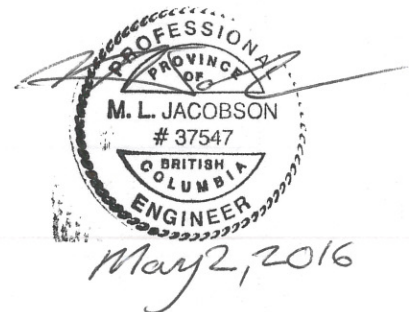


# ESQUIMALT TOWN CENTRE

## Traffic Impact Assessment



Prepared for: **Aragon Properties Ltd.**

Prepared by: **Boulevard Transportation, a division of Watt Consulting Group**

Our File: **1958**

Date: **May 2, 2016**

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>EXISTING CONDITIONS .....</b>	<b>2</b>
	2.1 Road Network .....	2
	2.2 Traffic Volumes .....	2
	2.3 Existing Site Trips .....	3
	2.4 Traffic Modelling – Background Information.....	3
	2.5 Existing Traffic - Results .....	3
<b>3.0</b>	<b>POST DEVELOPMENT .....</b>	<b>5</b>
	3.1 Land Use.....	5
	3.2 Site Access .....	6
	3.3 Trip Generation .....	7
	3.3.1 Internal and Pass-by Trips.....	8
	3.4 Trip Assignment .....	8
	3.5 Post Development Roadway Volumes.....	10
	3.6 Post Development Traffic Analysis Results .....	11
	3.7 Long Term Conditions (2026 Horizon Year, full buildout) .....	12
	3.8 Mitigation Review .....	13
<b>4.0</b>	<b>OTHER MODES .....</b>	<b>14</b>
	6.1 Pedestrian Facilities .....	14
	6.2 Bicycle Facilities.....	15
	6.2 Transit.....	15
<b>5.0</b>	<b>CONCLUSIONS.....</b>	<b>15</b>
<b>6.0</b>	<b>RECOMMENDATIONS.....</b>	<b>17</b>
APPENDIX A:	SYNCHRO BACKGROUND	
APPENDIX B:	2016 Existing Conditions	
APPENDIX C:	2016 Post Development Conditions	
APPENDIX D:	2026 Post Development Conditions	

## LIST OF FIGURES

Figure 1: Study Area and Site Location .....	1
Figure 2: Existing AM Peak Hour Conditions.....	4
Figure 3: Existing PM Peak Hour Conditions.....	5
Figure 4: Site Plan and Site Accesses.....	6
Figure 5: New Site Trips Assigned during PM Peak Hour .....	10
Figure 6: Post Development Conditions during PM Peak Hour.....	11
Figure 7: Long-term (2026 Horizon Year) Post-Development Conditions, PM Peak Hour .....	13

## LIST OF TABLES

Table 1: AM Peak Hour Trip Generation.....	7
Table 2: PM Peak Hour Trip Generation.....	7
Table 3: Background and 2016 Post Development LOS and Delay.....	12

## 1.0 INTRODUCTION

Boulevard Transportation Group, a division of Watt Consulting Group, was retained by Aragon Properties Ltd. to conduct a traffic impact assessment for the proposed Esquimalt Town Centre development in Esquimalt, BC.

An analysis of post-development conditions was undertaken in order to provide a clear view of the impacts on the adjacent roadways after full build-out and occupancy. The study assessed traffic impacts of the development, reviewed the site access roads, and assessed the need for any mitigation measures. Study recommendations and conclusions are to provide safe and efficient movement of pedestrians, bicycles and vehicular traffic for the proposed development while minimizing the impact to non-site trips.

The development site is located in the Township of Esquimalt, in the heart of the Esquimalt Village. The study area includes Esquimalt Road, Admirals Road, Park Place, Fraser Street, Lampson Street, Lyall Street and the existing and proposed site accesses. Key intersections in the study area from a traffic conditions / capacity perspective are the following four intersections: Esquimalt Road / Admirals Road, Esquimalt Road / Park Place, Esquimalt Road / Fraser Street and Esquimalt Road / Lampson Street. See **Figure 1** for the study area and site location.

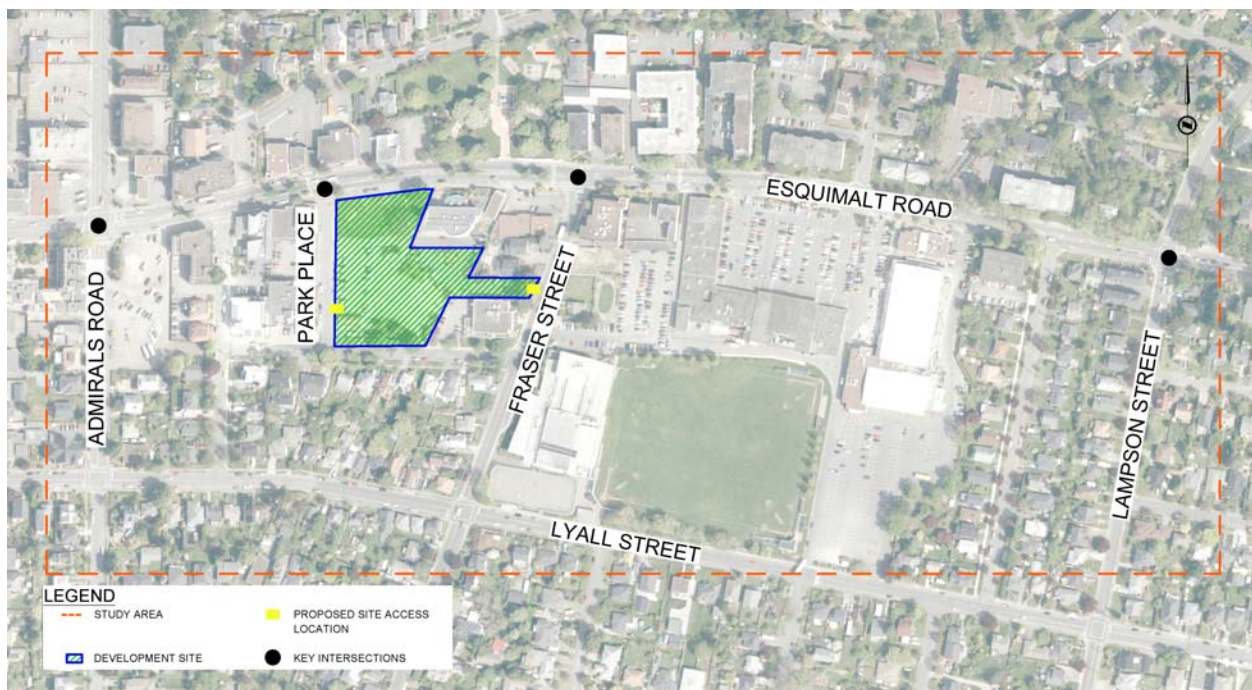


Figure 1: Study Area and Site Location

## 2.0 EXISTING CONDITIONS

### 2.1 Road Network

Fraser Street and Park Place are the access roads to the development parking areas. Fraser Street is a two lane collector road with no on street parking along the site frontage. Between Esquimalt Road and Lyall Street, there is “Playground” warning signage with a 30 km/h speed limit. Park Place and Carlisle Avenue are two lane local roads, with on street parking on both sides. Site traffic will also be impacting Esquimalt Road, Admirals Road and Lampson Street which are all major roads in the network.

Esquimalt Road is designated as a Major road and is an important east–west connector for through traffic in the township, as well traffic to/from the Town Centre area. In the study area, it has one motor vehicle lane in each direction, along with left turn lanes or medians, as well bike lanes and parking bays. The posted speed limit on Esquimalt Road through the study area is 40km/hr. Lampson Street and Admirals Road are north–south major roads, and both roads connect several residential neighborhoods.

The intersection of Esquimalt Road & Admirals Road is signalized. At the intersection, there are separate left turn lanes on Esquimalt Road (westbound and eastbound). Admirals Road is a four-lane road at Esquimalt Road. The intersection of Esquimalt Road & Lampson Street is signalized. At the intersection, there are separate right turn lanes on Esquimalt Road and Lampson Street. The posted speed limits on Esquimalt Road and Lampson Street is 40km/hr.

The intersection of Esquimalt Road & Park Place is currently stop controlled on Park Place. At the intersection, there is a westbound left turn lane on Esquimalt Road. The intersection of Esquimalt Road & Fraser Street is currently stop controlled on Fraser Street. At the intersection, there is a westbound left turn lane on Esquimalt Road and a northbound left turn lane on Fraser Street.

### 2.2 Traffic Volumes

Manual counts were undertaken at the four intersections of Esquimalt Road / Admirals Road, Esquimalt Road / Park Place, Esquimalt Road / Fraser Street, Esquimalt Road / Lampson Street and the two existing accesses to the surface parking lot on Park Place and Fraser Street. The counts for Esquimalt Road / Park Place and Esquimalt Road / Fraser Street were conducted during the AM and PM peak hours on March 22<sup>nd</sup>, 2016. The counts at the two existing accesses were completed for the PM peak hour on the following day, March 23<sup>rd</sup>, 2016. The counts for Esquimalt Road / Admirals Road and Esquimalt Road / Lampson Street were conducted previously for the AM and PM peak hours on October 31<sup>st</sup>, 2012 and October 17<sup>th</sup>, 2012 respectively. As the 2012 traffic volumes along Esquimalt Road are greater than the 2016 traffic volumes, a growth rate was not applied to the 2012 volumes, which were used as background

volumes without adjustment. See **Figures 2 and 3** for existing AM and PM peak hour turning movement counts.

According to Esquimalt's Official Community Plan, the 2004 population was listed as 17,038 and the 2026 projected population<sup>1</sup> as 21,100. Utilizing the two values, a 1.0% annual growth rate was calculated and used for the long term background traffic projections in this study.

### 2.3 Existing Site Trips

Currently, there are two site accesses for the existing surface parking lot: one on Park Place and the other on Fraser Street. The existing site trips (total of the two driveways) were measured to be 82 vehicles (34 trips in, 48 trips out) during the PM peak hour.

### 2.4 Traffic Modelling – Background Information

Analysis of the traffic conditions at the intersections within the study area were undertaken using Synchro software and SimTraffic.

Synchro / SimTraffic is a two-part traffic modelling software that provides analysis of traffic conditions based on traffic control, geometry, volumes and traffic operations. Synchro software (Synchro 9) is used because of its ability to provide analysis using the Highway Capacity Manual (2010) methodology, while SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. Synchro uses measures of effectiveness to return the results of the analysis. These measures of effectiveness include level of service (LOS), delay and 95<sup>th</sup> percentile queue length. The delays and type of traffic control are used to determine the level of service. The level of services are broken down into six letter grades with LOS A being excellent operations and LOS F being unstable/failure operations. Level of service C is generally considered to be an acceptable LOS by most municipalities. Level of service D is generally considered to be on the threshold between acceptable and unacceptable operations.

