



Sackville Drive Development

Sackville, NS

Transportation Impact Study

December 2021

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01 Introduction and Existing Conditions

1.1 Context and Study Area

This study was prepared to identify the anticipated impacts of a new multi-unit residential building on the north side of Sackville Drive and about 110 meters west of Skyridge Avenue. This building will be the second building constructed on the site and is located north and uphill of the first building which is currently under construction directly adjacent to Sackville Drive. The first building, was subject to a previous Transportation Impact Study prepared by Fathom Studios in October 2020. In general, the lands were previously undeveloped and characterized by relatively steep graded lands rising to the north of Sackville Drive towards Kaye Street.

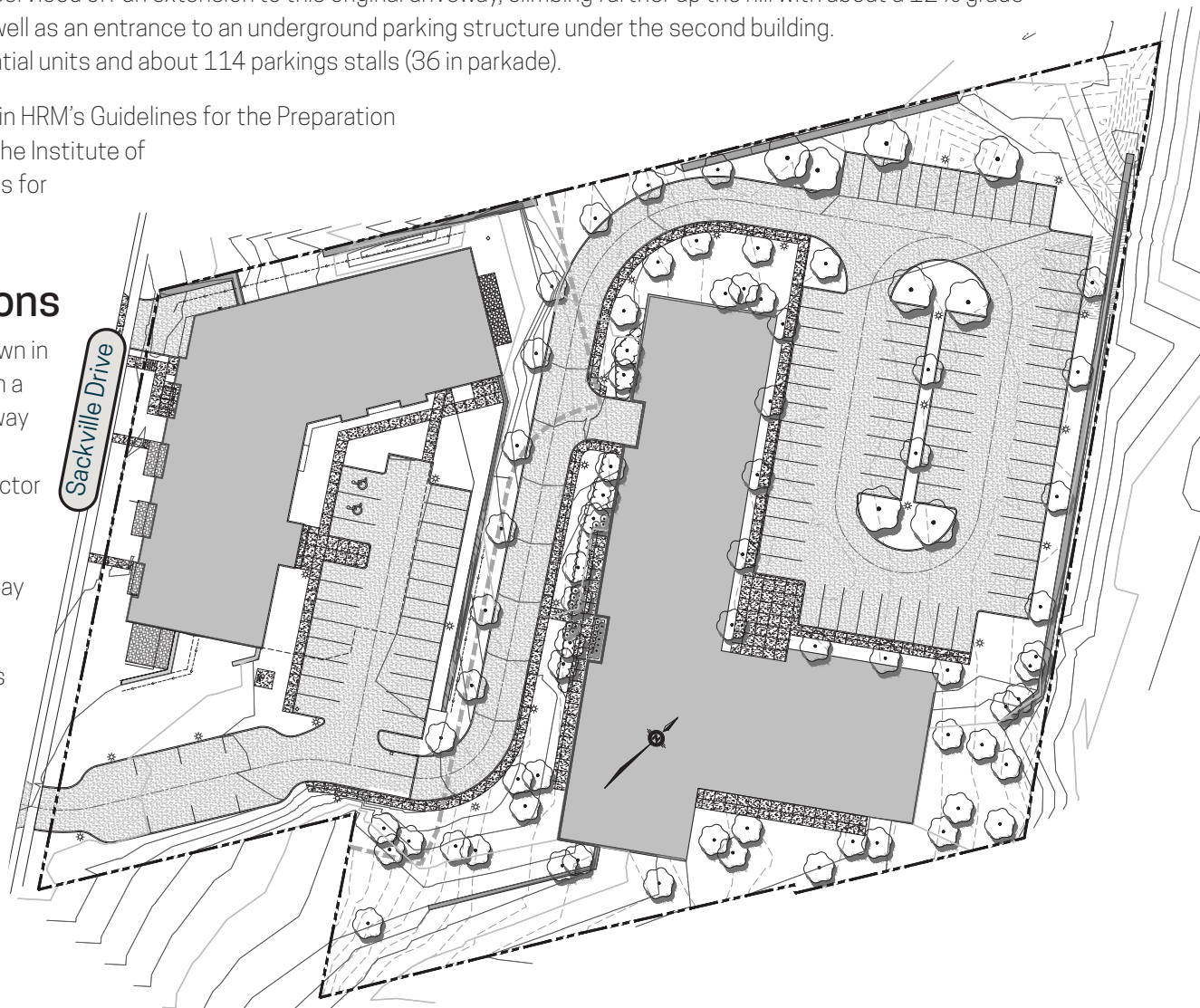
The first building closest to Sackville Drive consists of 54 units within a 5 story structure including about 59 underground and 26 surface parking stalls, as well as 27 class A and 6 class B bicycle parking stalls. Driveway access was provided directly off of Sackville Driveway that slopes up to a surface parking lot which in turn provides access to an underground parkade ramp. The second building is serviced off an extension to this original driveway, climbing further up the hill with about a 12% grade and provides access to a second surface parking lot as well as an entrance to an underground parking structure under the second building. The second building is anticipated to include 105 residential units and about 114 parkings stalls (36 in parkade).

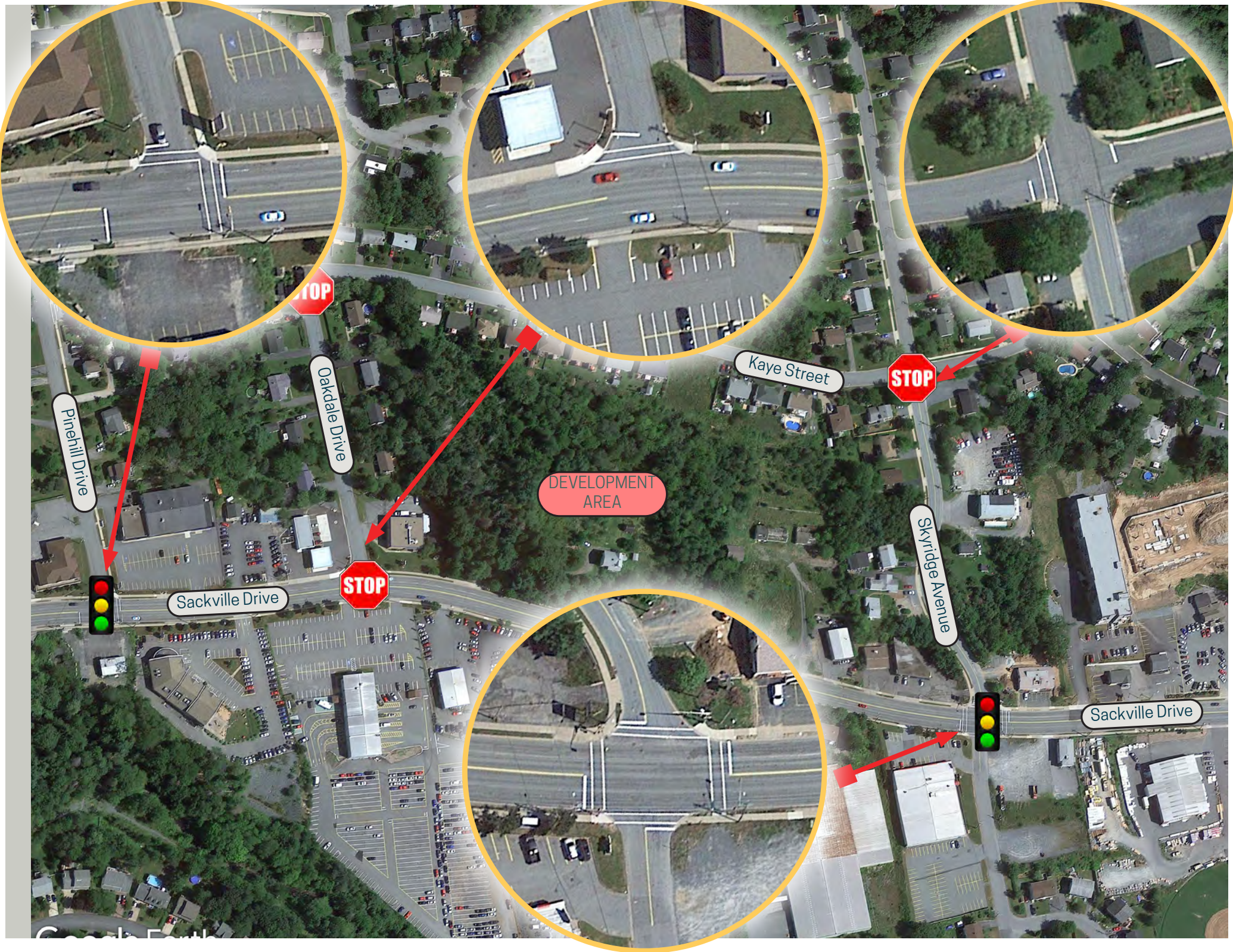
The study was carried out using methodologies defined in HRM's Guidelines for the Preparation of Transportation Impact Studies, guidance provided by the Institute of Transportation Engineers (ITE), and general best practices for such studies.

1.2 Roadways and Intersections

Sackville Drive in the vicinity of the development, as shown in the figure below, is a 4-lane undivided urban roadway with a posted speed limit of 50 km/hr. It is a major arterial roadway that forms part of Provincial Trunk Highway 1 with the portions of the roadway between the Beaverbank Connector and Cobequid Road service as a commercial / business corridor with a high level of access provided to various driveways off of Sackville Drive. In this regard, the driveway to the proposed development.

The nearest impacted intersection to the development is located about 110 meters east and is a 4-leg signalized intersection at Sackville Drive with Skyridge Avenue and the opposing Armoyan Drive. The intersection is composed of a single lane, full movement legs on both Skyridge Avenue and Armoyan Drive and two full through lanes in each direction on Sackville Drive that serve as both shared through/right, and shared through/left lanes. This intersection is discussed in greater detail in the Analysis sections of the report.





DEVELOPMENT
AREA

Pinehill Drive

Oakdale Drive

Kaye Street

STOP

Skridge Avenue

Sackville Drive

STOP

Sackville Drive



1.3 Other Transportation Infrastructure

Active Transportation

The proposed development has direct access to Sackville Drive, which includes concrete sidewalks along both sides of the roadway. Skyridge Avenue to the East also includes sidewalks on the west side of the roadway. Kaye Crescent to the north currently does not have sidewalks but has been identified for the future installation of sidewalks.

The development is in relatively close proximity to a variety of trails including minor trail residential connections north of Kaye Crescent and North of Hillside Ave and has direct access to the Bedford-

Sackville Greenway located approximately 900 meters to the southeast and the First Lake Trail network located approximately 1km to the north.

Transit

The figure below was extracted from the most recent Halifax Transit route map and shows the transit network in the areas surrounding the development. This includes 2 routes on Sackville Drive and 1 route on Glendale Drive.

The development is in close proximity to the Cobequid Transit Terminal about 1 km to the east, which services 7 different routes. It is also near the Sackville Terminal on Beaverbank Road about 2 km to the west which services 12 separate routes.



Truck Routes

Halifax's By-Law T-400 "Respecting the Establishment of Truck Routes for Certain Trucking Motor Vehicles within the HRM" defines Sackville Drive, Beaverbank Road and Cobequid Road as "Full Time" truck routes shown in blue in the figure below.



1.4 Existing Traffic

Existing traffic volumes were generated for the study area based on recent and historical intersection turning movement counts and road section counts provided by Halifax. Counts were obtained between the years 2016 and 2019 on streets and intersections surrounding the development. As the development is relatively small and adds limited traffic to the network, the study area addressed volumes that were present only on intersections and roadways immediately adjacent to the development. To bring traffic volumes to a common 2020 base year, past counts were increase using an average annual growth rate of 1%.

02 Proposed Development

New West Royalty Development

The overall development includes two buildings:

- The initial 5-storey residential building (Building A) consists of 54 residential units. This building is currently under construction and was addressed in a previous transportation impact study for this site. Access is provided of a main driveway to Sackville Street and a secondary access to the underground parkade also off Sackville Drive. This building is shown to the left in the figure below.
- A second 6-storey building with approximately 105 residential units. This building includes one level of underground parking, about 114 total parking spaces, and 3,500 ft² of amenity space.



Building B that is the subject of this study as shown to the right is accessed off the same driveway to Sackville Drive that services the upper parking lot of Building A. The extension of the driveway slopes upward toward the building with access to the underground parkade partway up the slope and access to the surface parking lot at the top of the slope. There are no commercial land uses proposed for this property at this time.

2.1 Trip Generation, Distribution and Assignment

Trips Generated by the Development

The new trips generated by the development were based on guidance provided from the Institute of Transportation Engineers (ITE) Trip Generation Guide (10th Edition). The table below shows the estimated trips generated by the overall development based on 54-units of residential development for the first building and an additional 105 residential units for the second building.

