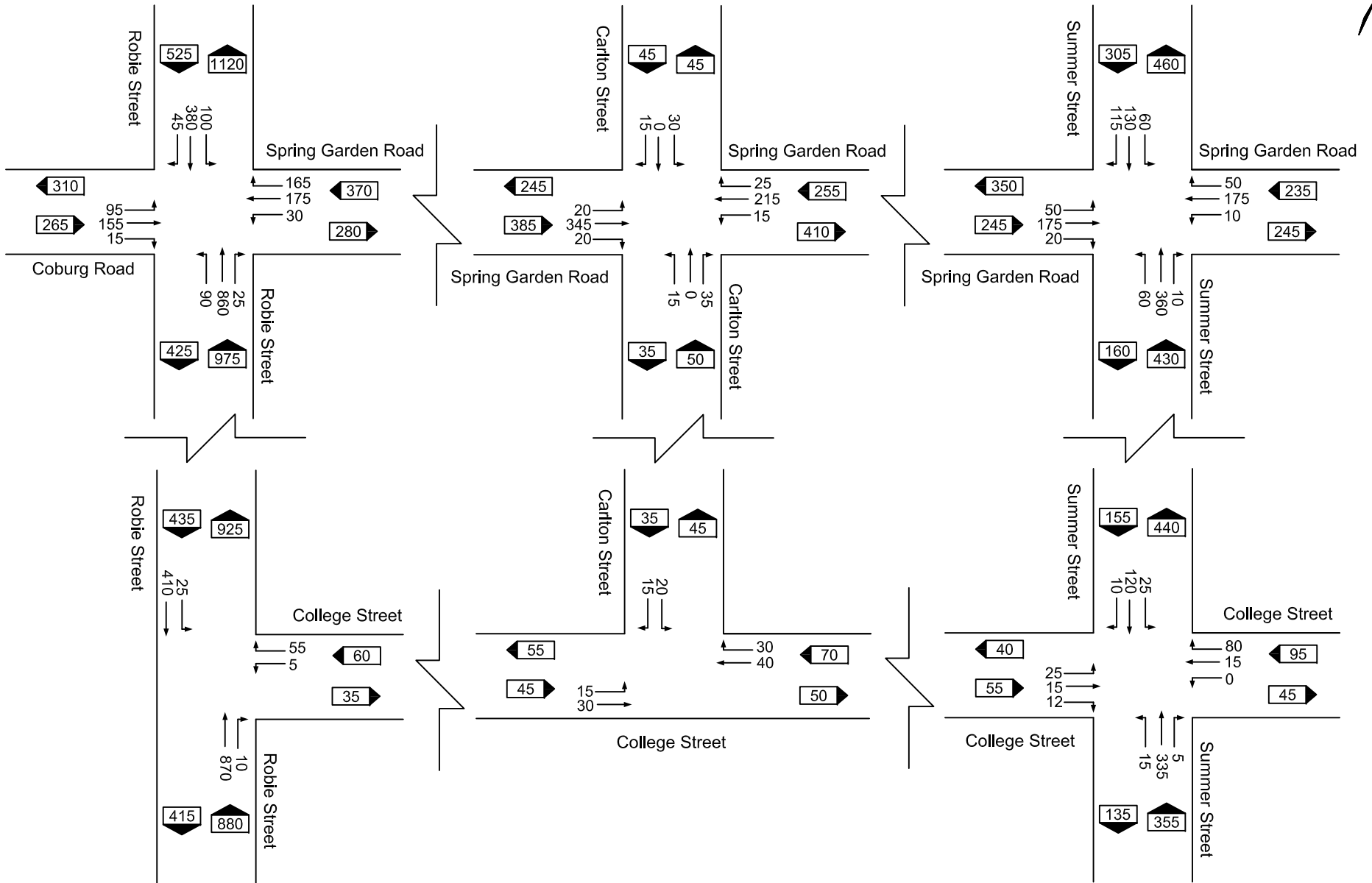


Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-1A

2020 Weekday AM Peak Hour
Without Background Traffic or Site Development

May 2020



PM Peak Hour

NOT TO SCALE

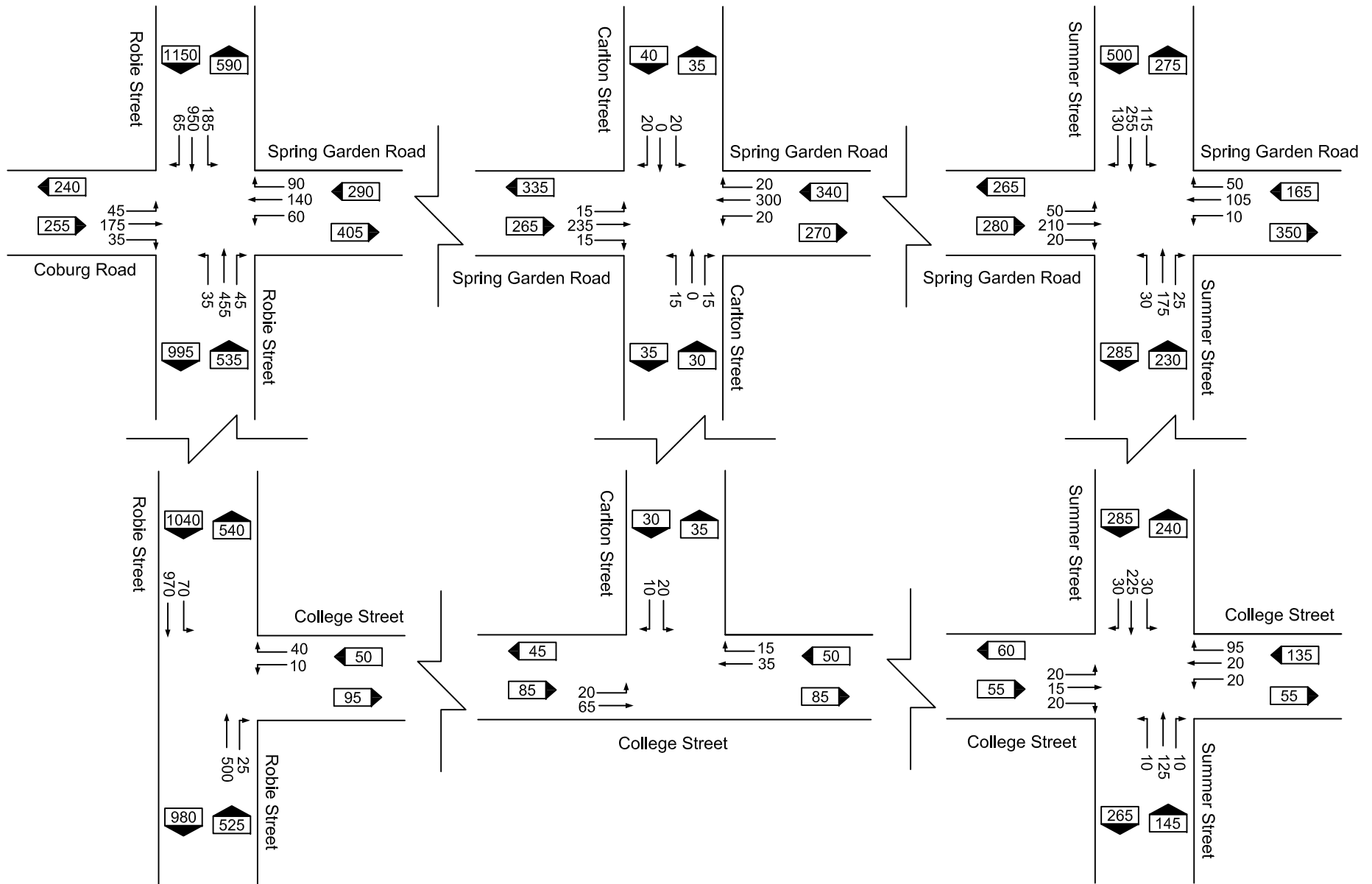


Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-1B

2020 Weekday PM Peak Hour
Without Background Traffic or Site Development