### 2.5 Existing Traffic - Results

Existing traffic conditions were analyzed during the AM peak hours and PM peak hours for the four intersections on Esquimalt Road, and the PM peak hours for the two existing parking lot accesses on Fraser Street and Park Place. Existing traffic conditions provide a base point for comparison with post-development conditions. See **Figures 2 and 3** for existing AM and PM peak levels of service.

At the intersection of Esquimalt Road / Admirals Road, all movements are operating at LOS C or better during the AM and PM peak hours.

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<sup>1</sup> 2026 projected population from the Capital Regional District's Regional Growth Strategy document



At the intersection of Esquimalt Road / Park Place, all movements are operating at LOS A, except for the northbound movements on Park Place which operate at LOS B during the AM peak hours and at LOS C during the PM peak hours.

At the intersection of Esquimalt Road / Fraser Street, all movements are operating at LOS A, except for the northbound left turn and right turn on Fraser Street. The northbound left turn operates at LOS C during the AM peak hours and at LOS D during the PM peak hours. The northbound right turn operates at LOS B during the AM peak hours and at LOS C during the PM peak hours.

At the intersection of Esquimalt Road / Lampson Street, all movements are operating at LOS C or better during the AM peak hour. During the PM peak hour, the westbound through and left turn movements and the northbound through and left turn movements drop to LOS D from LOS C.

At both site accesses, all movements operate at a LOS A during the PM peak hour.

Overall, the PM peak hour is the worst-case time period for traffic operations in the study area.

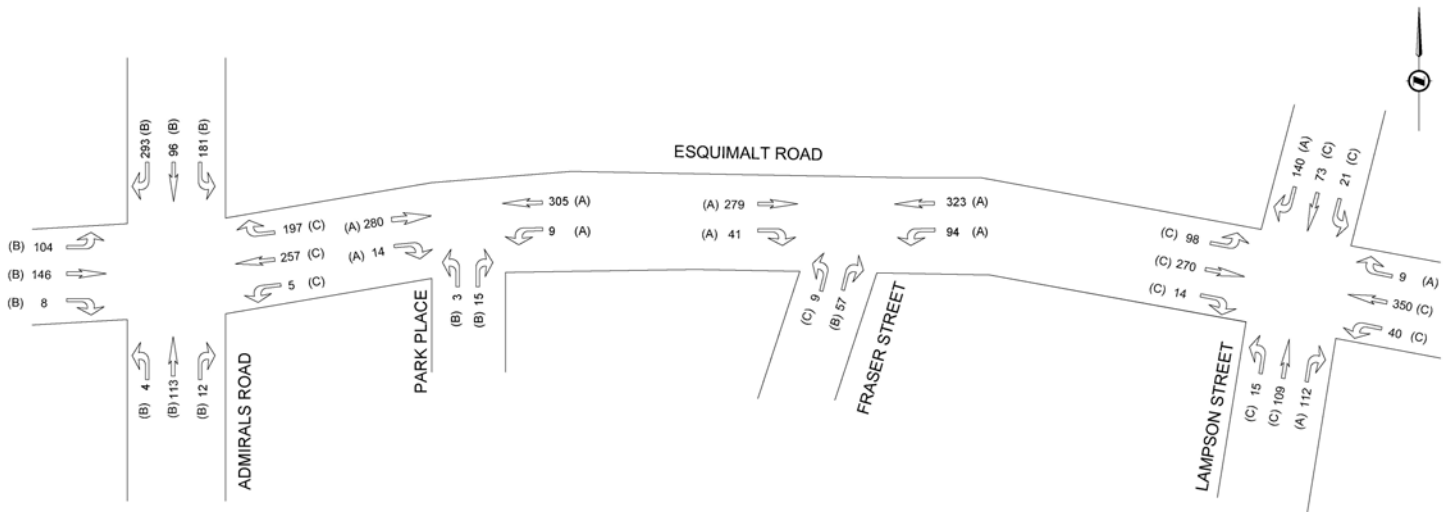
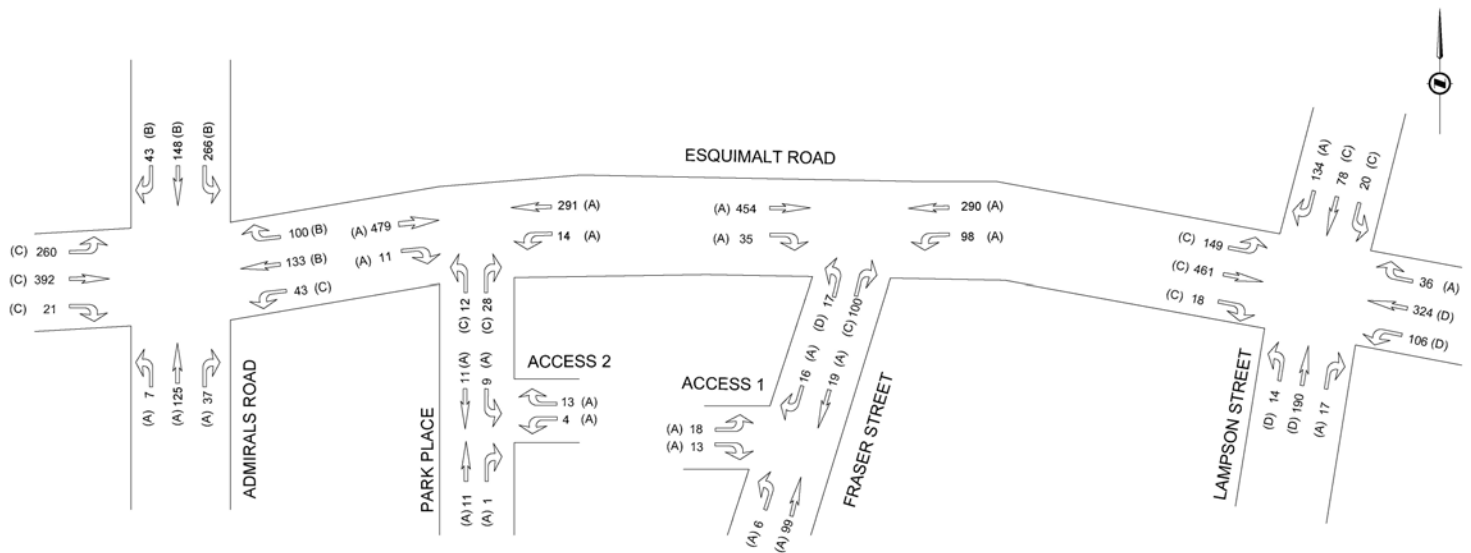


Figure 2: Existing AM Peak Hour Conditions



**Figure 3: Existing PM Peak Hour Conditions**

### 3.0 POST DEVELOPMENT

#### 3.1 Land Use

At the time of technical analysis, the following land use data was used: 88 condominium units, 47 rental apartment units, 5,300 sq.ft. of specialty retail, a 15,000 sq.ft. library, 9,200 sq.ft. of office space, and a 18,000 sq.ft. Justice Institute. To account for potential changes to final residential unit numbers, this included an additional buffer of 25 residential units (of which 17 were condominium, and 8 were apartments).

At the time of this report production date (May 2, 2016), the site characteristics have been revised to consist of a 10,000 sq.ft. library, 18,000 sq.ft. of office space, 18,000 sq.ft. of Justice Institute, and 4,460 sq.ft. of specialty retail (or potential café), along with 69 condominium and 32 rental apartment units. This represents an increase in combined office/library area of 3,800 sq.ft. and a decrease in the specialty retail space of 840 sq.ft. and decrease of two (2) condominium and seven (7) rental apartment units from what was proposed (and a decrease of 19 condominium and 15 apartment units from what was analyzed). This variation is not anticipated to materially impact the traffic impacts associated with this site, as the traffic analysis buffer of additional residential units that was analyzed (over what is proposed) along with the decrease in retail space more than offsets the increased trips due to an increase of 3,800 sq.ft. of office/library space. See Section 3.3 for trip generation rates by land use.

Note that the existing Municipal Hall building adjacent to the redevelopment area will continue to be used in the future, albeit with a shift in some land uses (e.g. the library will be moving, with that space repurposed to office / Municipal Hall needs). For this study, the existing site vehicle trips associated with this building were assumed to remain in the post-development period.



### 3.2 Site Access

There are two site accesses proposed for the development. One site access is located on Park Place and leads to an underground parking facility that serves a large majority of the development. The second site access is located on Fraser Street and a surface parking lot. This access will also accommodate the existing Town Hall building, and is assumed to be the primary access and parking lot for library visitors. See **Figure 4** for the proposed site plan and site access locations. Note that the site plan was not finalized at the time of this report's production, however all key elements are reflected in the analysis.

