COMOX AVENUE / RODELLO STREET INTERSECTION REVIEW

January 12, 2022

URBAN SYSTEMS

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January 12 2022

File: 3791.0008.01

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APPENDICES

1.0 OVERVIEW

With corridor improvements planned for Comox Avenue in 2022 and redevelopment being contemplated for the former St. Joseph's General Hospital site, the Town of Comox ("the Town") is seeking to confirm the most appropriate traffic control configuration for the Comox Avenue / Rodello Street intersection. Urban Systems has completed a review of the intersection on the Town's behalf, with consideration given to existing and future intersection performance, and possible improvements to intersection traffic control including a roundabout or traffic signal. The study includes analysis for the weekday AM and PM peak periods under the 2021 (existing), 2031 (medium-term) and 2041 (long-term) horizons. This document summarizes the assumptions, methodologies, and analysis results.

2.0 BACKGROUND

2.1 LOCATION

The Comox Avenue / Rodello Street intersection is located in the Town of Comox, immediately adjacent the former St. Joseph's General Hospital site and approximately 1-km west of downtown Comox. Refer to **Figure 2-1**.

Figure 2-1: COMOX AVENUE / RODELLO STREET INTERSECTION

2.2 INTERSECTION CHARACTERISTICS

The subject intersection is an offset four-legged intersection (essentially two T-intersections), with a pedestrian-actuated signal on the east leg between the two legs of the intersection and stop control on the north and south legs. The posted speed limit is 50 km/h on all streets.

Comox Avenue is oriented east-west and is classified as an Arterial Road[1]. It consists of one travel lane in each direction with painted bike lanes on both sides. Sidewalks are present on both the north and south sides.

Rodello Street is classified as a Local Road and is oriented north-south with one travel lane per direction. The south leg has painted bike lanes on both sides. Sidewalks are in-place on the east side of the north leg and the west side of the south leg. Marked crosswalks are provided on both the north and west legs of the intersection.

Transit service is provided on Comox Avenue via Route 4 – Driftwood Mall / Comox Mall. Eastbound (ID 111340) and westbound (ID 111332) bus stops are approximately 150m west of the intersection between Rodello Street and Alpine Street.

2.3 2011 / 2020 TRANSPORTATION PLANS

The *Comox Transportation Study 2011*[2] identified that the Comox Avenue / Rodello Street intersection northbound and southbound movements operate at a level of service (LOS) E/F. A single-lane roundabout was recommended as a short-term improvement.

The detailed intersection turn movement counts (TMCs) were analyzed as part of this study and the results from the 2011 Study confirmed - the northbound and southbound approaches (Rodello Street) operate at LOS "E/F" using the 2011 volumes.

The *2020 Comox Transportation Master Plan Update* reported that the intersection operates at failing conditions (LOS "E/F"), although it did not include updated detailed TMCs for the study intersection.

[1] 2020 Transportation Master Plan Update – Town of Comox, Available online: comox.ca/modx/assets/pdfs/public%20works/Transportation/2020%20Transportation%20Master%20Plan%20Update.pdf

[2] Comox Transportation Study 2011 – Town of Comox, available online: www.comox.ca/modx/assets/pdfs/public%20works/Transportation/2011%20Transportation%20Study.pdf

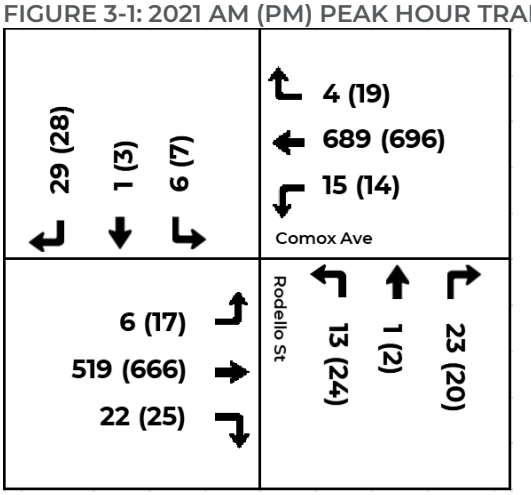
3.0 EXISTING CONDITION ASSESSMENT

3.1 EXISTING TRAFFIC VOLUMES

For traffic operational analysis, the TMCs during the weekday morning and afternoon peak periods are required. Urban Systems collected TMCs at the study intersection on Tuesday, November 30, 2021, from 7:00am to 9:00am and 3:00pm to 6:00pm. The count included breakdowns of passenger vehicle, truck, bike, and pedestrian movements. The AM and PM peak hours are identified between 8:00am and 9:00am and between 3:00pm and 4:00pm, respectively.

The final traffic analysis volumes are estimated by increasing the collected TMCs by 10% to accommodate for potential volume reduction caused by seasonality. The adjustment factor (10%) is based on the Ministry of Transportation and Infrastructure (MOTI)'s typical seasonal factors and the nearest MOTI permanent count station (P-14-4NS -N). The final analysis traffic volumes are summarized in **FIGURE 3-1**: 2021 AM (PM) PEAK HOUR TRAFFIC VOLUMES.

FIGURE 3-1: 2021 AM (PM) PEAK HOUR TRAFFIC VOLUMES



Compared to the 2011 traffic volumes, the adjusted 2021 traffic volumes on Comox Avenue have increased by 5% - 10%. The increase in traffic volumes appears reasonable as regional traffic increases due to population growth. On the other hand, the number of vehicles on Rodello Street has decreased by 20 - 25 vehicles in 2021 compared to the 2011 volumes, likely a result of the reduced operations on the St. Josephs General Hospital site.

The 2021 traffic counts showed that approximately 10 to 18 people crossed Comox Avenue during the AM and PM peak hours. The MioVision video footage also verified that the pedestrian signal was actuated less than ten times during the PM peak hour meaning that the pedestrian activity was minimal to moderate during peak hours.

3.2 TRAFFIC OPERATIONS

3.2.1 BACKGROUND

Synchro 11, a macroscopic traffic analysis tool, and SimTraffic, a microscopic traffic analysis tool, are used to analyze the traffic operational performance at the study intersection. Comox Avenue has an actuated pedestrian signal, while Rodello Street is stop controlled. To better model and analyze the traffic operations at the study intersection, Synchro is used in assessing the operations of the east-west approaches (Comox Avenue), while SimTraffic is used to assess operations of the north-south approaches (Rodello Street). SimTraffic is more capable of capturing gaps between vehicles in a microsimulation environment which leads to producing more realistic results for the unsignalized side street traffic compared to Synchro.

Traffic performance measures including level of service (LOS), average vehicle delay, volume-to-capacity ratio (v/c), and 95th percentile queue are reviewed.

The level of service (LOS) indicates the average delays experienced by motorists and can be reported at an intersection level and a movement level. LOS is expressed using letter grades from "A" through "F", where LOS "A" represents minimal delays, and LOS "F" represents significant delays (equal to or more than 85 seconds per vehicle for signalized intersections and 50 seconds per vehicle for unsignalized intersections). LOS "F" often indicates insufficient capacity, and that the intersection or movement is likely operating at a failing condition. LOS "D" or better is usually considered by many agencies as an acceptable operational condition. See **TABLE 3-1** for LOS and associated vehicle delays.

TABLE 3-1: LEVEL OF SERVICE (LOS) AND ASSOCIATED VEHICLE DELAY

LOS	Signalized Intersection (seconds)	Unsignalized Intersection (seconds)
A	≤10	≤10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	>80	>50

The volume-to-capacity ratio (v/c) is a measure that reflects the mobility and quality of travel of a facility or a section of a facility. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). A v/c ratio of 1.00 indicates that the roadway facility is operating at its capacity. It is generally acceptable when a v/c ratio is less than 0.90. Additionally, the 95th percentile queue is defined as the queue length (in metres) that has only a 5-percent probability of being exceeded during the analysis time period.

3.2.2 RESULTS

The modelling results for the existing condition are summarized in **TABLE 3-2**, including v/c ratio, delay, LOS, and queue length. Note that v/c ratios are not available for northbound and southbound traffic as it is not an output from SimTraffic.

Based on the model results, the intersection and individual movements operate at an acceptable level of service (LOS "D" or better) except for the northbound approach (LOS "F" with 70 seconds of delay in the PM peak). The 95th queue lengths for the eastbound and westbound movements are up to 110m in length. The v/c ratio values for the eastbound and westbound approaches are less than 0.90. Eastbound and westbound queuing is a result of both pedestrians crossing triggering the signal and eastbound and westbound left turn vehicles queued waiting for gaps in opposing traffic.

These results are moderately different than conditions from the 2020 Plan Update due to reduced volumes on Rodello Street and the use of microsimulation instead of Synchro.

TABLE 3-2: 2021 AM (PM) PEAK HOUR SYNCHRO / SIMTRAFFIC RESULTS

Approach	V/C Ratio	Delay (sec)	Level of Service	95% Queue Length (m)
Eastbound Left, Thru, Right	0.66 (0.76)	13.0 (15.8)	B (B)	68.7 (99.1)
Westbound Left, Thru, Right	0.83 (0.82)	19.3 (18.7)	B (B)	111.4 (113.6)
Northbound Left, Thru, Right	-	29.4 (70.8)	D **(F)**	20.8 (30.0)
Southbound Left, Thru, Right	-	17.8 (26.4)	C (D)	15.5 (18.2)
Intersection	**-**	**16.9 (19.1)**	**C (C)**	**-**

4.0 FUTURE TRAFFIC OPERATIONAL ASSESSMENT

4.1 FUTURE VOLUMES

4.1.1 BACKGROUND GROWTH

A background growth rate of 1% per year, compounded, is applied to the existing traffic volumes to project future background traffic volumes. Confirmed through conversation with Town staff, the growth rate is consistent with the assumption used from the 2020 *Transportation Master Plan Update* and reflects change between the adjusted 2021 traffic volumes and 2011 TMCs.

4.1.2 HOSPITAL SITE TRIPS

The Hospital site, south of Comox Avenue between Rodello Street and its west access, will be undergoing redevelopment. The proposed development will consist of a mix of medical, residential, and institutional land uses. Through discussions with the Town, three land use scenarios are identified (low, medium and high) with projected assumptions for each. For the purpose of the analysis, the Medium Scenario is used as the base case, while the High Scenario is used as a sensitivity check. **TABLE 4-1** summarizes the land use assumptions with associated Institute of Transportation Engineers (ITE) land use types for each scenario. Also note that the figures below represent a 50% build-out under the 20-year horizon, as suggested by the Town.

TABLE 4-1: LAND USE BREAKDOWNS AND ITE LAND USE TYPES

Scenario	Horizon	**Dementia Valley** (Bed)	**Day Care** (Student)	**Health/Long Term Care** (Bed)	**Mid Density Residential** (Dwelling Unit)
		ITE – Assisted Living (254)	ITE – Day Care Center (565)	ITE – Nursing Home (620)	ITE – Multi-family Mid-rise (221)
Medium	10-year	78	18	152	-
	20-year	78	18	303	-
High	20-year	78	18	-	253

Relevant trip generation rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*, are used to develop the additional trips associated with the planned development. **TABLE 4-2** summarizes the trip generation rates used in this study.

TABLE 4-2: ITE (v11) VEHICLE TRIP GENERATION RATES

Land Use (ITE Code)	Unit	AM			PM		
		Rate	In %	Out %	Rate	In %	Out %
Assisted Living (254)	Bed	0.18	60%	40%	0.24	39%	61%
Day Care Center (565)	Student	0.78	53%	47%	0.79	47%	53%
Nursing Home (620)	Bed	0.14	72%	28%	0.14	33%	67%
Multi-family Mid-rise (221)	Dwelling Unit	0.37	23%	77%	0.39	61%	39%

TABLE 4-3 shows the estimated additional vehicle trips based on the Medium Scenario land uses under the 10-year and 20-year horizons.

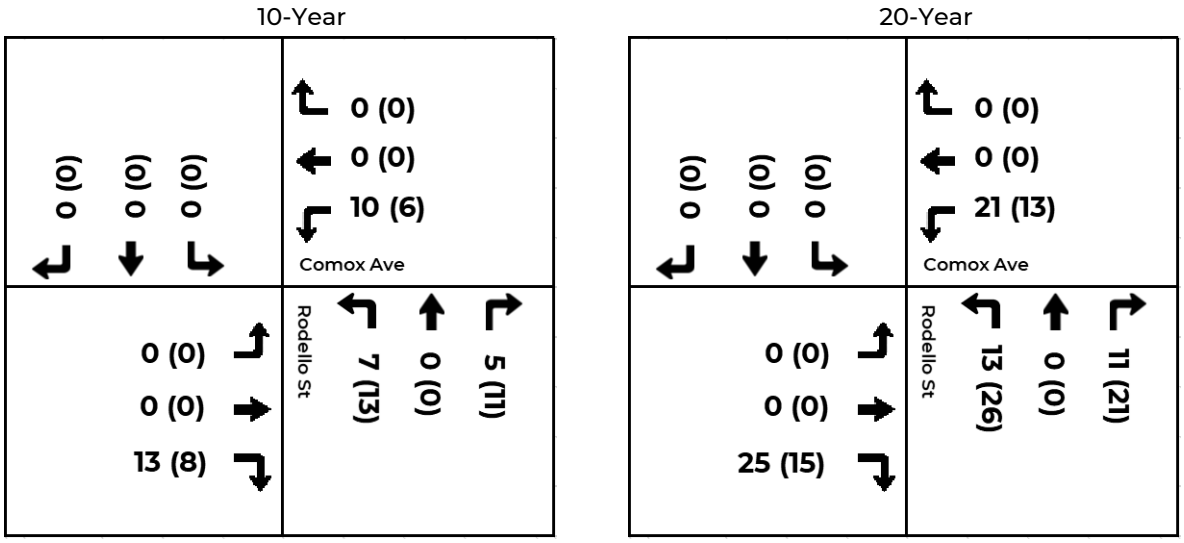
TABLE 4-3: ESTIMATED SITE GENERATED TRIPS

Land Use	Quantity	Unit	AM			PM		
			In	Out	Total	In	Out	Total
10-year Horizon[3]								
Assisted Living (254)	39	Bed	4	3	7	4	5	9
Day Care Center (565)	9	Student	4	3	7	3	4	7
Nursing Home (620)	152	Bed	15	6	21	7	14	21
Subtotal			**23**	**12**	**35**	**14**	**23**	**37**
20-year Horizon								
Assisted Living (254)	78	Bed	8	6	14	7	12	19
Day Care Center (565)	18	Student	7	7	14	7	7	14
Nursing Home (620)	303	Bed	31	12	43	14	28	42
Subtotal			**46**	**25**	**71**	**28**	**47**	**75**

The inbound and outbound trips of the future development are assigned onto Comox Avenue with a distribution assumption of approximately 55% to and from the west and 45% to and from the east. The distribution assumptions are developed based on the current travel patterns using intersection volumes. While it is recognized that some of the trips may use the west access, which is planned to be a right-in/right-out access, all site generated trips are assigned to the Rodello Street intersection. This approach is to offset the current west access traffic volumes that are not captured in the 2021 traffic counts.

FIGURE 4-1 illustrates the site generated trips under the 10-year and 20-year horizons, respectively.

FIGURE 4-1: AM (PM) PEAK HOUR SITE GENERATED TRAFFIC VOLUMES

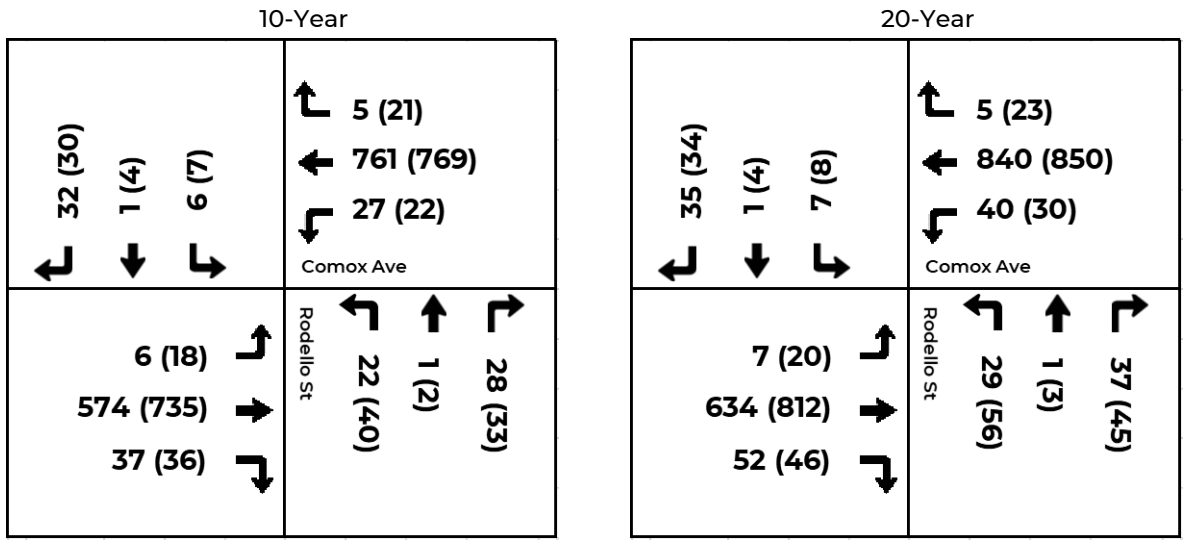


[3] 10-year horizon assumes 50% build-out for Dementia Valley (Assisted Living) and Day Care uses

4.1.3 TOTAL FUTURE TRAFFIC VOLUMES

The total traffic volumes are the combined background and site-generated traffic volumes. **FIGURE 4-2** illustrates the estimated total traffic volumes under the 10-year and 20-year horizons.

FIGURE 4-2: AM (PM) PEAK HOUR TOTAL TRAFFIC VOLUMES



4.2 TRAFFIC OPERATIONAL ASSESSMENT

4.2.1 2031 HORIZON

TABLE 4-4 summarizes the 2031 v/c ratio, delay, LOS, and queue length. Under the 2031 (medium-term) traffic conditions, the intersection operates at LOS "C/D" at the intersection level, in both the morning and afternoon peak periods. The northbound approach operates at failing conditions in both the AM and PM peak periods, with excessive delays and long queues in the PM peak period. The southbound approach experiences significant delays and queues in the PM peak period leading to operating at failing conditions. The eastbound and westbound approaches experience minimal delays and operate at LOS "C" or better in both AM and PM peak periods. The 95th percentile queue lengths are in the range of 100m to 150m for the eastbound and westbound approaches due to interruptions from pedestrian crossing in both AM and PM peak periods. The v/c ratio values for the eastbound and westbound approaches are still less than 0.90.