May 2020



AM Peak Hour

NOT TO SCALE

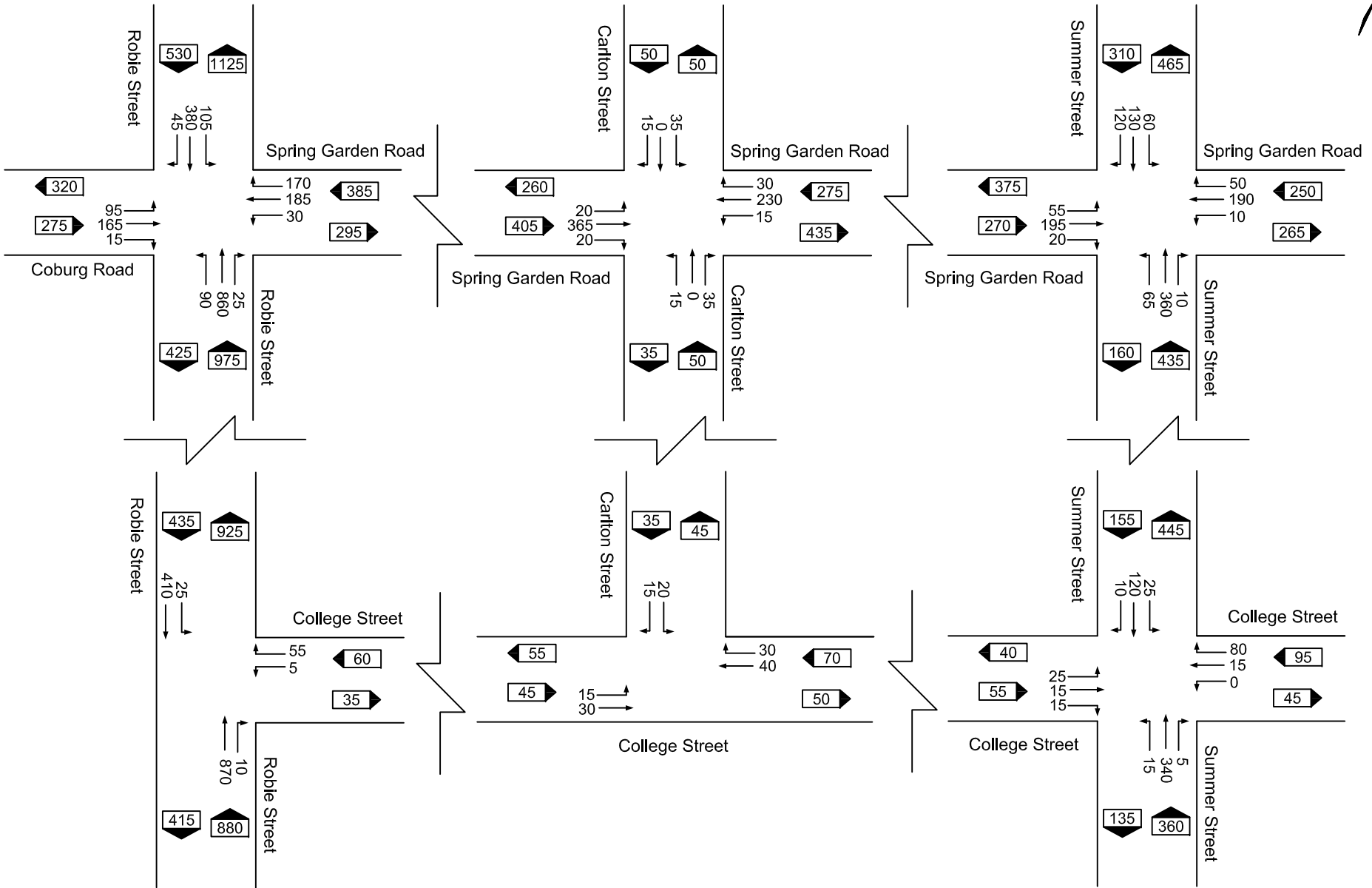


Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-2A

2024 Weekday AM Peak Hour
With Background Traffic and Without Site Development

May 2020



PM Peak Hour

NOT TO SCALE

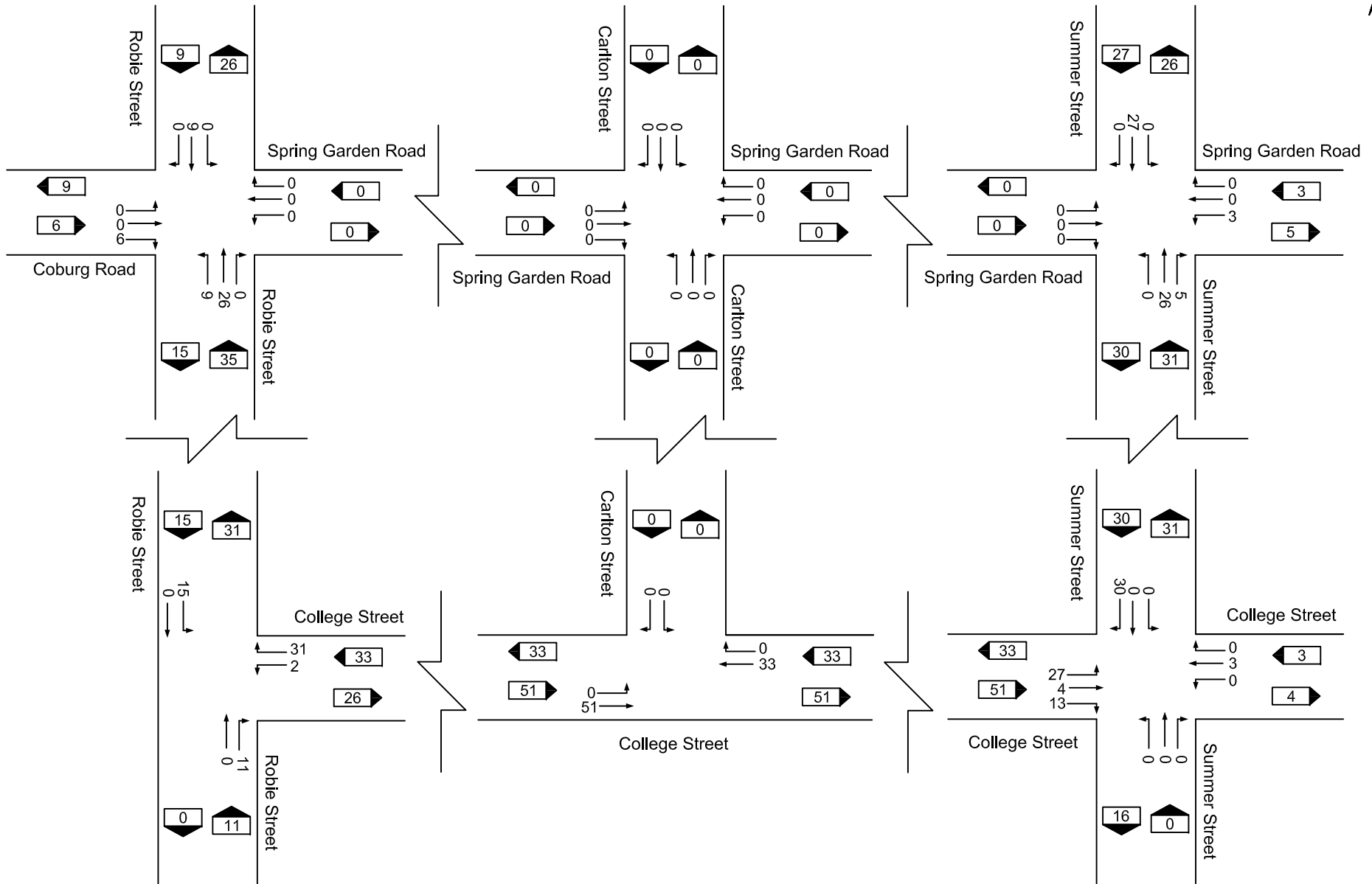


Traffic Impact Study - The Promenade
 Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-2B