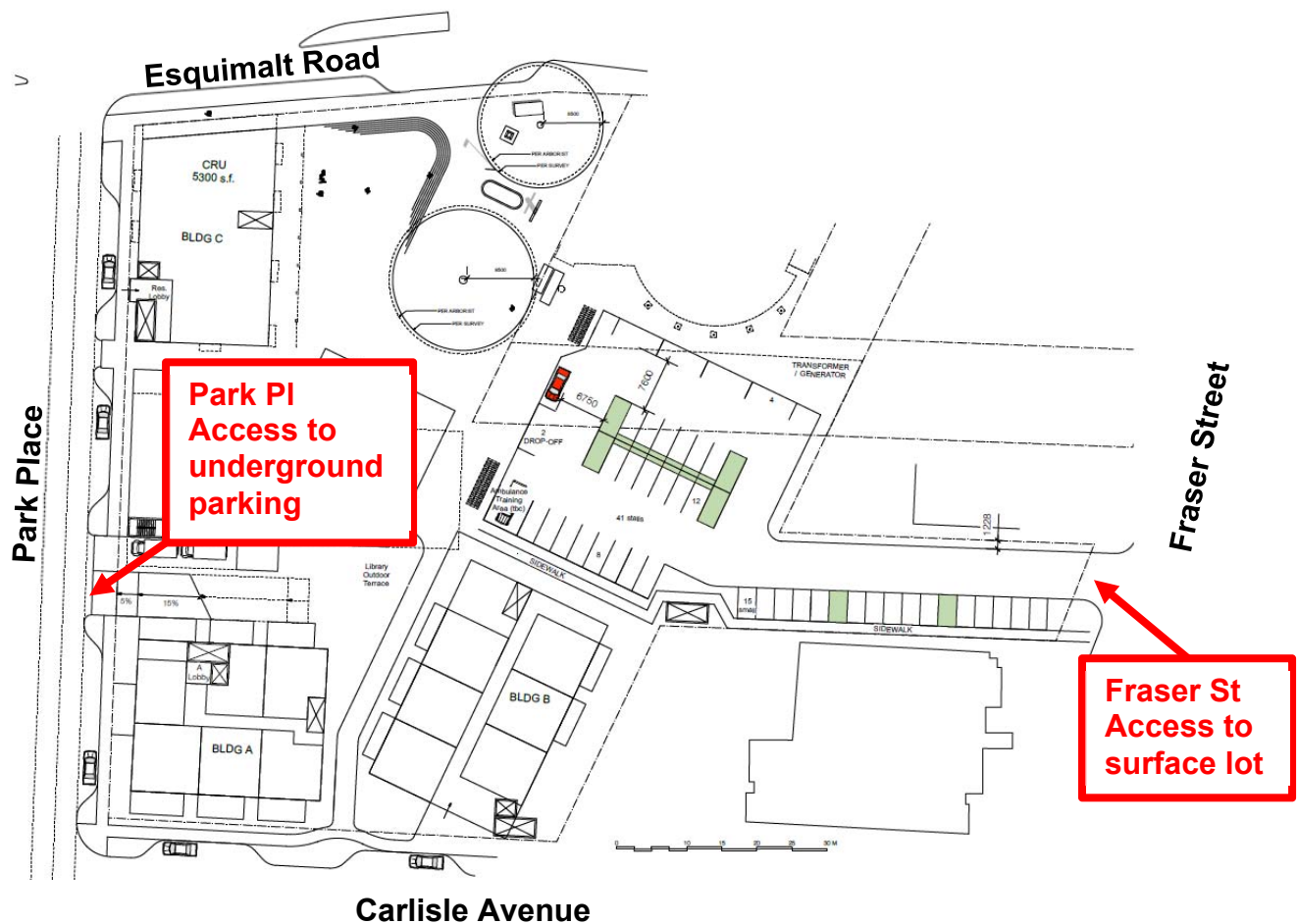


Figure 4: Site Plan and Site Accesses<sup>2</sup>

<sup>2</sup> Site Plan Concept, D'ambrosio Architecture, April 4, 2016

### 3.3 Trip Generation

Site trips were estimated from the *ITE Trip Generation Manual (9th Edition)* for all trips except for the PM peak Library / Office trips. The *Trip Generation Manual* provides trip rates for a wide variety of land uses gathered from actual sites across North America over the past 35 years.

The Library / Office trips were calculated by taking the existing trips in and out of the parking lots (which are primarily for Municipal Hall / Library) and generating a trip rate by dividing by the size of the complex (20,000 sq.ft.). The trip rate was calculated to be 4.1 / 1000 sq.ft. As a conservative estimate, it is assumed that the existing site trips will persist in the future to account for the Municipal Hall site trips. **Tables 1 and 2** summarize the trip generation rates and estimated site trips by land use during the AM and PM peak hours.

**TABLE 1: AM PEAK HOUR TRIP GENERATION**

Land Use	ITE Code	Size / Unit	Rate	%In	%Out	In	Out	Total Trips
Retail	826 (820)	5,300 sq.ft	<b>0.96 / 1000 sq.ft</b>	62%	38%	3	2	5
Library	590	15,000 sq.ft	<b>1.04 / 1000 sq.ft</b>	71%	29%	11	5	16
Office	710	9,200 sq.ft	<b>1.56 / 1000 sq.ft</b>	88%	12%	9	1	10
Justice Institute	540	18,000 sq.ft	<b>2.99 / 1000 sq.ft</b>	74%	26%	40	14	54
Apartment	220	47 units	<b>.51 / unit</b>	20%	80%	5	19	24
Condominiums	230	88 units	<b>.44 / unit</b>	17%	83%	7	32	39
<b>Total</b>						<b>75</b>	<b>73</b>	<b>148</b>

**TABLE 2: PM PEAK HOUR TRIP GENERATION**

Land Use	ITE Code	Size / Unit	Rate	%In	%Out	In	Out	Total Trips
Retail	826	5,300 sq.ft	<b>2.71 / 1000 sq.ft</b>	44%	56%	6	8	14
Library / Office	N/A	24,200 sq.ft	<b>4.1 / 1000 sq.ft</b>	41%	59%	41	58	99
Justice Institute	540	18,000 sq.ft	<b>2.54 / 1000 sq.ft</b>	58%	42%	27	19	46
Apartment	220	47 units	<b>.62 / unit</b>	65%	35%	19	10	29
Condominiums	230	88 units	<b>.52 / unit</b>	67%	33%	31	15	46
<b>Total</b>						<b>124</b>	<b>110</b>	<b>234</b>

The site generates the most trips in the PM peak hour (1.6 times the AM peak hour). The peak hour volumes along Esquimalt Road between Park Place and Fraser Road are also 25% greater than the AM peak hour. In addition, overall, the LOS during the PM peak hour is worse than the

AM peak hour. Therefore, the analysis is focused on the weekday PM peak hour as it is the worst case recurring time period.

### 3.3.1 Internal and Pass-by Trips

As the proposed site is a multi-use development, there will be internal trips which are between on-site land uses. Internal trips can be made either by walking or by vehicles using internal roadways without using external streets. An internal capture rate can be generally defined as a percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. The internal trips should be subtracted out before pass-by trip reductions are applied.

It is estimated that the number of internal trips will be 4 vehicles (2 In, 2 Out) during the PM peak hour. Therefore, the external trips are 230 vehicles (122 In, 108 Out) during the PM peak hour. Also, it is assumed that there are no internal trips to/from the library and the Justice Institute, as while they may occur, they are anticipated to be a low number. For the AM peak hour, it is assumed that there are no internal trips because the retail/office may not be open yet. See **Appendix B** for the internal trip calculation chart.

Though the proposed development includes a commercial component (retail), it is assumed to not generate any pass-by trips from and to nearby roads because it is small in size and is surrounded by several stores and a shopping centre.

### 3.4 Trip Assignment

The generated site trips were assigned based on the existing trip distributions at the existing site accesses. The trip assignment differs slightly at the accesses between Residential / Commercial and the Office / Library / Justice Institute land uses. For Residential / Commercial, the trip assignment at the access was based on the Fraser Street / Parking Access traffic split as that distribution better reflects the residential neighborhood. For Office / Library / Justice Institute, the trip assignment at the access was based on the sum of the trips in and out of the accesses at Fraser Street and Park Place. Also, the trip assignment for all land uses calculated at Esquimalt Road / Admirals Road was based on the traffic split from the last 15 minutes of the count, as the traffic in the first 45 minutes of the count is observed to be influenced by the Canadian Force Base traffic which does not leave the base in the PM Peak hour anymore. It should be noted that all development traffic, except for the traffic generated by the additional library space, is assumed to exit out of the Park Place access. The library traffic is assumed to use the surface lot, largely because library trips are short duration. The directional splits for the site trips at the accesses are as follows:

*Residential / Commercial – PM Peak Hour*

**Site Trips at Access (Park Place)**

Trips In

- 73% of the trip totals are from Esquimalt Road
- 27% of the trip totals are from the south

Trips Out

- 79% of the trip totals are to Esquimalt Road
- 21% of the trip totals are to the South

*Office / Library / Justice Institute – PM Peak Hour*

**Site Trips at Access (Park Place / Fraser Street)**

Trips In

- 79% of the trip totals are from Esquimalt Road
- 21% of the trip totals are from the south

Trips Out

- 65% of the trip totals are to Esquimalt Road
- 35% of the trip totals are to the South

The trip distribution for the following intersections are the same for all land uses. The directional splits for the site trips at the intersections are as follows:

*All Land uses – PM Peak Hour*

**Site Trips at Esquimalt Road / Fraser Street and Esquimalt Road / Park Place**

Trips In

- 71% of the total trips are from Lampson Street
- 29% of the total trips are from Admirals Road

Trips Out

- 82% of the total trips are to Lampson Street
- 18% of the total trips are to Admirals Road

**Site Trips at Esquimalt Road / Lampson Street**

Trips In

- 77% are from Esquimalt Road east of Lampson Street
- 23% are from Lampson Street north of Esquimalt Road

### Trips out

- 75% are to Esquimalt Road east of Lampson Street
- 25% are from Lampson Street north of Esquimalt Road

### **Site Trips at Esquimalt Road / Admirals Road**

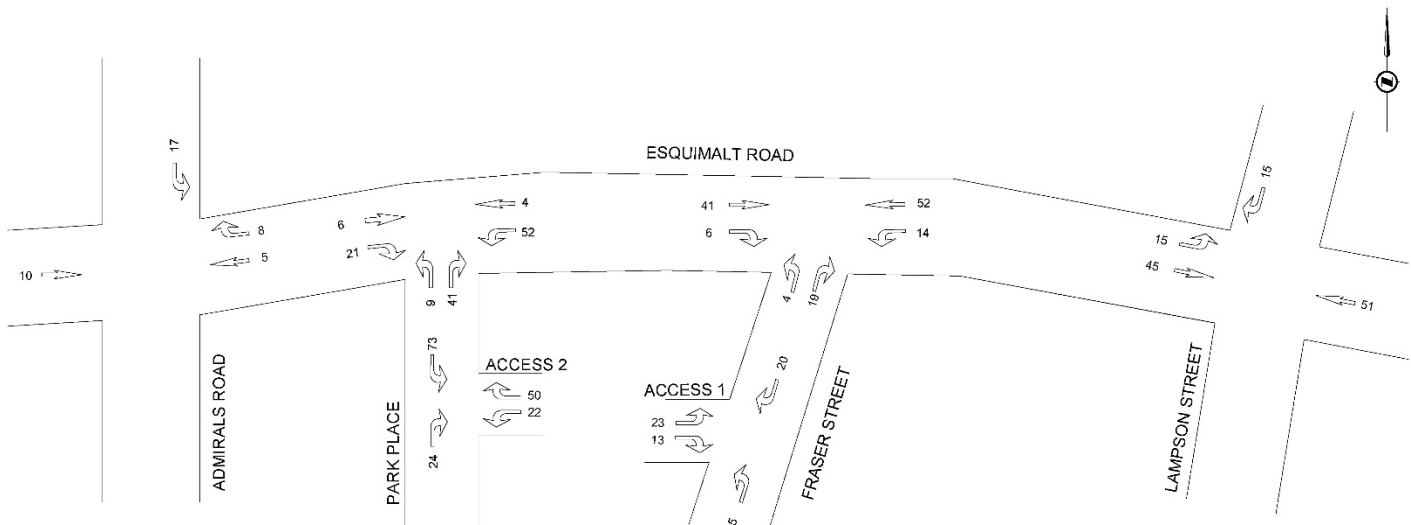
#### Trips In

- 63% from Admirals Road north of Esquimalt Road
- 37% from Esquimalt Road west of Admirals Road