TABLE 4-4: 2031 AM (PM) PEAK HOUR SYNCHRO / SIMTRAFFIC RESULTS

Approach	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left, Thru, Right	0.69 (0.79)	12.9 (16.9)	B (B)	82.9 (123.3)
Westbound Left, Thru, Right	0.89 (0.87)	23.8 (21.7)	C (C)	153.1 (148.7)
Northbound Left, Thru, Right	-	74.9 (300+)	**F (F)**	37.4 (65.5)
Southbound Left, Thru, Right	-	24.4 (75.2)	C **(F)**	16.1 (69.1)
Intersection	**-**	**21.1 (33.4)**	**C (D)**	**-**

4.2.2 2041 HORIZON

TABLE 4-5: summarizes the 2041 v/c ratio, delay, LOS, and queue length. Under the 2041 (long-term) traffic conditions, the intersection operates at LOS "D/F" at the intersection level, in the morning and afternoon peak periods, respectively. While the eastbound and westbound approaches experience moderate delays and operate at LOS "D" or better, the northbound and southbound approaches operate at failing conditions with excessive delays and long queues in both AM and PM peak periods. The westbound 95th percentile queue length can build up to approximately 230m. The v/c ratio values for the westbound approach exceed 0.90 in both AM and PM peak periods.

TABLE 4-5: 2041 AM (PM) PEAK HOUR SYNCHRO / SIMTRAFFIC RESULTS

Approach	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left, Thru, Right	0.72 (0.83)	13.7 (18.8)	B (B)	102.5 (159.8)
Westbound Left, Thru, Right	0.97 (0.93)	37.3 (28.8)	D (C)	236.4 (226.4)
Northbound Left, Thru, Right	-	84.5 (300+)	**F (F)**	65.5 (85.8)
Southbound Left, Thru, Right	-	39.7 (300+)	**E (F)**	69.1 (71.7)
Intersection	**-**	**29.5 (83.6)**	**D (F)**	**-**

4.2.3 SENSITIVITY ANALYSIS

Critical Year

A sensitivity analysis was undertaken to determine when the northbound and southbound (Rodello Street) movements begin to experience failing conditions. This analysis suggests that Rodello Street begins to experience high delays leading to failing operational conditions (LOS "E/F") in 2023 (2-year horizon) during the PM peak period.

High Growth Scenario (20-year horizon)

Based on the ITE trip generation rates, the estimated site generated trips for the High Scenario is approximately 120 - 130 vehicles per hour, which produces 50 to 60 more vehicle trips than the Medium scenario. The model results indicate that with the High Scenario volumes, the intersection will operate at LOS "F" at the intersection level, in both the AM and PM peak periods. Both the northbound and southbound approaches operate at failing conditions with excessive delays and long queues in both the AM and PM peak periods. In addition to that, the westbound and eastbound approaches operate at slightly worse conditions compared to the Medium Scenario.

4.2.4 SUMMARY

The study intersection was shown to generally operate at acceptable conditions, except for the PM northbound approach. Under future horizons (2031, 2041), conditions for the northbound and southbound movements deteriorate as both Comox Avenue and Rodello Street traffic volumes increase. The result is failing conditions for the northbound and southbound movements and a need for intersection operation improvements. A sensitivity analysis concluded the northbound and southbound movements will begin to fail in approximately two years (2023).

5.0 IMPROVEMENT OPTIONS

As was concluded above, the Comox Avenue / Rodello Street intersection will require operational improvements to address failing intersection performance. Three options are analyzed in detail below:

1. Roundabout (single-lane)
2. Traffic signal
3. Turn restrictions

5.1 ROUNDABOUT

A single-lane roundabout was recommended in the *Comox Transportation Study 2011* as a short-term improvement for the Comox Avenue / Rodello Street intersection. Refer to **FIGURE 5-1**. The roundabout has been identified alongside the development application associated with the Dementia Village proposal[4] for the 2137 Comox Avenue site, adjacent the former St. Joseph's Regional Hospital.

SIDRA (v9), a micro-analytical tool, is used as an aid for the evaluation of a roundabout option. SIDRA modelling was completed to assess the traffic operational performance for a single-lane roundabout for the study intersection under future conditions. Key traffic operational measures including delay, LOS, v/c ratio, and queue length re reviewed.

Table 5-1 and **Table 5-2** summarize the SIDRA results under the 2031 and 2041 horizons. The model results indicate that the intersection and movements will operate with minimal to moderate delays and moderate queue lengths. The longest queue length, the PM westbound queue, is expected to be approximately 85m under the 2041 horizon. The v/c ratio values for all movements are less than 0.90.

FIGURE 5-1: COMOX AVENUE / RODELLO STREET ROUNDABOUT CONCEPT[5]

[4] Town of Comox, Staff Report, July 14 2021, available online at: comox.ca/modx/assets/pdfs/RCM_DVP%2021-3%20and%20Road%20Closure%20Bylaw%202137%20Comox%20Avenue_July%2014%202021.pdf

[5] Comox Transportation Study 2011, page 23, available online at: www.comox.ca/modx/assets/pdfs/public%20works/Transportation/2011%20Transportation%20Study.pdf

Table 5-1: AM (PM) PERFORMANCE RESULTS FOR ROUNDABOUT, 2031 VOLUMES

Movement	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left	0.482 (0.595)	7.6 (7.7)	A (A)	28.3 (42.8)
Eastbound Thru	0.482 (0.595)	3.1 (3.2)	A (A)	28.3 (42.8)
Eastbound Right	0.482 (0.595)	3.2 (3.2)	A (A)	28.3 (42.8)
Westbound Left	0.591 (0.670)	7.6 (8.1)	A (A)	45.5 (57.7)
Westbound Thru	0.591 (0.670)	3.1 (3.6)	A (A)	45.5 (57.7)
Westbound Right	0.591 (0.670)	3.1 (3.6)	A (A)	45.5 (57.7)
Northbound Left	0.090 (0.158)	12.2 (14.8)	B (B)	3.2 (5.9)
Northbound Thru	0.090 (0.158)	7.8 (10.1)	A (B)	3.2 (5.9)
Northbound Right	0.090 (0.158)	8.0 (10.1)	A (B)	3.2 (5.9)
Southbound Left	0.089 (0.103)	16.2 (17.0)	B (B)	3.4 (4.1)
Southbound Thru	0.089 (0.103)	10.6 (11.0)	B (B)	3.4 (4.1)
Southbound Right	0.089 (0.103)	10.8 (11.2)	B (B)	3.4 (4.1)
Intersection	**-**	**3.7 (4.1)**	**A (A)**	**-**

Table 5-2: AM (PM) PERFORMANCE RESULTS FOR ROUNDABOUT, 2041 VOLUMES

Movement	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left	0.562 (0.678)	7.8 (7.9)	A (A)	38.1 (60.1)
Eastbound Thru	0.562 (0.678)	3.3 (3.4)	A (A)	38.1 (60.1)
Eastbound Right	0.562 (0.678)	3.4 (3.4)	A (A)	38.1 (60.1)
Westbound Left	0.673 (0.775)	7.8 (8.7)	A (A)	61.8 (83.8)
Westbound Thru	0.673 (0.775)	3.3 (4.3)	A (A)	61.8 (83.8)
Westbound Right	0.673 (0.775)	3.3 (4.2)	A (A)	61.8 (83.8)
Northbound Left	0.128 (0.248)	13.1 (16.4)	B (B)	4.8 (9.9)
Northbound Thru	0.128 (0.248)	8.7 (11.7)	A (B)	4.8 (9.9)
Northbound Right	0.128 (0.248)	8.9 (11.6)	A (B)	4.8 (9.9)
Southbound Left	0.114 (0.145)	18.1 (19.3)	B (B)	4.5 (6.1)
Southbound Thru	0.114 (0.145)	12.4 (13.1)	B (B)	4.5 (6.1)
Southbound Right	0.114 (0.145)	12.6 (13.3)	B (B)	4.5 (6.1)
Intersection	**-**	**4.0 (4.7)**	**A (A)**	**-**

5.2 FULL TRAFFIC SIGNAL

5.2.1 SIGNAL WARRANT

The Transportation Association of Canada (TAC) warrant for a traffic control signal is conducted to confirm the appropriateness of a full traffic signal at this location. To meet the warrant's requirements, the study intersection needs to meet a minimum threshold of 100 points and the side street's traffic volumes need to be greater than 75 vehicles per hour.

The traffic signal warrant analysis results in a score of 54 for the current condition, falling short of the signal warrant threshold. The warrant is also completed for the 10-year horizon (2031) and achieves a score of 78 points. While closer to meeting the minimum threshold (100 points), the TAC warrant is not met under the 2031 horizon. Finally, for the 20-year horizon, the warrant analysis results in a score of 107, showing that a traffic signal is warranted for this location in 2041.

5.2.2 TRAFFIC OPERATIONS – CURRENT CONFIGURATION

Synchro is used to analyze a full signal scenario while maintaining today's laning under the 20-year horizon. In this option, a traffic signal with split phasing for both northbound and southbound approaches is assumed due to offset nature of the intersection. **TABLE 5-3** summarizes the 2041 v/c ratio, delay, LOS, and queue length for this option.

Under the 2041 (long-term) traffic conditions, the intersection operates at LOS "B/C" in the morning and afternoon peak periods, respectively. However, the northbound approach operates at failing conditions in the PM peak period. The eastbound and westbound approaches experience minimal delays and operate at LOS "C" or better in both AM and PM peak periods. However, the eastbound and westbound 95th percentile queue lengths can reach up to almost 280m. Furthermore, the v/c ratio values for all approaches are less than 0.90.

TABLE 5-3: 2041 AM (PM) PEAK HOUR SYNCHRO RESULTS

Approach	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left, Thru, Right	0.65 (0.80)	12.9 (20.3)	B (C)	137.7 (234.0)
Westbound Left, Thru, Right	0.87 (0.89)	24.0 (27.9)	C (C)	278.2 (268.0)
Northbound Left, Thru, Right	0.57 (0.88)	36.1 (72.7)	D **(E)**	31.5 (58.8)
Southbound Left, Thru, Right	0.23 (0.20)	13.1 (13.1)	B (B)	11.8 (12.3)
Intersection	**-**	**19.8 (27.4)**	**B (C)**	**-**

5.2.3 TRAFFIC OPERATIONS – RECONFIGURED INTERSECTION

Synchro is used to analyze another full signal scenario with improved intersection geometry that includes aligning the north and south legs and adding eastbound and westbound left turn lanes on Comox Avenue. In this option, the intersection geometry is enhanced to a typical (non-offset) four-leg intersection. It is assumed that similar property dedication on the 2137 Comox Avenue site is required as what is required to accommodate a roundabout (refer to **FIGURE 5-1**).

A traffic signal with left-turn permissive phasing for all approaches was tested. **TABLE 5-4** summarizes the 2041 v/c ratio, delay, LOS, and queue length for this option.

Under the 2041 (long-term) traffic conditions, the intersection operates at LOS "A/B" at the intersection level in both the morning and afternoon peak periods. All movements operate at LOS "C" or better during both AM and PM peak periods. Further, the v/c ratio values for all approaches are less than 0.90. However, the eastbound and westbound 95th percentile queue lengths can reach up to almost 150m.

TABLE 5-4: 2041 AM (PM) PEAK HOUR SYNCHRO RESULTS

Approach	V/C Ratio	Delay (s)	Level of Service	95% Queue Length (m)
Eastbound Left	0.05 (0.10)	4.7 (5.6)	A (A)	1.4 (3.7)
Eastbound Thru, Right	0.61 (0.73)	8.2 (10.9)	A (B)	89.8 (130.1)
Westbound Left	0.19 (0.18)	5.9 (6.4)	A (A)	5.0 (4.5)
Westbound Thru, Right	0.71 (0.77)	10.4 (12.4)	B (B)	139.1 (146.6)
Northbound Left, Thru, Right	0.29 (0.45)	14.9 (21.0)	B (C)	20.7 (33.9)
Southbound Left, Thru, Right	0.17 (0.18)	11.2 (12.1)	B (B)	11.7 (12.2)
Intersection	**-**	**9.6 (12.2)**	**A (B)**	**-**

5.3 TURN RESTRICTIONS

Options to restrict left-turn movements to/from Rodello Street were considered to improve overall intersection operations. While it is anticipated that restricting turn movements would help improve operations at the intersection, it would result in additional circulation by vehicles travelling to/from the Hospital site and nearby sites and negatively impact the surrounding neighbourhood with through traffic using more minor streets such as Beaufort Avenue and Beach Drive. As such, turn restrictions are not recommended for this location.

5.4 REMOVE HALF SIGNAL

The option to remove the existing pedestrian half signal and include only a marked crosswalk with possible rectangular rapid flashing beacons (RRFBs) was considered independent of any of the intersection traffic control improvements identified above. The interruption to Comox Avenue traffic (westbound, eastbound) associated with the marked crosswalk will be only the time required for a pedestrian to physically complete the crossing and not the full stop time associated with the half signal (timed to accommodate slow pedestrians crossing). Accordingly, this option would have modest benefits to westbound and eastbound traffic on Comox Avenue, while northbound and southbound traffic on Rodello Street would experience greater delay as gaps on Comox Avenue are reduced.

As the primary trigger for the intersection improvements is deteriorating conditions on Rodello Street, it is suggested that replacing the pedestrian half signal with a marked crosswalk would further impact conditions and Rodello Street and should not be pursued.

5.5 SUMMARY

The analysis demonstrates that both the roundabout and traffic signal with intersection reconfiguration (to remove off-set) provide significant operational improvement over the current intersection configuration. The intersection performance resulting from the roundabout is superior to the traffic signal, with more limited queuing and delay and a LOS “B” or better up to the 2041 horizon.

In addition to the superior operational performance, a roundabout offers a number of design and safety benefits over signalization. The following is an overview of the general advantages and disadvantages of a roundabout comparted to a signalized intersection:

- **Traffic Safety** – Roundabouts offer reduced collision severity as compared to a signalized intersection resulting from eliminating head-on and 90-degree (“t-bone”) collisions.
- **Vehicle Speed** – A properly designed roundabout with appropriate deflection on entry results in reduced vehicle travel speeds as compared to most signalized intersections.
- **Cyclist Safety** – Where properly design with a protected cycling treatment, both a signalized intersection and roundabout provide similar level of cyclist safety.
- **Pedestrian Safety** – Roundabouts generally provide safe conditions for pedestrians where they walk on sidewalks around the perimeter and cross only one direction of traffic at a time.
- **Accessibility** - Roundabouts can be challenging for people with visual and / or mobility challenges as pedestrians rely on timing gaps between traffic to complete a crossing.
- **Land / Space** - Roundabouts typically take up more space and require more property than a signalized intersection, especially when trucks or buses need to be accommodated (note: land acquisition required to achieve four-leg intersection considered earlier in this study).
- **Capital Cost** – The initial capital cost of a roundabout is generally approximately 50% more expensive than a traffic signal (note: costing was not completed specifically for this study).
- **Maintenance Cost** - Roundabouts typically require less maintenance than signal infrastructure, except where landscape maintenance is required.
- **Landscape** – Roundabouts commonly include opportunities for landscaping that are not available with a signalized intersection, including potential for stormwater management features and/or placemaking.

6.0 DESIGN CONSIDERATIONS

While the focus of this review is on intersection traffic operations, consideration has been given to some of the key design parameters associated with possible intersection improvements.

6.1 CYCLING FACILITIES THROUGH ROUNDABOUTS

The Town's *2020 Transportation Master Plan Update* identifies Comox Avenue for a "Proposed Buffered Upgrade". This is to include a 1.8m bike lane with 0.6m buffer area between the bike lane and travel lane. If a roundabout is pursued for this intersection, consideration should be given to appropriate and safe accommodation of cyclists through the roundabout. It is unclear in the design included in the July 2021 staff report whether cycling facilities are included in the roundabout design.

The TAC *Geometric Design Guide for Canadian Roads* clarifies that shared lane treatments through roundabouts are appropriate on roadways of less than 2,500 vehicles per day (Comox Avenue is approximately 14,000 vpd), above which ramps should be provided in advance on the roundabout allowing cyclists to join a protected facility separate of traffic[6]. Specific guidance on integrating cycling facilities into a single-lane roundabout is provided in the *Ontario Traffic Manual*[7] and should be referenced in the design of a roundabout at this location.

6.2 OFFSET INTERSECTIONS

The TAC *Geometric Design Guide for Canadian Roads* clarifies that intersections with an offset of between 1.5m and 40m should be avoided wherever possible as they create conflict points, difficult turn maneuvers, and unsafe conditions for vehicles and pedestrians[8]. The Guide clarifies that intersection spacing should be greater than 40m to effectively function as two independent three-leg intersection where located on major roads.

The current intersection offset is approximate 25m, which exceeds the minimum offset threshold recommended by TAC (1.5m) and is less than the distance at which an offset intersection can effectively function as two independent three-leg intersections (40m or greater). It is therefore noted that the roundabout and intersection realignment options both help address existing challenges with the offset intersection configuration.

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[6] Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Roads, Section 5.6.8 – Bicycle Facilities at Roundabouts, pg. 65/66

[7] Ontario Traffic Manual, Book 18 – Cycling Facilities, Section 6.9.1, pg. 212-216. Available online at: www.library.mto.gov.on.ca/SydneyPLUS/Sydney/Portal/default.aspx?component=AAAAIY&record=9c49ce44-e3b2-4389-91cd-5e9b67aad03d

[8] Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Roads, Section 9.2.4 – Basic Intersection Configurations, pg. 8

7.0 SUMMARY

A roundabout has historically been planned for the Comox Avenue / Rodello Street intersection, dating back to the *Comox Transportation Study 2011*. As the roundabout was being advanced alongside the St. Josephs Regional Hospital site redevelopment and as part of regional sewer improvements, Council has requested a second opinion on the appropriateness of the improvement given it has been some time since the initial recommendations were made. Urban Systems was retained to complete a review of this intersection.

A study was undertaken that considers the intersection's existing and future traffic operational performance accounting for both background growth and additional traffic from the planned hospital site. The study intersection was found to be currently operating at acceptable conditions with the exception of the northbound approach in the PM period. It was also concluded that within the next few years both the northbound and southbound approaches will reach failing conditions and that operational improvements are required.

The single-lane roundabout option identified in the 2011 Study was analyzed, alongside options to install a traffic signal and to restrict turn movement. While the analysis demonstrates that both the roundabout and traffic signal with intersection reconfiguration (to remove off-set) provide significant operational benefit, the intersection performance resulting from the roundabout is superior to the traffic signal, with more limited queuing and delay and a LOS "B" or better up to the 2041 horizon. A roundabout provides additional traffic safety benefits by reducing collision severity and reducing vehicle speeds. Accordingly, the roundabout is the preferred improvement for this location.