2024 Weekday PM Peak Hour
 With Background Traffic and Without Site Development

May 2020



AM Peak Hour

NOT TO SCALE

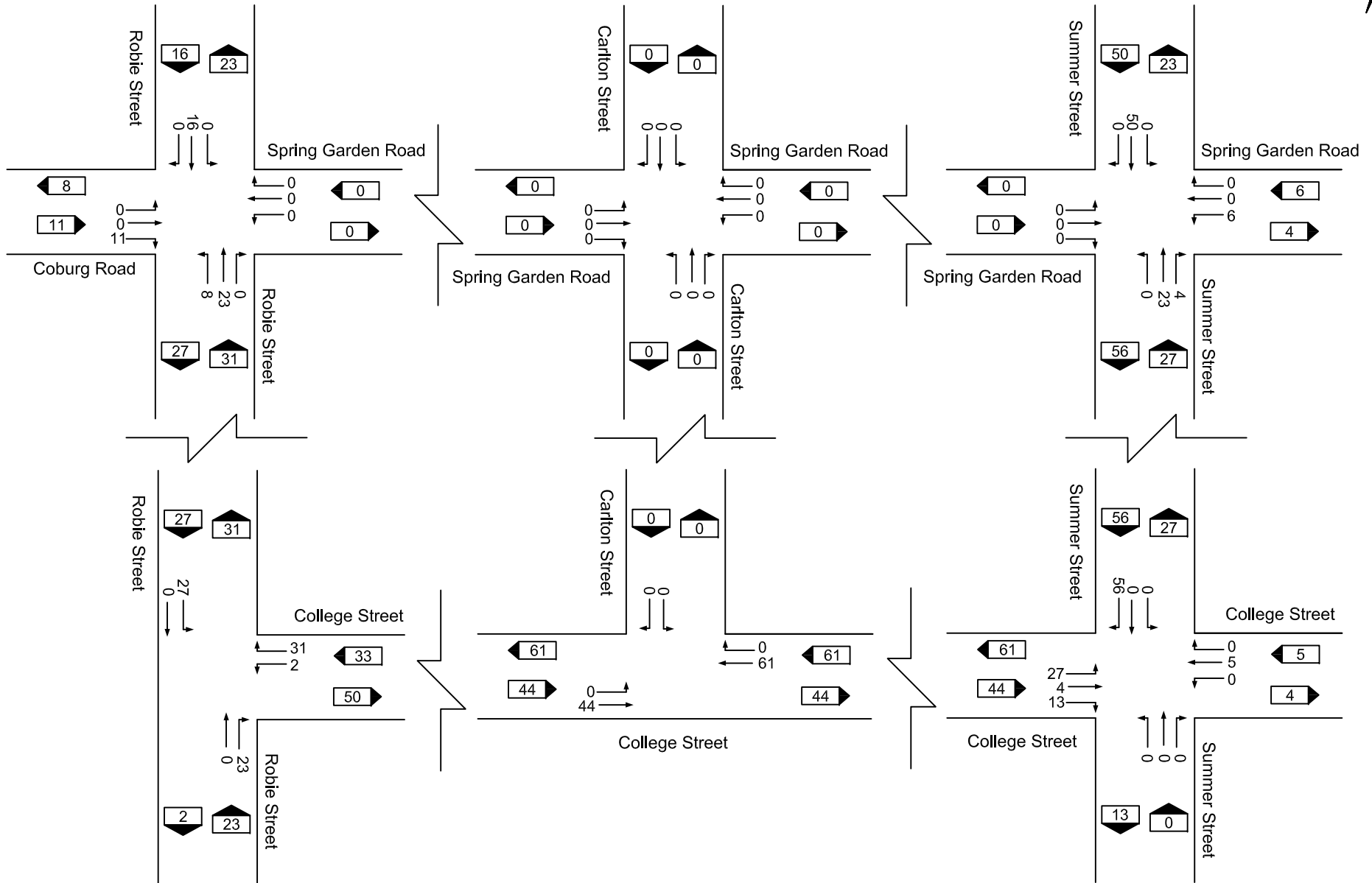


Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-3A

Case 20761 Site Generated Trip Estimates
AM Peak Hour

May 2020



PM Peak Hour

NOT TO SCALE

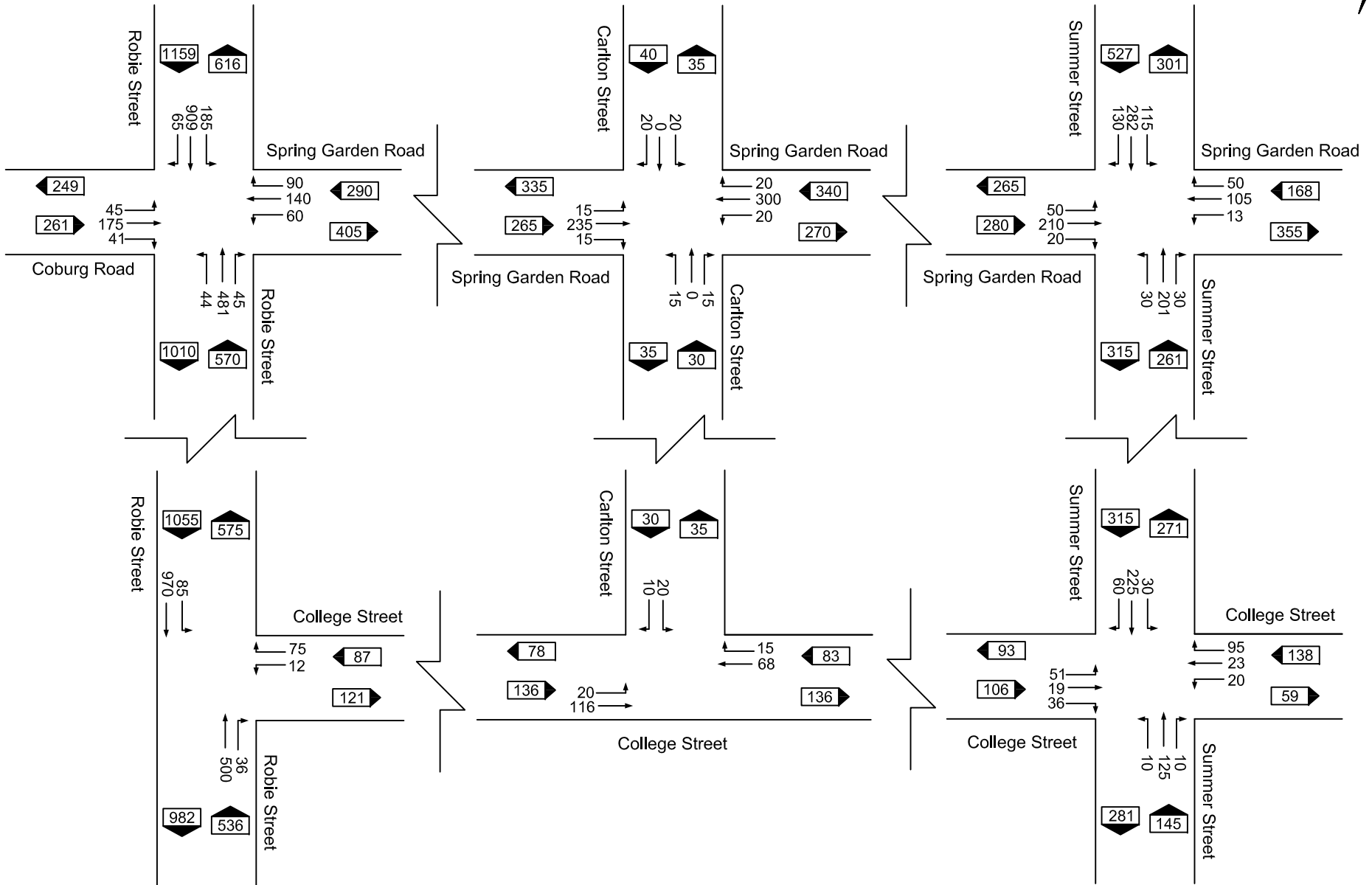


Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-3B

The Promenade Site Generated Trip Estimates
PM Peak Hour

May 2020



AM Peak Hour

NOT TO SCALE

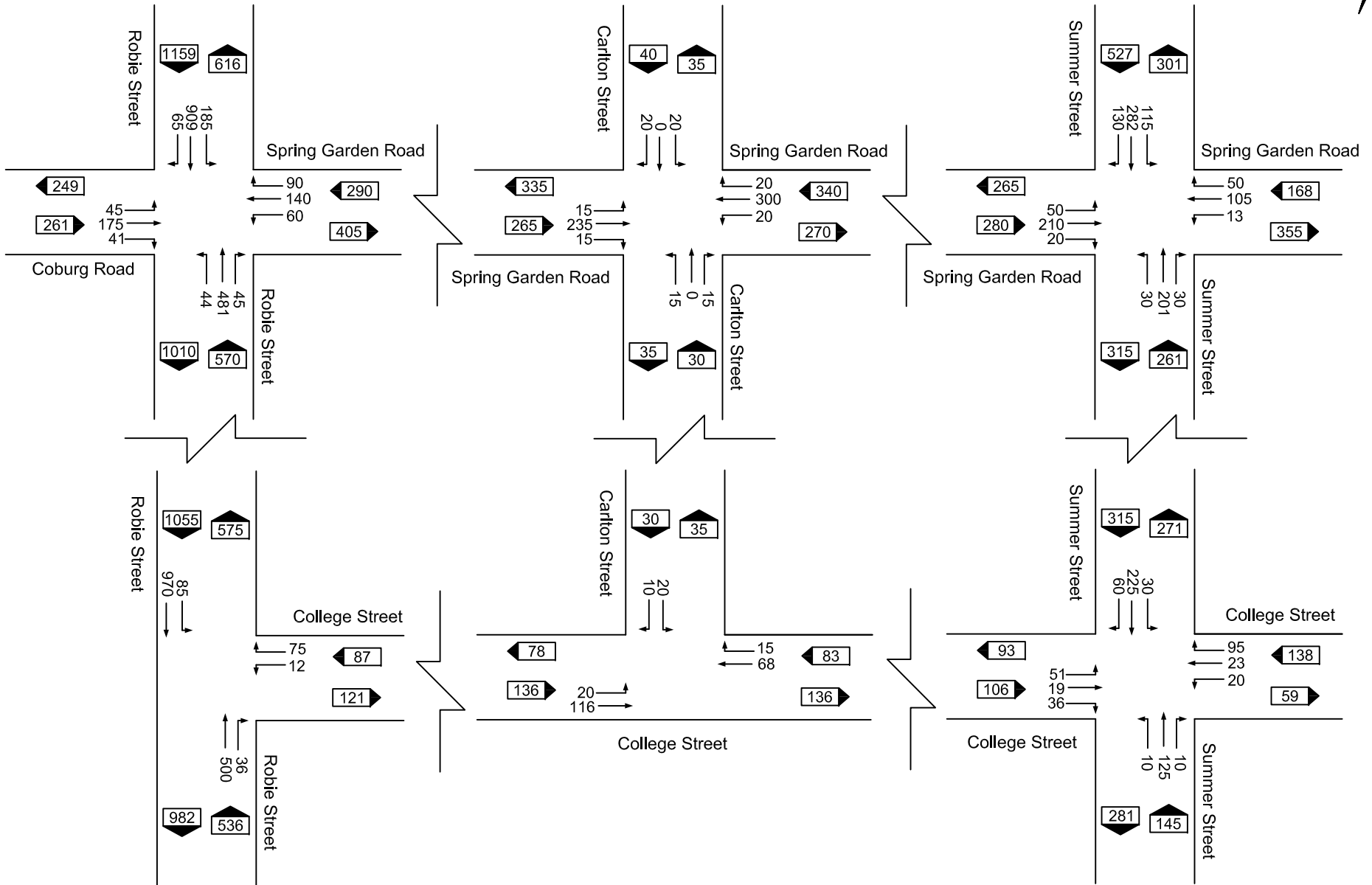


Traffic Impact Study - The Promenade
 Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

2024 Weekday AM Peak Hour
 With Background Traffic and Site Development

Figure A-4A

May 2020



PM Peak Hour

NOT TO SCALE



Traffic Impact Study - The Promenade
Property Bound by Robie Street, College Street and Carlton Street, Halifax, Nova Scotia

Figure A-4B

2024 Weekday PM Peak Hour
With Background Traffic and Site Development

May 2020

APPENDIX

B

INTERSECTION PERFORMANCE ANALYSIS

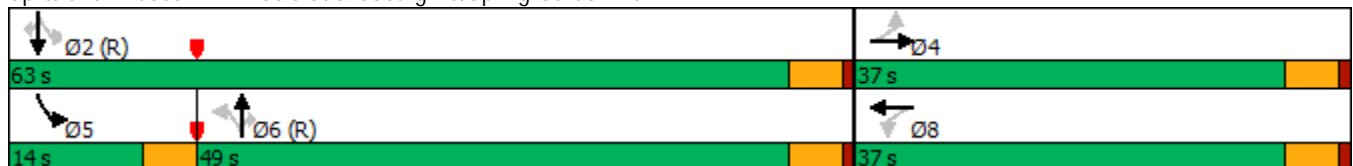













Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	165	35	55	130	80	35	455	40	175	900	65
Future Volume (vph)	45	165	35	55	130	80	35	455	40	175	900	65
Satd. Flow (prot)	1770	1800	0	0	3277	0	0	3529	1583	0	3511	1583
Flt Permitted	0.469				0.657			0.811			0.736	
Satd. Flow (perm)	829	1800	0	0	2154	0	0	2868	1336	0	2586	1435
Satd. Flow (RTOR)		9			58				65			70
Lane Group Flow (vph)	49	270	0	0	318	0	0	555	43	0	1201	71
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	37.0	37.0		37.0	37.0		49.0	49.0	49.0	14.0	63.0	63.0
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	19.9	19.9			19.9			70.1	70.1		70.1	70.1
Actuated g/C Ratio	0.20	0.20			0.20			0.70	0.70		0.70	0.70
v/c Ratio	0.30	0.74			0.67			0.28	0.05		0.66	0.07
Control Delay	36.9	48.2			36.5			6.6	1.0		11.6	1.9
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	36.9	48.2			36.5			6.6	1.0		11.6	1.9
LOS	D	D			D			A	A		B	A
Approach Delay		46.5			36.5			6.2			11.1	
Approach LOS		D			D			A			B	
Queue Length 50th (m)	8.6	50.3			25.9			19.3	0.0		63.1	0.1
Queue Length 95th (m)	18.2	53.6			29.6			32.9	2.3		105.5	5.0
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	265	582			728			2010	955		1812	1026
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.18	0.46			0.44			0.28	0.05		0.66	0.07

