#### Trips out

- 59% from Admirals Road north of Esquimalt Road
- 41% from Esquimalt Road west of Admirals Road

**Figure 5** outlines the site trips assigned during the PM peak hour at the key intersections.



**Figure 5: New Site Trips Assigned during PM Peak Hour**

### 3.5 Post Development Roadway Volumes

Though the development represents a significant increase in land usage for the site, the number of vehicles added to the network is relatively low by comparison to existing traffic volumes, and the adjacent roads will continue to operate within their classification (e.g. local roads will continue to operate as local roads). For example, there are 41 vehicles added to the eastbound through movement along Esquimalt Road at Fraser Street, which is approximately a 9% increase in traffic when compared to the existing eastbound through volume of 454 vehicles. Along Fraser Street, south of the site access, there are 18 vehicles added (two-way total), and spread out over an hour, that is equivalent to approximately one additional vehicle every three minutes. On Park Place, there are 46 additional vehicles going to and from the south via Carlisle Avenue, which is

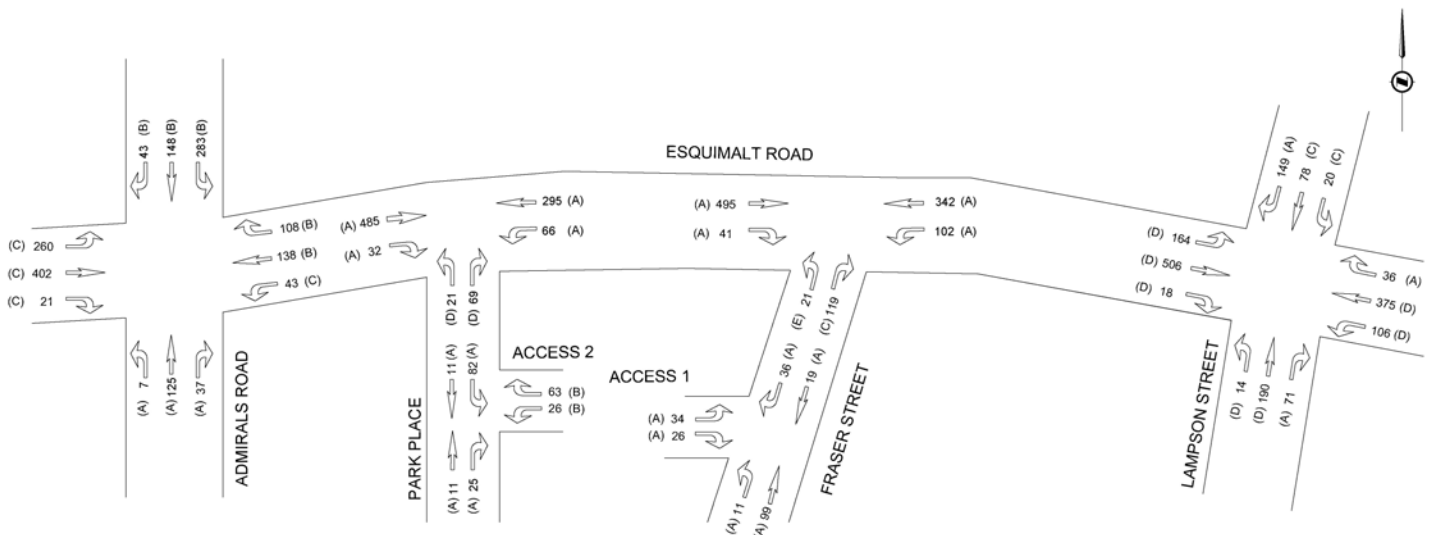
equivalent to approximately one additional vehicle every 90 seconds. Carlisle Avenue is a local road, and the addition of 46 vehicles will not change that.

### 3.6 Post Development Traffic Analysis Results

**Figure 6** shows the level of service and traffic volumes for the PM peak hour in the post development period, and **Table 3** shows a comparison of post development and existing traffic LOS and delay at key study area intersections.

All intersections and movements, except for the intersections of Esquimalt Road / Lampson Street, Esquimalt Road / Park Place, Esquimalt Road / Fraser Street and the site accesses, continue to operate at the same levels of service as existing conditions. At Esquimalt Road / Park Place, the northbound left / right turn drops from LOS C to LOS D, based on Synchro/HCM 2010 modelling results (and LOS D is generally an acceptable level of service in peak hours). At Esquimalt Road / Fraser Street the northbound left turn drops from LOS D to LOS E, based on Synchro/HCM 2010 results. The average vehicle delay based on SimTraffic, however, is 19.3s which is equivalent to a LOS C. It should be noted that although there was a drop in level of service for Synchro, traffic volumes for the northbound left turn on Fraser Street differ by only four vehicles when compared to existing conditions, and on Park Place by nine vehicles. At Esquimalt Road / Lampson Street the eastbound movements drop from LOS C to LOS D.

At the access on Park Place, the eastbound left and right turn movements drop to LOS B from LOS A, but are still operating at a good level of service. At the access on Fraser Street, the westbound left and right turn movements also drop to LOS B from LOS A. See Section 5.0 for a review of mitigation considerations.



**Figure 6: Post Development Conditions during PM Peak Hour**



**TABLE 3: BACKGROUND AND 2016 POST DEVELOPMENT LOS AND DELAY**

Intersection	Movement	LOS		Delay (s)	
		Background	Post Dev	Background	Post Dev
Esquimalt Road / Lampson Street	EB L/T	C	D	32.5	36.2
	EB T/R	C	D	32.5	36.2
	WB L/T	D	D	41.5	51.7
	WBR	A	A	1.7	1.6
	NB L/T	D	D	37.4	39.2
	NBR	A	A	6.8	6.7
	SB L/T	C	C	28.4	29.3
	SBR	A	A	6.7	6.8
Esquimalt Road / Admirals Road	EBL	C	C	26.1	26.9
	EB T/R	C	C	23.4	24.0
	WBL	C	C	34.3	34.3
	WBT	B	B	15.5	15.3
	WB T/R	B	B	15.5	15.3
	NB L/T	A	A	9.0	9.1
	NB T/R	A	A	9.0	9.1
	SB L/T	B	B	17.5	18.2
Esquimalt Road / Fraser Street	SB T/R	B	B	17.5	18.2
	EB T/R	A	A	0	0
	WBL	A	A	9.6	9.9
	WBT	A	A	0	0
	NBL	D	E	30.9	38.1
Esquimalt Road / Park Place	NBR	C	C	16.6	18.8
	EB T/R	A	A	0	0
	WBL	A	A	9.0	9.7
	WBT	A	A	0	0
Esquimalt Road / Park Place	NB L/R	C	D	19.9	25.1

### 3.7 Long Term Conditions (2026 Horizon Year, full buildout)

A long-term analysis for the 10-year horizon (2026) was conducted. To obtain 2026 background traffic volumes, a growth rate of 1.0% was applied to the background volumes. The proposed development traffic was then added to the 2026 background traffic to obtain the 2026 post development conditions. The long term conditions were analyzed in Synchro software. The long term PM peak hour conditions are shown in **Figure 7**.

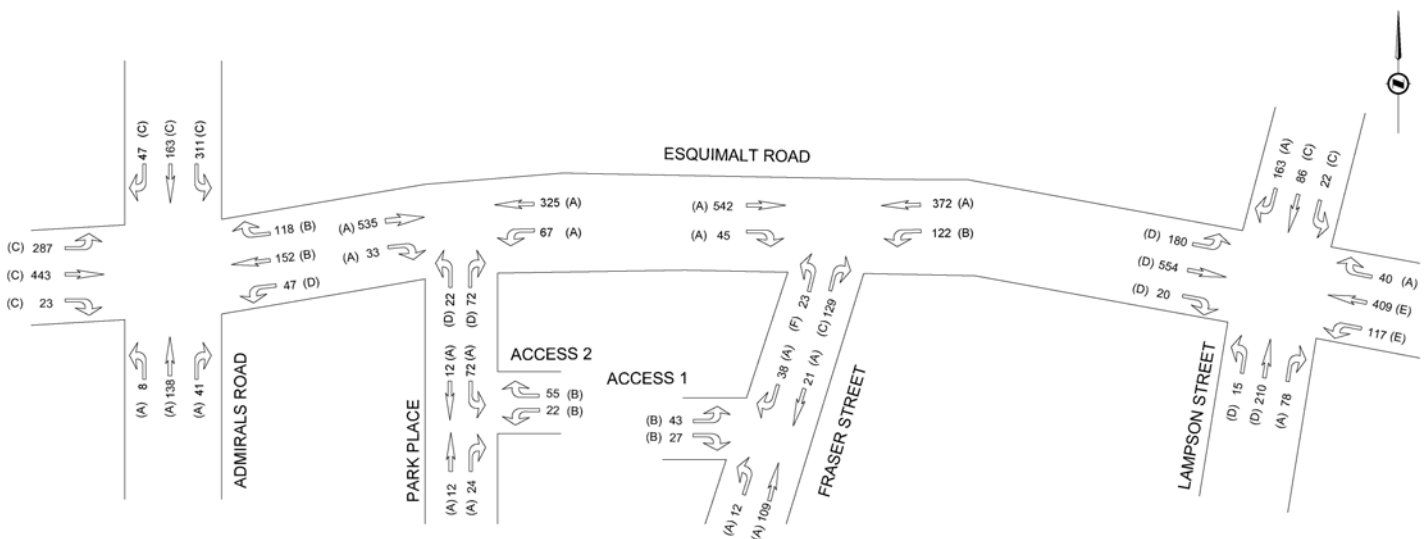
In the long term, the intersection of Esquimalt Road / Admirals Road, and the two accesses on Park Place and Fraser Street will operate with good or acceptable levels of service in the PM peak hour (all movements at LOS D or better).

The remaining intersections, Esquimalt Road / Lampson Street, Esquimalt Road / Park Place and Esquimalt Road / Fraser Street, will not be operating at a good or acceptable level of services on some approaches in the PM peak hour.

The intersection of Esquimalt Road / Lampson Street has a reduction in level of service along Esquimalt Road, where the westbound through and left turn movements drop from LOS D to LOS E.

At the intersection of Esquimalt Road / Park Place, the northbound left / right turn movement remains at LOS D (same as current-year post development conditions).

At the intersection of Esquimalt Road / Fraser Street, the northbound left turn remains at LOS E. The SimTraffic results yields a delay of 20.7s which is equivalent to LOS C.