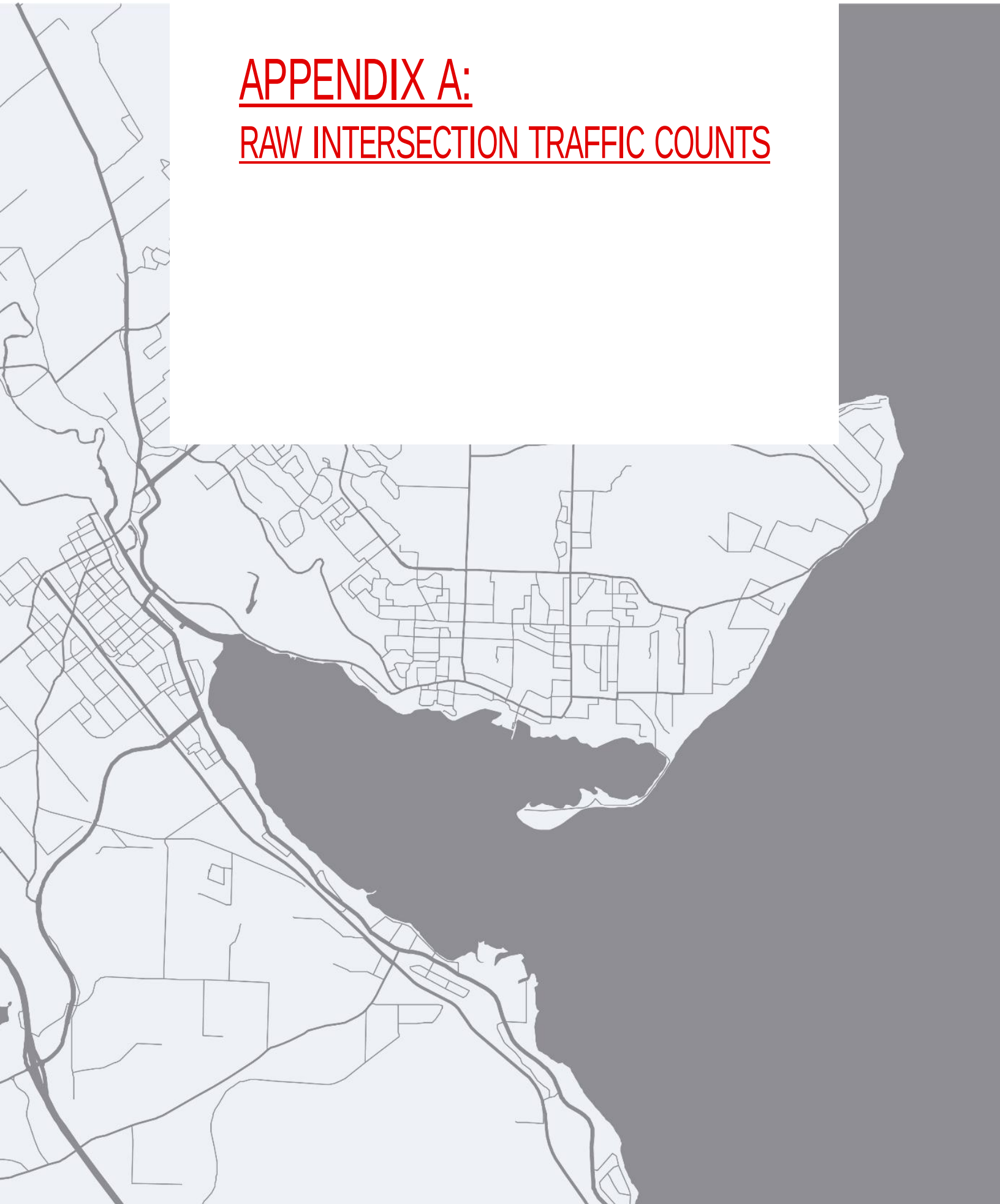
7.1 RECOMMENDATIONS

The following are the specific recommendations of this review for the Comox Avenue / Rodello Street intersection:

1. Intersection improvements are required to address deteriorating performance, particularly for the northbound and southbound movements; and
2. A single-lane roundabout provides the greatest operational performance and is the preferred intersection improvement option.

APPENDIX A:

RAW INTERSECTION TRAFFIC COUNTS



West Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
Full Length (7 AM-9 AM, 3 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Leg	Rodello St					Comox Ave					Comox Ave					
Direction	Southbound					Eastbound					Westbound					
Time	L	R	U	App	Ped*	L	T	U	App	Ped*	T	R	U	App	Ped*	Int
2021-11-30 7:00AM	1	5	0	**6**	2	0	43	0	**43**	1	73	1	0	**74**	0	**123**
7:15AM	1	0	0	**1**	1	0	66	0	**66**	1	73	0	0	**73**	0	**140**
7:30AM	0	1	0	**1**	0	1	79	0	**80**	0	108	0	0	**108**	0	**189**
7:45AM	0	7	0	**7**	1	3	92	0	**95**	0	116	0	0	**116**	0	**218**
Hourly Total	2	13	0	**15**	4	4	280	0	**284**	2	370	1	0	**371**	0	**670**
8:00AM	1	3	0	**4**	0	0	105	0	**105**	0	139	0	0	**139**	0	**248**
8:15AM	1	7	0	**8**	0	1	140	0	**141**	0	153	3	0	**156**	2	**305**
8:30AM	2	9	0	**11**	1	2	89	0	**91**	0	161	1	0	**162**	6	**264**
8:45AM	2	7	0	**9**	0	3	138	0	**141**	0	182	0	0	**182**	6	**332**
Hourly Total	6	26	0	**32**	1	6	472	0	**478**	0	635	4	0	**639**	14	**1149**
3:00PM	1	4	0	**5**	0	5	161	0	**166**	0	142	4	0	**146**	2	**317**
3:15PM	2	5	0	**7**	0	4	143	0	**147**	0	181	7	0	**188**	3	**342**
3:30PM	3	9	0	**12**	0	5	156	0	**161**	0	154	3	0	**157**	3	**330**
3:45PM	3	7	0	**10**	1	3	145	0	**148**	0	165	3	0	**168**	5	**326**
Hourly Total	9	25	0	**34**	1	17	605	0	**622**	0	642	17	0	**659**	13	**1315**
4:00PM	3	6	0	**9**	1	6	149	0	**155**	0	139	3	0	**142**	2	**306**
4:15PM	0	6	0	**6**	0	4	173	0	**177**	0	133	5	0	**138**	1	**321**
4:30PM	1	5	0	**6**	0	6	154	0	**160**	0	149	3	0	**152**	0	**318**
4:45PM	0	3	0	**3**	0	4	171	0	**175**	0	137	5	0	**142**	2	**320**
Hourly Total	4	20	0	**24**	1	20	647	0	**667**	0	558	16	0	**574**	5	**1265**
5:00PM	1	3	0	**4**	0	3	160	0	**163**	0	137	2	0	**139**	2	**306**
5:15PM	1	2	0	**3**	1	7	164	0	**171**	0	103	4	0	**107**	0	**281**
5:30PM	4	3	0	**7**	0	7	127	0	**134**	0	104	1	0	**105**	0	**246**
5:45PM	1	6	0	**7**	0	3	114	0	**117**	0	79	1	0	**80**	1	**204**
Hourly Total	7	14	0	**21**	1	20	565	0	**585**	0	423	8	0	**431**	3	**1037**
Total	28	98	0	**126**	8	67	2569	0	**2636**	2	2628	46	0	**2674**	35	**5436**
% Approach	22.2%	77.8%	0%	**-**	-	2.5%	97.5%	0%	**-**	-	98.3%	1.7%	0%	**-**	-	-
% Total	0.5%	1.8%	0%	**2.3%**	-	1.2%	47.3%	0%	**48.5%**	-	48.3%	0.8%	0%	**49.2%**	-	-
Lights	20	94	0	**114**	-	67	2515	0	**2582**	-	2571	42	0	**2613**	-	5309
% Lights	71.4%	95.9%	0%	**90.5%**	-	100%	97.9%	0%	**98.0%**	-	97.8%	91.3%	0%	**97.7%**	-	97.7%
Single-Unit Trucks	0	1	0	**1**	-	0	38	0	**38**	-	34	1	0	**35**	-	74
% Single-Unit Trucks	0%	1.0%	0%	**0.8%**	-	0%	1.5%	0%	**1.4%**	-	1.3%	2.2%	0%	**1.3%**	-	1.4%
Articulated Trucks	0	0	0	**0**	-	0	4	0	**4**	-	1	0	0	**1**	-	5
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0.2%	0%	**0.2%**	-	0%	0%	0%	**0%**	-	0.1%
Buses	7	1	0	**8**	-	0	8	0	**8**	-	17	0	0	**17**	-	33
% Buses	25.0%	1.0%	0%	**6.3%**	-	0%	0.3%	0%	**0.3%**	-	0.6%	0%	0%	**0.6%**	-	0.6%
Bicycles on Road	1	2	0	**3**	-	0	4	0	**4**	-	5	3	0	**8**	-	15
% Bicycles on Road	3.6%	2.0%	0%	**2.4%**	-	0%	0.2%	0%	**0.2%**	-	0.2%	6.5%	0%	**0.3%**	-	0.3%
Pedestrians	-	-	-	-	7	-	-	-	-	2	-	-	-	-	31	
% Pedestrians	-	-	-	-	87.5%	-	-	-	-	100%	-	-	-	-	88.6%	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	4	
% Bicycles on Crosswalk	-	-	-	-	12.5%	-	-	-	-	0%	-	-	-	-	11.4%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021

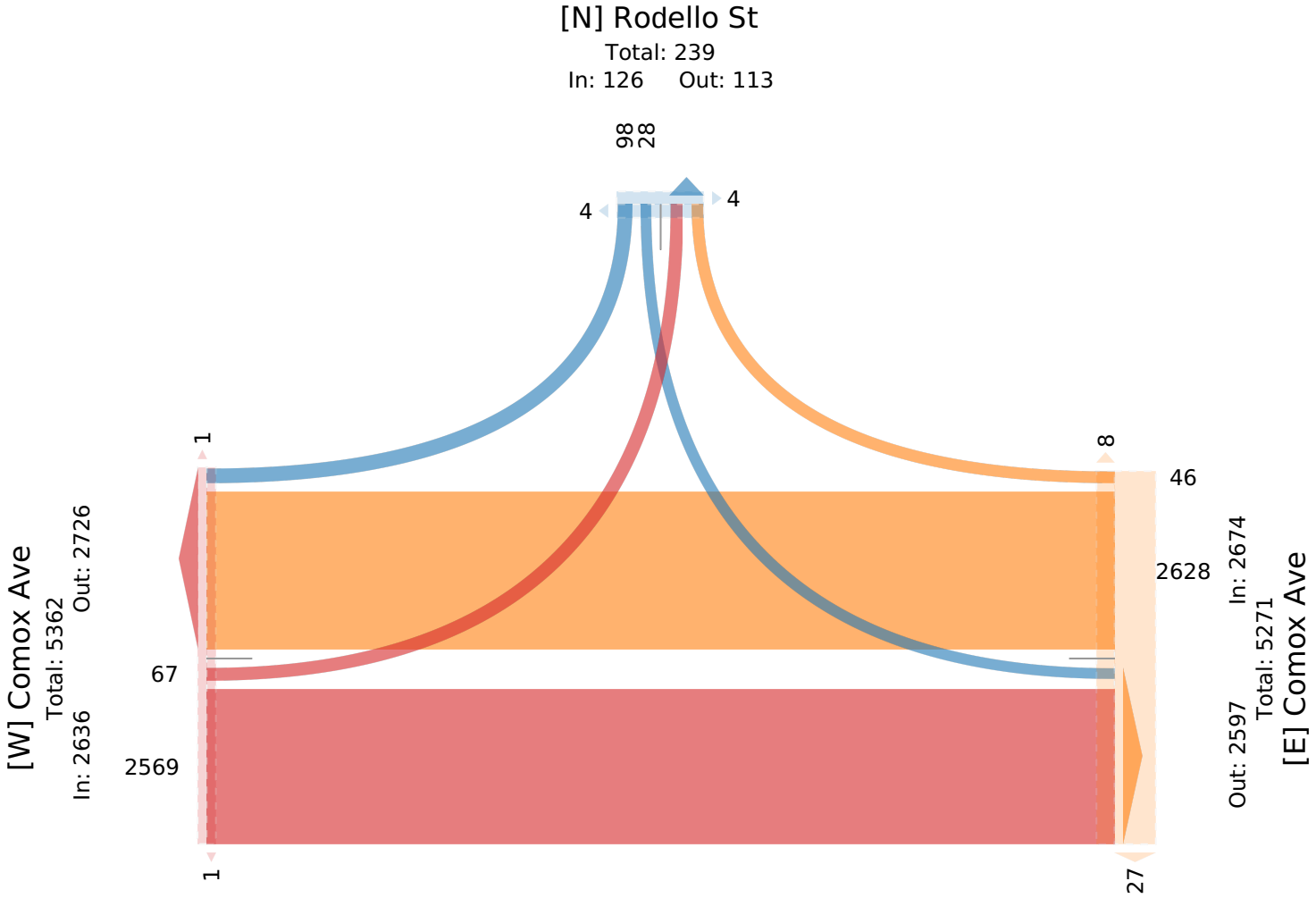
Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA



3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Leg Direction	Rodello St Southbound					Comox Ave Eastbound					Comox Ave Westbound					
Time	L	R	U	**App**	Ped*	L	T	U	**App**	Ped*	T	R	U	**App**	Ped*	**Int**
2021-11-30 8:00AM	1	3	0	**4**	0	0	105	0	**105**	0	139	0	0	**139**	0	**248**
8:15AM	1	7	0	**8**	0	1	140	0	**141**	0	153	3	0	**156**	2	**305**
8:30AM	2	9	0	**11**	1	2	89	0	**91**	0	161	1	0	**162**	6	**264**
8:45AM	2	7	0	**9**	0	3	138	0	**141**	0	182	0	0	**182**	6	**332**
Total	6	26	0	**32**	1	6	472	0	**478**	0	635	4	0	**639**	14	**1149**
% Approach	18.8%	81.3%	0%	**-**	-	1.3%	98.7%	0%	**-**	-	99.4%	0.6%	0%	**-**	-	-
% Total	0.5%	2.3%	0%	**2.8%**	-	0.5%	41.1%	0%	**41.6%**	-	55.3%	0.3%	0%	**55.6%**	-	-
PHF	0.625	0.694	-	**0.682**	-	0.500	0.843	-	**0.848**	-	0.871	0.250	-	**0.875**	-	0.865
Lights	4	24	0	**28**	-	6	453	0	**459**	-	622	3	0	**625**	-	1112
% Lights	66.7%	92.3%	0%	**87.5%**	-	100%	96.0%	0%	**96.0%**	-	98.0%	75.0%	0%	**97.8%**	-	96.8%
Single-Unit Trucks	0	1	0	**1**	-	0	14	0	**14**	-	5	0	0	**5**	-	20
% Single-Unit Trucks	0%	3.8%	0%	**3.1%**	-	0%	3.0%	0%	**2.9%**	-	0.8%	0%	0%	**0.8%**	-	1.7%
Articulated Trucks	0	0	0	**0**	-	0	4	0	**4**	-	0	0	0	**0**	-	4
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0.8%	0%	**0.8%**	-	0%	0%	0%	**0%**	-	0.3%
Buses	1	0	0	**1**	-	0	1	0	**1**	-	7	0	0	**7**	-	9
% Buses	16.7%	0%	0%	**3.1%**	-	0%	0.2%	0%	**0.2%**	-	1.1%	0%	0%	**1.1%**	-	0.8%
Bicycles on Road	1	1	0	**2**	-	0	0	0	**0**	-	1	1	0	**2**	-	4
% Bicycles on Road	16.7%	3.8%	0%	**6.3%**	-	0%	0%	0%	**0%**	-	0.2%	25.0%	0%	**0.3%**	-	0.3%
Pedestrians	-	-	-	-	1	-	-	-	-	0	-	-	-	-	11	
% Pedestrians	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	78.6%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	21.4%	-

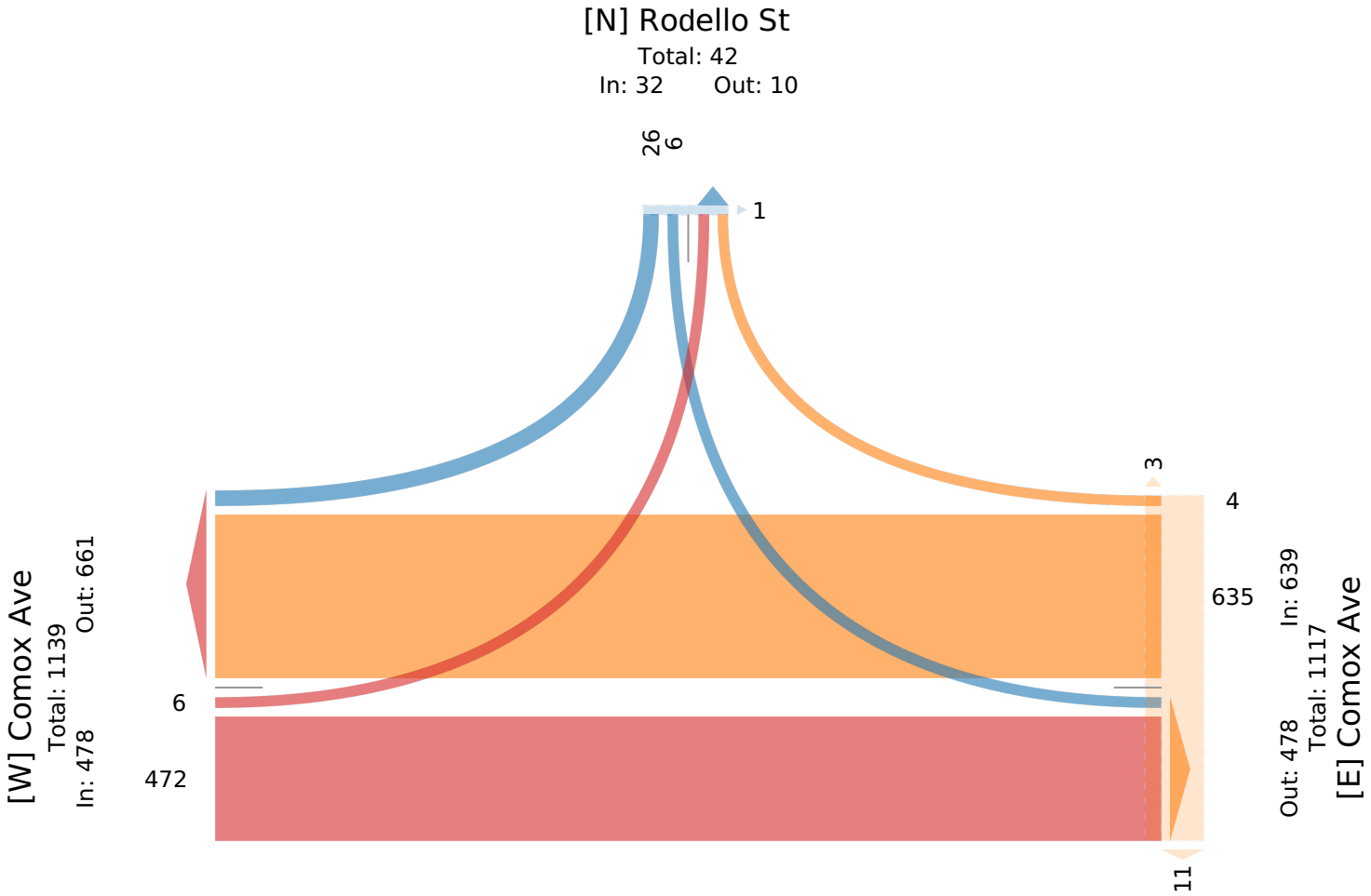
*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

West Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA



3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
PM Peak (3 PM - 4 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Leg Direction	Rodello St Southbound					Comox Ave Eastbound					Comox Ave Westbound					
Time	L	R	U	**App**	Ped*	L	T	U	**App**	Ped*	T	R	U	**App**	Ped*	**Int**
2021-11-30 3:00PM	1	4	0	**5**	0	5	161	0	**166**	0	142	4	0	**146**	2	**317**
3:15PM	2	5	0	**7**	0	4	143	0	**147**	0	181	7	0	**188**	3	**342**
3:30PM	3	9	0	**12**	0	5	156	0	**161**	0	154	3	0	**157**	3	**330**
3:45PM	3	7	0	**10**	1	3	145	0	**148**	0	165	3	0	**168**	5	**326**
Total	9	25	0	**34**	1	17	605	0	**622**	0	642	17	0	**659**	13	**1315**
% Approach	26.5%	73.5%	0%	**-**	-	2.7%	97.3%	0%	**-**	-	97.4%	2.6%	0%	**-**	-	**-**
% Total	0.7%	1.9%	0%	**2.6%**	-	1.3%	46.0%	0%	**47.3%**	-	48.8%	1.3%	0%	**50.1%**	-	**-**
PHF	0.750	0.694	-	**0.708**	-	0.850	0.942	-	**0.939**	-	0.889	0.750	-	**0.885**	-	0.965
Lights	7	24	0	**31**	-	17	595	0	**612**	-	622	15	0	**637**	-	1280
% Lights	77.8%	96.0%	0%	**91.2%**	-	100%	98.3%	0%	**98.4%**	-	96.9%	88.2%	0%	**96.7%**	-	97.3%
Single-Unit Trucks	0	0	0	**0**	-	0	7	0	**7**	-	13	0	0	**13**	-	20
% Single-Unit Trucks	0%	0%	0%	**0%**	-	0%	1.2%	0%	**1.1%**	-	2.0%	0%	0%	**2.0%**	-	1.5%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	2	1	0	**3**	-	0	1	0	**1**	-	5	0	0	**5**	-	9
% Buses	22.2%	4.0%	0%	**8.8%**	-	0%	0.2%	0%	**0.2%**	-	0.8%	0%	0%	**0.8%**	-	0.7%
Bicycles on Road	0	0	0	**0**	-	0	2	0	**2**	-	2	2	0	**4**	-	6
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0.3%	0%	**0.3%**	-	0.3%	11.8%	0%	**0.6%**	-	0.5%
Pedestrians	-	-	-	-	1	-	-	-	-	0	-	-	-	-	12	
% Pedestrians	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	92.3%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	7.7%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021

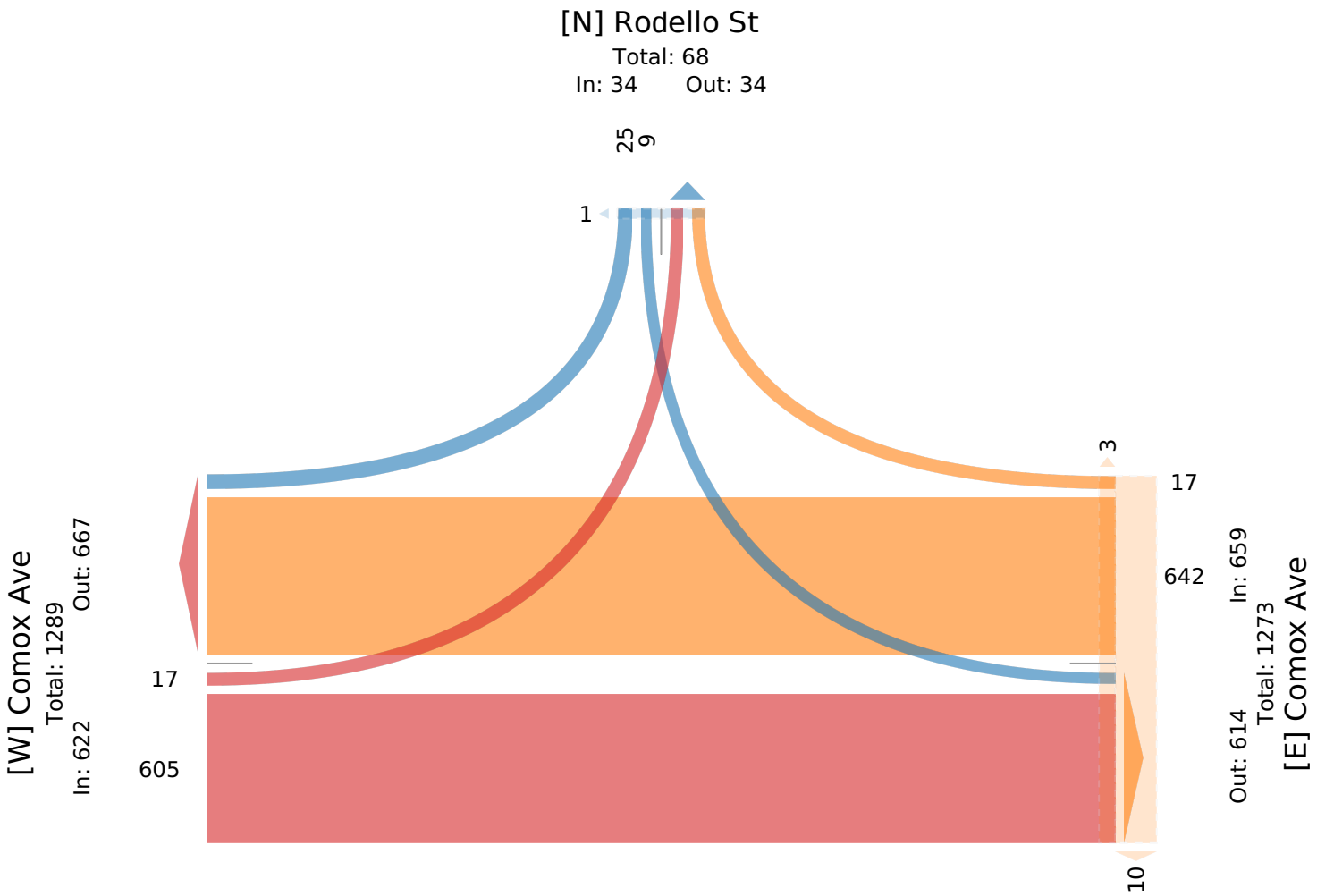
PM Peak (3 PM - 4 PM) - Overall Peak Hour

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 905244, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA



East Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
Full Length (7 AM-9 AM, 3 PM-6 PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Leg Direction	Rodello St Northbound					Comox Ave Eastbound					Comox Ave Westbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2021-11-30 7:00AM	0	0	0	**0**	0	42	0	0	**42**	0	0	77	0	**77**	0	**119**
7:15AM	0	1	0	**1**	0	60	3	0	**63**	0	0	69	0	**69**	0	**133**
7:30AM	1	0	0	**1**	0	78	3	0	**81**	1	0	107	0	**107**	0	**189**
7:45AM	1	0	0	**1**	0	93	3	0	**96**	0	5	118	0	**123**	0	**220**
Hourly Total	2	1	0	**3**	0	273	9	0	**282**	1	5	371	0	**376**	0	**661**
8:00AM	2	8	0	**10**	0	95	3	0	**98**	0	2	135	0	**137**	0	**245**
8:15AM	5	4	0	**9**	0	136	6	0	**142**	2	3	150	0	**153**	0	**304**
8:30AM	3	7	0	**10**	0	92	4	0	**96**	7	3	163	0	**166**	0	**272**
8:45AM	3	2	0	**5**	0	142	7	0	**149**	6	7	178	0	**185**	0	**339**
Hourly Total	13	21	0	**34**	0	465	20	0	**485**	15	15	626	0	**641**	0	**1160**
3:00PM	6	3	0	**9**	1	160	8	0	**168**	2	2	145	0	**147**	0	**324**
3:15PM	8	8	0	**16**	0	141	3	0	**144**	6	6	174	0	**180**	0	**340**
3:30PM	5	4	0	**9**	0	153	6	0	**159**	5	3	155	0	**158**	0	**326**
3:45PM	5	3	0	**8**	1	142	6	0	**148**	7	5	159	0	**164**	0	**320**
Hourly Total	24	18	0	**42**	2	596	23	0	**619**	20	16	633	0	**649**	0	**1310**
4:00PM	1	2	0	**3**	0	141	3	0	**144**	2	0	142	0	**142**	0	**289**
4:15PM	1	0	0	**1**	0	174	0	0	**174**	1	1	139	0	**140**	0	**315**
4:30PM	1	1	0	**2**	0	157	1	0	**158**	1	1	156	0	**157**	0	**317**
4:45PM	2	4	0	**6**	0	160	3	0	**163**	4	4	133	0	**137**	0	**306**
Hourly Total	5	7	0	**12**	0	632	7	0	**639**	8	6	570	0	**576**	0	**1227**
5:00PM	4	5	0	**9**	0	154	5	0	**159**	3	1	138	0	**139**	0	**307**
5:15PM	1	0	0	**1**	0	167	4	0	**171**	0	0	107	0	**107**	0	**279**
5:30PM	2	1	0	**3**	0	128	2	0	**130**	0	1	102	0	**103**	0	**236**
5:45PM	2	1	0	**3**	0	112	4	0	**116**	1	1	78	0	**79**	0	**198**
Hourly Total	9	7	0	**16**	0	561	15	0	**576**	4	3	425	0	**428**	0	**1020**
Total	53	54	0	**107**	2	2527	74	0	**2601**	48	45	2625	0	**2670**	0	**5378**
% Approach	49.5%	50.5%	0%	**-**	-	97.2%	2.8%	0%	**-**	-	1.7%	98.3%	0%	**-**	-	-
% Total	1.0%	1.0%	0%	**2.0%**	-	47.0%	1.4%	0%	**48.4%**	-	0.8%	48.8%	0%	**49.6%**	-	-
Lights	49	53	0	**102**	-	2462	67	0	**2529**	-	45	2571	0	**2616**	-	5247
% Lights	92.5%	98.1%	0%	**95.3%**	-	97.4%	90.5%	0%	**97.2%**	-	100%	97.9%	0%	**98.0%**	-	97.6%
Single-Unit Trucks	2	0	0	**2**	-	41	3	0	**44**	-	0	31	0	**31**	-	77
% Single-Unit Trucks	3.8%	0%	0%	**1.9%**	-	1.6%	4.1%	0%	**1.7%**	-	0%	1.2%	0%	**1.2%**	-	1.4%
Articulated Trucks	1	0	0	**1**	-	4	0	0	**4**	-	0	2	0	**2**	-	7
% Articulated Trucks	1.9%	0%	0%	**0.9%**	-	0.2%	0%	0%	**0.2%**	-	0%	0.1%	0%	**0.1%**	-	0.1%
Buses	0	1	0	**1**	-	14	0	0	**14**	-	0	17	0	**17**	-	32
% Buses	0%	1.9%	0%	**0.9%**	-	0.6%	0%	0%	**0.5%**	-	0%	0.6%	0%	**0.6%**	-	0.6%
Bicycles on Road	1	0	0	**1**	-	6	4	0	**10**	-	0	4	0	**4**	-	15
% Bicycles on Road	1.9%	0%	0%	**0.9%**	-	0.2%	5.4%	0%	**0.4%**	-	0%	0.2%	0%	**0.1%**	-	0.3%
Pedestrians	-	-	-	-	1	-	-	-	-	41	-	-	-	-	0	
% Pedestrians	-	-	-	-	50.0%	-	-	-	-	85.4%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	7	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	50.0%	-	-	-	-	14.6%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

East Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021

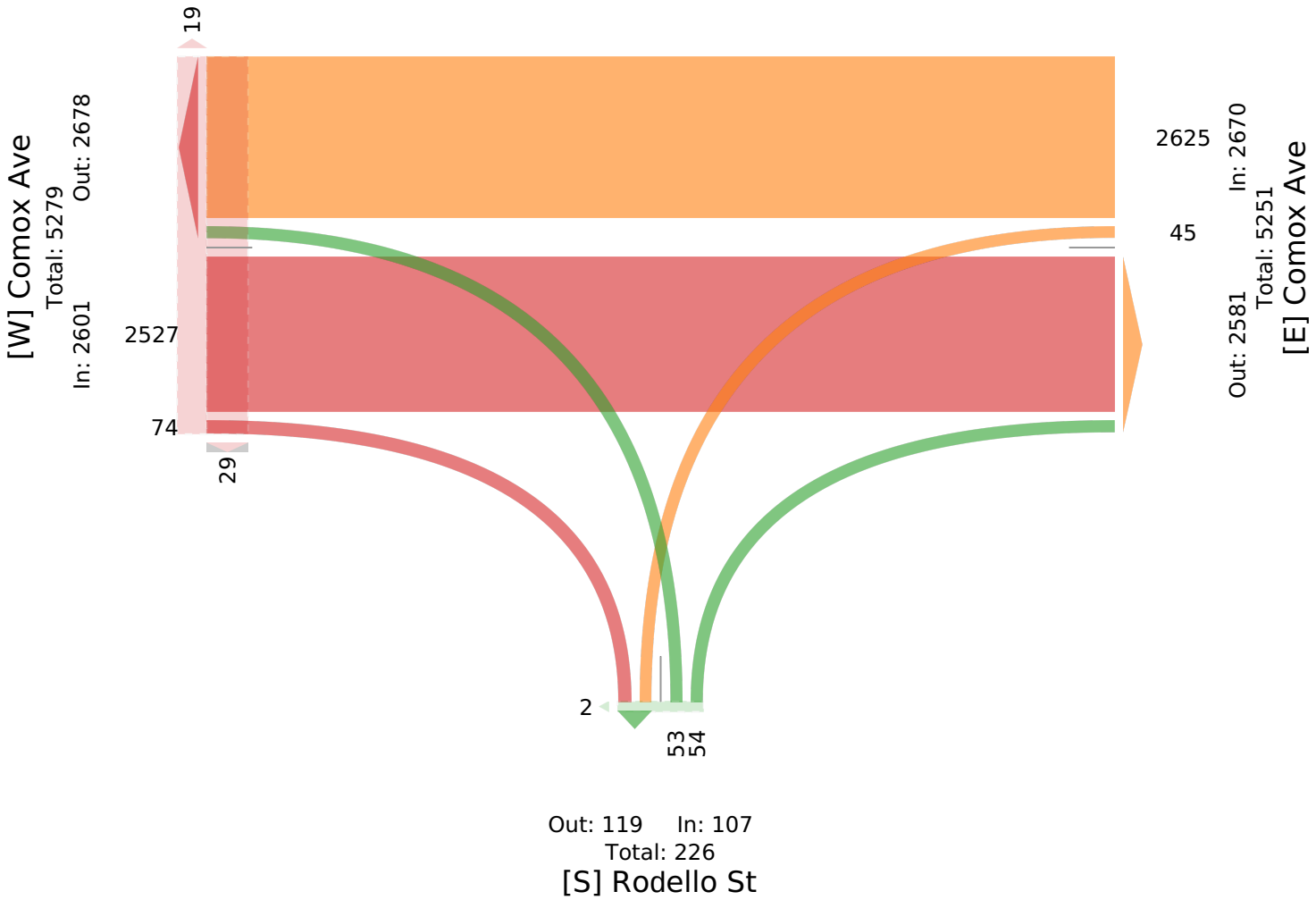
Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA



3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

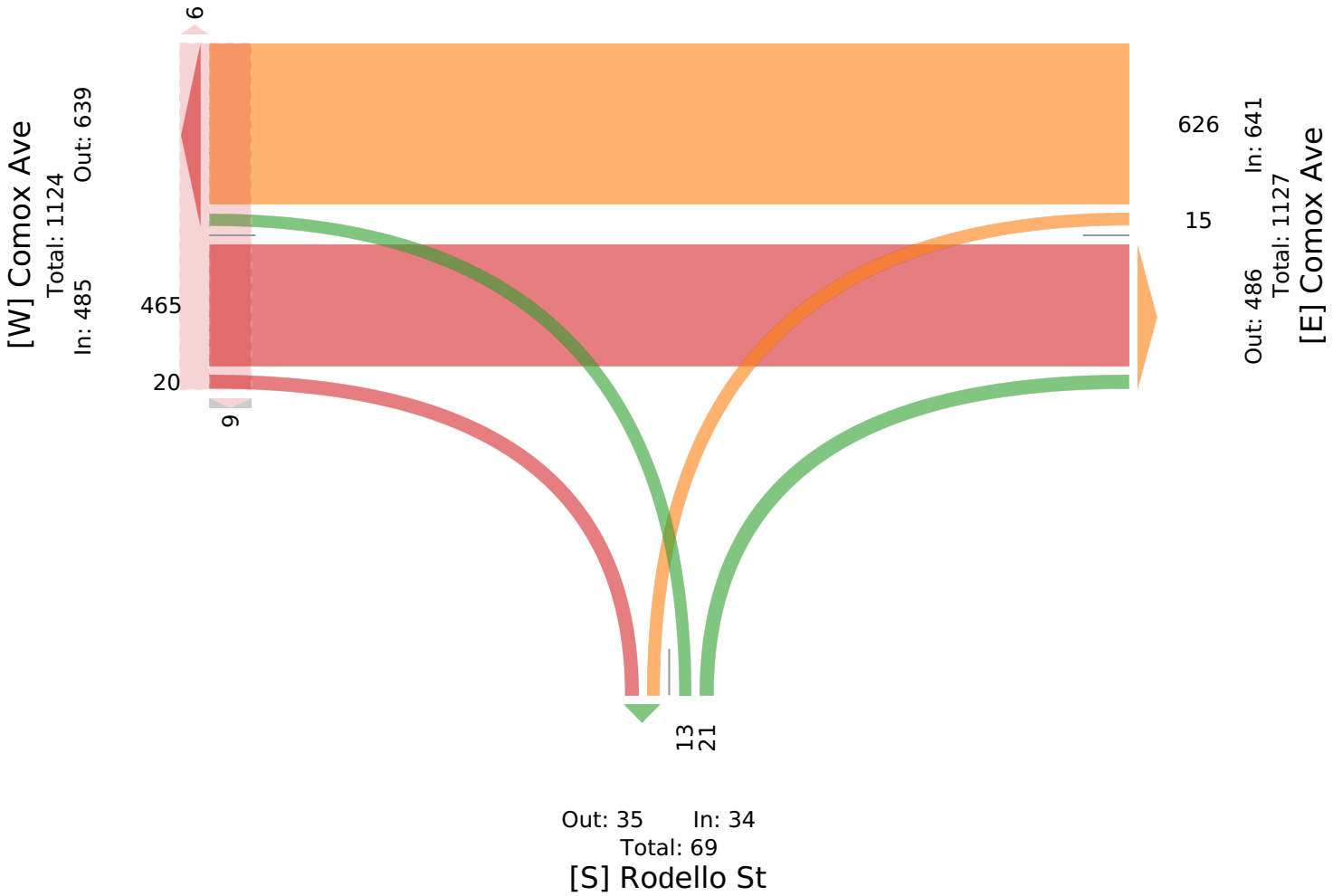
Leg Direction	Rodello St Northbound					Comox Ave Eastbound					Comox Ave Westbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2021-11-30 8:00AM	2	8	0	**10**	0	95	3	0	**98**	0	2	135	0	**137**	0	**245**
8:15AM	5	4	0	**9**	0	136	6	0	**142**	2	3	150	0	**153**	0	**304**
8:30AM	3	7	0	**10**	0	92	4	0	**96**	7	3	163	0	**166**	0	**272**
8:45AM	3	2	0	**5**	0	142	7	0	**149**	6	7	178	0	**185**	0	**339**
Total	13	21	0	**34**	0	465	20	0	**485**	15	15	626	0	**641**	0	**1160**
% Approach	38.2%	61.8%	0%	**-**	-	95.9%	4.1%	0%	**-**	-	2.3%	97.7%	0%	**-**	-	-
% Total	1.1%	1.8%	0%	**2.9%**	-	40.1%	1.7%	0%	**41.8%**	-	1.3%	54.0%	0%	**55.3%**	-	-
PHF	0.600	0.656	-	**0.825**	-	0.823	0.750	-	**0.825**	-	0.536	0.878	-	**0.865**	-	0.859
Lights	12	20	0	**32**	-	443	17	0	**460**	-	15	613	0	**628**	-	1120
% Lights	92.3%	95.2%	0%	**94.1%**	-	95.3%	85.0%	0%	**94.8%**	-	100%	97.9%	0%	**98.0%**	-	96.6%
Single-Unit Trucks	0	0	0	**0**	-	15	1	0	**16**	-	0	5	0	**5**	-	21
% Single-Unit Trucks	0%	0%	0%	**0%**	-	3.2%	5.0%	0%	**3.3%**	-	0%	0.8%	0%	**0.8%**	-	1.8%
Articulated Trucks	0	0	0	**0**	-	4	0	0	**4**	-	0	0	0	**0**	-	4
% Articulated Trucks	0%	0%	0%	**0%**	-	0.9%	0%	0%	**0.8%**	-	0%	0%	0%	**0%**	-	0.3%
Buses	0	1	0	**1**	-	2	0	0	**2**	-	0	7	0	**7**	-	10
% Buses	0%	4.8%	0%	**2.9%**	-	0.4%	0%	0%	**0.4%**	-	0%	1.1%	0%	**1.1%**	-	0.9%
Bicycles on Road	1	0	0	**1**	-	1	2	0	**3**	-	0	1	0	**1**	-	5
% Bicycles on Road	7.7%	0%	0%	**2.9%**	-	0.2%	10.0%	0%	**0.6%**	-	0%	0.2%	0%	**0.2%**	-	0.4%
Pedestrians	-	-	-	-	0	-	-	-	-	10	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	66.7%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	5	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	33.3%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA



East Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
Kelowna, BC, V1Y 1Z9, CA

Tue Nov 30, 2021
PM Peak (3 PM - 4 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Leg	Rodello St					Comox Ave					Comox Ave					
Direction	Northbound					Eastbound					Westbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2021-11-30 3:00PM	6	3	0	**9**	1	160	8	0	**168**	2	2	145	0	**147**	0	**324**
3:15PM	8	8	0	**16**	0	141	3	0	**144**	6	6	174	0	**180**	0	**340**
3:30PM	5	4	0	**9**	0	153	6	0	**159**	5	3	155	0	**158**	0	**326**
3:45PM	5	3	0	**8**	1	142	6	0	**148**	7	5	159	0	**164**	0	**320**
Total	24	18	0	**42**	2	596	23	0	**619**	20	16	633	0	**649**	0	**1310**
% Approach	57.1%	42.9%	0%	**-**	-	96.3%	3.7%	0%	**-**	-	2.5%	97.5%	0%	**-**	-	**-**
% Total	1.8%	1.4%	0%	**3.2%**	-	45.5%	1.8%	0%	**47.3%**	-	1.2%	48.3%	0%	**49.5%**	-	**-**
PHF	0.750	0.563	-	**0.656**	-	0.932	0.719	-	**0.922**	-	0.667	0.913	-	**0.905**	-	0.966
Lights	23	18	0	**41**	-	581	23	0	**604**	-	16	615	0	**631**	-	1276
% Lights	95.8%	100%	0%	**97.6%**	-	97.5%	100%	0%	**97.6%**	-	100%	97.2%	0%	**97.2%**	-	97.4%
Single-Unit Trucks	0	0	0	**0**	-	9	0	0	**9**	-	0	12	0	**12**	-	21
% Single-Unit Trucks	0%	0%	0%	**0%**	-	1.5%	0%	0%	**1.5%**	-	0%	1.9%	0%	**1.8%**	-	1.6%
Articulated Trucks	1	0	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	1
% Articulated Trucks	4.2%	0%	0%	**2.4%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.1%
Buses	0	0	0	**0**	-	3	0	0	**3**	-	0	5	0	**5**	-	8
% Buses	0%	0%	0%	**0%**	-	0.5%	0%	0%	**0.5%**	-	0%	0.8%	0%	**0.8%**	-	0.6%
Bicycles on Road	0	0	0	**0**	-	3	0	0	**3**	-	0	1	0	**1**	-	4
% Bicycles on Road	0%	0%	0%	**0%**	-	0.5%	0%	0%	**0.5%**	-	0%	0.2%	0%	**0.2%**	-	0.3%
Pedestrians	-	-	-	-	1	-	-	-	-	18	-	-	-	-	0	
% Pedestrians	-	-	-	-	50.0%	-	-	-	-	90.0%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	2	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	50.0%	-	-	-	-	10.0%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

East Intersection

3791.0008.01 Comox Ave & Rodello St - TMC

Tue Nov 30, 2021

PM Peak (3 PM - 4 PM) - Overall Peak Hour

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 905757, Location: 49.675692, -124.940011, Site Code: Comox Ave & Rodello St

Provided by: Urban Systems Ltd.
1353 Ellis St, 304,
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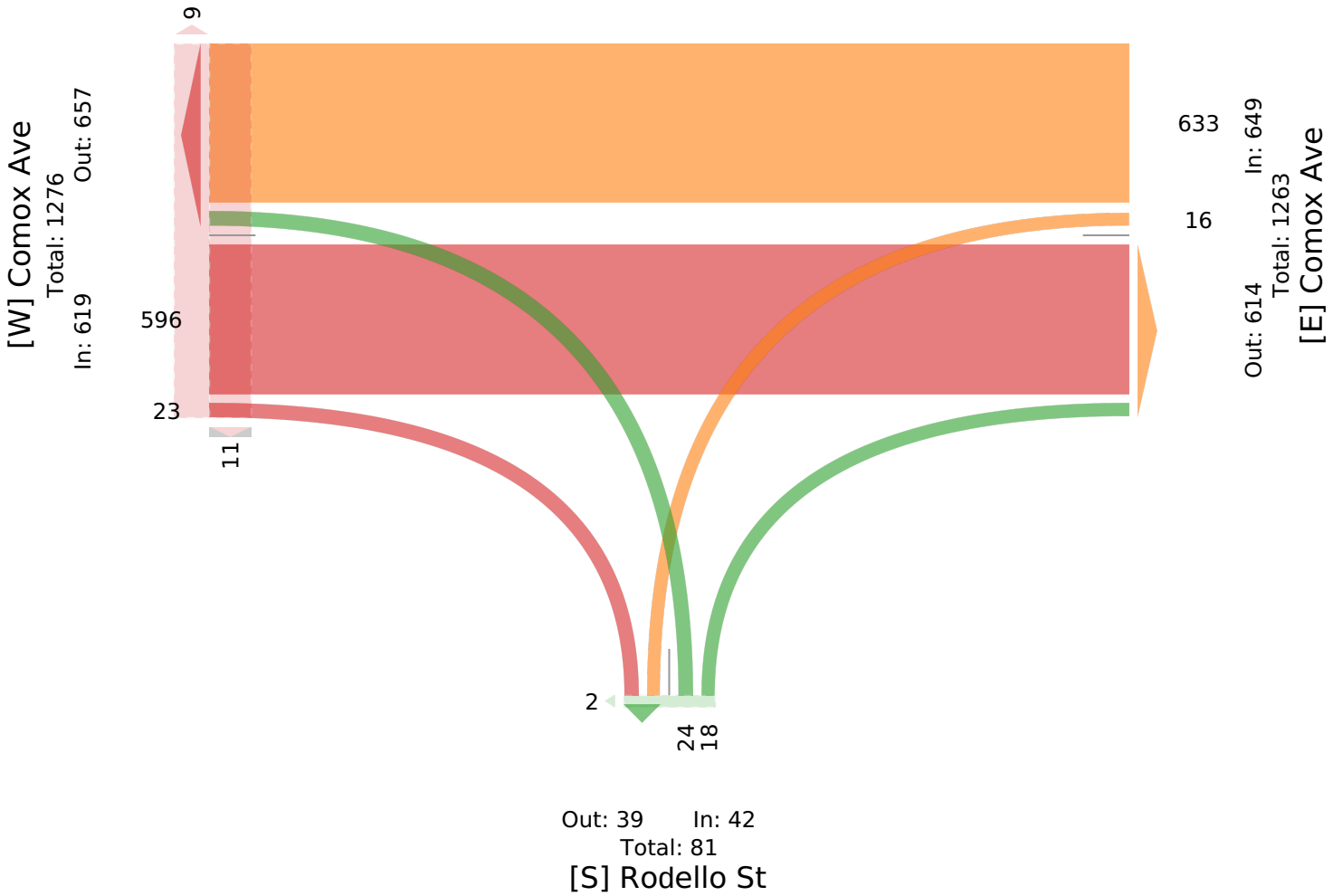
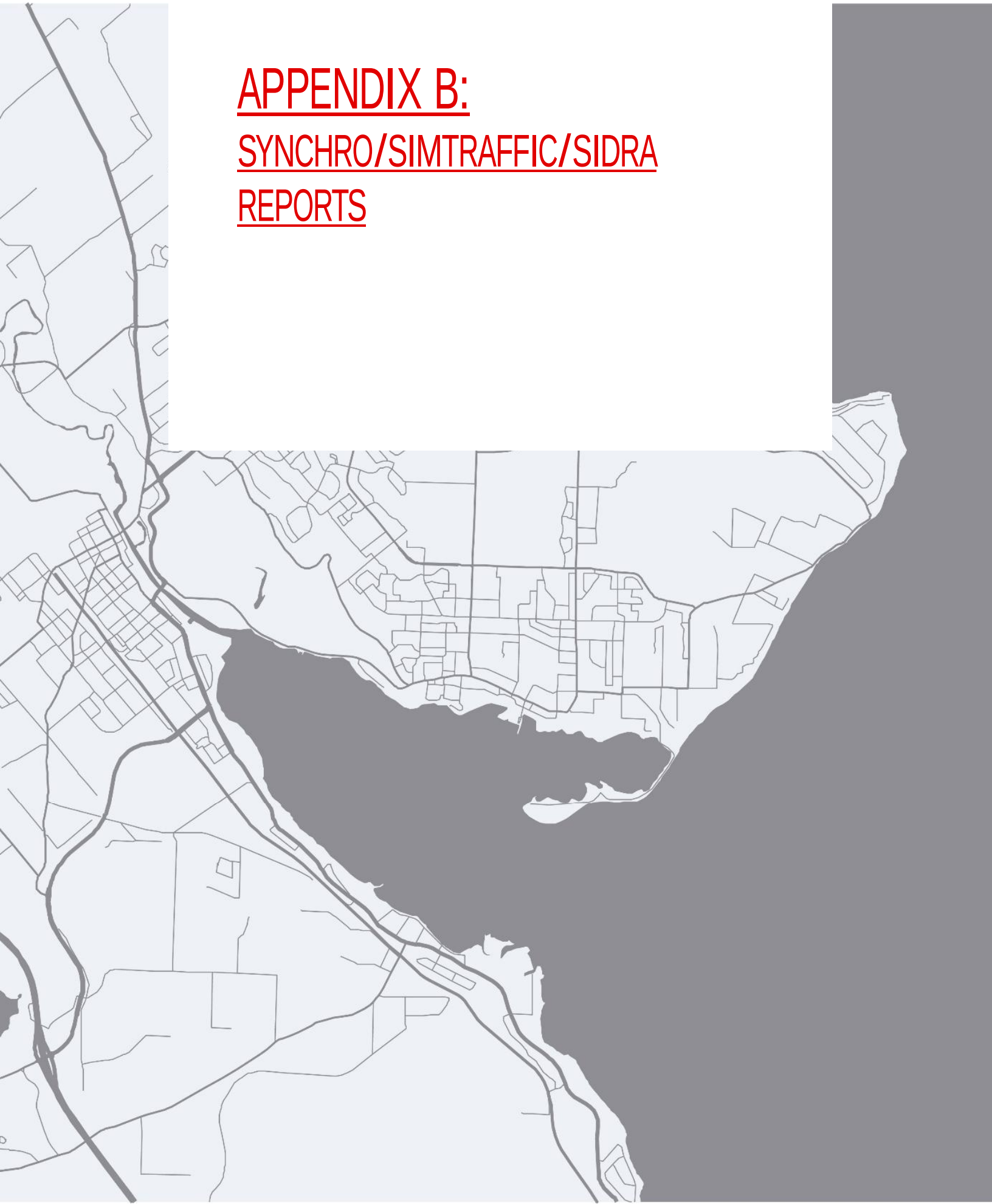


APPENDIX B:

SYNCHRO/SIMTRAFFIC/SIDRA REPORTS



APPENDIX B-1 Base

AM/PM SYNCHRO AND SIMTRAFFIC REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	519	22	15	689	4	0	0	0	0	0	0
Future Volume (vph)	6	519	22	15	689	4	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1815	0	0	1855	0	0	0	0	0	0	0
Flt Permitted		0.984			0.969							
Satd. Flow (perm)	0	1787	0	0	1801	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	657	0	0	827	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		35.8			35.8							
Actuated g/C Ratio		0.55			0.55							
v/c Ratio		0.66			0.83							
Control Delay		13.0			19.3							
Queue Delay		0.0			0.0							
Total Delay		13.0			19.3							
LOS		B			B							
Approach Delay		13.0			19.3							
Approach LOS		B			B							
Queue Length 50th (m)		50.2			74.5							
Queue Length 95th (m)		68.7			111.4							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1496			1507							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.44			0.55							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 64.6			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 49.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:55	7:55	7:55	7:55	7:55	7:55
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1354	1320	1282	1346	1289	1318
Vehs Exited	1349	1311	1279	1346	1289	1315
Starting Vehs	5	6	6	10	9	6
Ending Vehs	10	15	9	10	9	9
Travel Distance (km)	345	336	327	344	329	336
Travel Time (hr)	8.6	8.8	7.9	8.8	8.0	8.4
Total Delay (hr)	1.4	1.7	1.0	1.6	1.1	1.4
Total Stops	128	137	102	137	120	123
Fuel Used (l)	28.4	28.0	26.4	28.5	26.6	27.6

Interval #0 Information Seeding

Start Time	7:55
End Time	8:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1354	1320	1282	1346	1289	1318
Vehs Exited	1349	1311	1279	1346	1289	1315
Starting Vehs	5	6	6	10	9	6
Ending Vehs	10	15	9	10	9	9
Travel Distance (km)	345	336	327	344	329	336
Travel Time (hr)	8.6	8.8	7.9	8.8	8.0	8.4
Total Delay (hr)	1.4	1.7	1.0	1.6	1.1	1.4
Total Stops	128	137	102	137	120	123
Fuel Used (l)	28.4	28.0	26.4	28.5	26.6	27.6

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.4	0.5	0.6	0.6	0.8	0.1	0.1	0.1	0.1		0.1
Total Del/Veh (s)	5.6	1.1	0.4	6.8	1.6	0.8	53.5	53.3	14.8	57.2		10.3

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	2.6

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	3.2

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	29.6	45.2	29.7	20.0
Average Queue (m)	4.2	3.7	7.7	6.1
95th Queue (m)	17.6	21.2	20.8	15.5
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	666	25	14	696	19	0	0	0	0	0	0
Future Volume (vph)	17	666	25	14	696	19	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1868	0	0	1837	0	0	0	0	0	0	0
Flt Permitted		0.974			0.975							
Satd. Flow (perm)	0	1821	0	0	1793	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			4							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	764	0	0	811	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		35.6			35.6							
Actuated g/C Ratio		0.55			0.55							
v/c Ratio		0.76			0.82							
Control Delay		15.8			18.7							
Queue Delay		0.0			0.0							
Total Delay		15.8			18.7							
LOS		B			B							
Approach Delay		15.8			18.7							
Approach LOS		B			B							
Queue Length 50th (m)		63.7			72.1							
Queue Length 95th (m)		99.1			113.6							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1494			1470							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.51			0.55							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 64.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 17.3		Intersection LOS: B	
Intersection Capacity Utilization 49.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	2:55	2:55	2:55	2:55	2:55	2:55
End Time	4:00	4:00	4:00	4:00	4:00	4:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1537	1544	1527	1453	1486	1510
Vehs Exited	1529	1541	1523	1452	1483	1505
Starting Vehs	13	6	11	8	5	9
Ending Vehs	21	9	15	9	8	13
Travel Distance (km)	390	394	390	371	379	385
Travel Time (hr)	11.2	10.8	11.0	9.7	10.2	10.6
Total Delay (hr)	3.0	2.5	2.9	2.0	2.2	2.5
Total Stops	167	170	166	176	133	163
Fuel Used (l)	34.1	33.8	33.7	31.4	31.9	33.0

Interval #0 Information Seeding

Start Time	2:55
End Time	3:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:00
End Time	4:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1537	1544	1527	1453	1486	1510
Vehs Exited	1529	1541	1523	1452	1483	1505
Starting Vehs	13	6	11	8	5	9
Ending Vehs	21	9	15	9	8	13
Travel Distance (km)	390	394	390	371	379	385
Travel Time (hr)	11.2	10.8	11.0	9.7	10.2	10.6
Total Delay (hr)	3.0	2.5	2.9	2.0	2.2	2.5
Total Stops	167	170	166	176	133	163
Fuel Used (l)	34.1	33.8	33.7	31.4	31.9	33.0

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.5	0.6	0.8	0.6	0.7	0.6	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	7.5	2.0	2.1	6.7	1.5	1.0	80.5	78.4	58.3	68.3	35.6	14.9

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	4.6

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	5.4

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	63.0	26.9	36.2	22.9
Average Queue (m)	10.1	2.7	12.7	7.7
95th Queue (m)	36.5	14.0	30.0	18.2
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	574	37	27	761	5	0	0	0	0	0	0
Future Volume (vph)	6	574	37	27	761	5	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1811	0	0	1853	0	0	0	0	0	0	0
Flt Permitted		0.984			0.936							
Satd. Flow (perm)	0	1783	0	0	1740	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			3							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	740	0	0	935	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		43.5			43.5							
Actuated g/C Ratio		0.60			0.60							
v/c Ratio		0.69			0.89							
Control Delay		12.9			23.8							
Queue Delay		0.0			0.0							
Total Delay		12.9			23.8							
LOS		B			C							
Approach Delay		12.9			23.8							
Approach LOS		B			C							
Queue Length 50th (m)		61.1			98.6							
Queue Length 95th (m)		82.9			153.1							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1312			1280							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.56			0.73							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 72			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 61.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:55	7:55	7:55	7:55	7:55	7:55
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1539	1506	1440	1484	1431	1479
Vehs Exited	1529	1499	1437	1483	1436	1477
Starting Vehs	6	7	11	9	9	8
Ending Vehs	16	14	14	10	4	11
Travel Distance (km)	390	382	365	377	366	376
Travel Time (hr)	11.9	12.2	9.5	10.0	9.2	10.6
Total Delay (hr)	3.7	4.2	1.8	2.1	1.5	2.7
Total Stops	221	201	149	168	129	175
Fuel Used (l)	35.5	35.1	30.9	31.9	30.4	32.7