Transit and Active Transportation Impacts

Active transportation and transit connections are considered to be reasonable from this development given the proximity to routes on Sackville Drive and it is expected that some resident are likely to use active transportation or transit modes of travel for some trips. For the purposes of this analysis though, the study has assumed no trip generation reduction factors related to AT or transit availability in order to keep the analysis conservative.

Trip Distribution and Assignment

Trips to and from the proposed site are expected to distribute themselves in a manner similar to today's traffic distribution. The trip distribution assumptions have been applied to the traffic modeling exercise based on existing roadway volumes and logical route choices to and from the development site.

Land Use	Trip Code	# Units	Variable	AM Peak			PM Peak		
				Entering	Exiting	TOTAL	Entering	Exiting	TOTAL
Mid Rise - Building A Residential	221	54	Units	5	14	19	15	10	25
Mid Rise - Building B Residential	221	105	Units	9	27	36	28	18	46
TOTAL DEVELOPMENT TRIPS				14	41	55	43	28	71

03 Transportation Analysis



3.1 Transportation Modeling

A detailed traffic model was prepared using the Synchro/SimTraffic (v.10) platform for the weekday AM and PM peak hours of analysis. The model was used to gain insight into operations and capacity utilization at the various intersections directly impacted by the proposed development.

The analysis included the following models for each of the AM and PM peak hours:

- 2021 Baseline conditions; and,
- 2026 conditions with baseline growth plus development traffic.

The model preparation utilized the Traffic Impact Analysis tool-set contained within the Synchro model to distribute development traffic throughout the study area and for the application of background traffic.

The results of the modeling exercise are summarized for each peak period along the Sackville Drive corridor as it is the main entry and exit points to the

development. Specific results are shown for the development driveway locations and for the nearest intersection at Skyridge Avenue as it is the most significantly impacted intersection adjacent to the site. Results are shown in a graphical form that allows for the quick comparison of key performance criteria between the different analysis scenarios. Key performance indicators include:

- Peak hour volumes (vehicles / hour);
- Volume to capacity ratios (V/C); and,
- Average Delay (sec/vehicle).

The summary figures are followed by a brief discussion of the results for each peak period at that intersection highlighting key findings. Additional details are provided in the Synchro reports provided in Appendix D of this report.

3.2 AM Peak Hours Analysis

The figures to the right show the results of the AM Peak Hour analysis for existing (pre-development) and future conditions which includes background traffic growth and traffic related to the development. Results are shown for the adjusted volumes (including growth factors and peak hour factors), volume to capacity ratios (V/C indicates the portion of the total capacities at the intersection that are being utilized), and average delay in seconds per vehicle.

The results show that future volumes at the driveways and Skyridge intersection experience only minor increases in volume, with the background traffic composing a greater percentage of the total growth. Development related traffic represents a very small portion of the total traffic at the intersections.

As a result, there is virtually no change in volume to capacity ratios and all V/C ratios operate at less than 50% capacity utilization. Similarly, delays and queuing statistics remain almost identical in both scenarios. The exiting movements from the new development show that only about 3% of the total capacity of the driveway intersection is utilized and this results in an average vehicle delay of about 13 seconds during the AM peak hour.



3.3 AM Peak Hours Analysis

The figures to the right show the results of the PM Peak hour existing and future conditions with background traffic growth and development traffic in place. Results are very similar to the AM Peak hour showing that all movements at the signalized Sackville / Skyridge intersection operate at high levels of service and that there is significant excess capacity available to accommodate additional traffic.

Again, the new volumes through the driveways and the Skyridge intersections represent a very small portion of the total traffic at the intersections resulting in little change in volume to capacity ratios and delays. The exiting movements from the new development show that less than 10% of the total capacity of the driveway intersections are utilized and this results in an average vehicle delay of about 17 seconds at the main driveway during the PM peak hour. This is logical given that both eastbound and westbound volumes on Sackville Drive are relatively high during the PM peak, while volumes during the AM peak are heavy in the inbound (eastbound) direction but significantly lower in the westbound direction.

Under both scenarios, it is important to note that the signalized intersection to the east at Sackville / Skyridge / Armoyan, and the signalized intersection to the west at Sackville / Pinehill both contribute to increased gaps in traffic at the development's driveways. These gaps help traffic enter and exit Sackville Drive more easily and it is likely that actual operations may be better than those shown in this report.



3.4 Other Intersections

The intersections of Sackville Drive with Pinehill Drive and Oakdale Drive were also modeled as part of this analysis, though results show that new volumes created by the development have negligible impacts on these intersections and development volumes represent an even smaller percentage of overall traffic at those intersections. For these reasons, the report does not present formal analysis results for these intersections though Synchro reports have been provided in Appendix D.

04 Conclusions and Recommendations



This Transportation Impact Study was prepared to evaluate the impacts of two new residential buildings located on the north side of Sackville Drive just west of Skyridge Avenue in Sackville, Nova Scotia. The first building was addressed through a prior transportation impact study and included 54 new residential units. The second building that is the subject of this report adds an additional 105 units to the site and is accessed through the same driveway to Sackville Drive as evaluated during the original study.

This study shows that this driveway continues to operate at a high level of service with little delay and low capacity utilization with the addition of the second building. As noted in the earlier report, the driveways are reasonably spaced from adjacent and opposing driveways and functions well as a stop controlled intersection at Sackville Drive with a single entry and exit lane.

The proposed development is consistent with other residential properties located to the north of the site and complements the adjacent commercial land uses along Sackville Drive and schools that are in close proximity to the development.

The modeling exercise shows that the existing intersection operate with significant excess capacity and the new volumes from the development have very little impact to the overall volumes, capacity utilization, and delays at those intersections. The entry and exit movements from the driveway continue operate and a good level of service under proposed conditions and are expected to operate adequately well into the future.

The development is well situated to take advantage of transit with two regular routes located immediately adjacent to the development on Sackville Drive and another route on Glendale to the north. Two transit terminals are also located in relatively close proximity to the development

for additional transit options. The development connects to existing sidewalk infrastructure and accesses a variety of different on- and off-road active transportation routes including the First Lake Trail networks and the Bedford-Sackville Greenway.

As per the previous study, it is important that sight distances are achieved on both sides of the new driveways both to vehicles and pedestrians. This is not anticipated to be an issue given the relatively flat vertical and horizontal alignments along Sackville Drive near the development. Otherwise, the development does not generate any specific recommendations for infrastructure upgrades in order to accommodate the new traffic volumes generated by the development.

We trust that this report satisfies HRM's requirements for the preparation of a development Transportation Impact Study. Should there be any questions or comments regarding the content of the study, please do not hesitate to contact the undersigned.

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APPENDIX A

Appendix A: TRAFFIC COUNTS

MANUAL TRAFFIC COUNTS

INTERSECTION:

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

WEATHER
RECORDER

RAINY
SS

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

STREET: TIME: 15 MIN INTERVALS		SKYRIDGE AVENUE FROM THE EAST			ARMOYAN DRIVE FROM THE WEST			SACKVILLE DRIVE FROM THE NORTH			SACKVILLE DRIVE FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
07:00:00 AM	07:15:00 AM	3	0	2	2	1	9	2	118	0	2	27	3	169
07:15:00 AM	07:30:00 AM	6	2	2	4	2	17	3	163	4	3	61	4	271
07:30:00 AM	07:45:00 AM	12	2	2	6	4	18	2	134	2	5	74	8	269
07:45:00 AM	08:00:00 AM	10	1	6	10	1	5	1	136	2	2	63	2	239

TOTAL	31	5	12	22	8	49	8	551	8	12	225	17	948
PEAK	48			79			567			254			FACTOR
15 MIN PEAK	68			112			680			348			
PEAK HOUR FACTOR	0.71			0.71			0.83			0.73			
TWO WAY TOTALS	81			104			826			885			
													1
													948

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

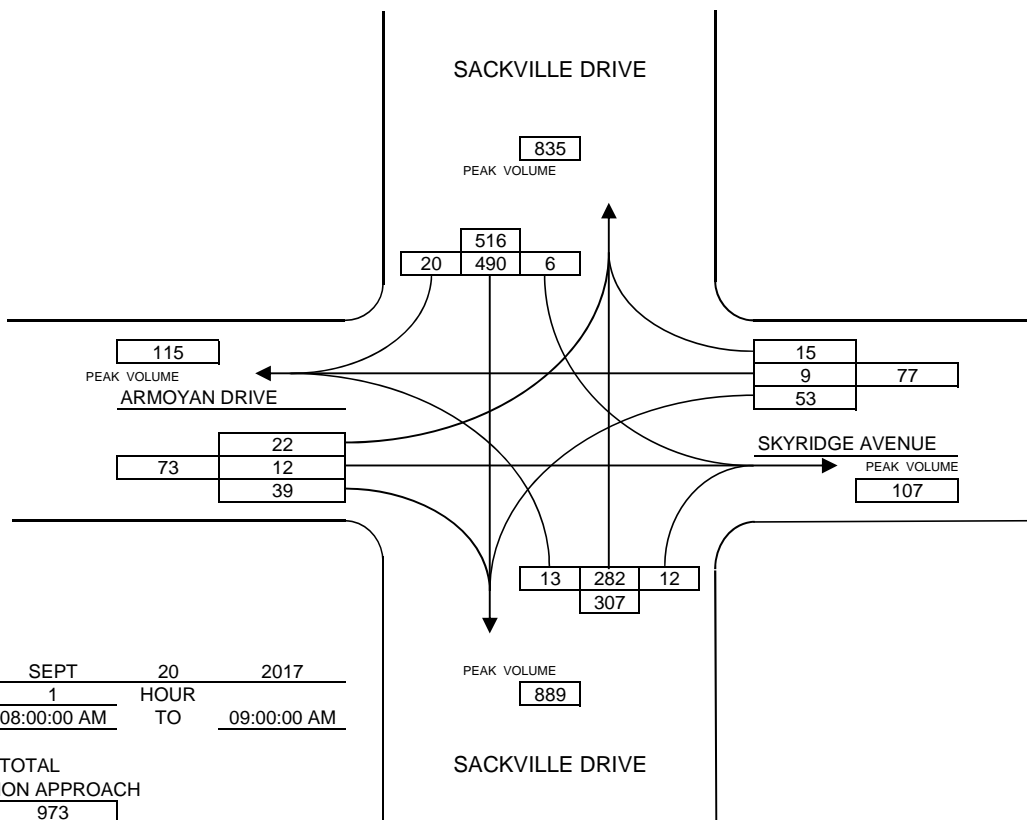
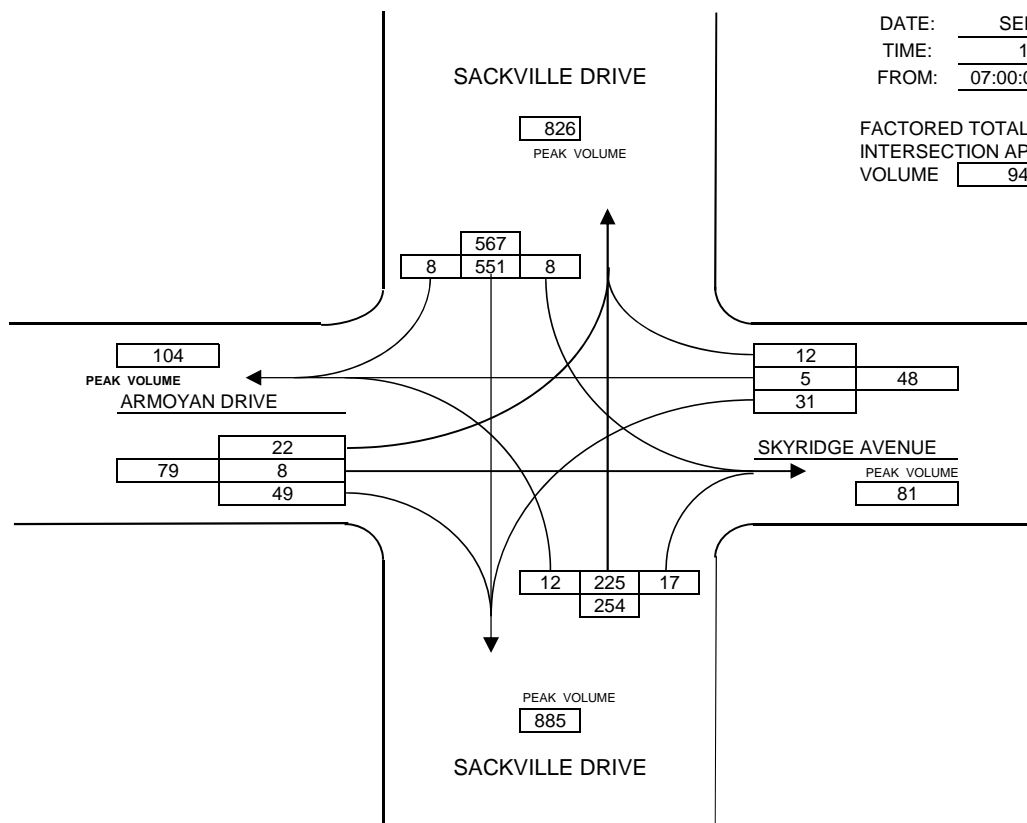
TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
08:00:00 AM	08:15:00 AM	13	3	6	7	3	8	2	123	5	3	77	6	256
08:15:00 AM	08:30:00 AM	17	3	1	4	6	10	1	119	4	2	73	1	241
08:30:00 AM	08:45:00 AM	14	2	3	6	2	9	2	122	6	3	67	3	239
08:45:00 AM	09:00:00 AM	9	1	5	5	1	12	1	126	5	5	65	2	237