**Figure 7: Long-term (2026 Horizon Year) Post-Development Conditions, PM Peak Hour**

### 3.8 Mitigation Review

The two intersections where there are very poor or failing levels of service in the PM peak hour are Fraser Street (northbound left at Esquimalt Road) and Lampson Street (westbound through). These are therefore locations where mitigation for traffic operations is a consideration.

#### *Esquimalt Road / Fraser Street*

The northbound left turn movement at Esquimalt Road / Fraser Street is LOS E on opening day and LOS F in the long term (although this assumes continued traffic growth on Esquimalt Road, which may not occur at the assumed rate, as in recent years peak hour volumes have actually

decreased). This is not due to the volume of left turns, which is comparatively low (17 currently, 21 in the near term post development period, and 23 in the long term post development period), but rather due to high volumes on Esquimalt Road that can make finding suitable gaps difficult.

Installing a signal would improve the northbound movement to a good/acceptable LOS B. A signal is not, however, warranted, based on TAC's signal warrant review<sup>3</sup> for existing or post development volumes (near or long term). This is because of the comparatively low volumes that a signal will actually benefit (effectively only the northbound left turns really benefit).

Another option that would improve the northbound left turn level of service is converting the median on the west leg of Esquimalt Road into a two-way left turn lane, which would allow for staged left turns. This would improve the northbound left level of service to LOS C. There is, however, an existing signed and marked crosswalk that would need to be moved so that this option is feasible, and this existing crosswalk is an important crossing for access to/from the Municipal Hall as well as the Esquimalt Rec Centre (and was observed to be well-used).

In consideration that the northbound left turn traffic volume in 2026 on Fraser Street is relatively low and similar to existing day conditions, and that conditions are only an issue in the peak hour, it is reasonable and appropriate to leave the existing traffic operations unchanged (in terms of traffic control and geometry).

#### *Esquimalt Road / Lampson Street*

In the 10-year horizon at Esquimalt Road / Lampson Street, the movements on Esquimalt Road drop to LOS E. Signal timing adjustments were investigated in order to see if improvements to the level of service could be realized.

The option of removing the split phasing at Esquimalt Road / Lampson Street was reviewed, with all left turn movements being permissive. The eastbound movement improved from LOS D to LOS B, the westbound through and left turn movement improved from LOS E to LOS C and the northbound through and left turn movement improved from LOS D to LOS C. Therefore, in the longer term, the Township may consider signal timing and phasing changes at this intersection if traffic volumes increase and operational issues are observed.

## **4.0 OTHER MODES**

### **6.1 Pedestrian Facilities**

Currently, there are sidewalks on all adjacent frontage roads and there is an existing path on the southwest end of the site that leads to the existing Esquimalt square. The sidewalks will be retained as part as the development plan, and there will be a "Public Artwalk" that will replace the

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<sup>3</sup> Transportation Association of Canada Signal Warrant Handbook, March 2007

existing path. The existing Esquimalt square is to be replaced by the proposed Village Square. The current and proposed facilities provide pedestrians with safe and accessible sidewalks.

There are several marked and signed crosswalks in the vicinity of the site, to facilitate pedestrian movements in the area. There are crosswalks across Esquimalt Road at Park Place and at Fraser Street. There is also a crosswalk across Fraser Street at Carlisle Avenue, which connects the Municipal Hall with the Esquimalt Recreation Centre. These crosswalks are ideally positioned near the outer quadrants of the Town Centre area.

## **6.2 Bicycle Facilities**

Esquimalt Road is designated as a commuter cycling route, and there are bike lanes in both directions from Park Place to the east (up to the border with the City of Victoria), with the exception of a short section in front of the Municipal Hall (where the bike lane ends for the width of six on-street parking stalls due to limited curb-to-curb width) and at the intersections with Lampson Street and Head Street. This is suitable and appropriate for confident commuter cyclists.

Both Fraser Street and Lyall Street are designated as commuter + recreational cycling routes. Fraser Street provides a north-south alignment into residential areas, while Lyall Street provides east-west connectivity for both local residents and commuter traffic. Both streets have shared lanes, which is an appropriate design for lower volume collector roads. These routes provide an alternative for accessing the site from Esquimalt Road on quieter neighbourhood roads.

## **6.2 Transit**

Esquimalt Road is served by two BC Transit routes: #15 and #26. Route 15, which is a regional route connects Esquimalt Village to the University of Victoria via downtown Victoria and Oak Bay. Route #26 also connects Esquimalt Village to the University of Victoria, via Tillicum Centre, Uptown Centre and McKenzie Avenue. In the opposite direction, both routes connect to the HMC Dockyard. There is an existing bus stop in the eastbound direction in front of the proposed site and in the westbound direction just west of Fraser Street, which are easily accessible. In addition to these routes, within 250m, on Admirals Road, there is a stop serviced by Route #25 which connects Esquimalt Village to the Admirals Walk Shopping Centre as well as the Colwood exchange. This route also connects to downtown Victoria and the Quadra/McKenzie area of Saanich, with the nearest stops being at the intersection of Fraser Street and Lyall Street. This site is therefore well-served by transit, which can lessen the dependence on private vehicle trips to/from the site.

## **5.0 CONCLUSIONS**

The following conclusions are made regarding the traffic impact assessment for the proposed Esquimalt Town Centre development.

The proposed development will see an increase in employment, service, and residential uses for the area, which can contribute to creating a more vibrant core area for the Township. The increase in land usage will result in the most acute traffic increases in the PM peak hour, which is also the current busiest time period for the adjacent streets, and thus was the time period used for traffic analysis. The land use analyzed for the traffic models represents a worst case over that which is ultimately proposed (to ensure the ongoing changes to the site plan were accounted for).

The site will result in an estimated 230 additional vehicle trips (combined in and out). Despite the increase in trips, the adjacent roads will all continue to operate within their current functional designations (Esquimalt Road as a major road, Fraser Street as a collector road, and Park Place and Carlisle Avenue as local roads).

In terms of operations at specific intersections, in the near term post-development timeframe, the levels of service will remain the same for most intersections and movements except for northbound left on Fraser Street (drops to LOS E from D), northbound Park Place (drops to LOS D from C), and eastbound through on Esquimalt Rd at Lampson Street (drops to LOS D from C). LOS D is generally considered acceptable in peak hours in urban locations. Note that the LOS E for the northbound left turns is due primarily to the high volume of traffic on Esquimalt Road and not site traffic (with the site, only four additional northbound left turn vehicles are anticipated in the peak hour, up to 21 from 17).

In the longer term (10-year horizon), all movements will remain at LOS D or better except the northbound left on Fraser Street at Esquimalt road will remain at LOS E, and the westbound through movement on Esquimalt Road at Lampson St will drop to LOS E.

In terms of mitigation at Fraser Street and Esquimalt Road, while there are measures that could improve the level of service for the northbound left turn movement, specifically signalization or the conversion of the median into a two-way left turn (to facilitate staged left turns), those measures have drawbacks which make them less desirable than the status quo. A signal is not warranted based on the TAC signal warrant, and a two-way left turn lane would adversely impact the crosswalk across Esquimalt Road at Fraser St. In the longer term at Esquimalt Road and Lampson Street, signal timing changes could be implemented to improve the level of service if needed.

Pedestrians are well served in the area by sidewalks along all site frontage roads, as well as marked and signed crosswalks across Esquimalt Road at Fraser St and Park Place, and across Fraser Street at Carlisle Avenue. Commuter cyclists are accommodated on Esquimalt Road (generally in bike lanes), and both commuter and recreational cyclists are accommodated on Fraser Street and Lyall Street in shared lanes. The site is well served by three transit routes that provide connections throughout the Township and to adjacent municipalities and key destinations.

## 6.0 RECOMMENDATIONS

No mitigation measures are required or recommended for the adjacent roadways for traffic operations. Pedestrian frontage improvements should be incorporated as required.



## APPENDIX A: SYNCHRO BACKGROUND

## SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modeling software. Results were measured in delay, level of service (LOS) and 95th percentile queue length. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. The simulation is run five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

### Levels of Service

Traffic operations are typically described in terms of levels of service, which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally unacceptable levels of service under normal everyday conditions.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The table below indicates the range of delay for LOS for signalized and unsignalized intersections.

**Table A1: LOS Criteria, by Intersection Traffic Control**

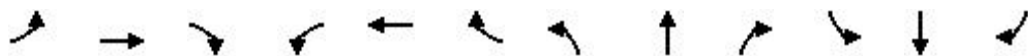
Level of Service	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	Less than 10	Less than 10
B	10 to 15	11 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	More than 50	More than 80

## APPENDIX B: 2016 Existing Conditions

Lanes, Volumes, Timings

2: Lampson St

3/24/2016

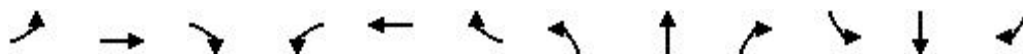


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	98	270	14	40	350	9	15	109	112	21	73	140
Future Volume (vph)	98	270	14	40	350	9	15	109	112	21	73	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			3%			5%			8%	
Storage Length (m)	30.0		0.0	0.0		70.0	0.0		70.0	0.0		40.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00	0.97		1.00	0.94		0.99	0.92
Frt		0.992				0.850			0.850			0.850
Flt Protected		0.987			0.993			0.994			0.988	
Satd. Flow (prot)	0	3288	0	0	1782	1591	0	1809	1575	0	1720	1463
Flt Permitted		0.987			0.993			0.952			0.895	
Satd. Flow (perm)	0	3282	0	0	1778	1537	0	1726	1481	0	1548	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				95			115			184
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		135.6			80.0			135.2			109.8	
Travel Time (s)		9.8			5.8			9.7			7.9	
Confl. Peds. (#/hr)	7		13	13		7	18		28	28		18
Confl. Bikes (#/hr)									18			18
Peak Hour Factor	0.82	0.84	0.58	0.56	0.80	0.75	0.75	0.80	0.97	0.66	0.76	0.76
Heavy Vehicles (%)	12%	6%	0%	0%	5%	0%	7%	1%	0%	10%	3%	6%
Adj. Flow (vph)	120	321	24	71	438	12	20	136	115	32	96	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	509	12	0	156	115	0	128	184
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.02	1.02	1.02	1.03	1.03	1.03	1.05	1.05	1.05
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4		8	8			2			2	
Permitted Phases						8	2		2	2		2