Interval #0 Information Seeding

Start Time	7:55
End Time	8:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1539	1506	1440	1484	1431	1479
Vehs Exited	1529	1499	1437	1483	1436	1477
Starting Vehs	6	7	11	9	9	8
Ending Vehs	16	14	14	10	4	11
Travel Distance (km)	390	382	365	377	366	376
Travel Time (hr)	11.9	12.2	9.5	10.0	9.2	10.6
Total Delay (hr)	3.7	4.2	1.8	2.1	1.5	2.7
Total Stops	221	201	149	168	129	175
Fuel Used (l)	35.5	35.1	30.9	31.9	30.4	32.7

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.5	0.6	0.7	0.7	0.4	0.1	0.1	0.2	0.1	0.1	0.1
Total Del/Veh (s)	10.7	1.6	0.8	7.7	2.3	1.3	106.1	62.5	50.8	59.7	52.0	16.9

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	5.2

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	5.9

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	52.4	54.6	39.4	21.0
Average Queue (m)	5.7	6.1	14.5	7.0
95th Queue (m)	29.7	30.3	37.4	16.1
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0	0	0	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	735	36	22	769	21	0	0	0	0	0	0
Future Volume (vph)	18	735	36	22	769	21	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1864	0	0	1836	0	0	0	0	0	0	0
Flt Permitted		0.972			0.955							
Satd. Flow (perm)	0	1813	0	0	1757	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			4							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	853	0	0	906	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		41.9			41.9							
Actuated g/C Ratio		0.59			0.59							
v/c Ratio		0.79			0.87							
Control Delay		16.6			21.7							
Queue Delay		0.0			0.0							
Total Delay		16.6			21.7							
LOS		B			C							
Approach Delay		16.6			21.7							
Approach LOS		B			C							
Queue Length 50th (m)		77.9			91.1							
Queue Length 95th (m)		123.3			148.7							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1368			1325							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.62			0.68							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 70.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 56.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	2:55	2:55	2:55	2:55	2:55	2:55
End Time	4:00	4:00	4:00	4:00	4:00	4:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1691	1725	1690	1670	1588	1673
Vehs Exited	1681	1726	1689	1673	1594	1673
Starting Vehs	8	13	24	16	11	13
Ending Vehs	18	12	25	13	5	13
Travel Distance (km)	429	439	429	424	403	425
Travel Time (hr)	24.7	15.5	18.7	17.7	15.7	18.5
Total Delay (hr)	15.8	6.3	9.7	8.8	7.2	9.5
Total Stops	280	234	172	179	223	218
Fuel Used (l)	50.6	41.7	43.6	42.2	40.0	43.6

Interval #0 Information Seeding

Start Time	2:55
End Time	3:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:00
End Time	4:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1691	1725	1690	1670	1588	1673
Vehs Exited	1681	1726	1689	1673	1594	1673
Starting Vehs	8	13	24	16	11	13
Ending Vehs	18	12	25	13	5	13
Travel Distance (km)	429	439	429	424	403	425
Travel Time (hr)	24.7	15.5	18.7	17.7	15.7	18.5
Total Delay (hr)	15.8	6.3	9.7	8.8	7.2	9.5
Total Stops	280	234	172	179	223	218
Fuel Used (l)	50.6	41.7	43.6	42.2	40.0	43.6

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.6	0.7	0.9	0.9	0.8	0.6	62.8	10.2	46.2	0.1	0.1	0.1
Total Del/Veh (s)	11.1	2.8	2.0	10.4	2.9	2.0	332.8	341.9	280.9	145.5	87.7	57.1

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	2.8
Total Del/Veh (s)	16.7

Total Network Performance

Denied Del/Veh (s)	2.8
Total Del/Veh (s)	17.6

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	67.0	101.8	69.0	38.6
Average Queue (m)	12.2	9.3	43.0	13.5
95th Queue (m)	45.6	46.0	81.1	33.2
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0	0	26	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	634	52	40	840	5	0	0	0	0	0	0
Future Volume (vph)	7	634	52	40	840	5	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1807	0	0	1852	0	0	0	0	0	0	0
Flt Permitted		0.980			0.895							
Satd. Flow (perm)	0	1772	0	0	1664	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			2							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	832	0	0	1049	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		51.4			51.4							
Actuated g/C Ratio		0.65			0.65							
v/c Ratio		0.72			0.97							
Control Delay		13.7			37.3							
Queue Delay		0.0			0.0							
Total Delay		13.7			37.3							
LOS		B			D							
Approach Delay		13.7			37.3							
Approach LOS		B			D							
Queue Length 50th (m)		75.6			138.7							
Queue Length 95th (m)		102.5			#236.4							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1165			1091							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.71			0.96							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 79.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 26.9		Intersection LOS: C	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:55	7:55	7:55	7:55	7:55	7:55
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1678	1673	1658	1639	1573	1645
Vehs Exited	1657	1655	1667	1642	1575	1640
Starting Vehs	6	11	19	12	15	13
Ending Vehs	27	29	10	9	13	17
Travel Distance (km)	423	422	421	414	400	416
Travel Time (hr)	12.7	13.9	13.5	12.3	11.3	12.7
Total Delay (hr)	3.8	5.0	4.6	3.5	2.9	4.0
Total Stops	277	232	251	247	203	242
Fuel Used (l)	38.9	39.8	39.9	38.1	35.9	38.5

Interval #0 Information Seeding

Start Time	7:55
End Time	8:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1678	1673	1658	1639	1573	1645
Vehs Exited	1657	1655	1667	1642	1575	1640
Starting Vehs	6	11	19	12	15	13
Ending Vehs	27	29	10	9	13	17
Travel Distance (km)	423	422	421	414	400	416
Travel Time (hr)	12.7	13.9	13.5	12.3	11.3	12.7
Total Delay (hr)	3.8	5.0	4.6	3.5	2.9	4.0
Total Stops	277	232	251	247	203	242
Fuel Used (l)	38.9	39.8	39.9	38.1	35.9	38.5

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.5	0.6	0.7	0.9	0.9	0.5	0.1	0.1	0.2	0.2	0.6	0.1
Total Del/Veh (s)	9.0	2.1	1.0	9.6	3.6	0.5	109.1	66.4	65.7	91.7	69.5	28.5

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	7.0

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	7.9

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	71.6	85.8	49.6	31.1
Average Queue (m)	6.4	14.4	17.0	9.3
95th Queue (m)	33.2	53.5	41.1	21.8
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0	0	0	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	812	46	30	850	23	0	0	0	0	0	0
Future Volume (vph)	20	812	46	30	850	23	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1861	0	0	1836	0	0	0	0	0	0	0
Flt Permitted		0.965			0.931							
Satd. Flow (perm)	0	1798	0	0	1713	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			4							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	952	0	0	1010	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		48.8			48.8							
Actuated g/C Ratio		0.63			0.63							
v/c Ratio		0.83			0.93							
Control Delay		18.8			28.8							
Queue Delay		0.0			0.0							
Total Delay		18.8			28.8							
LOS		B			C							
Approach Delay		18.8			28.8							
Approach LOS		B			C							
Queue Length 50th (m)		97.9			120.0							
Queue Length 95th (m)		159.8			#226.4							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1225			1166							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.78			0.87							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 77			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 24.0		Intersection LOS: C	
Intersection Capacity Utilization 65.0%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	2:55	2:55	2:55	2:55	2:55	2:55
End Time	4:00	4:00	4:00	4:00	4:00	4:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1816	1871	1856	1788	1705	1808
Vehs Exited	1798	1851	1835	1772	1679	1787
Starting Vehs	9	14	14	20	13	13
Ending Vehs	27	34	35	36	39	33
Travel Distance (km)	460	476	470	451	431	458
Travel Time (hr)	43.9	97.8	54.4	52.5	115.9	72.9
Total Delay (hr)	34.3	87.9	44.6	43.0	106.9	63.4
Total Stops	302	462	334	312	301	341
Fuel Used (l)	69.7	122.3	79.5	76.2	134.1	96.4

Interval #0 Information Seeding

Start Time	2:55
End Time	3:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:00
End Time	4:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1816	1871	1856	1788	1705	1808
Vehs Exited	1798	1851	1835	1772	1679	1787
Starting Vehs	9	14	14	20	13	13
Ending Vehs	27	34	35	36	39	33
Travel Distance (km)	460	476	470	451	431	458
Travel Time (hr)	43.9	97.8	54.4	52.5	115.9	72.9
Total Delay (hr)	34.3	87.9	44.6	43.0	106.9	63.4
Total Stops	302	462	334	312	301	341
Fuel Used (l)	69.7	122.3	79.5	76.2	134.1	96.4

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	35.1	28.1	28.1	24.4	24.3	11.5	945.7	676.7	934.6	248.1	186.4	166.8
Total Del/Veh (s)	41.2	12.8	11.6	30.1	15.6	11.5	1025.1	497.0	901.9	506.0	394.0	405.1

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	78.9
Total Del/Veh (s)	41.0

Total Network Performance

Denied Del/Veh (s)	78.9
Total Del/Veh (s)	42.6

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	102.0	127.8	72.4	70.3
Average Queue (m)	34.0	40.5	62.9	32.1
95th Queue (m)	102.2	123.6	85.8	71.7
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	12	10	84	20
Queuing Penalty (veh)	0	0	0	0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

APPENDIX B-2 Sensitivity Analysis

AM/PM SYNCHRO AND SIMTRAFFIC REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	530	25	18	702	4	0	0	0	0	0	0
Future Volume (vph)	6	530	25	18	702	4	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1815	0	0	1855	0	0	0	0	0	0	0
Flt Permitted		0.984			0.962							
Satd. Flow (perm)	0	1787	0	0	1788	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			2							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	673	0	0	847	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		37.2			37.2							
Actuated g/C Ratio		0.56			0.56							
v/c Ratio		0.67			0.84							
Control Delay		13.0			19.9							
Queue Delay		0.0			0.0							
Total Delay		13.0			19.9							
LOS		B			B							
Approach Delay		13.0			19.9							
Approach LOS		B			B							
Queue Length 50th (m)		52.2			78.5							
Queue Length 95th (m)		71.2			118.1							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1438			1438							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.47			0.59							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 65.9			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 52.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:55	7:55	7:55	7:55	7:55	7:55
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1386	1384	1301	1393	1309	1356
Vehs Exited	1376	1373	1300	1396	1308	1350
Starting Vehs	5	7	9	12	9	8
Ending Vehs	15	18	10	9	10	12
Travel Distance (km)	352	353	332	355	334	345
Travel Time (hr)	9.3	9.0	8.1	9.2	8.2	8.8
Total Delay (hr)	2.0	1.7	1.2	1.8	1.2	1.6
Total Stops	151	129	112	155	121	135
Fuel Used (l)	29.9	29.2	27.2	29.9	27.2	28.7

Interval #0 Information Seeding

Start Time	7:55
End Time	8:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1386	1384	1301	1393	1309	1356
Vehs Exited	1376	1373	1300	1396	1308	1350
Starting Vehs	5	7	9	12	9	8
Ending Vehs	15	18	10	9	10	12
Travel Distance (km)	352	353	332	355	334	345
Travel Time (hr)	9.3	9.0	8.1	9.2	8.2	8.8
Total Delay (hr)	2.0	1.7	1.2	1.8	1.2	1.6
Total Stops	151	129	112	155	121	135
Fuel Used (l)	29.9	29.2	27.2	29.9	27.2	28.7

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.5	0.5	0.7	0.6	0.6	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	8.6	1.4	0.4	7.2	1.9	0.8	57.3	20.1	15.2	61.3	24.2	13.1

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	3.0

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	3.6

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	39.4	57.3	25.8	20.3
Average Queue (m)	4.9	5.2	8.0	6.1
95th Queue (m)	25.9	27.8	18.7	15.2
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	679	28	16	710	19	0	0	0	0	0	0
Future Volume (vph)	17	679	28	16	710	19	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1866	0	0	1837	0	0	0	0	0	0	0
Flt Permitted		0.974			0.970							
Satd. Flow (perm)	0	1819	0	0	1784	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	781	0	0	829	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		36.6			36.6							
Actuated g/C Ratio		0.56			0.56							
v/c Ratio		0.76			0.83							
Control Delay		16.0			19.3							
Queue Delay		0.0			0.0							
Total Delay		16.0			19.3							
LOS		B			B							
Approach Delay		16.0			19.3							
Approach LOS		B			B							
Queue Length 50th (m)		66.3			75.4							
Queue Length 95th (m)		103.1			119.1							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1474			1446							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.53			0.57							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 65.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 17.7		Intersection LOS: B	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	2:55	2:55	2:55	2:55	2:55	2:55
End Time	4:00	4:00	4:00	4:00	4:00	4:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1566	1588	1554	1484	1486	1535
Vehs Exited	1565	1588	1545	1485	1482	1534
Starting Vehs	13	6	12	8	4	8
Ending Vehs	14	6	21	7	8	10
Travel Distance (km)	398	405	395	378	379	391
Travel Time (hr)	14.5	12.4	11.9	10.2	11.0	12.0
Total Delay (hr)	6.2	3.9	3.7	2.3	3.1	3.8
Total Stops	210	205	203	185	188	199
Fuel Used (l)	38.0	36.5	35.2	32.4	33.0	35.0

Interval #0 Information Seeding

Start Time	2:55
End Time	3:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:00
End Time	4:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1566	1588	1554	1484	1486	1535
Vehs Exited	1565	1588	1545	1485	1482	1534
Starting Vehs	13	6	12	8	4	8
Ending Vehs	14	6	21	7	8	10
Travel Distance (km)	398	405	395	378	379	391
Travel Time (hr)	14.5	12.4	11.9	10.2	11.0	12.0
Total Delay (hr)	6.2	3.9	3.7	2.3	3.1	3.8
Total Stops	210	205	203	185	188	199
Fuel Used (l)	38.0	36.5	35.2	32.4	33.0	35.0

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.5	0.6	0.8	0.7	0.7	0.7	2.8	0.4	6.9	0.1	0.1	0.1
Total Del/Veh (s)	9.9	2.4	2.5	9.9	2.3	1.3	146.0	204.0	87.2	90.6	46.9	22.0

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	7.4

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	8.2

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	75.0	73.4	51.6	23.8
Average Queue (m)	11.0	7.2	19.0	8.1
95th Queue (m)	40.8	35.1	48.0	18.8
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	0		3	
Queuing Penalty (veh)	0		0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	634	47	36	840	5	0	0	0	0	0	0
Future Volume (vph)	7	634	47	36	840	5	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1809	0	0	1854	0	0	0	0	0	0	0
Flt Permitted		0.980			0.907							
Satd. Flow (perm)	0	1774	0	0	1687	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			3							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	826	0	0	1042	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		50.4			50.4							
Actuated g/C Ratio		0.64			0.64							
v/c Ratio		0.72			0.96							
Control Delay		13.7			34.4							
Queue Delay		0.0			0.0							
Total Delay		13.7			34.4							
LOS		B			C							
Approach Delay		13.7			34.4							
Approach LOS		B			C							
Queue Length 50th (m)		74.6			133.1							
Queue Length 95th (m)		101.0			#231.2							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1180			1120							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.70			0.93							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:55	7:55	7:55	7:55	7:55	7:55
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1689	1664	1696	1693	1636	1675
Vehs Exited	1667	1655	1703	1688	1637	1671
Starting Vehs	10	18	30	14	21	19
Ending Vehs	32	27	23	19	20	23
Travel Distance (km)	425	421	431	426	414	423
Travel Time (hr)	38.6	60.1	50.3	39.3	17.2	41.1
Total Delay (hr)	29.7	51.2	41.2	30.2	8.5	32.2
Total Stops	209	149	167	159	218	180
Fuel Used (l)	61.3	78.7	71.8	61.6	41.9	63.1

Interval #0 Information Seeding

Start Time	7:55
End Time	8:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1689	1664	1696	1693	1636	1675
Vehs Exited	1667	1655	1703	1688	1637	1671
Starting Vehs	10	18	30	14	21	19
Ending Vehs	32	27	23	19	20	23
Travel Distance (km)	425	421	431	426	414	423
Travel Time (hr)	38.6	60.1	50.3	39.3	17.2	41.1
Total Delay (hr)	29.7	51.2	41.2	30.2	8.5	32.2
Total Stops	209	149	167	159	218	180
Fuel Used (l)	61.3	78.7	71.8	61.6	41.9	63.1

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.5	0.6	0.8	0.9	0.9	0.7	610.1	68.8	616.5	9.9	0.4	4.2
Total Del/Veh (s)	7.9	1.8	0.9	8.5	3.1	0.4	389.5	158.5	315.9	135.8	67.5	59.8

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	43.6
Total Del/Veh (s)	23.6

Total Network Performance

Denied Del/Veh (s)	43.6
Total Del/Veh (s)	24.4

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	38.6	74.3	77.9	38.6
Average Queue (m)	5.5	11.2	64.1	12.4
95th Queue (m)	24.4	44.3	87.2	35.9
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)			79	2
Queuing Penalty (veh)			0	0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	812	72	50	850	23	0	0	0	0	0	0
Future Volume (vph)	20	812	72	50	850	23	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1851	0	0	1834	0	0	0	0	0	0	0
Flt Permitted		0.965			0.876							
Satd. Flow (perm)	0	1788	0	0	1613	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			4							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	988	0	0	1040	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA							
Protected Phases		4			4							
Permitted Phases	4			4								
Detector Phase	4	4		4	4							
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0							
Minimum Split (s)	15.0	15.0		15.0	15.0							
Total Split (s)	57.0	57.0		57.0	57.0							
Total Split (%)	71.3%	71.3%		71.3%	71.3%							
Yellow Time (s)	3.5	3.5		3.5	3.5							
All-Red Time (s)	1.5	1.5		1.5	1.5							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		5.0			5.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min							
Act Effct Green (s)		52.0			52.0							
Actuated g/C Ratio		0.65			0.65							
v/c Ratio		0.85			0.99							
Control Delay		19.8			41.8							
Queue Delay		0.0			0.0							
Total Delay		19.8			41.8							
LOS		B			D							
Approach Delay		19.8			41.8							
Approach LOS		B			D							
Queue Length 50th (m)		106.2			142.7							
Queue Length 95th (m)		#208.5			#248.7							
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1167			1049							
Starvation Cap Reductn		0			0							
Spillback Cap Reductn		0			0							
Storage Cap Reductn		0			0							
Reduced v/c Ratio		0.85			0.99							

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 31.1		Intersection LOS: C	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	29%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	2:55	2:55	2:55	2:55	2:55	2:55
End Time	4:00	4:00	4:00	4:00	4:00	4:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1844	1733	1855	1808	1784	1804
Vehs Exited	1823	1695	1829	1801	1757	1781
Starting Vehs	9	17	16	28	19	16
Ending Vehs	30	55	42	35	46	41
Travel Distance (km)	465	436	468	457	447	455
Travel Time (hr)	58.1	191.9	83.6	71.6	89.2	98.9
Total Delay (hr)	48.4	182.8	73.8	61.9	79.7	89.3
Total Stops	405	323	448	463	435	416
Fuel Used (l)	84.3	201.3	107.5	95.7	109.8	119.7