Intersection Summary










Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 94 (94%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 17.6
 Intersection Capacity Utilization 89.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	10	40	500	25	70	965
Future Volume (Veh/h)	10	40	500	25	70	965
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.86	0.92	0.92	0.82
Hourly flow rate (vph)	12	49	581	27	76	1177
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.86					
vC, conflicting volume	1335	304			608	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1058	304			608	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	93			92	
cM capacity (veh/h)	174	692			966	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	61	387	221	468	785	
Volume Left	12	0	0	76	0	
Volume Right	49	0	27	0	0	
cSH	436	1700	1700	966	1700	
Volume to Capacity	0.14	0.23	0.13	0.08	0.46	
Queue Length 95th (m)	3.9	0.0	0.0	2.0	0.0	
Control Delay (s)	14.6	0.0	0.0	2.2	0.0	
Lane LOS	B			A		
Approach Delay (s)	14.6	0.0		0.8		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			56.7%		ICU Level of Service	B
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	220	15	20	285	20	15	0	15	15	0	15
Future Volume (Veh/h)	15	220	15	20	285	20	15	0	15	15	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.87	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	253	16	22	339	22	16	0	16	16	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		150			147							
pX, platoon unblocked												
vC, conflicting volume	361			269			703	698	261	703	695	350
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361			269			703	698	261	703	695	350
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	100	98	95	100	98
cM capacity (veh/h)	1198			1295			336	353	778	337	355	693
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	285	383	32	32								
Volume Left	16	22	16	16								
Volume Right	16	22	16	16								
cSH	1198	1295	469	454								
Volume to Capacity	0.01	0.02	0.07	0.07								
Queue Length 95th (m)	0.3	0.4	1.7	1.8								
Control Delay (s)	0.6	0.6	13.2	13.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.6	13.2	13.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			32.4%		ICU Level of Service				A			
Analysis Period (min)			15									

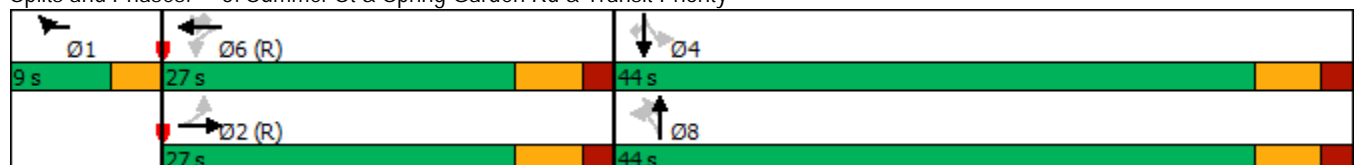
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	65	35	15	20	10
Future Volume (Veh/h)	20	65	35	15	20	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	71	38	16	22	11
Pedestrians						
Lane Width (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	54				161	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54				161	46
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				97	99
cM capacity (veh/h)	1551				818	1023
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	93	54	33			
Volume Left	22	0	22			
Volume Right	0	16	11			
cSH	1551	1700	877			
Volume to Capacity	0.01	0.03	0.04			
Queue Length 95th (m)	0.3	0.0	0.9			
Control Delay (s)	1.8	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	1.8	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			21.2%		ICU Level of Service	A
Analysis Period (min)			15			


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	200	20	10	85	10	50	30	175	25	115	255
Future Volume (vph)	50	200	20	10	85	10	50	30	175	25	115	255
Satd. Flow (prot)	0	3446	0	0	1853	808	1583	0	1811	0	0	1837
Flt Permitted		0.889			0.960				0.840			0.796
Satd. Flow (perm)	0	3042	0	0	1777	703	1583	0	1521	0	0	1465
Satd. Flow (RTOR)		9					82		10			
Lane Group Flow (vph)	0	336	0	0	116	11	54	0	257	0	0	444
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	27.0	27.0		27.0	27.0	9.0	27.0	44.0	44.0		44.0	44.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		37.0			37.0	41.2	37.0		29.2			29.2
Actuated g/C Ratio		0.46			0.46	0.52	0.46		0.36			0.36
v/c Ratio		0.24			0.14	0.03	0.07		0.46			0.83
Control Delay		15.9			16.8	13.0	3.0		20.0			36.3
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		15.9			16.8	13.0	3.0		20.0			36.3
LOS		B			B	B	A		C			D
Approach Delay		15.9			12.4				20.0			31.9
Approach LOS		B			B				C			C
Queue Length 50th (m)		15.2			9.8	0.8	0.0		29.2			63.0
Queue Length 95th (m)		29.0			25.1	4.1	4.9		40.4			69.2
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1410			821	370	775		727			695
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		0.24			0.14	0.03	0.07		0.35			0.64

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 25 (31%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 23.1
 Intersection Capacity Utilization 72.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

















Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority





Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	125
Future Volume (vph)	125
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	136
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	44.0
Total Lost Time (s)	6.0
Act Effct Green (s)	29.2
Actuated g/C Ratio	0.36
v/c Ratio	0.27
Control Delay	17.5
Queue Delay	0.0
Total Delay	17.5
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	14.9
Queue Length 95th (m)	23.3
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	655
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.21

Intersection Summary

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	15	20	20	20	95	10	125	10	30	225	30
Future Volume (Veh/h)	20	15	20	20	20	95	10	125	10	30	225	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.57	0.92	0.92	0.59	0.92	0.92	0.88	0.92	0.92	0.80	0.92
Hourly flow rate (vph)	22	26	22	22	34	103	11	142	11	33	281	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	653	538	298	568	550	148	314			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	492	355	69	391	369	148	88			153		
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 %	93	94	97	95	93	89	99			98		
cM capacity (veh/h)	334	464	835	434	456	899	1266			1428		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	70	159	164	347								
Volume Left	22	22	11	33								
Volume Right	22	103	11	33								
cSH	472	663	1266	1428								
Volume to Capacity	0.15	0.24	0.01	0.02								
Queue Length 95th (m)	4.1	7.5	0.2	0.6								
Control Delay (s)	14.0	12.1	0.6	0.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.0	12.1	0.6	0.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization			37.9%		ICU Level of Service				A			
Analysis Period (min)			15									

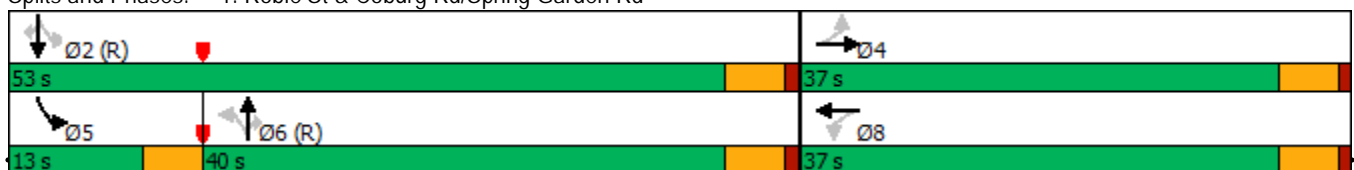
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	155	15	30	175	165	90	860	25	100	380	45
Future Volume (vph)	95	155	15	30	175	165	90	860	25	100	380	45
Satd. Flow (prot)	1770	1825	0	0	3190	0	0	3522	1583	0	3507	1583
Flt Permitted	0.338				0.895			0.821			0.640	
Satd. Flow (perm)	606	1825	0	0	2855	0	0	2896	1358	0	2265	1448
Satd. Flow (RTOR)		6			179				73			49
Lane Group Flow (vph)	103	192	0	0	434	0	0	1033	27	0	578	49
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	37.0	37.0		37.0	37.0		40.0	40.0	40.0	13.0	53.0	53.0
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	17.2	17.2			17.2			62.8	62.8		62.8	62.8
Actuated g/C Ratio	0.19	0.19			0.19			0.70	0.70		0.70	0.70
v/c Ratio	0.89	0.54			0.63			0.51	0.03		0.37	0.05
Control Delay	92.9	36.1			22.4			8.6	0.0		7.4	2.3
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	92.9	36.1			22.4			8.6	0.0		7.4	2.3
LOS	F	D			C			A	A		A	A
Approach Delay		56.0			22.4			8.4			7.0	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	18.5	30.9			22.0			39.4	0.0		19.1	0.0
Queue Length 95th (m)	#38.2	44.4			26.1			75.5	0.0		33.7	4.3
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	215	652			1130			2020	969		1579	1024
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.48	0.29			0.38			0.51	0.03		0.37	0.05












Intersection Summary

















Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 86.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E










95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	5	55	870	10	25	410
Future Volume (Veh/h)	5	55	870	10	25	410
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.91	0.92	0.92	0.87
Hourly flow rate (vph)	6	71	956	11	27	471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.98					
vC, conflicting volume	1251	484			967	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1207	484			967	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	87			96	
cM capacity (veh/h)	165	529			708	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	77	637	330	184	314	
Volume Left	6	0	0	27	0	
Volume Right	71	0	11	0	0	
cSH	451	1700	1700	708	1700	
Volume to Capacity	0.17	0.37	0.19	0.04	0.18	
Queue Length 95th (m)	4.9	0.0	0.0	1.0	0.0	
Control Delay (s)	14.6	0.0	0.0	1.9	0.0	
Lane LOS	B			A		
Approach Delay (s)	14.6	0.0		0.7		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			40.4%		ICU Level of Service	A
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	345	20	15	215	25	15	0	15	30	0	15
Future Volume (Veh/h)	20	345	20	15	215	25	15	0	15	30	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	375	22	16	256	27	16	0	16	33	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		150			147							
pX, platoon unblocked	0.98			0.92			0.93	0.93	0.92	0.93	0.93	0.98
vC, conflicting volume	283			397			748	745	386	748	742	270
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			303			648	646	291	648	643	247
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 %	98			99			95	100	98	90	100	98
cM capacity (veh/h)	1280			1159			341	352	689	340	353	777
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	419	299	32	49								
Volume Left	22	16	16	33								
Volume Right	22	27	16	16								
cSH	1280	1159	456	417								
Volume to Capacity	0.02	0.01	0.07	0.12								
Queue Length 95th (m)	0.4	0.3	1.8	3.2								
Control Delay (s)	0.6	0.6	13.5	14.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.6	13.5	14.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			35.8%		ICU Level of Service				A			
Analysis Period (min)			15									