# Lanes, Volumes, Timings

## 2: Lampson St

3/24/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0		30.0	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	31.3%	31.3%		37.5%	37.5%	37.5%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%
Maximum Green (s)	20.0	20.0		25.0	25.0	25.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0			-1.0	-1.0		-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	30	30		30	30	30	30	30	30	30	30	30
Act Effect Green (s)		16.1			23.6	23.6		14.3	14.3		14.3	14.3
Actuated g/C Ratio		0.24			0.36	0.36		0.22	0.22		0.22	0.22
v/c Ratio		0.58			0.81	0.02		0.42	0.28		0.39	0.42
Control Delay		26.1			33.5	0.1		27.5	7.2		27.4	7.5
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		26.1			33.5	0.1		27.5	7.2		27.4	7.5
LOS		C			C	A		C	A		C	A
Approach Delay		26.1			32.7			18.9			15.7	
Approach LOS		C			C			B			B	

### Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	66.4
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	25.0
Intersection LOS:	C
Intersection Capacity Utilization	58.8%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 2: Lampson St



Lanes, Volumes, Timings

12: Admirals Rd

3/24/2016

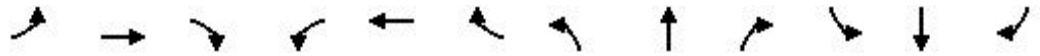


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	146	8	5	257	197	4	113	12	181	96	293
Future Volume (vph)	104	146	8	5	257	197	4	113	12	181	96	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		10.0	20.0		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		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	0.98			0.99				0.96
Frt		0.991			0.944			0.986				0.915
Flt Protected	0.950			0.950				0.998				0.986
Satd. Flow (prot)	1736	1628	0	1805	3135	0	0	3407	0	0	3071	0
Flt Permitted	0.186			0.633				0.918				0.799
Satd. Flow (perm)	337	1628	0	1188	3135	0	0	3133	0	0	2456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			145			13				478
Link Speed (k/h)		50			50			50				50
Link Distance (m)		94.1			80.9			126.6				151.2
Travel Time (s)		6.8			5.8			9.1				10.9
Confl. Peds. (#/hr)	22		11	11		22	17		27	27		17
Confl. Bikes (#/hr)			4			1						8
Peak Hour Factor	0.90	0.78	0.67	0.42	0.63	0.82	0.50	0.74	0.75	0.67	0.67	0.54
Heavy Vehicles (%)	4%	14%	38%	0%	8%	5%	0%	4%	0%	2%	5%	4%
Adj. Flow (vph)	116	187	12	12	408	240	8	153	16	270	143	543
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	199	0	12	648	0	0	177	0	0	956	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1		1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left		Thru
Leading Detector (m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0		15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0		15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt		NA
Protected Phases	7	4			8			2		1		6
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		1		6



Lanes, Volumes, Timings  
12: Admirals Rd

3/24/2016

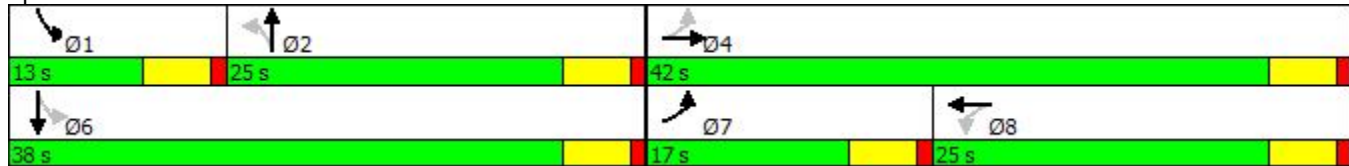


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	25.0		25.0	25.0		25.0	25.0		13.0	25.0	
Total Split (s)	17.0	42.0		25.0	25.0		25.0	25.0		13.0	38.0	
Total Split (%)	21.3%	52.5%		31.3%	31.3%		31.3%	31.3%		16.3%	47.5%	
Maximum Green (s)	12.0	37.0		20.0	20.0		20.0	20.0		8.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag			Lag		Lag		Lead	
Lead-Lag Optimize?	Yes			Yes			Yes		Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)	29.1	29.1		17.5	17.5			34.8			34.8	
Actuated g/C Ratio	0.40	0.40		0.24	0.24			0.48			0.48	
v/c Ratio	0.33	0.30		0.04	0.74			0.12			0.67	
Control Delay	15.0	14.3		22.4	25.8			12.1			10.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	15.0	14.3		22.4	25.8			12.1			10.7	
LOS	B	B		C	C			B			B	
Approach Delay		14.5			25.7			12.1			10.7	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 72.1  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 16.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 65.9%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 12: Admirals Rd



**Intersection**

Int Delay, s/veh	0.6
------------------	-----

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	280	14	9	305	3	15
Future Vol, veh/h	280	14	9	305	3	15
Conflicting Peds, #/hr	0	0	22	0	28	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	58	45	66	38	63
Heavy Vehicles, %	9	14	0	5	0	0
Mvmt Flow	301	24	20	462	8	24

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	353
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1217
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1194
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	522	-	-	1194	-
HCM Lane V/C Ratio	0.061	-	-	0.017	-
HCM Control Delay (s)	12.3	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

**Intersection**

Int Delay, s/veh	2.1
------------------	-----

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	279	41	94	323	9	57
Future Vol, veh/h	279	41	94	323	9	57
Conflicting Peds, #/hr	0	13	13	0	24	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	79	81	71	56	79
Heavy Vehicles, %	9	2	2	4	0	2
Mvmt Flow	291	52	116	455	16	72

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	367
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1192
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1179
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	229	669	-	-	1179	-
HCM Lane V/C Ratio	0.07	0.108	-	-	0.098	-
HCM Control Delay (s)	21.9	11	-	-	8.4	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	0.4	-	-	0.3	-

# Lanes, Volumes, Timings

## 2: Lampson St

3/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕	↕		↕	↕		↕	↕
Traffic Volume (vph)	149	461	18	106	324	36	14	190	71	20	78	134
Future Volume (vph)	149	461	18	106	324	36	14	190	71	20	78	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			3%			5%			8%	
Storage Length (m)	30.0		0.0	0.0		70.0	0.0		70.0	0.0		40.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99	0.92		1.00	0.95		1.00	0.91
Frt		0.992				0.850			0.850			0.850
Flt Protected		0.987			0.988			0.998			0.987	
Satd. Flow (prot)	0	3405	0	0	1791	1544	0	1831	1529	0	1777	1505
Flt Permitted		0.987			0.988			0.984			0.705	
Satd. Flow (perm)	0	3378	0	0	1777	1420	0	1802	1446	0	1265	1368
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				95			120			189
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		135.6			80.0			135.2			109.8	
Travel Time (s)		9.8			5.8			9.7			7.9	
Confl. Peds. (#/hr)	31		39	39		31	28		19	19		28
Confl. Bikes (#/hr)									24			12
Peak Hour Factor	0.85	0.99	0.50	0.85	0.84	0.69	0.88	0.61	0.59	0.63	0.89	0.71
Heavy Vehicles (%)	2%	4%	0%	1%	4%	3%	0%	1%	3%	5%	0%	3%
Adj. Flow (vph)	175	466	36	125	386	52	16	311	120	32	88	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	677	0	0	511	52	0	327	120	0	120	189
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.02	1.02	1.02	1.03	1.03	1.03	1.05	1.05	1.05
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4		8	8			2			2	
Permitted Phases						8	2		2	2		2

# Lanes, Volumes, Timings

## 2: Lampson St

3/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0		30.0	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	31.3%	31.3%		37.5%	37.5%	37.5%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%
Maximum Green (s)	20.0	20.0		25.0	25.0	25.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0			-1.0	-1.0		-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	30	30		30	30	30	30	30	30	30	30	30
Act Effct Green (s)		19.0		24.4	24.4		18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.26		0.33	0.33		0.25	0.25		0.25	0.25	
v/c Ratio		0.77		0.86	0.10		0.73	0.27		0.38	0.39	
Control Delay		32.5		41.5	1.7		37.4	6.8		28.4	6.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		32.5		41.5	1.7		37.4	6.8		28.4	6.7	
LOS		C		D	A		D	A		C	A	
Approach Delay		32.5		37.8			29.1			15.1		
Approach LOS		C		D			C			B		

### Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	73.9
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	30.6
Intersection LOS:	C
Intersection Capacity Utilization:	72.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Lampson St



Lanes, Volumes, Timings  
12: Admirals Rd

3/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	392	21	43	133	100	7	125	37	266	148	43
Future Volume (vph)	260	392	21	43	133	100	7	125	37	266	148	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		10.0	20.0		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		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.97	1.00		0.98	0.96			0.96				0.95
Frt		0.991			0.925			0.962				0.986
Flt Protected	0.950			0.950				0.997				0.975
Satd. Flow (prot)	1805	1772	0	1805	3019	0	0	3268	0	0	3359	0
Flt Permitted	0.327			0.471				0.915				0.714
Satd. Flow (perm)	602	1772	0	877	3019	0	0	2994	0	0	2363	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			172			52				18
Link Speed (k/h)		50			50			50				50
Link Distance (m)		94.1			80.9			126.6				151.2
Travel Time (s)		6.8			5.8			9.1				10.9
Confl. Peds. (#/hr)	42		27	27		42	55		46	46		55
Confl. Bikes (#/hr)			4			1			11			1
Peak Hour Factor	0.76	0.80	0.66	0.67	0.77	0.58	0.58	0.87	0.71	0.72	0.55	0.63
Heavy Vehicles (%)	0%	6%	5%	0%	12%	1%	0%	3%	0%	2%	3%	2%
Adj. Flow (vph)	342	490	32	64	173	172	12	144	52	369	269	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	522	0	64	345	0	0	208	0	0	706	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1		1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left		Thru
Leading Detector (m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0		15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0		15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt		NA
Protected Phases	7	4			8			2		1		6
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		1		6

Lanes, Volumes, Timings  
12: Admirals Rd

3/29/2016

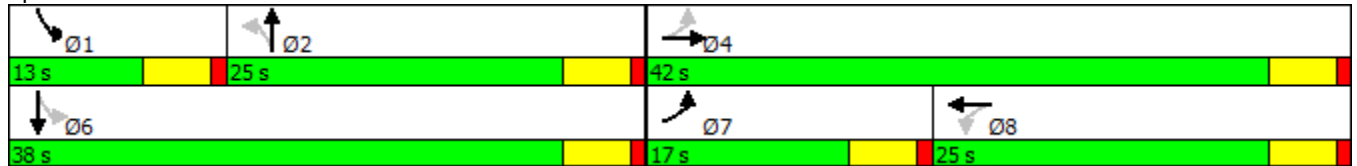


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	25.0		25.0	25.0		25.0	25.0		13.0	25.0	
Total Split (s)	17.0	42.0		25.0	25.0		25.0	25.0		13.0	38.0	
Total Split (%)	21.3%	52.5%		31.3%	31.3%		31.3%	31.3%		16.3%	47.5%	
Maximum Green (s)	12.0	37.0		20.0	20.0		20.0	20.0		8.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag		Lag		Lag		Lead		
Lead-Lag Optimize?	Yes			Yes		Yes		Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effect Green (s)	29.5	29.5		12.6	12.6			34.1			34.1	
Actuated g/C Ratio	0.41	0.41		0.18	0.18			0.48			0.48	
v/c Ratio	0.74	0.71		0.42	0.51			0.14			0.62	
Control Delay	26.1	23.4		34.3	15.5			9.0			17.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	26.1	23.4		34.3	15.5			9.0			17.5	
LOS	C	C		C	B			A			B	
Approach Delay		24.5			18.4			9.0			17.5	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 71.7  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 19.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 70.1%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 12: Admirals Rd