TOTAL	53	9	15	22	12	39	6	490	20	13	282	12	973
PEAK	77			73			516			307			FACTOR
15 MIN PEAK	88			80			528			344			
PEAK HOUR FACTOR	0.88			0.91			0.98			0.89			
TWO WAY TOTALS	107			115			835			889			
1													
973													

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE



MANUAL TRAFFIC COUNTS

INTERSECTION:

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

WEATHER
RECORDER

RAINY/CLOUDY
SS

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

STREET:		SKYRIDGE AVENUE			ARMOYAN DRIVE			SACKVILLE DRIVE			SACKVILLE DRIVE			TOTAL
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
11:00:00 AM	11:15:00 AM	4	0	4	13	1	4	4	109	4	4	121	2	270
11:15:00 AM	11:30:00 AM	3	1	2	10	3	7	4	131	4	4	143	5	317
11:30:00 AM	11:45:00 AM	3	0	3	8	2	3	5	126	2	3	147	3	305
11:45:00 AM	12:00:00 PM	4	1	2	6	1	4	2	117	3	5	150	4	299

TOTAL	14	2	11	37	7	18	15	483	13	16	561	14	1191
PEAK	27			62			511			591			FACTOR
15 MIN PEAK	32			80			556			636			
PEAK HOUR FACTOR	0.84			0.78			0.92			0.93			
TWO WAY TOTALS	63			93			1120			1106			
													1
													1191

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

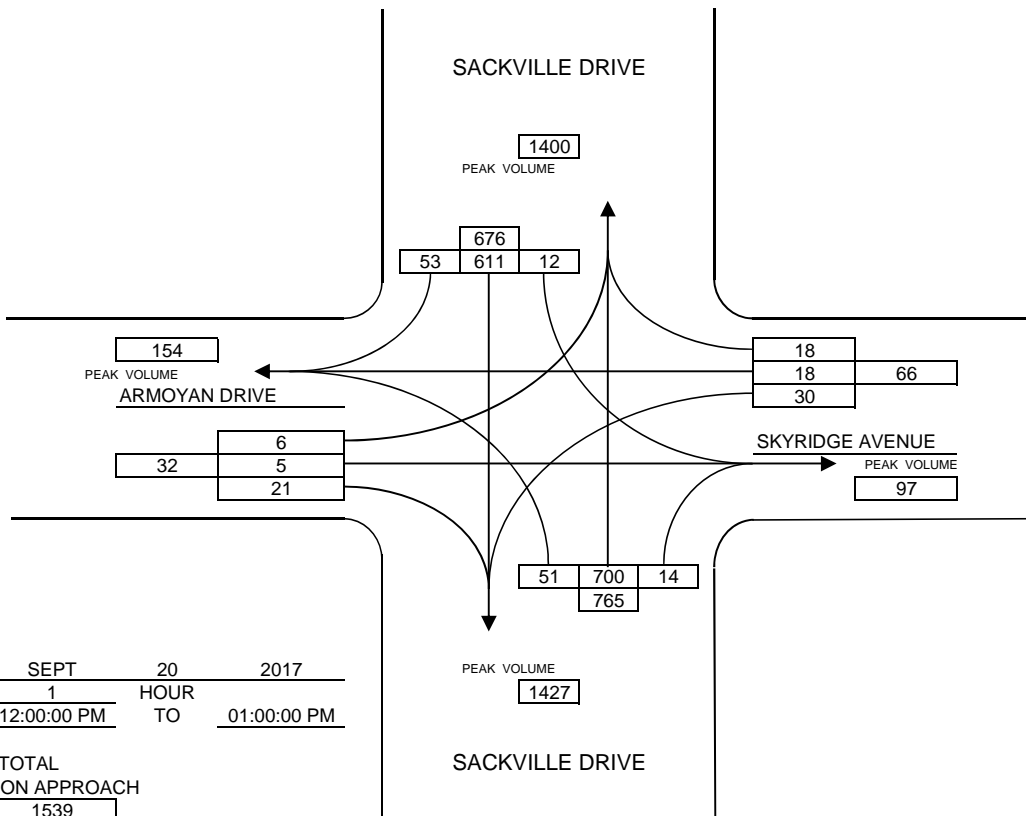
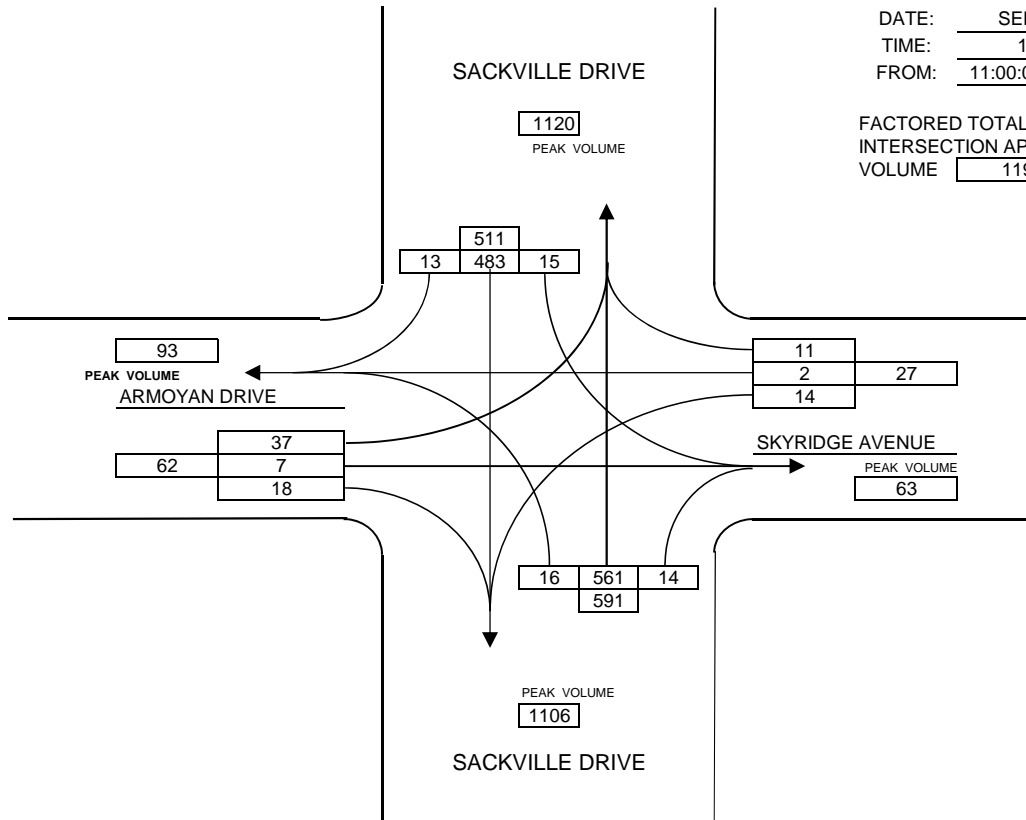
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
12:00:00 PM	12:15:00 PM	3	1	2	1	0	2	1	159	7	9	171	1	357
12:15:00 PM	12:30:00 PM	9	4	8	0	2	5	2	158	13	9	167	2	379
12:30:00 PM	12:45:00 PM	10	10	3	3	2	6	5	151	19	23	178	9	419
12:45:00 PM	01:00:00 PM	8	3	5	2	1	8	4	143	14	10	184	2	384

TOTAL	30	18	18	6	5	21	12	611	53	51	700	14	1539
PEAK	66			32			676			765			FACTOR
15 MIN PEAK	92			44			700			840			
PEAK HOUR FACTOR	0.72			0.73			0.97			0.91			
TWO WAY TOTALS	97			154			1400			1427			
													1
													1539

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE



MANUAL TRAFFIC COUNTS

INTERSECTION:

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

WEATHER
RECORDER

CLOUDY
SS

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

STREET: TIME: 15 MIN INTERVALS		SKYRIDGE AVENUE FROM THE EAST			ARMOYAN DRIVE FROM THE WEST			SACKVILLE DRIVE FROM THE NORTH			SACKVILLE DRIVE FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	7	3	2	5	0	10	3	134	4	11	183	4	366
04:15:00 PM	04:30:00 PM	8	4	3	8	3	2	2	120	5	10	188	7	360
04:30:00 PM	04:45:00 PM	3	1	9	1	2	11	2	145	12	9	166	14	375
04:45:00 PM	05:00:00 PM	8	4	8	6	1	1	1	132	1	8	98	13	281

TOTAL	26	12	22	20	6	24	8	531	22	38	635	38	1382
PEAK	60			50			561			711			FACTOR
15 MIN PEAK	80			60			636			820			
PEAK HOUR FACTOR	0.75			0.83			0.88			0.87			
TWO WAY TOTALS	112			122			1238			1292			
													1
													1382

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

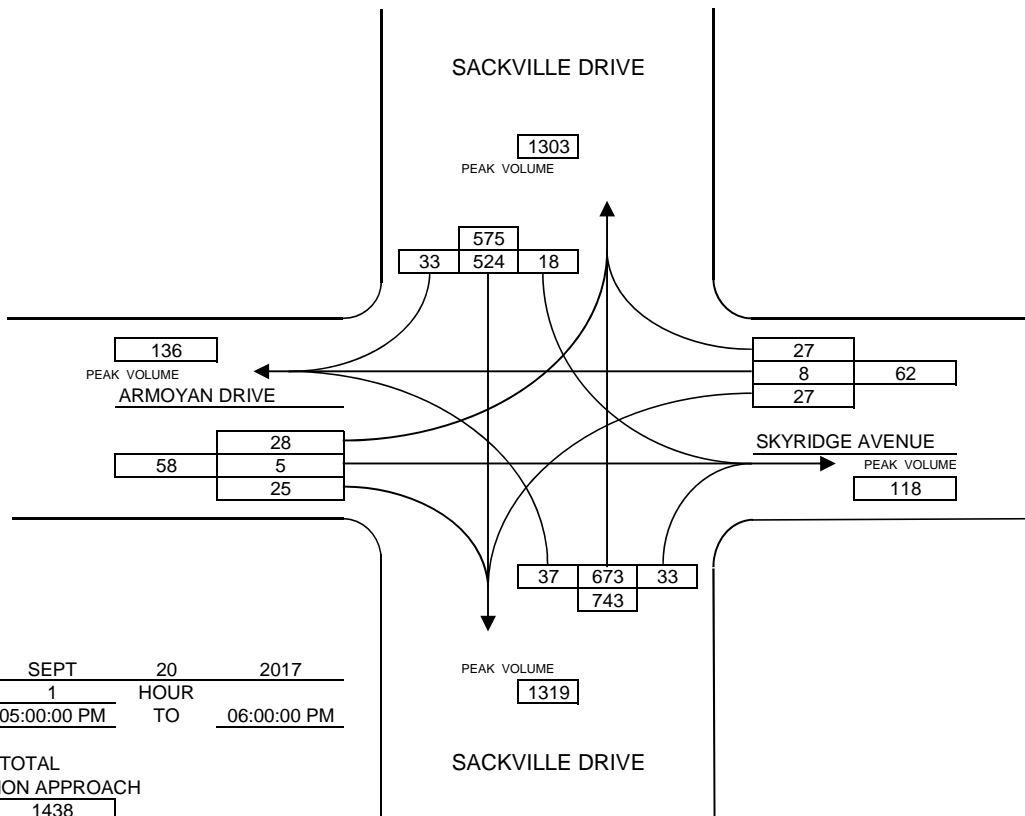
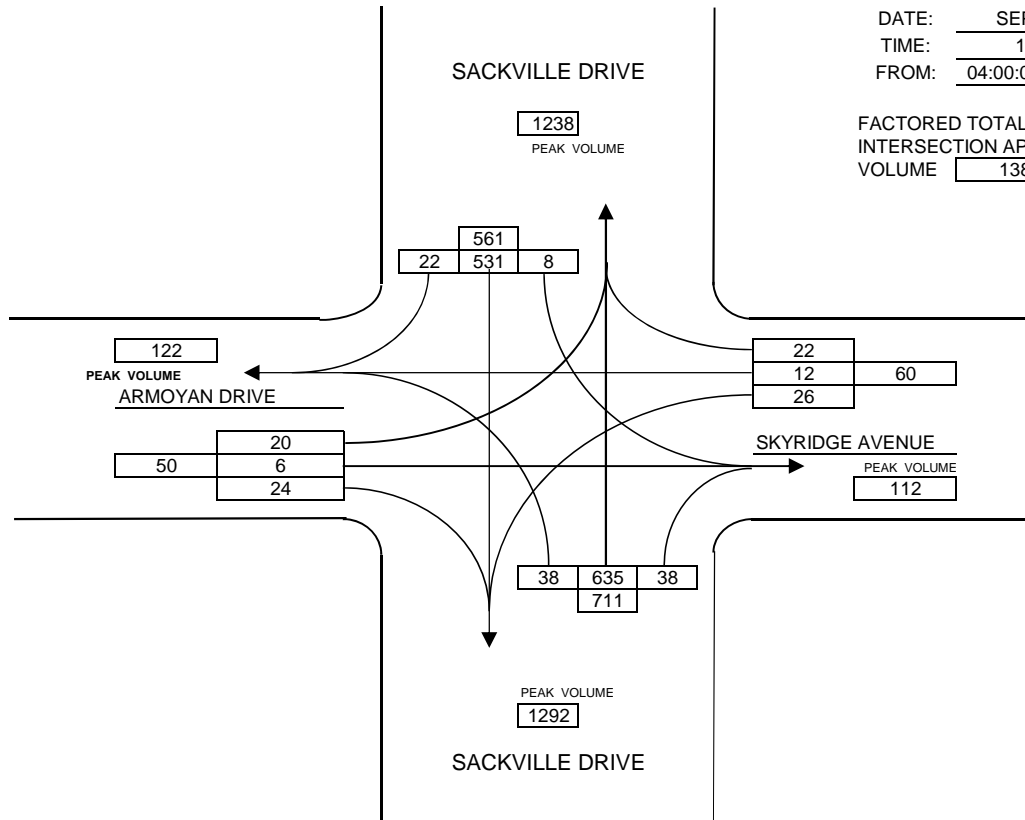
TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	9	3	12	8	2	8	5	135	8	10	166	9	375
05:15:00 PM	05:30:00 PM	7	2	5	9	0	7	6	139	8	7	183	11	384
05:30:00 PM	05:45:00 PM	7	3	3	7	2	5	3	128	11	7	165	6	347
05:45:00 PM	06:00:00 PM	4	0	7	4	1	5	4	122	6	13	159	7	332