Interval #0 Information Seeding

Start Time	2:55
End Time	3:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	3:00
End Time	4:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1844	1733	1855	1808	1784	1804
Vehs Exited	1823	1695	1829	1801	1757	1781
Starting Vehs	9	17	16	28	19	16
Ending Vehs	30	55	42	35	46	41
Travel Distance (km)	465	436	468	457	447	455
Travel Time (hr)	58.1	191.9	83.6	71.6	89.2	98.9
Total Delay (hr)	48.4	182.8	73.8	61.9	79.7	89.3
Total Stops	405	323	448	463	435	416
Fuel Used (l)	84.3	201.3	107.5	95.7	109.8	119.7

1: Rodello St & Comox Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	25.9	33.7	25.8	44.0	44.9	44.1	1326.9	1485.6	1309.4	292.9	269.3	205.0
Total Del/Veh (s)	32.9	11.9	10.3	39.7	22.1	24.2	1426.8	723.9	1320.7	594.2	509.4	568.0

1: Rodello St & Comox Ave Performance by movement

Movement	All
Denied Del/Veh (s)	118.1
Total Del/Veh (s)	48.3

Total Network Performance

Denied Del/Veh (s)	118.1
Total Del/Veh (s)	50.1

Intersection: 1: Rodello St & Comox Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	103.1	129.4	72.4	71.8
Average Queue (m)	37.0	57.7	64.3	42.6
95th Queue (m)	105.4	143.2	82.9	83.3
Link Distance (m)	97.4	120.6	65.5	69.1
Upstream Blk Time (%)	9	16	89	29
Queuing Penalty (veh)	0	0	0	0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

APPENDIX B-3 Roundabout Option

AM/PM SIDRA REPORTS

MOVEMENT SUMMARY

Site: 101 [Medium Scenario (2031 AM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	22	0.0	22	0.0	0.090	12.2	LOS B	0.4	3.2	0.65	0.73	0.65	45.3
2	T1	1	2.0	1	2.0	0.090	7.8	LOS A	0.4	3.2	0.65	0.73	0.65	45.1
3	R2	28	5.0	28	5.0	0.090	8.0	LOS A	0.4	3.2	0.65	0.73	0.65	44.1
Approach		51	2.8	51	2.8	0.090	9.8	LOS A	0.4	3.2	0.65	0.73	0.65	44.6
East: Comox Ave														
4	L2	27	0.0	27	0.0	0.591	7.6	LOS A	6.4	45.5	0.27	0.34	0.27	48.5
5	T1	761	2.0	761	2.0	0.591	3.1	LOS A	6.4	45.5	0.27	0.34	0.27	48.3
6	R2	5	0.0	5	0.0	0.591	3.1	LOS A	6.4	45.5	0.27	0.34	0.27	47.2
Approach		793	1.9	793	1.9	0.591	3.3	LOS A	6.4	45.5	0.27	0.34	0.27	48.3
North: Rodello St														
7	L2	6	17.0	6	17.0	0.089	16.2	LOS B	0.5	3.4	0.74	0.79	0.74	44.2
8	T1	1	2.0	1	2.0	0.089	10.6	LOS B	0.5	3.4	0.74	0.79	0.74	44.2
9	R2	32	4.0	32	4.0	0.089	10.8	LOS B	0.5	3.4	0.74	0.79	0.74	43.2
Approach		39	5.9	39	5.9	0.089	11.6	LOS B	0.5	3.4	0.74	0.79	0.74	43.4
West: Comox Ave														
10	L2	6	0.0	6	0.0	0.482	7.6	LOS A	3.9	28.3	0.23	0.34	0.23	48.7
11	T1	574	4.0	574	4.0	0.482	3.1	LOS A	3.9	28.3	0.23	0.34	0.23	48.5
12	R2	37	5.0	37	5.0	0.482	3.2	LOS A	3.9	28.3	0.23	0.34	0.23	47.3
Approach		617	4.0	617	4.0	0.482	3.2	LOS A	3.9	28.3	0.23	0.34	0.23	48.4
All Vehicles		1500	2.9	1500	2.9	0.591	3.7	LOS A	6.4	45.5	0.28	0.36	0.28	48.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Medium Scenario (2031 PM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	40	4.0	40	4.0	0.158	14.8	LOS B	0.8	5.9	0.74	0.84	0.74	43.8
2	T1	2	2.0	2	2.0	0.158	10.1	LOS B	0.8	5.9	0.74	0.84	0.74	43.7
3	R2	33	0.0	33	0.0	0.158	10.1	LOS B	0.8	5.9	0.74	0.84	0.74	42.8
Approach		75	2.2	75	2.2	0.158	12.6	LOS B	0.8	5.9	0.74	0.84	0.74	43.4
East: Comox Ave														
4	L2	22	0.0	22	0.0	0.670	8.1	LOS A	8.0	57.7	0.47	0.40	0.47	47.8
5	T1	769	3.0	769	3.0	0.670	3.6	LOS A	8.0	57.7	0.47	0.40	0.47	47.5
6	R2	21	0.0	21	0.0	0.670	3.6	LOS A	8.0	57.7	0.47	0.40	0.47	46.5
Approach		812	2.8	812	2.8	0.670	3.8	LOS A	8.0	57.7	0.47	0.40	0.47	47.5
North: Rodello St														
7	L2	7	22.0	7	22.0	0.103	17.0	LOS B	0.6	4.1	0.78	0.82	0.78	43.8
8	T1	4	2.0	4	2.0	0.103	11.0	LOS B	0.6	4.1	0.78	0.82	0.78	43.9
9	R2	30	4.0	30	4.0	0.103	11.2	LOS B	0.6	4.1	0.78	0.82	0.78	43.0
Approach		41	6.9	41	6.9	0.103	12.2	LOS B	0.6	4.1	0.78	0.82	0.78	43.2
West: Comox Ave														
10	L2	18	0.0	18	0.0	0.595	7.7	LOS A	6.1	42.8	0.28	0.34	0.28	48.5
11	T1	735	1.0	735	1.0	0.595	3.2	LOS A	6.1	42.8	0.28	0.34	0.28	48.3
12	R2	36	0.0	36	0.0	0.595	3.2	LOS A	6.1	42.8	0.28	0.34	0.28	47.2
Approach		789	0.9	789	0.9	0.595	3.3	LOS A	6.1	42.8	0.28	0.34	0.28	48.2
All Vehicles		1717	2.0	1717	2.0	0.670	4.1	LOS A	8.0	57.7	0.40	0.40	0.40	47.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Medium Scenario (2041 AM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	29	0.0	29	0.0	0.128	13.1	LOS B	0.7	4.8	0.70	0.79	0.70	44.8
2	T1	1	2.0	1	2.0	0.128	8.7	LOS A	0.7	4.8	0.70	0.79	0.70	44.6
3	R2	37	5.0	37	5.0	0.128	8.9	LOS A	0.7	4.8	0.70	0.79	0.70	43.7
Approach		67	2.8	67	2.8	0.128	10.7	LOS B	0.7	4.8	0.70	0.79	0.70	44.2
East: Comox Ave														
4	L2	40	0.0	40	0.0	0.673	7.8	LOS A	8.7	61.8	0.37	0.35	0.37	48.1
5	T1	840	2.0	840	2.0	0.673	3.3	LOS A	8.7	61.8	0.37	0.35	0.37	47.9
6	R2	5	0.0	5	0.0	0.673	3.3	LOS A	8.7	61.8	0.37	0.35	0.37	46.8
Approach		885	1.9	885	1.9	0.673	3.5	LOS A	8.7	61.8	0.37	0.35	0.37	47.9
North: Rodello St														
7	L2	7	17.0	7	17.0	0.114	18.1	LOS B	0.6	4.5	0.80	0.85	0.80	43.2
8	T1	1	2.0	1	2.0	0.114	12.4	LOS B	0.6	4.5	0.80	0.85	0.80	43.2
9	R2	35	4.0	35	4.0	0.114	12.6	LOS B	0.6	4.5	0.80	0.85	0.80	42.3
Approach		43	6.1	43	6.1	0.114	13.5	LOS B	0.6	4.5	0.80	0.85	0.80	42.5
West: Comox Ave														
10	L2	7	0.0	7	0.0	0.562	7.8	LOS A	5.3	38.1	0.32	0.36	0.32	48.3
11	T1	634	4.0	634	4.0	0.562	3.3	LOS A	5.3	38.1	0.32	0.36	0.32	48.1
12	R2	52	5.0	52	5.0	0.562	3.4	LOS A	5.3	38.1	0.32	0.36	0.32	47.0
Approach		693	4.0	693	4.0	0.562	3.4	LOS A	5.3	38.1	0.32	0.36	0.32	48.0
All Vehicles		1688	2.9	1688	2.9	0.673	4.0	LOS A	8.7	61.8	0.37	0.39	0.37	47.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Medium Scenario (2041 PM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	56	4.0	56	4.0	0.248	16.4	LOS B	1.4	9.9	0.81	0.91	0.81	43.0
2	T1	3	2.0	3	2.0	0.248	11.7	LOS B	1.4	9.9	0.81	0.91	0.81	42.9
3	R2	45	0.0	45	0.0	0.248	11.6	LOS B	1.4	9.9	0.81	0.91	0.81	42.0
Approach		104	2.2	104	2.2	0.248	14.2	LOS B	1.4	9.9	0.81	0.91	0.81	42.6
East: Comox Ave														
4	L2	30	0.0	30	0.0	0.775	8.7	LOS A	11.7	83.8	0.69	0.47	0.69	47.0
5	T1	850	3.0	850	3.0	0.775	4.3	LOS A	11.7	83.8	0.69	0.47	0.69	46.8
6	R2	23	0.0	23	0.0	0.775	4.2	LOS A	11.7	83.8	0.69	0.47	0.69	45.8
Approach		903	2.8	903	2.8	0.775	4.4	LOS A	11.7	83.8	0.69	0.47	0.69	46.8
North: Rodello St														
7	L2	8	22.0	8	22.0	0.145	19.3	LOS B	0.8	6.1	0.85	0.90	0.85	42.7
8	T1	4	2.0	4	2.0	0.145	13.1	LOS B	0.8	6.1	0.85	0.90	0.85	42.8
9	R2	34	4.0	34	4.0	0.145	13.3	LOS B	0.8	6.1	0.85	0.90	0.85	41.9
Approach		46	7.0	46	7.0	0.145	14.3	LOS B	0.8	6.1	0.85	0.90	0.85	42.1
West: Comox Ave														
10	L2	20	0.0	20	0.0	0.678	7.9	LOS A	8.5	60.1	0.39	0.36	0.39	48.0
11	T1	812	1.0	812	1.0	0.678	3.4	LOS A	8.5	60.1	0.39	0.36	0.39	47.9
12	R2	46	0.0	46	0.0	0.678	3.4	LOS A	8.5	60.1	0.39	0.36	0.39	46.8
Approach		878	0.9	878	0.9	0.678	3.5	LOS A	8.5	60.1	0.39	0.36	0.39	47.8
All Vehicles		1931	2.0	1931	2.0	0.775	4.7	LOS A	11.7	83.8	0.56	0.46	0.56	46.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [High Scenario (2041 AM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	62	0.0	62	0.0	0.242	13.5	LOS B	1.3	9.4	0.73	0.85	0.73	44.4
2	T1	1	2.0	1	2.0	0.242	9.1	LOS A	1.3	9.4	0.73	0.85	0.73	44.3
3	R2	64	5.0	64	5.0	0.242	9.4	LOS A	1.3	9.4	0.73	0.85	0.73	43.3
Approach		127	2.5	127	2.5	0.242	11.4	LOS B	1.3	9.4	0.73	0.85	0.73	43.9
East: Comox Ave														
4	L2	36	0.0	36	0.0	0.738	8.4	LOS A	10.5	74.5	0.60	0.44	0.60	47.3
5	T1	840	2.0	840	2.0	0.738	3.9	LOS A	10.5	74.5	0.60	0.44	0.60	47.1
6	R2	5	0.0	5	0.0	0.738	3.9	LOS A	10.5	74.5	0.60	0.44	0.60	46.0
Approach		881	1.9	881	1.9	0.738	4.1	LOS A	10.5	74.5	0.60	0.44	0.60	47.1
North: Rodello St														
7	L2	7	17.0	7	17.0	0.128	18.7	LOS B	0.7	5.3	0.84	0.88	0.84	42.9
8	T1	1	2.0	1	2.0	0.128	12.9	LOS B	0.7	5.3	0.84	0.88	0.84	42.9
9	R2	35	4.0	35	4.0	0.128	13.1	LOS B	0.7	5.3	0.84	0.88	0.84	42.0
Approach		43	6.1	43	6.1	0.128	14.1	LOS B	0.7	5.3	0.84	0.88	0.84	42.2
West: Comox Ave														
10	L2	7	0.0	7	0.0	0.553	7.7	LOS A	5.4	38.8	0.32	0.35	0.32	48.3
11	T1	634	4.0	634	4.0	0.553	3.3	LOS A	5.4	38.8	0.32	0.35	0.32	48.1
12	R2	47	5.0	47	5.0	0.553	3.3	LOS A	5.4	38.8	0.32	0.35	0.32	47.0
Approach		688	4.0	688	4.0	0.553	3.3	LOS A	5.4	38.8	0.32	0.35	0.32	48.0
All Vehicles		1739	2.9	1739	2.9	0.738	4.6	LOS A	10.5	74.5	0.50	0.44	0.50	47.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [High Scenario (2041 PM) (Site Folder: Comox Avenue & Rodello Street Intersection)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rodello St														
1	L2	61	4.0	61	4.0	0.288	16.5	LOS B	1.7	12.0	0.84	0.93	0.84	43.0
2	T1	3	2.0	3	2.0	0.288	11.8	LOS B	1.7	12.0	0.84	0.93	0.84	42.8
3	R2	50	0.0	50	0.0	0.288	11.7	LOS B	1.7	12.0	0.84	0.93	0.84	42.0
Approach		114	2.2	114	2.2	0.288	14.3	LOS B	1.7	12.0	0.84	0.93	0.84	42.5
East: Comox Ave														
4	L2	50	0.0	50	0.0	0.801	8.9	LOS A	12.8	92.0	0.76	0.50	0.76	46.7
5	T1	850	3.0	850	3.0	0.801	4.5	LOS A	12.8	92.0	0.76	0.50	0.76	46.5
6	R2	23	0.0	23	0.0	0.801	4.4	LOS A	12.8	92.0	0.76	0.50	0.76	45.5
Approach		923	2.8	923	2.8	0.801	4.7	LOS A	12.8	92.0	0.76	0.50	0.76	46.5
North: Rodello St														
7	L2	8	22.0	8	22.0	0.156	19.9	LOS B	0.9	6.7	0.87	0.92	0.87	42.5
8	T1	4	2.0	4	2.0	0.156	13.6	LOS B	0.9	6.7	0.87	0.92	0.87	42.5
9	R2	34	4.0	34	4.0	0.156	13.8	LOS B	0.9	6.7	0.87	0.92	0.87	41.7
Approach		46	7.0	46	7.0	0.156	14.9	LOS B	0.9	6.7	0.87	0.92	0.87	41.9
West: Comox Ave														
10	L2	20	0.0	20	0.0	0.737	8.3	LOS A	10.5	74.3	0.56	0.42	0.56	47.5
11	T1	812	1.0	812	1.0	0.737	3.8	LOS A	10.5	74.3	0.56	0.42	0.56	47.3
12	R2	72	0.0	72	0.0	0.737	3.8	LOS A	10.5	74.3	0.56	0.42	0.56	46.2
Approach		904	0.9	904	0.9	0.737	3.9	LOS A	10.5	74.3	0.56	0.42	0.56	47.2
All Vehicles		1987	2.0	1987	2.0	0.801	5.1	LOS A	12.8	92.0	0.67	0.50	0.67	46.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX B-4 Full Signal Option