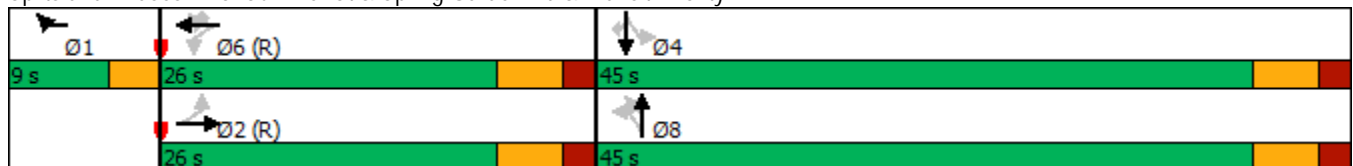
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	30	40	30	20	15
Future Volume (Veh/h)	15	30	40	30	20	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.81	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	16	37	51	33	22	16
Pedestrians						
Lane Width (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	84				136	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84				136	68
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				97	98
cM capacity (veh/h)	1513				848	996
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	53	84	38			
Volume Left	16	0	22			
Volume Right	0	33	16			
cSH	1513	1700	904			
Volume to Capacity	0.01	0.05	0.04			
Queue Length 95th (m)	0.3	0.0	1.1			
Control Delay (s)	2.3	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	2.3	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			19.1%	ICU Level of Service		A
Analysis Period (min)			15			


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	175	20	10	160	15	50	60	360	10	60	130
Future Volume (vph)	50	175	20	10	160	15	50	60	360	10	60	130
Satd. Flow (prot)	0	3436	0	0	1857	808	1583	0	1841	0	0	1837
Flt Permitted		0.864			0.978				0.920			0.721
Satd. Flow (perm)	0	2954	0	0	1815	703	1583	0	1687	0	0	1333
Satd. Flow (RTOR)		10					82		2			
Lane Group Flow (vph)	0	303	0	0	209	16	54	0	480	0	0	228
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	26.0	26.0		26.0	26.0	9.0	26.0	45.0	45.0		45.0	45.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		37.1			37.1	41.7	37.1		28.7			28.7
Actuated g/C Ratio		0.46			0.46	0.52	0.46		0.36			0.36
v/c Ratio		0.22			0.25	0.04	0.07		0.79			0.48
Control Delay		15.7			17.4	12.6	3.1		32.3			22.0
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		15.7			17.4	12.6	3.1		32.3			22.0
LOS		B			B	B	A		C			C
Approach Delay		15.7			14.4				32.3			20.5
Approach LOS		B			B				C			C
Queue Length 50th (m)		13.3			18.4	1.2	0.0		66.7			27.5
Queue Length 95th (m)		26.8			43.0	5.2	4.9		84.9			34.0
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1376			842	375	778		823			649
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		0.22			0.25	0.04	0.07		0.58			0.35

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 44 (55%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 22.3
 Intersection Capacity Utilization 87.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

















Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority





Lane Group	SBR
Lane Configurations	7
Traffic Volume (vph)	115
Future Volume (vph)	115
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	125
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	45.0
Total Lost Time (s)	6.0
Act Effct Green (s)	28.7
Actuated g/C Ratio	0.36
v/c Ratio	0.25
Control Delay	17.6
Queue Delay	0.0
Total Delay	17.6
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	13.8
Queue Length 95th (m)	21.8
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	672
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.19

Intersection Summary

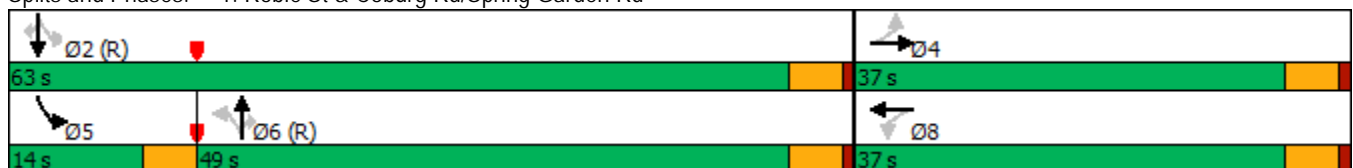
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	15	15	0	15	80	15	335	5	25	120	10
Future Volume (Veh/h)	25	15	15	0	15	80	15	335	5	25	120	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.58	0.92	0.92	0.52	0.92	0.92	0.86	0.92	0.92	0.81	0.92
Hourly flow rate (vph)	27	26	16	0	29	87	16	390	5	27	148	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	734	634	154	661	638	392	159			395		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	706	603	105	631	606	392	110			395		
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 %	90	93	98	100	92	87	99			98		
cM capacity (veh/h)	270	385	917	345	383	656	1428			1164		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	116	411	186								
Volume Left	27	0	16	27								
Volume Right	16	87	5	11								
cSH	373	557	1428	1164								
Volume to Capacity	0.19	0.21	0.01	0.02								
Queue Length 95th (m)	5.4	6.2	0.3	0.6								
Control Delay (s)	16.8	13.2	0.4	1.4								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.8	13.2	0.4	1.4								
Approach LOS	C	B										
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			36.5%		ICU Level of Service				A			
Analysis Period (min)			15									












Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	175	35	60	140	90	35	455	45	185	900	65
Future Volume (vph)	45	175	35	60	140	90	35	455	45	185	900	65
Satd. Flow (prot)	1770	1803	0	0	3271	0	0	3529	1583	0	3511	1583
Flt Permitted	0.440				0.642			0.809			0.730	
Satd. Flow (perm)	781	1803	0	0	2102	0	0	2861	1336	0	2564	1435
Satd. Flow (RTOR)		8			61				65			69
Lane Group Flow (vph)	49	284	0	0	347	0	0	555	49	0	1212	71
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	37.0	37.0		37.0	37.0		49.0	49.0	49.0	14.0	63.0	63.0
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	20.7	20.7			20.7			69.3	69.3		69.3	69.3
Actuated g/C Ratio	0.21	0.21			0.21			0.69	0.69		0.69	0.69
v/c Ratio	0.30	0.75			0.72			0.28	0.05		0.68	0.07
Control Delay	36.6	48.1			38.3			6.9	1.4		12.5	2.0
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	36.6	48.1			38.3			6.9	1.4		12.5	2.0
LOS	D	D			D			A	A		B	A
Approach Delay		46.4			38.3			6.5			11.9	
Approach LOS		D			D			A			B	
Queue Length 50th (m)	8.5	53.3			28.8			19.8	0.0		66.5	0.1
Queue Length 95th (m)	18.1	55.6			32.3			34.0	3.0		112.3	5.2
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	249	582			714			1982	945		1776	1015
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.20	0.49			0.49			0.28	0.05		0.68	0.07

















Intersection Summary










Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 94 (94%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 18.7
 Intersection Capacity Utilization 90.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	10	40	500	25	70	970
Future Volume (Veh/h)	10	40	500	25	70	970
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.86	0.92	0.92	0.82
Hourly flow rate (vph)	12	49	581	27	76	1183
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.85					
vC, conflicting volume	1338	304			608	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1049	304			608	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	93			92	
cM capacity (veh/h)	175	692			966	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	61	387	221	470	789	
Volume Left	12	0	0	76	0	
Volume Right	49	0	27	0	0	
cSH	437	1700	1700	966	1700	
Volume to Capacity	0.14	0.23	0.13	0.08	0.46	
Queue Length 95th (m)	3.8	0.0	0.0	2.0	0.0	
Control Delay (s)	14.6	0.0	0.0	2.2	0.0	
Lane LOS	B			A		
Approach Delay (s)	14.6	0.0		0.8		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			56.8%		ICU Level of Service	B
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	235	15	20	300	20	15	0	15	20	0	20
Future Volume (Veh/h)	15	235	15	20	300	20	15	0	15	20	0	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.87	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	270	16	22	357	22	16	0	16	22	0	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		150			147							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	379			286			744	733	278	738	730	368
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	373			286			740	729	278	734	726	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	100	98	93	100	97
cM capacity (veh/h)	1179			1276			313	337	761	319	339	679
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	302	401	32	44								
Volume Left	16	22	16	22								
Volume Right	16	22	16	22								
cSH	1179	1276	443	434								
Volume to Capacity	0.01	0.02	0.07	0.10								
Queue Length 95th (m)	0.3	0.4	1.9	2.7								
Control Delay (s)	0.6	0.6	13.8	14.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.6	13.8	14.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			33.4%		ICU Level of Service				A			
Analysis Period (min)			15									

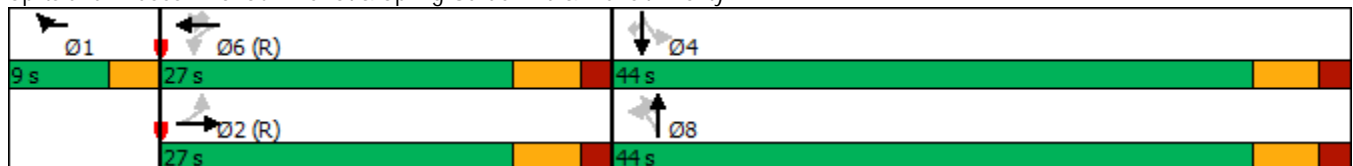
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	65	35	15	20	10
Future Volume (Veh/h)	20	65	35	15	20	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	71	38	16	22	11
Pedestrians						
Lane Width (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	54				161	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54				161	46
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				97	99
cM capacity (veh/h)	1551				818	1023
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	93	54	33			
Volume Left	22	0	22			
Volume Right	0	16	11			
cSH	1551	1700	877			
Volume to Capacity	0.01	0.03	0.04			
Queue Length 95th (m)	0.3	0.0	0.9			
Control Delay (s)	1.8	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	1.8	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			21.2%	ICU Level of Service		A
Analysis Period (min)			15			