TOTAL	27	8	27	28	5	25	18	524	33	37	673	33	1438
PEAK	62			58			575			743			FACTOR
15 MIN PEAK	96			72			612			804			
PEAK HOUR FACTOR	0.65			0.81			0.94			0.92			
TWO WAY TOTALS	118			136			1303			1319			
													1
													1438

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE



MANUAL TRAFFIC COUNTS

INTERSECTION:

PINEHILL DRIVE AT SACKVILLE DRIVE

WEATHER
RECORDER

RAINY
AA

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

TIME: 15 MIN INTERVALS		PINEHILL DRIVE FROM THE EAST			FACTORY 21 CAR REPAIR FROM THE WEST			SACKVILLE DRIVE FROM THE NORTH			SACKVILLE DRIVE FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
07:00:00 AM	07:15:00 AM	4	0	9	0	0	0	0	53	4	0	36	3	109
07:15:00 AM	07:30:00 AM	5	0	7	0	0	0	0	42	7	0	48	0	109
07:30:00 AM	07:45:00 AM	4	0	9	0	0	0	0	61	2	2	38	1	117
07:45:00 AM	08:00:00 AM	5	0	17	0	0	0	0	49	8	0	44	4	127

TOTAL	18	0	42	0	0	0	0	205	21	2	166	8	462
PEAK	60			0			226			176			FACTOR
15 MIN PEAK	88			0			252			192			
PEAK HOUR FACTOR	0.68			0			0.9			0.92			
TWO WAY TOTALS	68			23			434			399			
													1
													462

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

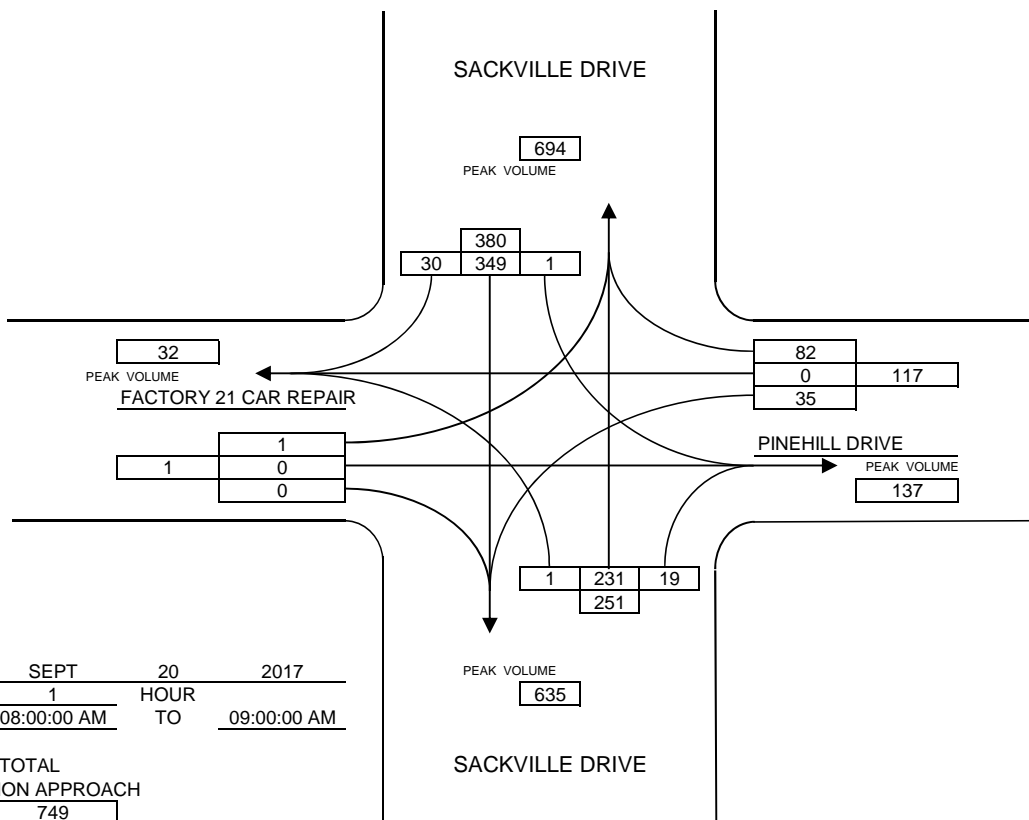
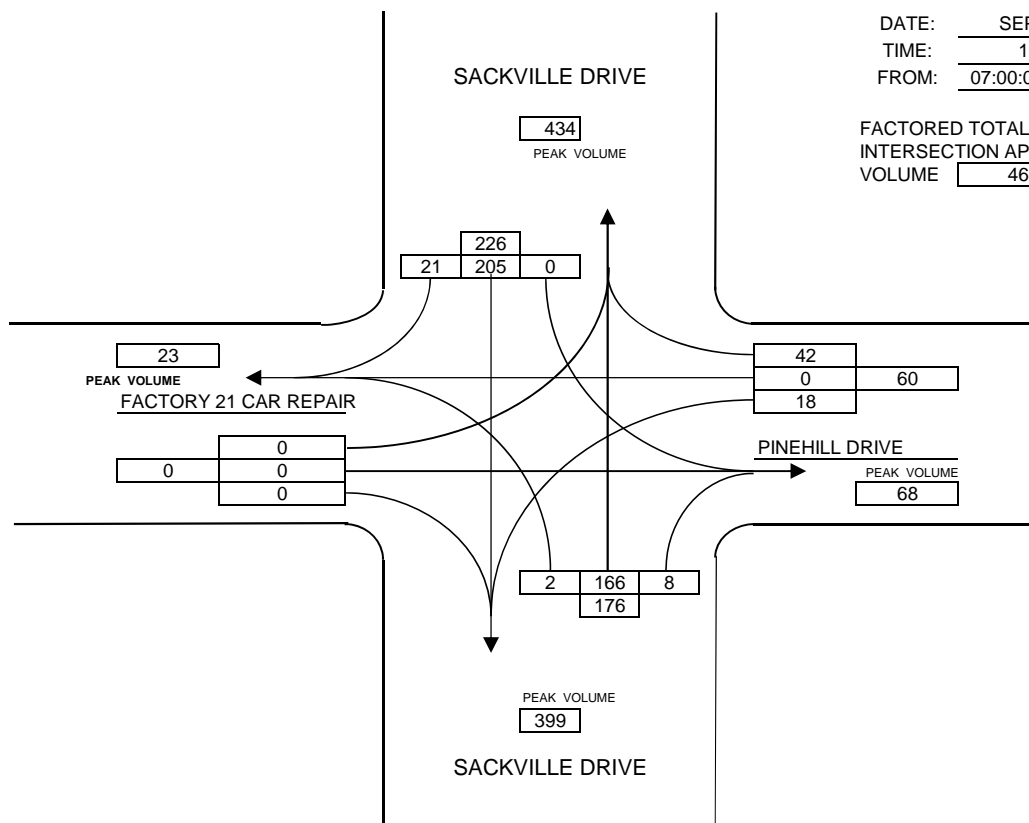
TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
08:00:00 AM	08:15:00 AM	8	0	23	0	0	0	1	78	6	0	54	3	173
08:15:00 AM	08:30:00 AM	11	0	19	0	0	0	0	73	11	1	57	5	177
08:30:00 AM	08:45:00 AM	7	0	18	1	0	0	0	97	6	0	49	8	186
08:45:00 AM	09:00:00 AM	9	0	22	0	0	0	0	101	7	0	71	3	213

TOTAL	35	0	82	1	0	0	1	349	30	1	231	19	749
PEAK	117			1			380			251			FACTOR
15 MIN PEAK	124			4			432			296			
PEAK HOUR FACTOR	0.94			0.25			0.88			0.85			
TWO WAY TOTALS	137			32			694			635			
													1
													749

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

PINEHILL DRIVE AT SACKVILLE DRIVE



MANUAL TRAFFIC COUNTS

INTERSECTION:

PINEHILL DRIVE AT SACKVILLE DRIVE

WEATHER
RECORDER

RAINY
AA

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

STREET: TIME: 15 MIN INTERVALS		PINEHILL DRIVE			FACTORY 21 CAR REPAIR			SACKVILLE DRIVE			SACKVILLE DRIVE			TOTAL
		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			
		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	8	0	21	0	0	0	16	116	0	0	157	11	329
04:15:00 PM	04:30:00 PM	6	0	25	1	0	0	19	128	0	0	148	8	335
04:30:00 PM	04:45:00 PM	7	0	24	0	0	0	22	134	0	0	114	6	307
04:45:00 PM	05:00:00 PM	11	0	22	0	0	0	30	121	0	0	134	9	327

TOTAL	32	0	92	1	0	0	87	499	0	0	553	34	1298
PEAK	124			1			586			587			FACTOR
15 MIN PEAK	132			4			624			672			
PEAK HOUR FACTOR	0.94			0.25			0.94			0.87			
TWO WAY TOTALS	245			1			1232			1118			
1													
1298													