**Intersection**

Int Delay, s/veh 4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	4	13	11	1	9	11
Future Vol, veh/h	4	13	11	1	9	11
Conflicting Peds, #/hr	4	2	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	81	55	25	45	69
Heavy Vehicles, %	0	15	0	0	11	0
Mvmt Flow	8	16	20	4	20	16

Major/Minor	Minor1	Minor2	Major1	Major2
Conflicting Flow All	82	36	0	0
Stage 1	26	-	-	-
Stage 2	56	-	-	-
Critical Hdwy	6.4	6.35	-	-
Critical Hdwy Stg 1	5.4	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-
Follow-up Hdwy	3.5	3.435	-	-
Pot Cap-1 Maneuver	925	1001	-	-
Stage 1	1002	-	-	-
Stage 2	972	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	902	989	-	-
Mov Cap-2 Maneuver	902	-	-	-
Stage 1	999	-	-	-
Stage 2	951	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	4.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	958	1516
HCM Lane V/C Ratio	-	-	0.025	0.013
HCM Control Delay (s)	-	-	8.9	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

**Intersection**

Int Delay, s/veh 1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	479	11	14	291	12	28
Future Vol, veh/h	479	11	14	291	12	28
Conflicting Peds, #/hr	0	51	51	0	57	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	55	58	80	43	47
Heavy Vehicles, %	2	9	0	4	0	7
Mvmt Flow	551	20	24	364	28	60

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	628
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	964
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	922
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	328	-	-	922	-
HCM Lane V/C Ratio	0.267	-	-	0.026	-
HCM Control Delay (s)	19.9	-	-	9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

**Intersection**

Int Delay, s/veh 3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	454	35	98	290	17	100
Future Vol, veh/h	454	35	98	290	17	100
Conflicting Peds, #/hr	0	71	71	0	47	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	73	70	83	85	83
Heavy Vehicles, %	4	0	2	4	0	4
Mvmt Flow	493	48	140	349	20	120

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	588
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	987
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	928
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	18.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	159	429	-	-	928	-
HCM Lane V/C Ratio	0.126	0.281	-	-	0.151	-
HCM Control Delay (s)	30.9	16.6	-	-	9.6	-
HCM Lane LOS	D	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	1.1	-	-	0.5	-

**Intersection**

Int Delay, s/veh	2.5
------------------	-----

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	18	13	6	99	19	16
Future Vol, veh/h	18	13	6	99	19	16
Conflicting Peds, #/hr	0	0	27	0	0	27
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	56	65	50	83	73	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	20	12	119	26	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	179	63	46	0	-	0
Stage 1	36	-	-	-	-	-
Stage 2	143	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	811	1002	1562	-	-	-
Stage 1	986	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	805	979	1526	-	-	-
Mov Cap-2 Maneuver	805	-	-	-	-	-
Stage 1	986	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1526	-	864	-	-
HCM Lane V/C Ratio	0.008	-	0.06	-	-
HCM Control Delay (s)	7.4	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

## **APPENDIX C: 2016 Post Development Conditions**

# Lanes, Volumes, Timings

## 2: Lampson St

4/18/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕	↕		↕	↕		↕	↕
Traffic Volume (vph)	164	506	18	106	375	36	14	190	71	20	78	149
Future Volume (vph)	164	506	18	106	375	36	14	190	71	20	78	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			3%			5%			8%	
Storage Length (m)	30.0		0.0	0.0		70.0	0.0		70.0	0.0		40.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99	0.92		1.00	0.95		1.00	0.91
Frt		0.993				0.850			0.850			0.850
Flt Protected		0.987			0.989			0.998			0.987	
Satd. Flow (prot)	0	3410	0	0	1791	1544	0	1831	1529	0	1777	1505
Flt Permitted		0.987			0.989			0.984			0.681	
Satd. Flow (perm)	0	3385	0	0	1780	1420	0	1802	1446	0	1222	1368
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				95			120			210
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		135.6			80.0			135.2			109.8	
Travel Time (s)		9.8			5.8			9.7			7.9	
Confl. Peds. (#/hr)	31		39	39		31	28		19	19		28
Confl. Bikes (#/hr)									24			12
Peak Hour Factor	0.85	0.99	0.50	0.85	0.84	0.69	0.88	0.61	0.59	0.63	0.89	0.71
Heavy Vehicles (%)	2%	4%	0%	1%	4%	3%	0%	1%	3%	5%	0%	3%
Adj. Flow (vph)	193	511	36	125	446	52	16	311	120	32	88	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	740	0	0	571	52	0	327	120	0	120	210
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.02	1.02	1.02	1.03	1.03	1.03	1.05	1.05	1.05
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4		8	8			2			2	
Permitted Phases						8	2		2	2		2

Lanes, Volumes, Timings

2: Lampson St

4/18/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0		30.0	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	31.3%	31.3%		37.5%	37.5%	37.5%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%
Maximum Green (s)	20.0	20.0		25.0	25.0	25.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0			-1.0	-1.0		-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	30	30		30	30	30	30	30	30	30	30	30
Act Effct Green (s)		20.0			26.1	26.1		18.5	18.5		18.5	18.5
Actuated g/C Ratio		0.26			0.34	0.34		0.24	0.24		0.24	0.24
v/c Ratio		0.83			0.94	0.10		0.75	0.27		0.41	0.43
Control Delay		36.2			51.7	1.6		39.2	6.7		29.3	6.8
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		36.2			51.7	1.6		39.2	6.7		29.3	6.8
LOS		D			D	A		D	A		C	A
Approach Delay		36.2			47.5			30.5			15.0	
Approach LOS		D			D			C			B	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	76.7
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	35.0
Intersection LOS:	D
Intersection Capacity Utilization:	76.4%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Lampson St





Lanes, Volumes, Timings  
12: Admirals Rd

4/18/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	402	21	43	138	108	7	125	37	283	148	43
Future Volume (vph)	260	402	21	43	138	108	7	125	37	283	148	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		10.0	20.0		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		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.97	1.00		0.98	0.96			0.96			0.95	
Frt		0.991			0.924			0.962			0.986	
Flt Protected	0.950			0.950				0.997			0.974	
Satd. Flow (prot)	1805	1772	0	1805	3016	0	0	3268	0	0	3357	0
Flt Permitted	0.310			0.465				0.914			0.711	
Satd. Flow (perm)	572	1772	0	866	3016	0	0	2991	0	0	2351	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			186			52			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		94.1			80.9			126.6			151.2	
Travel Time (s)		6.8			5.8			9.1			10.9	
Confl. Peds. (#/hr)	42		27	27		42	55		46	46		55
Confl. Bikes (#/hr)			4			1			11			1
Peak Hour Factor	0.76	0.80	0.66	0.67	0.77	0.58	0.58	0.87	0.71	0.72	0.55	0.63
Heavy Vehicles (%)	0%	6%	5%	0%	12%	1%	0%	3%	0%	2%	3%	2%
Adj. Flow (vph)	342	503	32	64	179	186	12	144	52	393	269	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	535	0	64	365	0	0	208	0	0	730	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0	15.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0	15.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		1	6	

Lanes, Volumes, Timings  
12: Admirals Rd

4/18/2016

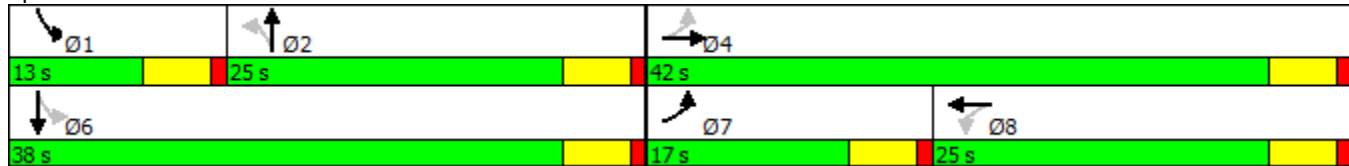


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	25.0		25.0	25.0		25.0	25.0		13.0	25.0	
Total Split (s)	17.0	42.0		25.0	25.0		25.0	25.0		13.0	38.0	
Total Split (%)	21.3%	52.5%		31.3%	31.3%		31.3%	31.3%		16.3%	47.5%	
Maximum Green (s)	12.0	37.0		20.0	20.0		20.0	20.0		8.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag		Lag		Lag		Lag		Lead
Lead-Lag Optimize?	Yes			Yes		Yes		Yes		Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effect Green (s)	29.6	29.6		12.8	12.8			34.1			34.1	
Actuated g/C Ratio	0.41	0.41		0.18	0.18			0.47			0.47	
v/c Ratio	0.75	0.73		0.42	0.53			0.14			0.65	
Control Delay	26.9	24.0		34.3	15.3			9.1			18.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	26.9	24.0		34.3	15.3			9.1			18.2	
LOS	C	C		C	B			A			B	
Approach Delay		25.2			18.2			9.1			18.2	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	71.8
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	20.1
Intersection LOS:	C
Intersection Capacity Utilization:	71.6%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 12: Admirals Rd



**Intersection**

Int Delay, s/veh 6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	26	63	11	25	82	11
Future Vol, veh/h	26	63	11	25	82	11
Conflicting Peds, #/hr	4	2	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	81	55	25	45	69
Heavy Vehicles, %	0	15	0	0	11	0
Mvmt Flow	52	78	20	100	182	16

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	454	84	0	0	124	0
Stage 1	74	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.4	6.35	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.435	-	-	2.299	-
Pot Cap-1 Maneuver	568	940	-	-	1409	-
Stage 1	954	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	488	929	-	-	1397	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	600	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	7.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	682	1397	-
HCM Lane V/C Ratio	-	-	0.19	0.13	-
HCM Control Delay (s)	-	-	11.5	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.4	-

**Intersection**

Int Delay, s/veh 3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	485	32	66	295	21	69
Future Vol, veh/h	485	32	66	295	21	69
Conflicting Peds, #/hr	0	51	51	0	57	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	55	58	80	80	80
Heavy Vehicles, %	2	9	0	4	0	7
Mvmt Flow	557	58	114	369	26	86