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	210	20	10	95	10	50	30	175	25	115	255
Future Volume (vph)	50	210	20	10	95	10	50	30	175	25	115	255
Satd. Flow (prot)	0	3451	0	0	1855	808	1583	0	1811	0	0	1837
Flt Permitted		0.889			0.962				0.840			0.796
Satd. Flow (perm)	0	3048	0	0	1782	703	1583	0	1521	0	0	1465
Satd. Flow (RTOR)		8					82		10			
Lane Group Flow (vph)	0	349	0	0	128	11	54	0	257	0	0	444
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	27.0	27.0		27.0	27.0	9.0	27.0	44.0	44.0		44.0	44.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		37.0			37.0	41.2	37.0		29.2			29.2
Actuated g/C Ratio		0.46			0.46	0.52	0.46		0.36			0.36
v/c Ratio		0.25			0.16	0.03	0.07		0.46			0.83
Control Delay		16.0			16.8	13.0	3.0		20.0			36.3
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		16.0			16.8	13.0	3.0		20.0			36.3
LOS		B			B	B	A		C			D
Approach Delay		16.0			12.7				20.0			31.8
Approach LOS		B			B				C			C
Queue Length 50th (m)		15.9			10.9	0.8	0.0		29.2			63.0
Queue Length 95th (m)		30.1			27.3	4.1	4.9		40.4			69.2
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1412			823	370	775		727			695
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		0.25			0.16	0.03	0.07		0.35			0.64

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 25 (31%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 23.0
 Intersection Capacity Utilization 72.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

















Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority





Lane Group	SBR
Lane Configurations	7
Traffic Volume (vph)	130
Future Volume (vph)	130
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	141
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	44.0
Total Lost Time (s)	6.0
Act Effct Green (s)	29.2
Actuated g/C Ratio	0.36
v/c Ratio	0.28
Control Delay	17.7
Queue Delay	0.0
Total Delay	17.7
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	15.5
Queue Length 95th (m)	24.0
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	655
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.22

Intersection Summary

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	15	20	20	20	95	10	125	10	30	225	30
Future Volume (Veh/h)	20	15	20	20	20	95	10	125	10	30	225	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.57	0.92	0.92	0.59	0.92	0.92	0.88	0.92	0.92	0.80	0.92
Hourly flow rate (vph)	22	26	22	22	34	103	11	142	11	33	281	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	653	538	298	568	550	148	314			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	492	355	69	391	369	148	88			153		
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 %	93	94	97	95	93	89	99			98		
cM capacity (veh/h)	334	464	835	434	456	899	1266			1428		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	70	159	164	347								
Volume Left	22	22	11	33								
Volume Right	22	103	11	33								
cSH	472	663	1266	1428								
Volume to Capacity	0.15	0.24	0.01	0.02								
Queue Length 95th (m)	4.1	7.5	0.2	0.6								
Control Delay (s)	14.0	12.1	0.6	0.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	14.0	12.1	0.6	0.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization			37.9%		ICU Level of Service				A			
Analysis Period (min)			15									

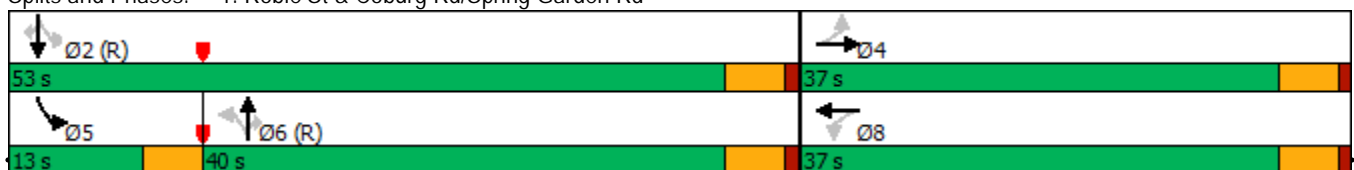
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	165	15	30	185	170	90	860	25	105	380	45
Future Volume (vph)	95	165	15	30	185	170	90	860	25	105	380	45
Satd. Flow (prot)	1770	1828	0	0	3194	0	0	3522	1583	0	3504	1583
Flt Permitted	0.324				0.888			0.820			0.629	
Satd. Flow (perm)	582	1828	0	0	2837	0	0	2893	1358	0	2226	1448
Satd. Flow (RTOR)		5			185				73			49
Lane Group Flow (vph)	103	204	0	0	452	0	0	1033	27	0	583	49
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	37.0	37.0		37.0	37.0		40.0	40.0	40.0	13.0	53.0	53.0
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	17.7	17.7			17.7			62.3	62.3		62.3	62.3
Actuated g/C Ratio	0.20	0.20			0.20			0.69	0.69		0.69	0.69
v/c Ratio	0.90	0.56			0.64			0.52	0.03		0.38	0.05
Control Delay	96.4	36.5			22.6			8.9	0.0		7.7	2.4
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	96.4	36.5			22.6			8.9	0.0		7.7	2.4
LOS	F	D			C			A	A		A	A
Approach Delay		56.6			22.6			8.6			7.3	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	18.5	33.1			23.2			40.3	0.0		19.7	0.0
Queue Length 95th (m)	#38.8	46.8			27.0			77.1	0.0		35.0	4.4
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	206	653			1127			2003	962		1541	1017
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.50	0.31			0.40			0.52	0.03		0.38	0.05












Intersection Summary

















Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 86.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E










95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	5	55	870	10	25	410
Future Volume (Veh/h)	5	55	870	10	25	410
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.91	0.92	0.92	0.87
Hourly flow rate (vph)	6	71	956	11	27	471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.97					
vC, conflicting volume	1251	484			967	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1206	484			967	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	87			96	
cM capacity (veh/h)	165	529			708	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	77	637	330	184	314	
Volume Left	6	0	0	27	0	
Volume Right	71	0	11	0	0	
cSH	452	1700	1700	708	1700	
Volume to Capacity	0.17	0.37	0.19	0.04	0.18	
Queue Length 95th (m)	4.9	0.0	0.0	1.0	0.0	
Control Delay (s)	14.6	0.0	0.0	1.9	0.0	
Lane LOS	B			A		
Approach Delay (s)	14.6	0.0		0.7		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			40.4%		ICU Level of Service	A
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	365	20	15	230	30	15	0	35	35	0	15
Future Volume (Veh/h)	20	365	20	15	230	30	15	0	35	35	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	397	22	16	274	33	16	0	38	38	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		150			147							
pX, platoon unblocked	0.97			0.91			0.93	0.93	0.91	0.93	0.93	0.97
vC, conflicting volume	307			419			790	791	408	812	786	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			318			666	666	305	689	660	254
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 %	98			99			95	100	94	88	100	98
cM capacity (veh/h)	1255			1136			331	342	671	308	345	762
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	441	323	54	54								
Volume Left	22	16	16	38								
Volume Right	22	33	38	16								
cSH	1255	1136	515	374								
Volume to Capacity	0.02	0.01	0.10	0.14								
Queue Length 95th (m)	0.4	0.3	2.8	4.0								
Control Delay (s)	0.6	0.5	12.8	16.3								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.6	0.5	12.8	16.3								
Approach LOS			B	C								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			39.5%		ICU Level of Service				A			
Analysis Period (min)			15									

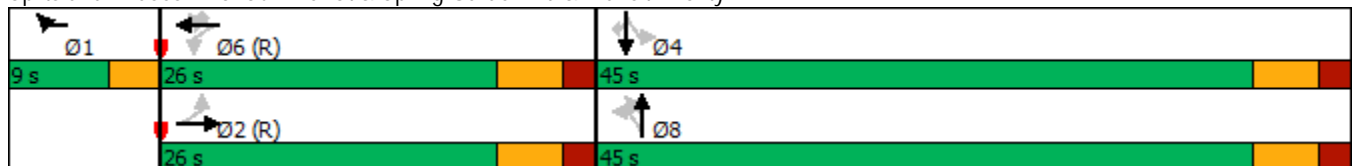
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	30	40	30	20	15
Future Volume (Veh/h)	15	30	40	30	20	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.81	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	16	37	51	33	22	16
Pedestrians						
Lane Width (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	84				136	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84				136	68
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				97	98
cM capacity (veh/h)	1513				848	996
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	53	84	38			
Volume Left	16	0	22			
Volume Right	0	33	16			
cSH	1513	1700	904			
Volume to Capacity	0.01	0.05	0.04			
Queue Length 95th (m)	0.3	0.0	1.1			
Control Delay (s)	2.3	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	2.3	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			19.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	195	20	10	175	15	50	65	360	10	60	130
Future Volume (vph)	55	195	20	10	175	15	50	65	360	10	60	130
Satd. Flow (prot)	0	3443	0	0	1859	808	1583	0	1841	0	0	1837
Flt Permitted		0.857			0.978				0.913			0.726
Satd. Flow (perm)	0	2937	0	0	1816	703	1583	0	1673	0	0	1343
Satd. Flow (RTOR)		9					82		2			
Lane Group Flow (vph)	0	335	0	0	227	16	54	0	486	0	0	228
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	26.0	26.0		26.0	26.0	9.0	26.0	45.0	45.0		45.0	45.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		36.8			36.8	41.2	36.8		29.2			29.2
Actuated g/C Ratio		0.46			0.46	0.52	0.46		0.36			0.36
v/c Ratio		0.25			0.27	0.04	0.07		0.80			0.47
Control Delay		16.2			17.8	12.9	3.1		32.0			21.4
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		16.2			17.8	12.9	3.1		32.0			21.4
LOS		B			B	B	A		C			C
Approach Delay		16.2			14.9				32.0			19.9
Approach LOS		B			B				C			B
Queue Length 50th (m)		15.2			20.5	1.2	0.0		67.5			27.2
Queue Length 95th (m)		29.6			46.3	5.3	4.9		84.7			33.2
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1355			834	370	772		816			654
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		0.25			0.27	0.04	0.07		0.60			0.35

















Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 44 (55%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 22.0
 Intersection Capacity Utilization 87.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority



Lane Group	SBR
Lane Configurations	7
Traffic Volume (vph)	120
Future Volume (vph)	120
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	130
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	45.0
Total Lost Time (s)	6.0
Act Effct Green (s)	29.2
Actuated g/C Ratio	0.36
v/c Ratio	0.26
Control Delay	17.4
Queue Delay	0.0
Total Delay	17.4
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	14.2
Queue Length 95th (m)	22.2
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	672
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.19
Intersection Summary	

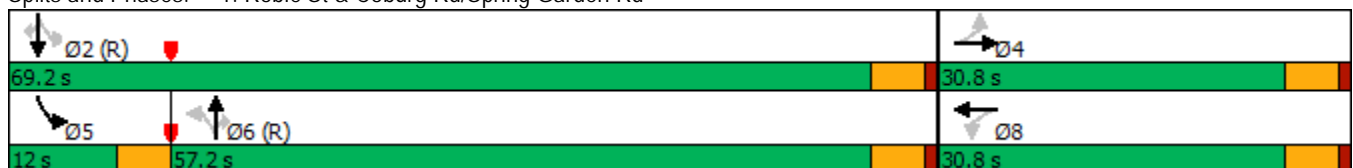
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	15	15	0	15	80	15	340	5	25	120	10
Future Volume (Veh/h)	25	15	15	0	15	80	15	340	5	25	120	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.58	0.92	0.92	0.52	0.92	0.92	0.86	0.92	0.92	0.81	0.92
Hourly flow rate (vph)	27	26	16	0	29	87	16	395	5	27	148	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	738	640	154	666	642	398	159			400		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712	609	106	637	612	398	112			400		
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 %	90	93	98	100	92	87	99			98		
cM capacity (veh/h)	267	382	916	342	381	652	1428			1159		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	116	416	186								
Volume Left	27	0	16	27								
Volume Right	16	87	5	11								
cSH	370	553	1428	1159								
Volume to Capacity	0.19	0.21	0.01	0.02								
Queue Length 95th (m)	5.4	6.3	0.3	0.6								
Control Delay (s)	17.0	13.2	0.4	1.4								
Lane LOS	C	B	A	A								
Approach Delay (s)	17.0	13.2	0.4	1.4								
Approach LOS	C	B										
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			36.8%		ICU Level of Service				A			
Analysis Period (min)			15									












Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	175	41	60	140	90	44	481	45	185	909	65
Future Volume (vph)	45	175	41	60	140	90	44	481	45	185	909	65
Satd. Flow (prot)	1770	1794	0	0	3271	0	0	3525	1583	0	3511	1583
Flt Permitted	0.438				0.629			0.774			0.717	
Satd. Flow (perm)	778	1794	0	0	2060	0	0	2736	1336	0	2519	1435
Satd. Flow (RTOR)		9			56				65			71
Lane Group Flow (vph)	49	291	0	0	347	0	0	595	49	0	1222	71
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	30.8	30.8		30.8	30.8		57.2	57.2	57.2	12.0	69.2	69.2
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	20.5	20.5			20.5			69.5	69.5		69.5	69.5
Actuated g/C Ratio	0.20	0.20			0.20			0.70	0.70		0.70	0.70
v/c Ratio	0.31	0.78			0.74			0.31	0.05		0.70	0.07
Control Delay	37.4	50.6			40.9			7.0	1.2		12.7	1.8
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	37.4	50.6			40.9			7.0	1.2		12.7	1.8
LOS	D	D			D			A	A		B	A
Approach Delay		48.7			40.9			6.6			12.1	
Approach LOS		D			D			A			B	
Queue Length 50th (m)	8.5	54.5			29.4			22.3	0.0		69.5	0.0
Queue Length 95th (m)	18.6	58.6			34.0			35.1	2.8		109.0	4.7
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	200	469			573			1901	948		1751	1019
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.24	0.62			0.61			0.31	0.05		0.70	0.07

















Intersection Summary










Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 94 (94%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.3
 Intersection Capacity Utilization 90.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	12	75	500	36	85	970
Future Volume (Veh/h)	12	75	500	36	85	970
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.81	0.86	0.92	0.92	0.82
Hourly flow rate (vph)	15	93	581	39	92	1183
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.85					
vC, conflicting volume	1376	310			620	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1091	310			620	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	86			90	
cM capacity (veh/h)	161	686			956	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	108	387	233	486	789	
Volume Left	15	0	0	92	0	
Volume Right	93	0	39	0	0	
cSH	472	1700	1700	956	1700	
Volume to Capacity	0.23	0.23	0.14	0.10	0.46	
Queue Length 95th (m)	7.0	0.0	0.0	2.5	0.0	
Control Delay (s)	14.9	0.0	0.0	2.7	0.0	
Lane LOS	B			A		
Approach Delay (s)	14.9	0.0		1.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			59.5%		ICU Level of Service	B
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	235	15	20	300	20	15	0	15	20	0	20
Future Volume (Veh/h)	15	235	15	20	300	20	15	0	15	20	0	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.87	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	270	16	22	357	22	16	0	16	22	0	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		150			147							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	379			286			744	733	278	738	730	368
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371			286			738	727	278	732	724	359
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	100	98	93	100	97
cM capacity (veh/h)	1179			1276			313	337	761	319	339	680
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	302	401	32	44								
Volume Left	16	22	16	22								
Volume Right	16	22	16	22								
cSH	1179	1276	443	435								
Volume to Capacity	0.01	0.02	0.07	0.10								
Queue Length 95th (m)	0.3	0.4	1.9	2.7								
Control Delay (s)	0.6	0.6	13.8	14.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.6	13.8	14.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			33.4%		ICU Level of Service				A			
Analysis Period (min)			15									

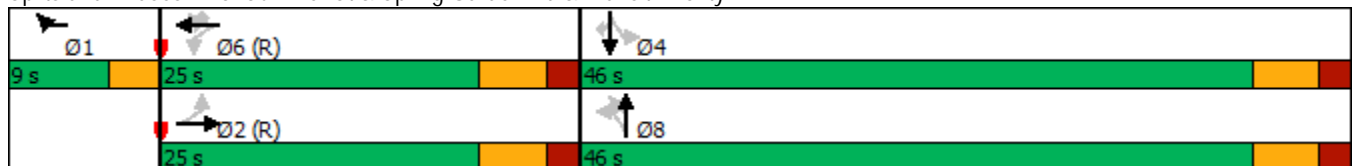
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	116	68	15	20	10
Future Volume (Veh/h)	20	116	68	15	20	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	126	74	16	22	11
Pedestrians						
Lane 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	90				252	82
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90				252	82
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				97	99
cM capacity (veh/h)	1505				726	978
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	148	90	33			
Volume Left	22	0	22			
Volume Right	0	16	11			
cSH	1505	1700	794			
Volume to Capacity	0.01	0.05	0.04			
Queue Length 95th (m)	0.4	0.0	1.0			
Control Delay (s)	1.2	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	1.2	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			23.9%		ICU Level of Service	A
Analysis Period (min)			15			


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	210	20	13	95	10	50	30	201	30	115	282
Future Volume (vph)	50	210	20	13	95	10	50	30	201	30	115	282
Satd. Flow (prot)	0	3451	0	0	1853	808	1583	0	1808	0	0	1839
Flt Permitted		0.887			0.949				0.850			0.792
Satd. Flow (perm)	0	3042	0	0	1755	703	1583	0	1538	0	0	1460
Satd. Flow (RTOR)		8					82		11			
Lane Group Flow (vph)	0	349	0	0	131	11	54	0	292	0	0	478
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	25.0	25.0		25.0	25.0	9.0	25.0	46.0	46.0		46.0	46.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		35.0			35.0	39.2	35.0		31.2			31.2
Actuated g/C Ratio		0.44			0.44	0.49	0.44		0.39			0.39
v/c Ratio		0.26			0.17	0.03	0.07		0.48			0.84
Control Delay		17.4			18.3	14.2	3.2		19.2			35.4
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		17.4			18.3	14.2	3.2		19.2			35.4
LOS		B			B	B	A		B			D
Approach Delay		17.4			13.9				19.2			31.0
Approach LOS		B			B				B			C
Queue Length 50th (m)		16.8			11.8	0.9	0.0		32.5			67.0
Queue Length 95th (m)		31.2			28.9	4.3	5.0		43.8			72.1
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1335			767	353	738		774			730
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			0.17	0.03	0.07		0.38			0.65

Intersection Summary

















Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 25 (31%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 23.1
 Intersection Capacity Utilization 74.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority





Lane Group	SBR
Lane Configurations	T
Traffic Volume (vph)	130
Future Volume (vph)	130
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	141
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	46.0
Total Lost Time (s)	6.0
Act Effct Green (s)	31.2
Actuated g/C Ratio	0.39
v/c Ratio	0.26
Control Delay	16.2
Queue Delay	0.0
Total Delay	16.2
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	14.8
Queue Length 95th (m)	22.6
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	689
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.20
Intersection Summary	

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	19	36	20	23	95	10	125	10	30	225	60
Future Volume (Veh/h)	47	19	36	20	23	95	10	125	10	30	225	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.57	0.92	0.92	0.59	0.92	0.92	0.88	0.92	0.92	0.80	0.92
Hourly flow rate (vph)	51	33	39	22	39	103	11	142	11	33	281	65
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82					
vC, conflicting volume	672	554	314	604	582	148	346			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495	353	61	414	386	148	100			153		
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 %	84	93	95	94	91	89	99			98		
cM capacity (veh/h)	322	457	828	398	438	899	1230			1428		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	123	164	164	379								
Volume Left	51	22	11	33								
Volume Right	39	103	11	65								
cSH	443	633	1230	1428								
Volume to Capacity	0.28	0.26	0.01	0.02								
Queue Length 95th (m)	9.0	8.2	0.2	0.6								
Control Delay (s)	16.2	12.7	0.6	0.9								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.2	12.7	0.6	0.9								
Approach LOS	C	B										
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization			43.5%		ICU Level of Service				A			
Analysis Period (min)			15									