DAY DATE MONTH YEAR
WEDNESDAY 20 SEPT 2017

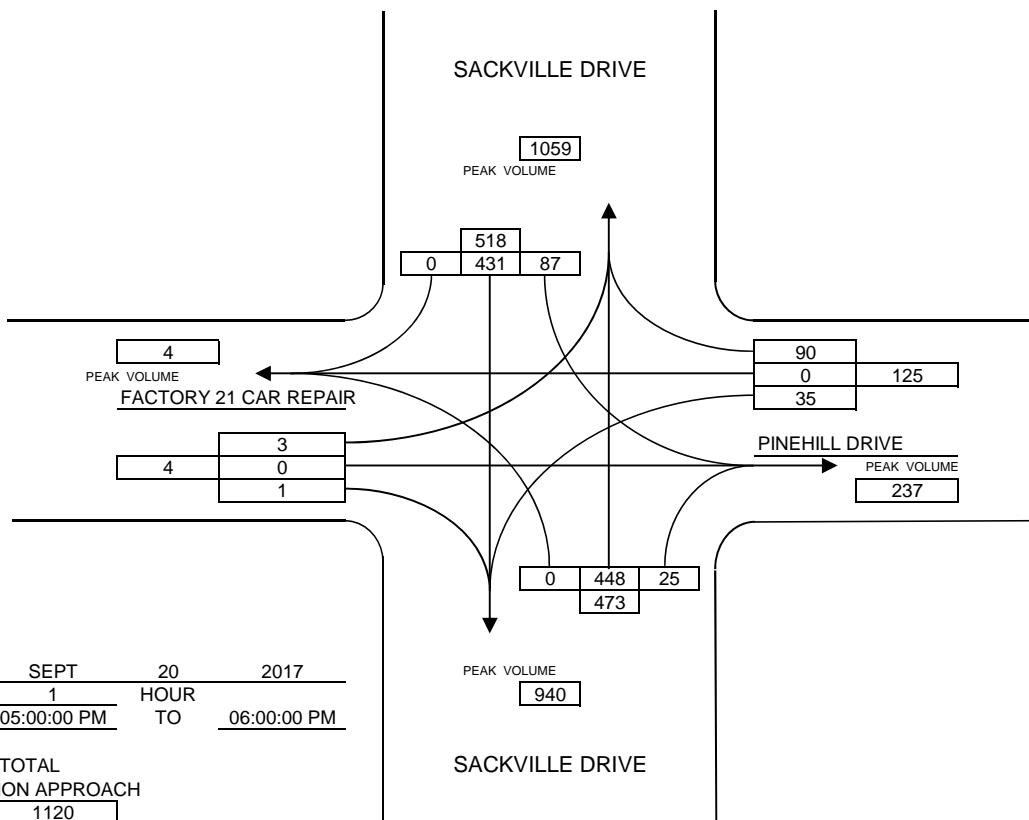
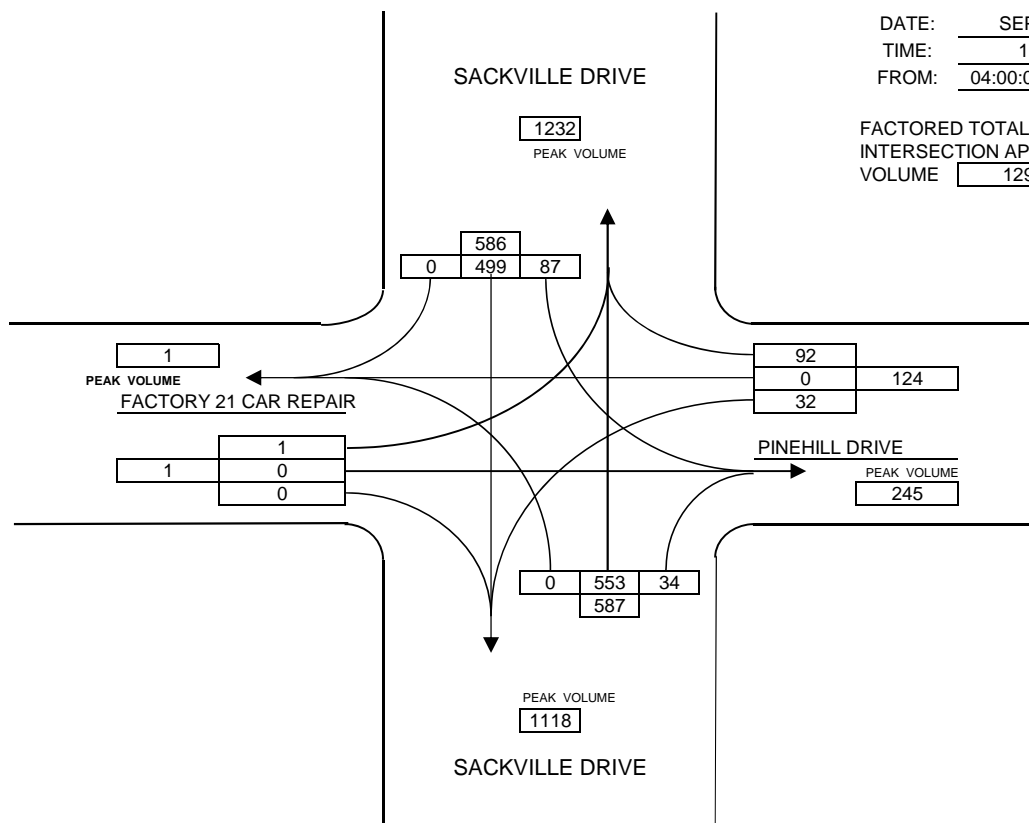
TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	9	0	22	1	0	1	25	112	0	0	136	7	313
05:15:00 PM	05:30:00 PM	10	0	28	2	0	0	16	106	0	0	115	6	283
05:30:00 PM	05:45:00 PM	7	0	21	0	0	0	30	123	0	0	101	7	289
05:45:00 PM	06:00:00 PM	9	0	19	0	0	0	16	90	0	0	96	5	235

TOTAL	35	0	90	3	0	1	87	431	0	0	448	25	1120
PEAK	125			4			518			473			FACTOR
15 MIN PEAK	152			8			612			572			
PEAK HOUR FACTOR	0.82			0.5			0.85			0.83			
TWO WAY TOTALS	237			4			1059			940			
1													
1120													

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

PINEHILL DRIVE AT SACKVILLE DRIVE



Study Name SACKVILLE DR BETWEEN COBEQUID RD AND SKYRIDGE**Start Date 06/22/2017****Start Time 7:00 AM****Site Code 17RQ210****Project 210**

MOTORVEHICLES	TOTALS	%
MOTORCYCLES	369	1.9%
CARS	15042	79.5%
LIGHT GOODS VEHICLES	2925	15.5%
BUSES	112	0.6%
SINGLE-UNIT TRUCKS	431	2.3%
ARTICULATED TRUCKS	51	0.3%
TOTALS	18930	100%
AAWT	18362	
AADT	16469	
BICYCLES ON ROADWAY	2	

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : PINEHILL DRIVE AT SACKVILLE DRIVE

DATE: SEPT. 20 2017
TIME: 1 HOUR
FROM: 07:00 AM TO 08:00 AM
WEATHER: RAINY
STREET WIDTH A:
B:
STUDY DONE BY: AA

N

SACKVILLE DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
0	0	0	0	0
0	0	0	0	0

FACTORY 21 CAR REPAIR
(STREET NAME)

ADULT	0	0
SENIOR	0	0
DISABLED	0	0
CHILDREN	0	0
CAD	0	0

PINEHILL DRIVE
(STREET NAME)

3	4	ADULT
0	0	SENIOR
0	0	DISABLED
0	0	CHILDREN
0	0	CAD

SACKVILLE DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
2	0	0	0	0
0	0	0	0	0

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : PINEHILL DRIVE AT SACKVILLE DRIVE

DATE: SEPT. 20 2017
TIME: 1 HOUR
FROM: 08:00 AM TO 09:00 AM
WEATHER: RAINY
STREET WIDTH A:
B:
STUDY DONE BY: AA

N



SACKVILLE DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
←				
1	0	0	0	0
				→
2	0	0	0	0

ADULT	0	↑	0
SENIOR	0		0
DISABLED	0		0
CHILDREN	0		0
CAD	0	↓	0

FACTORY 21 CAR REPAIR
(STREET NAME)

5	↑	6	ADULT
0		0	SENIOR
0		0	DISABLED
3		2	CHILDREN
0	↓	0	CAD

PINEHILL DRIVE
(STREET NAME)

←				
2	0	0	0	0
				→
2	0	0	0	0
ADULT	SENIOR	DISABLED	CHILDREN	CAD

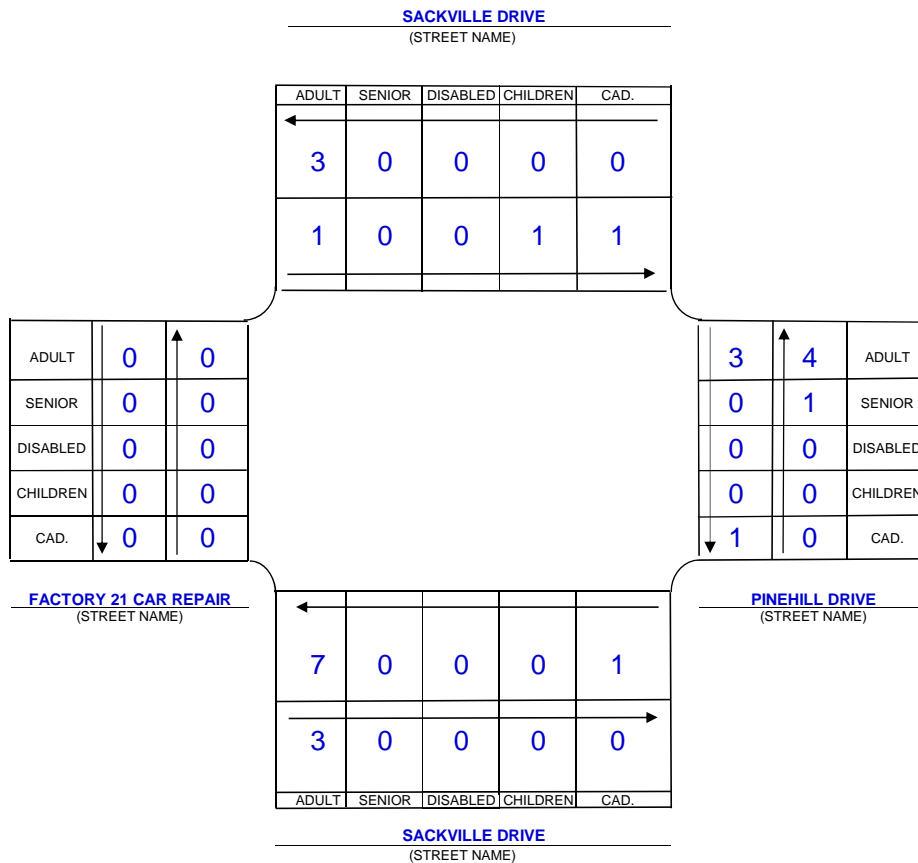
SACKVILLE DRIVE
(STREET NAME)

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : PINEHILL DRIVE AT SACKVILLE DRIVE

DATE: SEPT. 20 2017
TIME: 1 HOUR
FROM: 04:00 PM TO: 05:00 PM
WEATHER: RAINY
STREET WIDTH A: _____
B: _____
STUDY DONE BY: AA

N



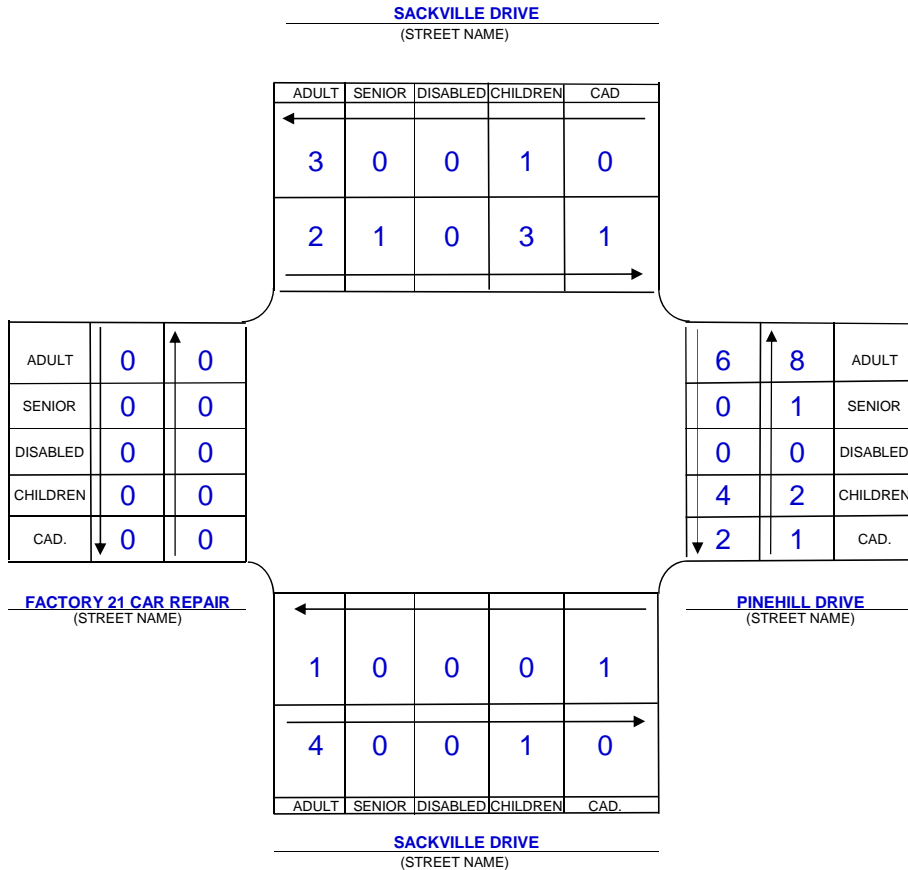
COMMENTS: - CHILDREN – child <12 unaccompanied by an adult (2 EAU)
- CAD – child <12 accompanied by an adult (1 EAU)

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : PINEHILL DRIVE AT SACKVILLE DRIVE