AM/PM SYNCHRO REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	634	52	40	840	5	29	1	37	7	1	35
Future Volume (vph)	7	634	52	40	840	5	29	1	37	7	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1807	0	0	1852	0	0	1595	0	0	1579	0
Flt Permitted		0.981			0.899			0.978			0.991	
Satd. Flow (perm)	0	1774	0	0	1672	0	0	1595	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			2			50			51	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1					1			11	11		
Confl. Bikes (#/hr)						1			1			
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	832	0	0	1049	0	0	105	0	0	63	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			4		6	6		2	2	
Permitted Phases	4			4								
Detector Phase	4	4		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.5	13.5		13.5	13.5		9.5	9.5		23.5	23.5	
Total Split (s)	57.0	57.0		57.0	57.0		9.5	9.5		23.5	23.5	
Total Split (%)	63.3%	63.3%		63.3%	63.3%		10.6%	10.6%		26.1%	26.1%	
Yellow Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		3.5			3.5			2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		59.4			59.4			7.1			12.2	
Actuated g/C Ratio		0.72			0.72			0.09			0.15	
v/c Ratio		0.65			0.87			0.57			0.23	
Control Delay		12.9			24.0			36.1			13.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			24.0			36.1			13.1	
LOS		B			C			D			B	
Approach Delay		12.9			24.0			36.1			13.1	
Approach LOS		B			C			D			B	
Queue Length 50th (m)		56.8			103.3			8.0			1.7	
Queue Length 95th (m)		137.7			#278.2			#31.5			11.8	
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1286			1211			183			444	
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		0.65			0.87			0.57			0.14	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.1			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 85.7%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	812	46	30	850	23	56	3	45	8	4	34
Future Volume (vph)	20	812	46	30	850	23	56	3	45	8	4	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1861	0	0	1836	0	0	1587	0	0	1579	0
Flt Permitted		0.966			0.933			0.977			0.991	
Satd. Flow (perm)	0	1800	0	0	1717	0	0	1587	0	0	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			3			45			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			77.0			79.9	
Travel Time (s)		7.6			11.2			5.5			5.8	
Confl. Peds. (#/hr)	1		1	1		1			18	18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	952	0	0	1010	0	0	158	0	0	64	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			4		6	6		2	2	
Permitted Phases	4			4								
Detector Phase	4	4		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.5	13.5		13.5	13.5		9.5	9.5		23.5	23.5	
Total Split (s)	56.0	56.0		56.0	56.0		9.8	9.8		24.2	24.2	
Total Split (%)	62.2%	62.2%		62.2%	62.2%		10.9%	10.9%		26.9%	26.9%	
Yellow Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		3.5			3.5			2.5			2.5	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)		55.3			55.3			7.3			14.9	
Actuated g/C Ratio		0.66			0.66			0.09			0.18	
v/c Ratio		0.80			0.89			0.88			0.20	
Control Delay		20.3			27.9			72.7			13.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		20.3			27.9			72.7			13.1	
LOS		C			C			E			B	
Approach Delay		20.3			27.9			72.7			13.1	
Approach LOS		C			C			E			B	
Queue Length 50th (m)		137.3			167.8			20.6			2.1	
Queue Length 95th (m)		#234.0			#268.0			#58.8			12.3	
Internal Link Dist (m)		81.5			131.6			53.0			55.9	
Turn Bay Length (m)												
Base Capacity (vph)		1186			1130			180			446	
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		0.80			0.89			0.88			0.14	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	634	52	40	840	5	29	1	37	7	1	35
Future Volume (vph)	7	634	52	40	840	5	29	1	37	7	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1805	1804	0	1805	1857	0	0	1679	0	0	1579	0
Flt Permitted	0.194			0.273				0.863			0.956	
Satd. Flow (perm)	369	1804	0	519	1857	0	0	1482	0	0	1519	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			3			56			51	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			85.5			80.2	
Travel Time (s)		7.6			11.2			6.2			5.8	
Confl. Peds. (#/hr)	1					1				11		
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.50	0.84	0.82	0.54	0.88	0.25	0.60	0.92	0.66	0.62	0.92	0.69
Heavy Vehicles (%)	0%	4%	5%	0%	2%	0%	0%	2%	5%	17%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	818	0	74	975	0	0	105	0	0	63	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.5	13.5		13.5	13.5		9.5	9.5		23.5	23.5	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Yellow Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5			2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	41.4	41.4		41.4	41.4			12.1			12.1	
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.22			0.22	
v/c Ratio	0.05	0.61		0.19	0.71			0.29			0.17	
Control Delay	4.7	8.2		5.9	10.4			14.9			11.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.7	8.2		5.9	10.4			14.9			11.2	
LOS	A	A		A	B			B			B	
Approach Delay		8.1			10.1			14.9			11.2	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	0.2	23.6		1.4	32.7			3.1			0.7	
Queue Length 95th (m)	1.4	89.8		5.0	139.1			20.7			11.7	
Internal Link Dist (m)		81.5			131.6			61.5			56.2	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	333	1631		469	1678			708			722	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.04	0.50		0.16	0.58			0.15			0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 55.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 9.6		Intersection LOS: A	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	812	46	30	850	23	56	3	45	8	4	34
Future Volume (vph)	20	812	46	30	850	23	56	3	45	8	4	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1805	1864	0	1805	1836	0	0	1697	0	0	1579	0
Flt Permitted	0.177			0.196				0.848			0.956	
Satd. Flow (perm)	336	1864	0	372	1836	0	0	1473	0	0	1517	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			4			54			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		105.5			155.6			85.5			80.2	
Travel Time (s)		7.6			11.2			6.2			5.8	
Confl. Peds. (#/hr)	1					1				18		
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.85	0.94	0.72	0.67	0.91	0.75	0.75	0.92	0.56	0.75	0.92	0.69
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	4%	2%	0%	22%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	928	0	45	965	0	0	158	0	0	64	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.5	13.5		13.5	13.5		9.5	9.5		23.5	23.5	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Yellow Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5			2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	41.3	41.3		41.3	41.3			12.5			12.5	
Actuated g/C Ratio	0.68	0.68		0.68	0.68			0.21			0.21	
v/c Ratio	0.10	0.73		0.18	0.77			0.45			0.18	
Control Delay	5.6	10.9		6.4	12.4			21.0			12.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.6	10.9		6.4	12.4			21.0			12.1	
LOS	A	B		A	B			C			B	
Approach Delay		10.8			12.1			21.0			12.1	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	0.5	37.7		1.1	42.0			10.0			1.4	
Queue Length 95th (m)	3.7	130.1		4.5	146.6			33.9			12.2	
Internal Link Dist (m)		81.5			131.6			61.5			56.2	
Turn Bay Length (m)	30.0			30.0								
Base Capacity (vph)	304	1689		337	1663			611			626	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	

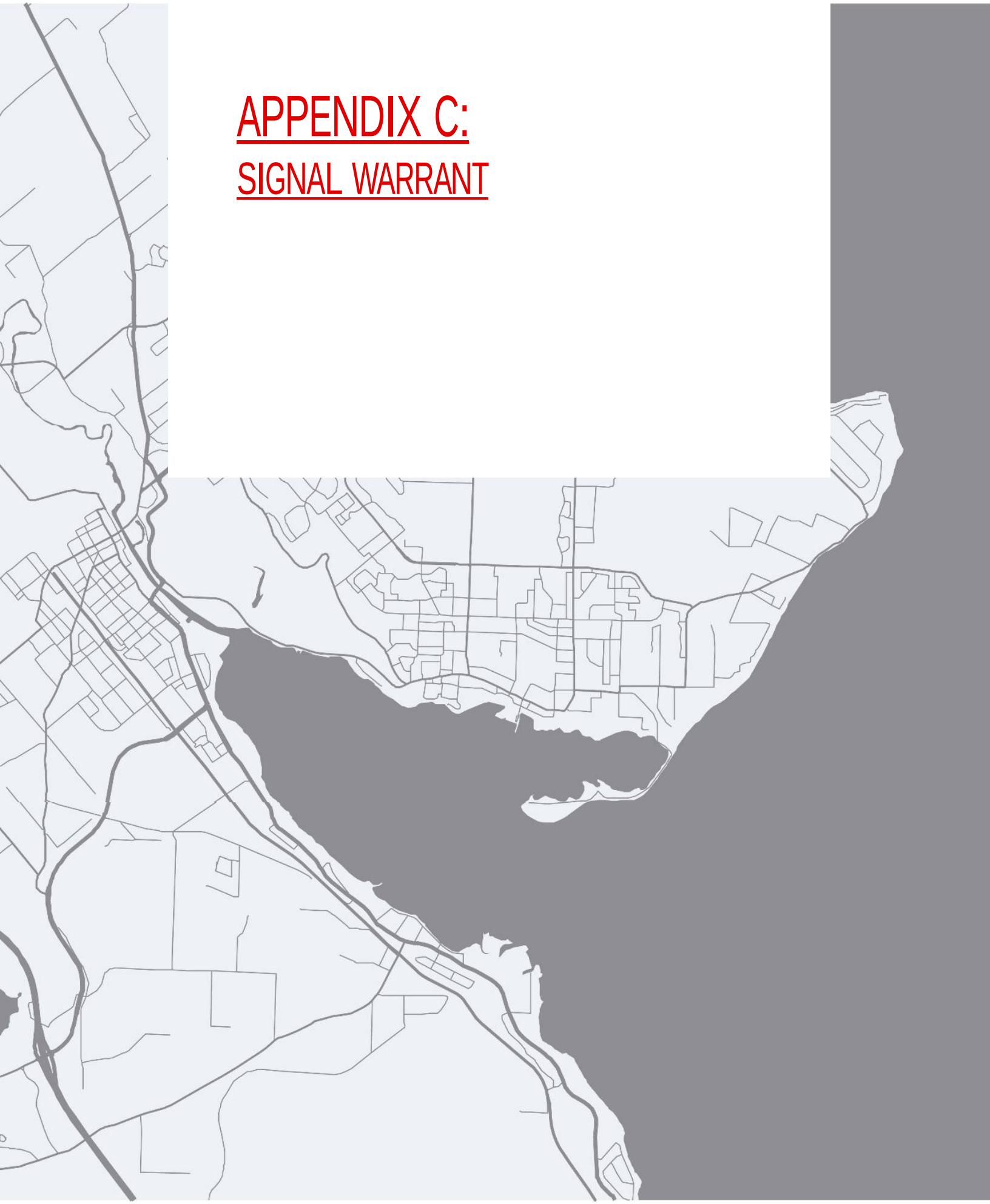
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.08	0.55		0.13	0.58			0.26			0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 60.5			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 65.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Rodello St & Comox Ave

APPENDIX C:

SIGNAL WARRANT



Town of Comox - Traffic Signal Warrant Analysis

Main Street (name)	Comox Ave	Direction (EW or NS)	EW	Road Authority:	Town of Comox
Side Street (name)	Rodello St	Direction (EW or NS)	NS	City:	Town of Comox
Quadrant / Int #		Comments	Existing - Adjusted (2021)	Analysis Date:	13-12-2021
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2021 Nov 30, Tue
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Comox Ave	WB				1			350	1
Comox Ave	EB				1			3,800	1
Rodello St	NB				1				
Rodello St	SB				1				
Are the Rodello St NB right turns significantly impeded by through movements? (y/n)							y		
Are the Rodello St SB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	15,000
Central Business District	(y/n)	n

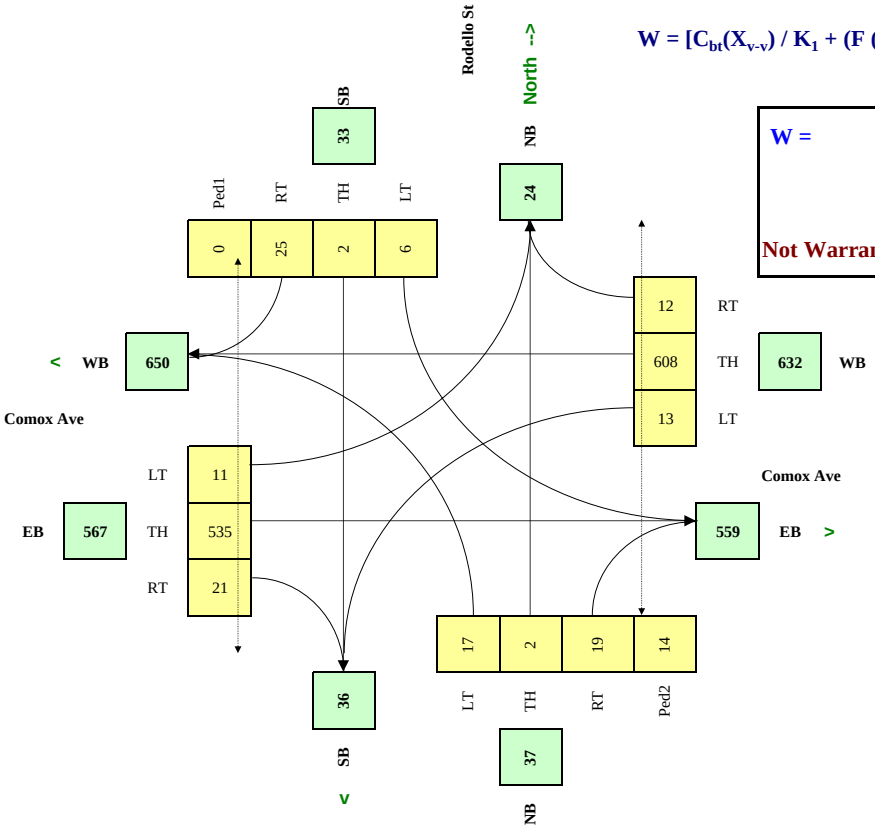
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Comox Ave	EW	50	2.5%	n	
Rodello St	NS		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	7	1	13	3	1	17	9	393	2	3	296	13	0	6	1	0
	13	1	23	6	1	29	15	689	4	6	519	22	0	11	1	0
	16	1	19	6	2	25	13	609	10	10	521	21	0	13	1	0
	24	2	20	7	3	28	14	696	19	17	666	25	0	18	1	1
	24	2	20	7	3	28	14	689	19	17	659	25	0	18	1	1
	20	2	16	6	2	23	11	571	16	14	546	21	0	15	1	1
Total (6-hour peak)	104	9	111	35	12	150	76	3,647	70	67	3,207	127	0	81	6	3
Average (6-hour peak)	17	2	19	6	2	25	13	608	12	11	535	21	0	14	1	1

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	54	38	16
		Veh	Ped

Not Warranted - Vs<75

RESET SHEET

Town of Comox - Traffic Signal Warrant Analysis

Main Street (name)	Comox Ave	Direction (EW or NS)	EW	Road Authority:	Town of Comox
Side Street (name)	Rodello St	Direction (EW or NS)	NS	City:	Town of Comox
Quadrant / Int #		Comments	Future - 10-year (2031)	Analysis Date:	13-12-2021
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2021 Nov 30, Tue
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Comox Ave	WB				1			350	1
Comox Ave	EB				1			3,800	1
Rodello St	NB				1				
Rodello St	SB				1				
Are the Rodello St NB right turns significantly impeded by through movements? (y/n)							y		
Are the Rodello St SB right turns significantly impeded by through movements? (y/n)							n		

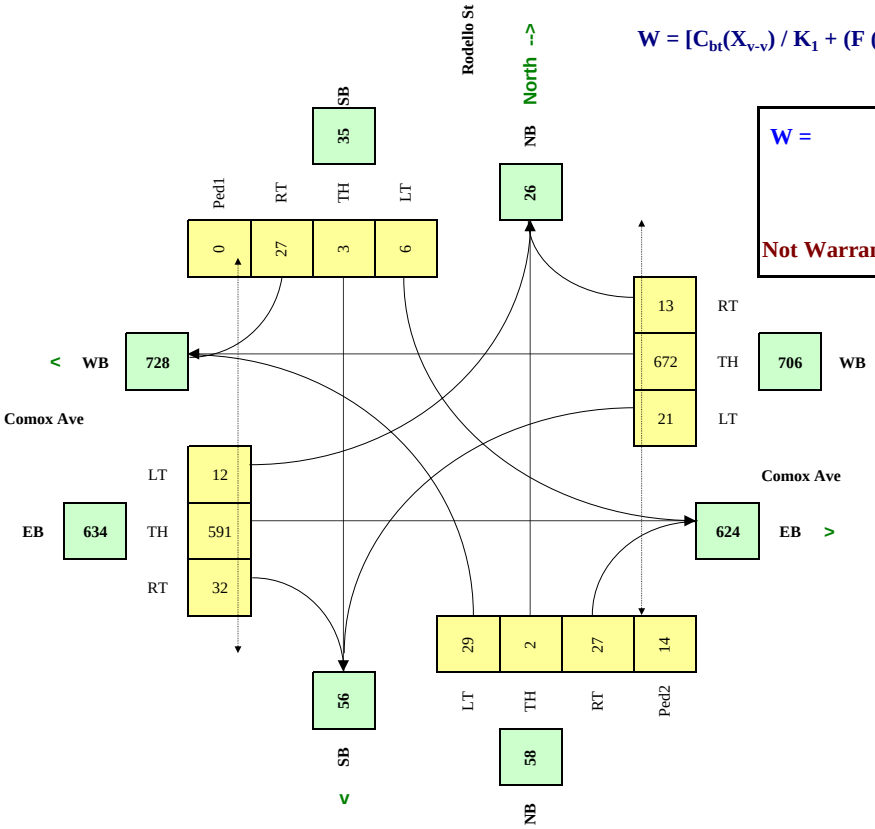
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	15,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Comox Ave	EW	50	2.5%	n	
Rodello St	NS		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	13	1	16	3	1	18	15	434	3	3	327	21	0	6	1	0
	22	1	28	6	1	32	27	761	5	6	574	37	0	11	1	0
	27	1	27	6	2	27	22	673	11	11	576	32	0	13	1	0
	40	2	33	7	4	30	22	769	21	18	735	36	0	18	1	1
	40	2	33	7	4	30	22	761	21	18	728	36	0	18	1	1
	33	2	27	6	3	25	18	631	17	15	603	30	0	15	1	1
Total (6-hour peak)	175	9	164	35	15	162	126	4,029	78	71	3,543	192	0	81	6	3
Average (6-hour peak)	29	2	27	6	3	27	21	672	13	12	591	32	0	14	1	1

Average 6-hour Peak Turning Movements



$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	78	59	19
		Veh	Ped

Not Warranted - Vs<75

RESET SHEET

Town of Comox - Traffic Signal Warrant Analysis

Main Street (name)	Comox Ave	Direction (EW or NS)	EW	Road Authority:	Town of Comox
Side Street (name)	Rodello St	Direction (EW or NS)	NS	City:	Town of Comox
Quadrant / Int #		Comments	Future - 20-year (2041)	Analysis Date:	13-12-2021
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2021 Nov 30, Tue
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Comox Ave	WB				1			350	1
Comox Ave	EB				1			3,800	1
Rodello St	NB				1				
Rodello St	SB				1				
Are the Rodello St NB right turns significantly impeded by through movements? (y/n)							y		
Are the Rodello St SB right turns significantly impeded by through movements? (y/n)							n		

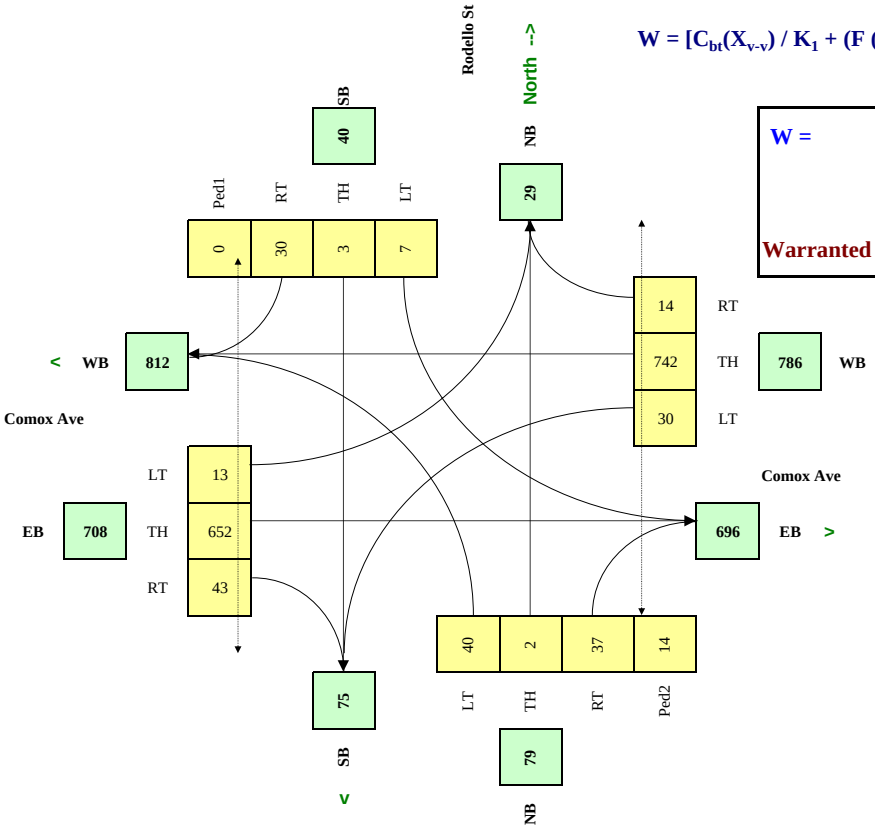
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	15,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Comox Ave	EW	50	2.5%	n	
Rodello St	NS		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	17	1	21	4	1	20	23	479	3	4	361	30	0	6	1	0
	29	1	37	7	1	35	40	840	5	7	634	52	0	11	1	0
	37	2	36	7	2	30	31	744	12	12	636	43	0	13	1	0
	56	3	45	8	4	34	30	850	23	20	812	46	0	18	1	1
	55	3	45	8	4	34	30	842	23	20	804	46	0	18	1	1
	46	2	37	7	3	28	25	697	19	16	666	38	0	15	1	1
Total (6-hour peak)	240	12	221	41	15	181	179	4,452	85	79	3,913	255	0	81	6	3
Average (6-hour peak)	40	2	37	7	3	30	30	742	14	13	652	43	0	14	1	1

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	107	86	21
		Veh	*Ped*

Warranted

RESET SHEET