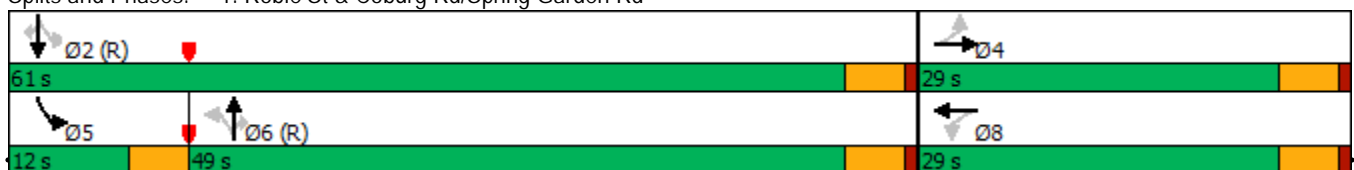
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	165	26	30	185	170	98	883	25	105	396	45
Future Volume (vph)	95	165	26	30	185	170	98	883	25	105	396	45
Satd. Flow (prot)	1770	1807	0	0	3194	0	0	3522	1583	0	3507	1583
Flt Permitted	0.326				0.873			0.806			0.624	
Satd. Flow (perm)	586	1807	0	0	2790	0	0	2843	1358	0	2208	1448
Satd. Flow (RTOR)		8			185				73			49
Lane Group Flow (vph)	103	216	0	0	452	0	0	1067	27	0	603	49
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8			6		5	2	
Permitted Phases	4			8			6		6	2		2
Total Split (s)	29.0	29.0		29.0	29.0		49.0	49.0	49.0	12.0	61.0	61.0
Total Lost Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	17.8	17.8			17.8			62.2	62.2		62.2	62.2
Actuated g/C Ratio	0.20	0.20			0.20			0.69	0.69		0.69	0.69
v/c Ratio	0.89	0.60			0.65			0.54	0.03		0.40	0.05
Control Delay	93.6	37.4			22.8			9.1	0.0		7.7	2.1
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	93.6	37.4			22.8			9.1	0.0		7.7	2.1
LOS	F	D			C			A	A		A	A
Approach Delay		55.5			22.8			8.9			7.3	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	18.2	34.3			22.8			45.1	0.0		21.8	0.0
Queue Length 95th (m)	#42.0	51.5			28.4			74.7	0.0		33.2	4.0
Internal Link Dist (m)		93.9			126.2			102.6			128.8	
Turn Bay Length (m)	25.0								50.0			50.0
Base Capacity (vph)	156	487			879			1964	960		1525	1015
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.66	0.44			0.51			0.54	0.03		0.40	0.05












Intersection Summary

















Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 87.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E










95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Robie St & Coburg Rd/Spring Garden Rd



						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	7	86	870	33	52	410
Future Volume (Veh/h)	7	86	870	33	52	410
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.91	0.92	0.92	0.87
Hourly flow rate (vph)	9	110	956	36	57	471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						126
pX, platoon unblocked	0.97					
vC, conflicting volume	1324	496			992	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1272	496			992	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	79			92	
cM capacity (veh/h)	142	519			693	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	119	637	355	214	314	
Volume Left	9	0	0	57	0	
Volume Right	110	0	36	0	0	
cSH	432	1700	1700	693	1700	
Volume to Capacity	0.28	0.37	0.21	0.08	0.18	
Queue Length 95th (m)	8.9	0.0	0.0	2.1	0.0	
Control Delay (s)	16.5	0.0	0.0	3.5	0.0	
Lane LOS	C			A		
Approach Delay (s)	16.5	0.0		1.4		
Approach LOS	C					
Intersection Summary						
Average Delay			1.7			
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)	20	365	20	15	230	30	15	0	35	35	0	15
Future Volume (Veh/h)	20	365	20	15	230	30	15	0	35	35	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	397	22	16	274	33	16	0	38	38	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)		150			147							
pX, platoon unblocked	0.97			0.91			0.93	0.93	0.91	0.93	0.93	0.97
vC, conflicting volume	307			419			790	791	408	812	786	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			316			660	661	304	684	655	252
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 %	98			99			95	100	94	88	100	98
cM capacity (veh/h)	1255			1136			334	344	672	310	347	763
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	441	323	54	54								
Volume Left	22	16	16	38								
Volume Right	22	33	38	16								
cSH	1255	1136	517	376								
Volume to Capacity	0.02	0.01	0.10	0.14								
Queue Length 95th (m)	0.4	0.3	2.8	4.0								
Control Delay (s)	0.6	0.5	12.8	16.2								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.6	0.5	12.8	16.2								
Approach LOS			B	C								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			39.5%		ICU Level of Service				A			
Analysis Period (min)			15									

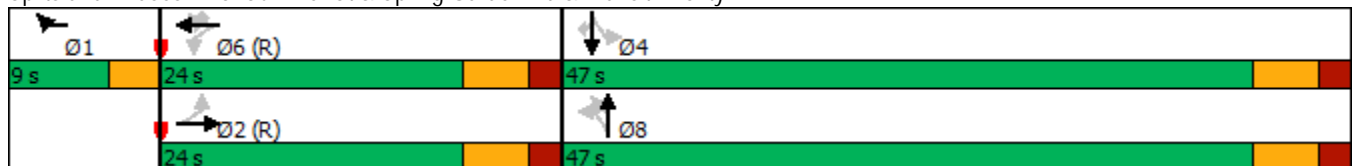
						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	74	101	30	20	15
Future Volume (Veh/h)	15	74	101	30	20	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.81	0.79	0.92	0.92	0.92
Hourly flow rate (vph)	16	91	128	33	22	16
Pedestrians						
Lane 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	161				268	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161				268	144
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				97	98
cM capacity (veh/h)	1418				714	903
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	107	161	38			
Volume Left	16	0	22			
Volume Right	0	33	16			
cSH	1418	1700	783			
Volume to Capacity	0.01	0.09	0.05			
Queue Length 95th (m)	0.3	0.0	1.2			
Control Delay (s)	1.2	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	1.2	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			25.2%	ICU Level of Service		A
Analysis Period (min)			15			


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	195	20	16	175	15	50	65	383	14	60	174
Future Volume (vph)	55	195	20	16	175	15	50	65	383	14	60	174
Satd. Flow (prot)	0	3443	0	0	1855	808	1583	0	1838	0	0	1842
Flt Permitted		0.854			0.963				0.908			0.768
Satd. Flow (perm)	0	2928	0	0	1785	703	1583	0	1664	0	0	1423
Satd. Flow (RTOR)		8					82		3			
Lane Group Flow (vph)	0	335	0	0	233	16	54	0	516	0	0	283
Turn Type	Perm	NA		Perm	NA	custom	Perm	Perm	NA		Perm	NA
Protected Phases		2			6	1			8			4
Permitted Phases	2			6		6	6	8			4	
Total Split (s)	24.0	24.0		24.0	24.0	9.0	24.0	47.0	47.0		47.0	47.0
Total Lost Time (s)		6.0			6.0	3.0	6.0		6.0			6.0
Act Effct Green (s)		34.9			34.9	39.4	34.9		31.0			31.0
Actuated g/C Ratio		0.44			0.44	0.49	0.44		0.39			0.39
v/c Ratio		0.26			0.30	0.05	0.07		0.80			0.51
Control Delay		17.6			19.5	14.1	3.3		30.6			21.0
Queue Delay		0.0			0.0	0.0	0.0		0.0			0.0
Total Delay		17.6			19.5	14.1	3.3		30.6			21.0
LOS		B			B	B	A		C			C
Approach Delay		17.6			16.3				30.6			19.4
Approach LOS		B			B				C			B
Queue Length 50th (m)		16.1			22.3	1.3	0.0		70.4			33.4
Queue Length 95th (m)		30.7			49.5	5.5	5.1		87.4			38.6
Internal Link Dist (m)		24.0			105.6				101.9			97.8
Turn Bay Length (m)						35.0	35.0					
Base Capacity (vph)		1283			779	354	737		854			729
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			0.30	0.05	0.07		0.60			0.39

Intersection Summary

















Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 44 (55%), Referenced to phase 6:WBTL and 2:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 22.1
 Intersection Capacity Utilization 89.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 5: Summer St & Spring Garden Rd & Transit Priority





Lane Group	SBR
Lane Configurations	7
Traffic Volume (vph)	120
Future Volume (vph)	120
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1379
Satd. Flow (RTOR)	
Lane Group Flow (vph)	130
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Total Split (s)	47.0
Total Lost Time (s)	6.0
Act Effct Green (s)	31.0
Actuated g/C Ratio	0.39
v/c Ratio	0.24
Control Delay	15.9
Queue Delay	0.0
Total Delay	15.9
LOS	B
Approach Delay	
Approach LOS	
Queue Length 50th (m)	13.6
Queue Length 95th (m)	20.9
Internal Link Dist (m)	
Turn Bay Length (m)	35.0
Base Capacity (vph)	706
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.18
Intersection Summary	

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	19	28	0	20	80	15	340	5	25	120	66
Future Volume (Veh/h)	52	19	28	0	20	80	15	340	5	25	120	66
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.58	0.92	0.92	0.52	0.92	0.92	0.86	0.92	0.92	0.81	0.92
Hourly flow rate (vph)	57	33	30	0	38	87	16	395	5	27	148	72
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											126	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	774	670	184	714	704	398	220			400		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717	605	81	653	641	398	120			400		
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 %	77	91	97	100	89	87	99			98		
cM capacity (veh/h)	248	369	908	310	352	652	1361			1159		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	120	125	416	247								
Volume Left	57	0	16	27								
Volume Right	30	87	5	72								
cSH	340	518	1361	1159								
Volume to Capacity	0.35	0.24	0.01	0.02								
Queue Length 95th (m)	12.4	7.5	0.3	0.6								
Control Delay (s)	21.2	14.2	0.4	1.1								
Lane LOS	C	B	A	A								
Approach Delay (s)	21.2	14.2	0.4	1.1								
Approach LOS	C	B										
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			39.9%		ICU Level of Service				A			
Analysis Period (min)			15									