DATE: SEPT. 20 2017
TIME: 1 HOUR
FROM: 05:00 PM TO 06:00 PM
WEATHER: RAINY
STREET WIDTH A:
B:
STUDY DONE BY: AA

N



COMMENTS: - CHILDREN – child <12 unaccompanied by an adult (2 EAU)
- CAD – child <12 accompanied by an adult (1 EAU)

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

DATE: SEP 20 2017
TIME: 1 HOUR
FROM: 07:00 AM TO 08:00 AM
WEATHER: RAINY
STREET WIDTH A:
B:
STUDY DONE BY: SS

N

SACKVILLE DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
0	0	0	0	0
0	0	0	0	0

ARMOYAN DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

SKYRIDGE DRIVE
(STREET NAME)

ADULT	SENIOR	DISABLED	CHILDREN	CAD
0	0	0	1	0
0	0	0	0	0

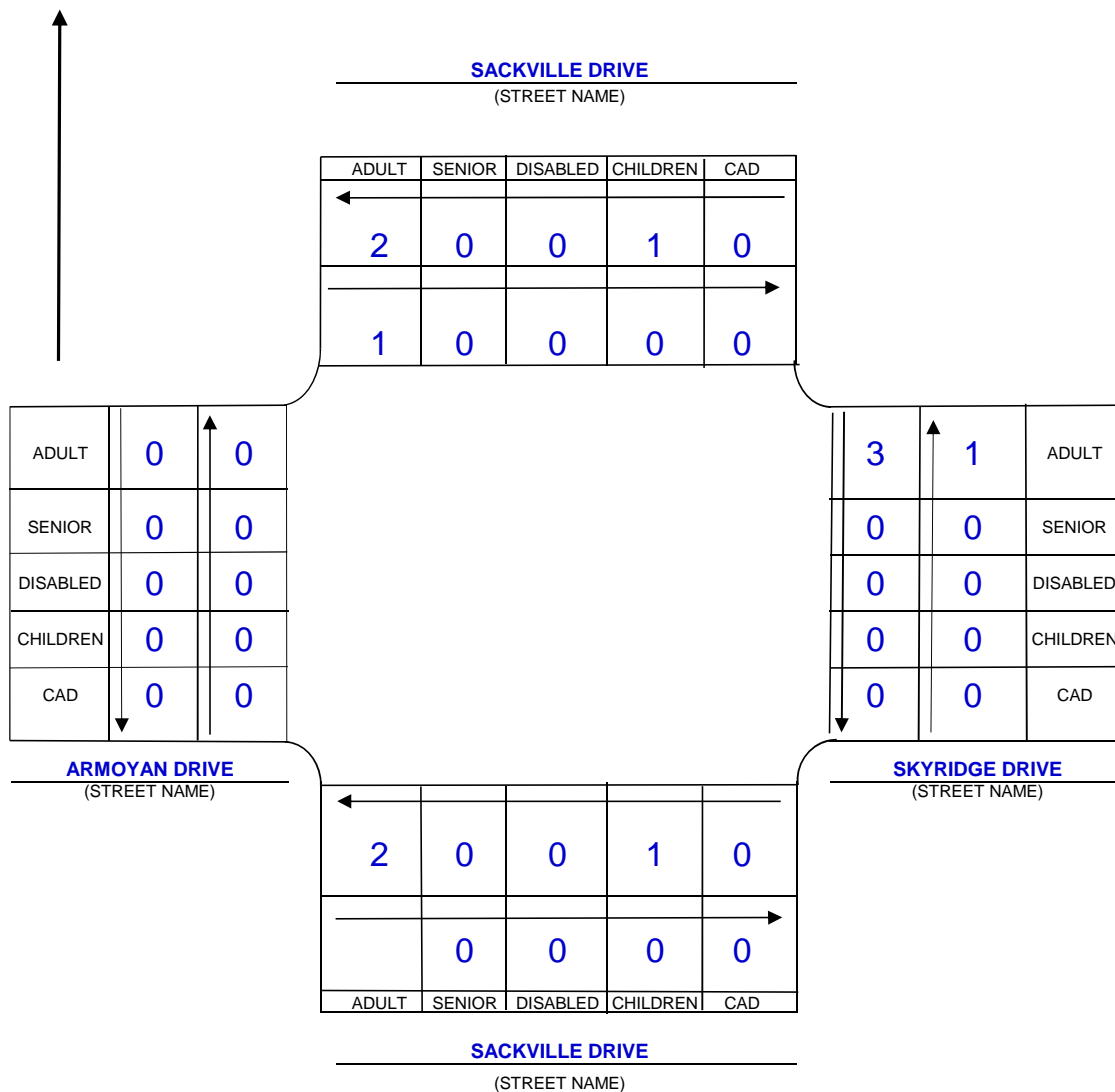
SACKVILLE DRIVE
(STREET NAME)

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : **ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE**

DATE: SEP 20 2017
TIME: 1 HOUR
FROM: 08:00 AM TO 09:00 AM
WEATHER: RAINY
STREET WIDTH A:
B:
STUDY DONE BY: SS

N

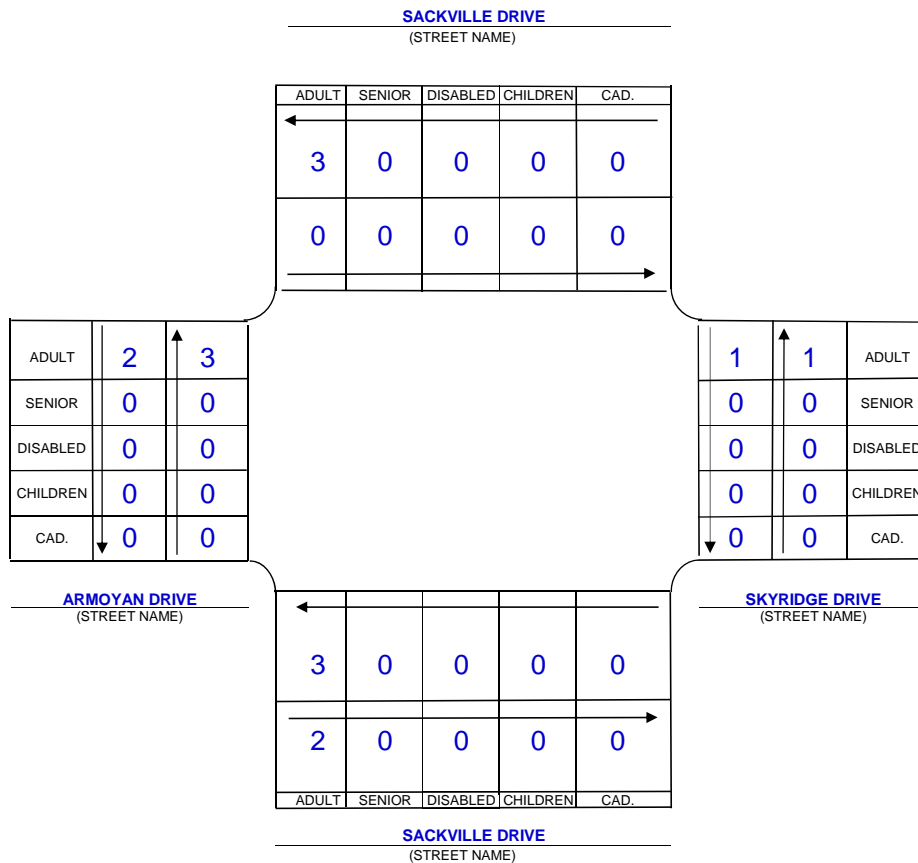


PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

DATE: SEP 20 2017
TIME: 1 HOUR
FROM: 04:00 PM TO 05:00 PM
WEATHER: CLOUDY
STREET WIDTH A: _____
B: _____
STUDY DONE BY: SS

N



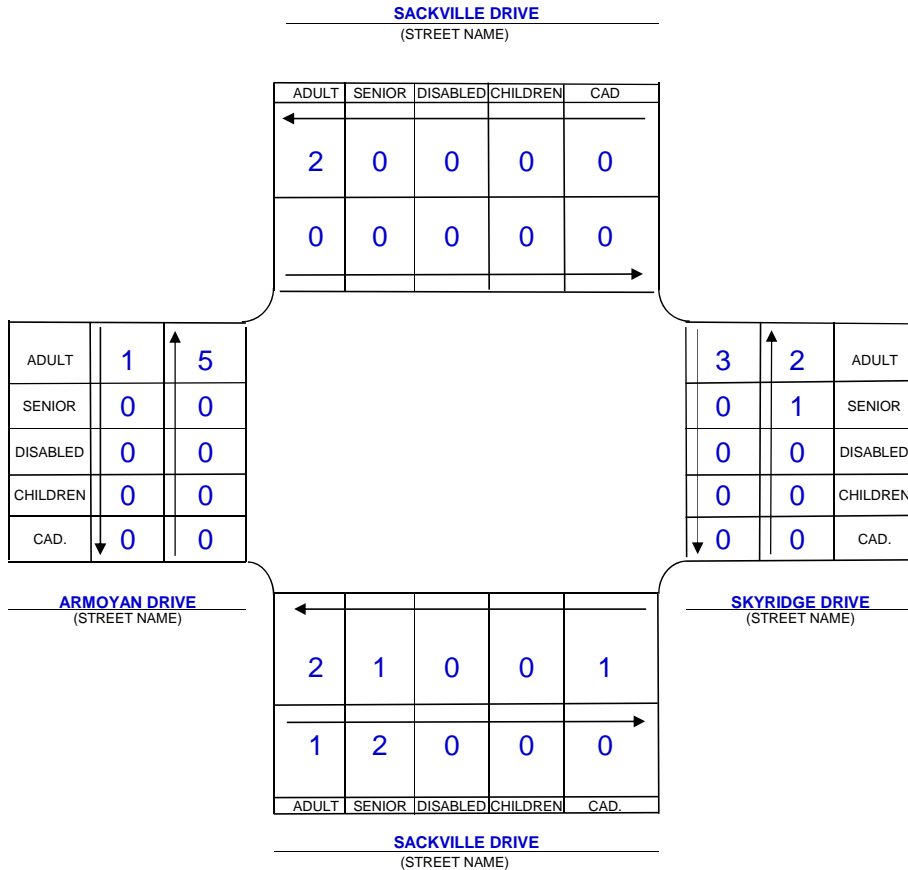
COMMENTS: - CHILDREN – child <12 unaccompanied by an adult (2 EAU)
- CAD – child <12 accompanied by an adult (1 EAU)

PEDESTRIAN STUDY GRAPHIC SUMMARY SHEET

INTERSECTION : ARMOYAN DRIVE AT SACKVILLE DRIVE AND SKYRIDGE AVENUE

DATE: SEP 20 2017
TIME: 1 HOUR
FROM: 05:00 PM TO 06:00 PM
WEATHER: CLOUDY
STREET WIDTH A:
B:
STUDY DONE BY: SS

N



COMMENTS: - CHILDREN – child <12 unaccompanied by an adult (2 EAU)
- CAD – child <12 accompanied by an adult (1 EAU)

APPENDIX B

Appendix B: TRIP GENERATION

Trip Generation Summary

Alternative: Alternative 1

Phase:

Open Date: 12/16/2021

Project: West Royalty

Analysis Date: 12/16/2021

ITE	Land Use	Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
221	Mid-Rise Residential - B		286	285	571		9	27	36		28	18	46
	105 Dwelling Units												
221	Mid-Rise Residential - A		147	146	293		5	14	19		15	10	25
	54 Dwelling Units												
Unadjusted Volume			433	431	864		14	41	55		43	28	71
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			433	431	864		14	41	55		43	28	71

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

P. 1

APPENDIX C

Appendix C: TRIP ASSIGNMENT

Development: West Royalty**Driveway: 1 Main Driveway**

Origin #	Route	To		From	
		Distribution %	Trips	Distribution %	Trips
1	Main Driveway to Skyridge North	4.00	1	4.00	2
2	Main Driveway to Sackville East	40.00	6	40.00	16
3	Main Driveway to Pineridge North	4.00	1	4.00	2
4	Main Driveway to Sackville West	20.00	3	20.00	8

Development: West Royalty**Driveway: 2 Bld A Parkade**

Origin #	Route	To		From	
		Distribution %	Trips	Distribution %	Trips
1	Bld A Parkade to Skyridge North	1.00	0	1.00	0
2	Bld A Parkade to Sackville East	20.00	3	20.00	8
3	Bld A Parkade to Pineridge North	1.00	0	1.00	0
4	Bld A Parkade to Sackville West	10.00	1	10.00	4

Development: West Royalty**Driveway: 1 Main Driveway**

Origin #	Route	To		From	
		Distribution %	Trips	Distribution %	Trips
1	Main Driveway to Skyridge North	4.00	2	4.00	1
2	Main Driveway to Sackville East	40.00	17	40.00	11
3	Main Driveway to Pineridge North	4.00	2	4.00	1
4	Main Driveway to Sackville West	20.00	9	20.00	6

Development: West Royalty**Driveway: 2 Bld A Parkade**













Origin #	Route	To		From	
		Distribution %	Trips	Distribution %	Trips
1	Bld A Parkade to Skyridge North	1.00	0	1.00	0
2	Bld A Parkade to Sackville East	20.00	9	20.00	6
3	Bld A Parkade to Pineridge North	1.00	0	1.00	0
4	Bld A Parkade to Sackville West	10.00	4	10.00	3

APPENDIX D

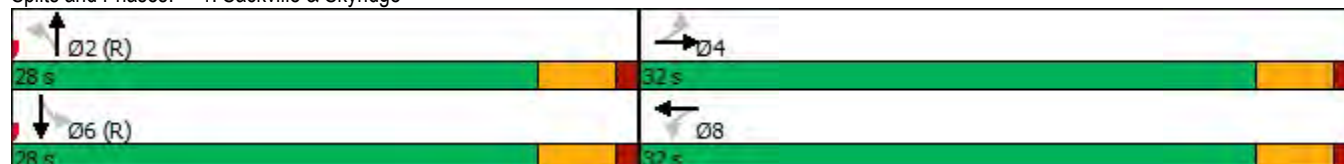
Appendix D: SYNCHRO REPORTS

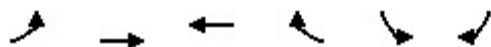
West Royalty Development 2021 Baseline

1: Sackville & Skyridge
Timing Plan: AM Peak Hour

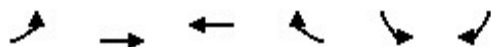
								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	580	15	285	25	15	55	10
Future Volume (vph)	10	580	15	285	25	15	55	10
Lane Group Flow (vph)	0	663	0	348	0	103	0	93
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	32.0	32.0	32.0	32.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		4.5		4.5		4.5		4.5
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		27.5		27.5		23.5		23.5
Actuated g/C Ratio		0.46		0.46		0.39		0.39
v/c Ratio		0.43		0.23		0.15		0.16
Control Delay		7.7		9.9		6.8		10.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		7.7		9.9		6.8		10.4
LOS		A		A		A		B
Approach Delay		7.7		9.9		6.8		10.4
Approach LOS		A		A		A		B
Queue Length 50th (m)		39.4		10.9		2.9		4.8
Queue Length 95th (m)		m57.6		17.8		10.6		12.6
Internal Link Dist (m)		87.9		116.2		51.0		107.1
Turn Bay Length (m)								
Base Capacity (vph)		1550		1505		667		586
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.43		0.23		0.15		0.16
Intersection Summary								
Cycle Length: 60								
Actuated Cycle Length: 60								
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green								
Natural Cycle: 45								
Control Type: Pretimed								
Maximum v/c Ratio: 0.43								
Intersection Signal Delay: 8.5					Intersection LOS: A			
Intersection Capacity Utilization 41.7%					ICU Level of Service A			
Analysis Period (min) 15								
m Volume for 95th percentile queue is metered by upstream signal.								

Splits and Phases: 1: Sackville & Skyridge

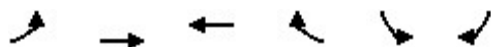




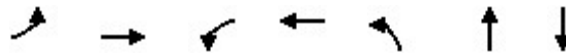
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	0	610	330	0	0	0
Future Volume (Veh/h)	0	610	330	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	663	359	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.98				0.98	0.98
vC, conflicting volume	359				690	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298				637	115
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1232				400	896
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	221	442	239	120	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1232	1700	1700	1700	1700	
Volume to Capacity	0.00	0.26	0.14	0.07	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	0	610	330	0	0	0
Future Volume (Veh/h)	0	610	330	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	663	359	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		378	175			
pX, platoon unblocked					0.93	
vC, conflicting volume	359				690	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	359				510	180
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1196				457	832
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	221	442	239	120	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1196	1700	1700	1700	1700	
Volume to Capacity	0.00	0.26	0.14	0.07	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	5	590	320	10	20	10
Future Volume (Veh/h)	5	590	320	10	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)	5	641	348	11	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)		160	393			
pX, platoon unblocked					0.86	
vC, conflicting volume	359				684	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	359				294	180
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	99
cM capacity (veh/h)	1196				574	832
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	219	427	232	127	33	
Volume Left	5	0	0	0	22	
Volume Right	0	0	0	11	11	
cSH	1196	1700	1700	1700	640	
Volume to Capacity	0.00	0.25	0.14	0.07	0.05	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	1.2	
Control Delay (s)	0.2	0.0	0.0	0.0	10.9	
Lane LOS	A				B	
Approach Delay (s)	0.1		0.0		10.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			29.8%		ICU Level of Service	A
Analysis Period (min)			15			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	5	550	10	290	5	5	5
Future Volume (vph)	5	550	10	290	5	5	5
Lane Group Flow (vph)	0	636	0	359	0	15	146
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	19.5	19.5	19.5	19.5	21.0	21.0	19.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	35.0%	35.0%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0
Total Lost Time (s)		4.5		4.5		4.5	4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effct Green (s)		15.0		15.0		16.5	15.0
Actuated g/C Ratio		0.25		0.25		0.28	0.25
v/c Ratio		0.75		0.43		0.04	0.29
Control Delay		27.1		25.3		13.9	9.4
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		27.1		25.3		13.9	9.4
LOS		C		C		B	A
Approach Delay		27.1		25.3		13.9	9.4
Approach LOS		C		C		B	A
Queue Length 50th (m)		33.3		20.8		0.8	4.1
Queue Length 95th (m)		#50.3		32.7		4.4	15.8
Internal Link Dist (m)		57.3		135.6		19.2	120.4
Turn Bay Length (m)							
Base Capacity (vph)		851		832		428	495
Starvation Cap Reductn		0		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.75		0.43		0.04	0.29

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 24.2

Intersection LOS: C

Intersection Capacity Utilization 37.3%

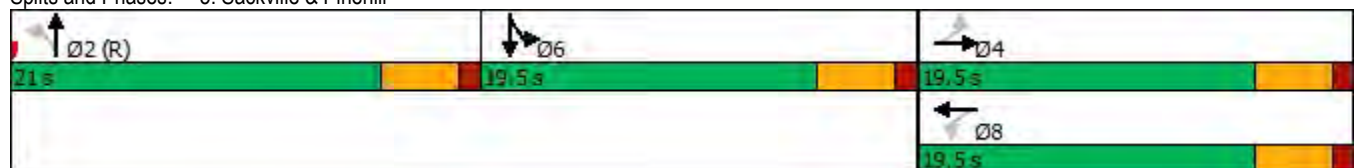
ICU Level of Service A

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

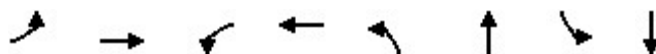
Queue shown is maximum after two cycles.

Splits and Phases: 5: Sackville & Pinehill



West Royalty Development 2026 Background and Development

1: Sackville & Skyridge
Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔↔		↔↔		↔↔		↔↔
Traffic Volume (vph)	10	580	15	285	25	15	55	10
Future Volume (vph)	13	635	16	309	26	16	58	11
Lane Group Flow (vph)	0	727	0	376	0	108	0	99
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	32.0	32.0	32.0	32.0	28.0	28.0	28.0	28.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		4.5		4.5		4.5		4.5
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		27.5		27.5		23.5		23.5
Actuated g/C Ratio		0.46		0.46		0.39		0.39
v/c Ratio		0.47		0.25		0.16		0.17
Control Delay		8.3		10.1		6.8		10.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		8.3		10.1		6.8		10.4
LOS		A		B		A		B
Approach Delay		8.3		10.1		6.8		10.4
Approach LOS		A		B		A		B
Queue Length 50th (m)		43.5		11.9		3.0		5.1
Queue Length 95th (m)		m59.5		19.3		10.9		13.2
Internal Link Dist (m)		87.9		116.2		51.0		107.1
Turn Bay Length (m)								
Base Capacity (vph)		1547		1498		668		585
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.47		0.25		0.16		0.17

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 8.9

Intersection LOS: A

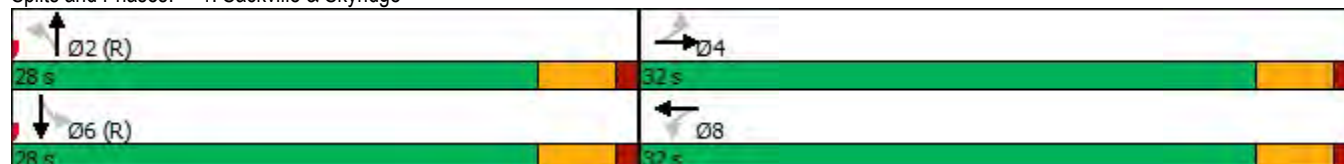
Intersection Capacity Utilization 41.7%

ICU Level of Service A

Analysis Period (min) 15

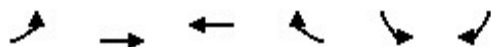
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Sackville & Skyridge



West Royalty Development 2026 Background and Development

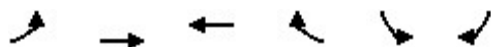
2: Sackville & DW1
Timing Plan: AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔↔	
Traffic Volume (veh/h)	0	610	330	0	0	0
Future Volume (Veh/h)	4	650	350	7	19	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	707	380	8	21	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.97				0.97	0.97
vC, conflicting volume	388				746	194
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306				675	106
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	99
cM capacity (veh/h)	1213				375	899
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	240	471	253	135	33	
Volume Left	4	0	0	0	21	
Volume Right	0	0	0	8	12	
cSH	1213	1700	1700	1700	475	
Volume to Capacity	0.00	0.28	0.15	0.08	0.07	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	1.7	
Control Delay (s)	0.2	0.0	0.0	0.0	13.1	
Lane LOS	A				B	
Approach Delay (s)	0.1		0.0		13.1	
Approach LOS					B	
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

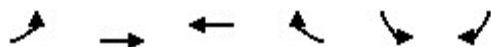
3: Sackville & DW2
Timing Plan: AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	0	610	330	0	0	0
Future Volume (Veh/h)	1	645	357	3	8	4
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)	1	701	388	3	9	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		378	175			
pX, platoon unblocked					0.91	
vC, conflicting volume	391				742	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	391				517	196
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1164				443	813
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	235	467	259	132	13	
Volume Left	1	0	0	0	9	
Volume Right	0	0	0	3	4	
cSH	1164	1700	1700	1700	516	
Volume to Capacity	0.00	0.27	0.15	0.08	0.03	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.6	
Control Delay (s)	0.0	0.0	0.0	0.0	12.2	
Lane LOS	A				B	
Approach Delay (s)	0.0		0.0		12.2	
Approach LOS					B	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			20.2%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

4: Sackville & Oakdale Timing Plan: AM Peak Hour

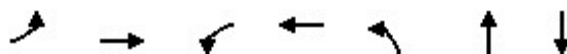


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	5	590	320	10	20	10
Future Volume (Veh/h)	5	625	351	11	21	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	679	382	12	23	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		160	393			
pX, platoon unblocked					0.84	
vC, conflicting volume	394				738	197
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	394				315	197
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	99
cM capacity (veh/h)	1161				548	811
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	231	453	255	139	35	
Volume Left	5	0	0	0	23	
Volume Right	0	0	0	12	12	
cSH	1161	1700	1700	1700	617	
Volume to Capacity	0.00	0.27	0.15	0.08	0.06	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	1.4	
Control Delay (s)	0.2	0.0	0.0	0.0	11.2	
Lane LOS	A				B	
Approach Delay (s)	0.1		0.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			29.8%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

5: Sackville & Pinehill

Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	5	550	10	290	5	5	5
Future Volume (vph)	5	582	11	317	5	5	5
Lane Group Flow (vph)	0	673	0	394	0	15	155
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	19.5	19.5	19.5	19.5	21.0	21.0	19.5
Total Split (%)	32.5%	32.5%	32.5%	32.5%	35.0%	35.0%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0
Total Lost Time (s)		4.5		4.5		4.5	4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effct Green (s)		15.0		15.0		16.5	15.0
Actuated g/C Ratio		0.25		0.25		0.28	0.25
v/c Ratio		0.79		0.47		0.03	0.31
Control Delay		29.3		25.8		13.9	9.5
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		29.3		25.8		13.9	9.5
LOS		C		C		B	A
Approach Delay		29.3		25.8		13.9	9.5
Approach LOS		C		C		B	A
Queue Length 50th (m)		35.8		22.8		0.8	4.4
Queue Length 95th (m)		#59.3		35.5		4.4	16.6
Internal Link Dist (m)		57.3		135.6		19.2	120.4
Turn Bay Length (m)							
Base Capacity (vph)		851		830		429	499
Starvation Cap Reductn		0		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.79		0.47		0.03	0.31

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 25.5

Intersection LOS: C

Intersection Capacity Utilization 37.3%

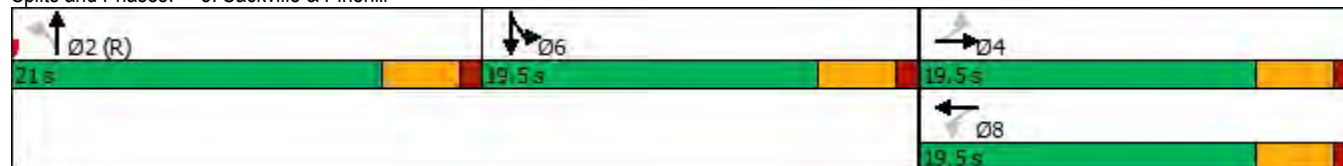
ICU Level of Service A

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













Splits and Phases: 5: Sackville & Pinehill



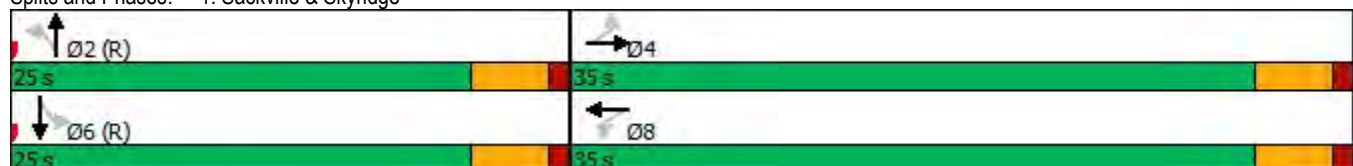
West Royalty Development
2021 Baseline

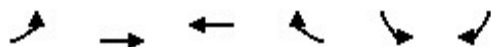
1: Sackville & Skyridge

Timing Plan: PM Peak Hour

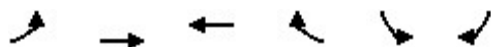
								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	550	40	680	30	10	30	15
Future Volume (vph)	10	550	40	680	30	10	30	15
Lane Group Flow (vph)	0	652	0	831	0	77	0	82
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		4.5		4.5		4.5		4.5
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		30.5		30.5		20.5		20.5
Actuated g/C Ratio		0.51		0.51		0.34		0.34
v/c Ratio		0.38		0.51		0.14		0.15
Control Delay		9.6		11.0		9.7		10.1
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		9.6		11.0		9.7		10.1
LOS		A		B		A		B
Approach Delay		9.6		11.0		9.7		10.1
Approach LOS		A		B		A		B
Queue Length 50th (m)		20.5		28.7		3.2		3.6
Queue Length 95th (m)		30.4		42.0		10.6		11.2
Internal Link Dist (m)		87.9		116.2		51.0		107.1
Turn Bay Length (m)								
Base Capacity (vph)		1701		1624		556		563
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.38		0.51		0.14		0.15
Intersection Summary								
Cycle Length: 60								
Actuated Cycle Length: 60								
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green								
Natural Cycle: 45								
Control Type: Pretimed								
Maximum v/c Ratio: 0.51								
Intersection Signal Delay: 10.3					Intersection LOS: B			
Intersection Capacity Utilization 54.8%					ICU Level of Service A			
Analysis Period (min) 15								







Splits and Phases: 1: Sackville & Skyridge

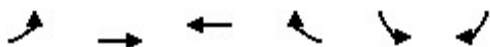




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	
Traffic Volume (veh/h)	0	600	740	0	0	0
Future Volume (Veh/h)	0	600	740	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	652	804	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	804				1130	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	468				844	4
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	945				262	935
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	217	435	536	268	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	945	1700	1700	1700	1700	
Volume to Capacity	0.00	0.26	0.32	0.16	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			23.8%		ICU Level of Service	A
Analysis Period (min)			15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 		 	
Traffic Volume (veh/h)	0	600	740	0	0	0
Future Volume (Veh/h)	0	600	740	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	652	804	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		378	175			
pX, platoon unblocked	0.88				0.91	0.88
vC, conflicting volume	804				1130	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509				630	53
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	928				379	885
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	217	435	536	268	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	928	1700	1700	1700	1700	
Volume to Capacity	0.00	0.26	0.32	0.16	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			23.8%	ICU Level of Service		A
Analvsis Period (min)			15			














Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	10	590	730	10	10	10
Future Volume (Veh/h)	10	590	730	10	10	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)	11	641	793	11	11	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)		160	393			
pX, platoon unblocked	0.98				0.88	0.98
vC, conflicting volume	804				1141	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	748				770	336
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	98
cM capacity (veh/h)	835				294	644
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	225	427	529	275	22	
Volume Left	11	0	0	0	11	
Volume Right	0	0	0	11	11	
cSH	835	1700	1700	1700	404	
Volume to Capacity	0.01	0.25	0.31	0.16	0.05	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	1.3	
Control Delay (s)	0.6	0.0	0.0	0.0	14.4	
Lane LOS	A				B	
Approach Delay (s)	0.2		0.0		14.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			33.4%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2021 Baseline

5: Sackville & Pinehill

Timing Plan: PM Peak Hour

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	95	555	5	600	5	5	5
Future Volume (vph)	95	555	5	600	5	5	5
Lane Group Flow (vph)	0	711	0	700	0	15	157
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	22.5	22.5	22.5
Total Split (%)	43.8%	43.8%	43.8%	43.8%	28.1%	28.1%	28.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0
Total Lost Time (s)		4.5		4.5		4.5	4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effct Green (s)		30.5		30.5		18.0	18.0
Actuated g/C Ratio		0.38		0.38		0.22	0.22
v/c Ratio		0.77		0.54		0.04	0.34
Control Delay		28.7		20.9		20.6	11.9
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		28.7		20.9		20.6	11.9
LOS		C		C		C	B
Approach Delay		28.7		20.9		20.6	11.9
Approach LOS		C		C		C	B
Queue Length 50th (m)		48.6		42.0		1.2	5.9
Queue Length 95th (m)		69.8		58.0		5.7	20.5
Internal Link Dist (m)		57.3		135.6		19.2	120.4
Turn Bay Length (m)							
Base Capacity (vph)		920		1292		344	463
Starvation Cap Reductn		0		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.77		0.54		0.04	0.34

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 75

Control Type: Pretimed

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.5

Intersection LOS: C

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15













Splits and Phases: 5: Sackville & Pinehill



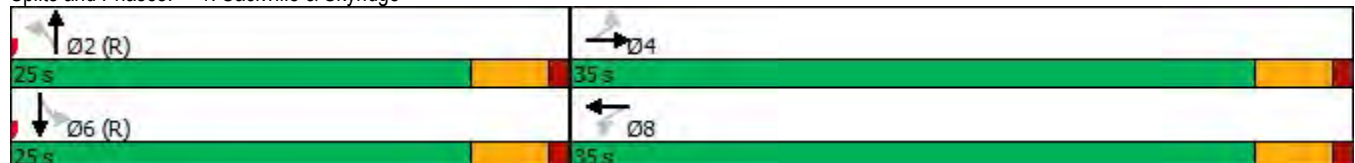
West Royalty Development 2026 Background and Development

1: Sackville & Skyridge

Timing Plan: PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	550	40	680	30	10	30	15
Future Volume (vph)	12	596	42	742	32	11	32	16
Lane Group Flow (vph)	0	707	0	904	0	82	0	89
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		4.5		4.5		4.5		4.5
Lead/Lag								
Lead-Lag Optimize?								
Act Effct Green (s)		30.5		30.5		20.5		20.5
Actuated g/C Ratio		0.51		0.51		0.34		0.34
v/c Ratio		0.42		0.56		0.15		0.16
Control Delay		9.9		11.6		9.8		10.0
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		9.9		11.6		9.8		10.0
LOS		A		B		A		A
Approach Delay		9.9		11.6		9.8		10.0
Approach LOS		A		B		A		A
Queue Length 50th (m)		22.8		32.4		3.4		3.8
Queue Length 95th (m)		33.5		47.0		11.1		11.8
Internal Link Dist (m)		87.9		116.2		51.0		107.1
Turn Bay Length (m)								
Base Capacity (vph)		1693		1615		555		563
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.42		0.56		0.15		0.16
Intersection Summary								
Cycle Length: 60								
Actuated Cycle Length: 60								
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green								
Natural Cycle: 45								
Control Type: Pretimed								
Maximum v/c Ratio: 0.56								
Intersection Signal Delay: 10.8					Intersection LOS: B			
Intersection Capacity Utilization 54.8%					ICU Level of Service A			
Analysis Period (min) 15								

Splits and Phases: 1: Sackville & Skyridge



West Royalty Development 2026 Background and Development

2: 740/Sackville & DW1
Timing Plan: PM Peak Hour

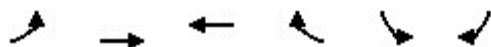


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	
Traffic Volume (veh/h)	0	600	740	0	0	0
Future Volume (Veh/h)	12	637	787	20	13	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	692	855	22	14	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.85				0.85	0.85
vC, conflicting volume	877				1238	438
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	494				920	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	99
cM capacity (veh/h)	903				225	919
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	244	461	570	307	22	
Volume Left	13	0	0	0	14	
Volume Right	0	0	0	22	8	
cSH	903	1700	1700	1700	311	
Volume to Capacity	0.01	0.27	0.34	0.18	0.07	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	1.7	
Control Delay (s)	0.6	0.0	0.0	0.0	17.5	
Lane LOS	A				C	
Approach Delay (s)	0.2		0.0		17.5	
Approach LOS					C	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			23.8%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

3: Sackville/740 & DW2

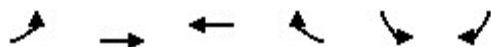
Timing Plan: PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	0	600	740	0	0	0
Future Volume (Veh/h)	4	642	785	9	6	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	698	853	10	7	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		378	175			
pX, platoon unblocked	0.87				0.91	0.87
vC, conflicting volume	863				1215	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				607	31
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	894				387	896
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	237	465	569	294	10	
Volume Left	4	0	0	0	7	
Volume Right	0	0	0	10	3	
cSH	894	1700	1700	1700	467	
Volume to Capacity	0.00	0.27	0.33	0.17	0.02	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.5	
Control Delay (s)	0.2	0.0	0.0	0.0	12.9	
Lane LOS	A				B	
Approach Delay (s)	0.1		0.0		12.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			23.8%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

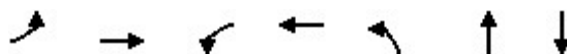
4: Sackville & Oakdale
Timing Plan: PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	10	590	730	10	10	10
Future Volume (Veh/h)	11	636	778	11	11	11
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)	12	691	846	12	12	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		160	393			
pX, platoon unblocked	0.96				0.88	0.96
vC, conflicting volume	858				1222	429
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	769				764	322
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	98
cM capacity (veh/h)	807				293	646
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	242	461	564	294	24	
Volume Left	12	0	0	0	12	
Volume Right	0	0	0	12	12	
cSH	807	1700	1700	1700	404	
Volume to Capacity	0.01	0.27	0.33	0.17	0.06	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	1.4	
Control Delay (s)	0.6	0.0	0.0	0.0	14.5	
Lane LOS	A				B	
Approach Delay (s)	0.2		0.0		14.5	
Approach LOS					B	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			33.4%		ICU Level of Service	A
Analysis Period (min)			15			

West Royalty Development 2026 Background and Development

5: Sackville & Pinehill
Timing Plan: PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations		↔↔		↔↔		↔↔	↔↔
Traffic Volume (vph)	95	555	5	600	5	5	5
Future Volume (vph)	100	597	5	640	5	5	5
Lane Group Flow (vph)	0	763	0	748	0	15	167
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	35.0	35.0	35.0	35.0	22.5	22.5	22.5
Total Split (%)	43.8%	43.8%	43.8%	43.8%	28.1%	28.1%	28.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0
Total Lost Time (s)		4.5		4.5		4.5	4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effct Green (s)		30.5		30.5		18.0	18.0
Actuated g/C Ratio		0.38		0.38		0.22	0.22
v/c Ratio		0.86		0.58		0.04	0.36
Control Delay		34.9		21.6		20.6	12.2
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		34.9		21.6		20.6	12.2
LOS		C		C		C	B
Approach Delay		34.9		21.6		20.6	12.2
Approach LOS		C		C		C	B
Queue Length 50th (m)		54.9		45.7		1.2	6.5
Queue Length 95th (m)		#87.8		62.7		5.7	21.6
Internal Link Dist (m)		57.3		135.6		19.2	120.4
Turn Bay Length (m)							
Base Capacity (vph)		885		1292		346	467
Starvation Cap Reductn		0		0		0	0
Spillback Cap Reductn		0		0		0	0
Storage Cap Reductn		0		0		0	0
Reduced v/c Ratio		0.86		0.58		0.04	0.36

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 26.6

Intersection LOS: C

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Sackville & Pinehill