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	673
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	927
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	887
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	25.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	290	-	-	887	-
HCM Lane V/C Ratio	0.388	-	-	0.128	-
HCM Control Delay (s)	25.1	-	-	9.7	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	1.8	-	-	0.4	-

**Intersection**

Int Delay, s/veh 3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	495	41	102	342	21	119
Future Vol, veh/h	495	41	102	342	21	119
Conflicting Peds, #/hr	0	71	71	0	47	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	73	70	83	85	83
Heavy Vehicles, %	4	0	2	4	0	4
Mvmt Flow	538	56	146	412	25	143

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	641	0	1316	684
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	703	-
Critical Hdwy	-	-	4.12	-	6.4	6.24
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.336
Pot Cap-1 Maneuver	-	-	943	-	176	445
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	886	-	133	402
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	389	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	133	402	-	-	886	-
HCM Lane V/C Ratio	0.186	0.357	-	-	0.164	-
HCM Control Delay (s)	38.1	18.8	-	-	9.9	-
HCM Lane LOS	E	C	-	-	A	-
HCM 95th %tile Q(veh)	0.7	1.6	-	-	0.6	-

**Intersection**

Int Delay, s/veh 4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	51	26	11	99	19	36
Future Vol, veh/h	51	26	11	99	19	36
Conflicting Peds, #/hr	0	0	27	0	0	27
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	56	65	50	83	73	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	40	22	119	26	45

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	212	76	71 0
Stage 1	49	-	- -
Stage 2	163	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	776	985	1529 -
Stage 1	973	-	- -
Stage 2	866	-	- -
Platoon blocked, %			-
Mov Cap-1 Maneuver	764	962	1494 -
Mov Cap-2 Maneuver	764	-	- -
Stage 1	973	-	- -
Stage 2	852	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	10.3	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1494	-	815	-	-
HCM Lane V/C Ratio	0.015	-	0.161	-	-
HCM Control Delay (s)	7.4	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

2: Lampson St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	6.3	1.7	0.1	0.0	0.0	0.0	0.7	0.5	3.3	0.4	0.6	3.8
Total Del/Veh (s)	76.9	58.2	29.9	41.8	42.6	15.9	21.4	26.7	6.7	26.8	25.7	10.1

2: Lampson St Performance by movement

Movement	All
Denied Del/Veh (s)	1.6
Total Del/Veh (s)	42.5

7: Park Pl & Access 2 Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.2	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	4.7	2.5	0.7	0.1	1.2	0.6	1.7

11: Park Pl & Esquimalt Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Total Del/Veh (s)	1.2	0.5	6.8	1.8	11.4	0.9	6.6	2.1

12: Admirals Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	1.9	1.7	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.1	0.2
Total Del/Veh (s)	20.5	20.6	12.4	32.8	18.7	10.2	25.6	13.6	6.8	26.0	17.0	4.9

12: Admirals Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	19.3

18: Fraser St & Esquimalt Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.0	2.5	8.3	1.9	19.3	0.7	7.0	3.3

22: Fraser St & Access 1 Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.0	0.0	0.1
Total Del/Veh (s)	3.4	2.5	1.3	0.8	0.6	0.8	1.3



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Total Network Performance

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Denied Del/Veh (s)	2.3
Total Del/Veh (s)	44.6

Intersection: 2: Lampson St

Movement	EB	EB	B1	WB	WB	B8	NB	NB	SB	SB
Directions Served	LT	TR	T	LT	R	T	LT	R	LT	R
Maximum Queue (m)	133.8	118.9	7.9	95.4	59.2	51.9	54.8	26.8	43.2	24.5
Average Queue (m)	89.7	66.1	0.3	76.5	12.8	24.0	27.8	10.2	16.8	11.8
95th Queue (m)	126.2	113.3	2.6	96.0	47.4	55.3	45.9	18.2	34.3	21.6
Link Distance (m)	115.7	115.7	252.1	59.3		36.9	122.9		94.8	
Upstream Blk Time (%)	3	1		40	0	16				
Queuing Penalty (veh)	9	2		0	0	0				
Storage Bay Dist (m)					70.0			70.0		40.0
Storage Blk Time (%)				40	0				1	
Queuing Penalty (veh)				14	1				1	

Intersection: 7: Park Pl & Access 2

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	38.4	6.7	16.2
Average Queue (m)	12.9	0.2	2.0
95th Queue (m)	24.9	2.2	9.6
Link Distance (m)	23.3	48.4	22.9
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	0		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (m)	76.7	66.3
Average Queue (m)	8.6	4.8
95th Queue (m)	44.2	30.3
Link Distance (m)	59.3	59.3
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	2	0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Park PI & Esquimalt Rd

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (m)	15.8	15.8	22.5	26.2
Average Queue (m)	3.6	7.8	4.4	12.6
95th Queue (m)	12.0	15.8	17.0	22.2
Link Distance (m)	59.1		158.6	22.9
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (m)		18.0		
Storage Blk Time (%)		0	0	
Queuing Penalty (veh)		1	0	

Intersection: 12: Admirals Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LT	TR	LT	TR
Maximum Queue (m)	37.4	91.6	27.3	46.6	52.5	21.4	14.5	71.7	56.7
Average Queue (m)	30.8	56.9	9.7	15.6	18.0	10.0	5.1	44.0	18.2
95th Queue (m)	46.0	91.5	21.8	32.8	36.0	20.5	11.8	69.1	48.4
Link Distance (m)		81.2		58.1	58.1	115.3	115.3	135.3	135.3
Upstream Blk Time (%)		5			0				
Queuing Penalty (veh)		0			0				
Storage Bay Dist (m)	30.0		20.0						
Storage Blk Time (%)	6	20	3	5					
Queuing Penalty (veh)	25	52	2	2					

Intersection: 18: Fraser St & Esquimalt Rd

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (m)	22.4	21.9	26.9	6.5	24.4
Average Queue (m)	6.4	12.0	2.6	3.3	9.0
95th Queue (m)	19.9	22.7	12.6	8.3	18.5
Link Distance (m)	158.6		252.1		66.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		18.0		10.0	
Storage Blk Time (%)		2	0	0	6
Queuing Penalty (veh)		7	0	1	1

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Intersection: 22: Fraser St & Access 1

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Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	22.3	9.0
Average Queue (m)	9.5	0.3
95th Queue (m)	16.4	3.0
Link Distance (m)	14.8	28.1
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 120

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## APPENDIX D: 2026 Post Development Conditions

# Lanes, Volumes, Timings

## 2: Lampson St

4/15/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕	↕		↕	↕		↕	↕
Traffic Volume (vph)	180	554	20	117	409	40	15	210	78	22	86	163
Future Volume (vph)	180	554	20	117	409	40	15	210	78	22	86	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			3%			5%			8%	
Storage Length (m)	30.0		0.0	0.0		70.0	0.0		70.0	0.0		40.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99	0.92		1.00	0.95		1.00	0.91
Frt		0.993				0.850			0.850			0.850
Flt Protected		0.987			0.989			0.998			0.987	
Satd. Flow (prot)	0	3409	0	0	1791	1544	0	1831	1529	0	1777	1505
Flt Permitted		0.987			0.989			0.984			0.612	
Satd. Flow (perm)	0	3386	0	0	1781	1420	0	1802	1446	0	1099	1368
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				95			132			230
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		135.6			80.0			135.2			109.8	
Travel Time (s)		9.8			5.8			9.7			7.9	
Confl. Peds. (#/hr)	31		39	39		31	28		19	19		28
Confl. Bikes (#/hr)									24			12
Peak Hour Factor	0.85	0.99	0.50	0.85	0.84	0.69	0.88	0.61	0.59	0.63	0.89	0.71
Heavy Vehicles (%)	2%	4%	0%	1%	4%	3%	0%	1%	3%	5%	0%	3%
Adj. Flow (vph)	212	560	40	138	487	58	17	344	132	35	97	230
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	812	0	0	625	58	0	361	132	0	132	230
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.02	1.02	1.02	1.03	1.03	1.03	1.05	1.05	1.05
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Split	NA		Split	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4		8	8			2			2	
Permitted Phases						8	2		2	2		2

# Lanes, Volumes, Timings

## 2: Lampson St

4/15/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0		30.0	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	31.3%	31.3%		37.5%	37.5%	37.5%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%
Maximum Green (s)	20.0	20.0		25.0	25.0	25.0	20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-1.0			-1.0	-1.0		-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min		Min	Min	Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	30	30		30	30	30	30	30	30	30	30	30
Act Effct Green (s)		20.6			26.0	26.0		19.5	19.5		19.5	19.5
Actuated g/C Ratio		0.26			0.33	0.33		0.25	0.25		0.25	0.25
v/c Ratio		0.90			1.05	0.11		0.80	0.29		0.48	0.45
Control Delay		42.6			79.1	2.1		42.8	6.5		31.8	6.7
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		42.6			79.1	2.1		42.8	6.5		31.8	6.7
LOS		D			E	A		D	A		C	A
Approach Delay		42.6			72.6			33.1			15.8	
Approach LOS		D			E			C			B	

### Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	78.2
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	45.2
Intersection LOS:	D
Intersection Capacity Utilization:	82.8%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 2: Lampson St





Lanes, Volumes, Timings  
12: Admirals Rd

4/15/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕			↕			↕	↕
Traffic Volume (vph)	287	443	23	47	152	118	8	138	41	311	163	47
Future Volume (vph)	287	443	23	47	152	118	8	138	41	311	163	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		10.0	20.0		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		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.97	1.00		0.98	0.96			0.96			0.95	
Frt		0.991			0.924			0.962			0.986	
Flt Protected	0.950			0.950				0.997			0.974	
Satd. Flow (prot)	1805	1772	0	1805	3016	0	0	3268	0	0	3357	0
Flt Permitted	0.289			0.442				0.905			0.702	
Satd. Flow (perm)	534	1772	0	825	3016	0	0	2961	0	0	2326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			203			55			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		94.1			80.9			126.6			151.2	
Travel Time (s)		6.8			5.8			9.1			10.9	
Confl. Peds. (#/hr)	42		27	27		42	55		46	46		55
Confl. Bikes (#/hr)			4			1			11			1
Peak Hour Factor	0.76	0.80	0.66	0.67	0.77	0.58	0.58	0.87	0.71	0.72	0.55	0.63
Heavy Vehicles (%)	0%	6%	5%	0%	12%	1%	0%	3%	0%	2%	3%	2%
Adj. Flow (vph)	378	554	35	70	197	203	14	159	58	432	296	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	378	589	0	70	400	0	0	231	0	0	803	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0	15.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	15.0	15.0		15.0	15.0		2.0	15.0		2.0	15.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		8	8		2	2		1	6	

Lanes, Volumes, Timings  
12: Admirals Rd

4/15/2016

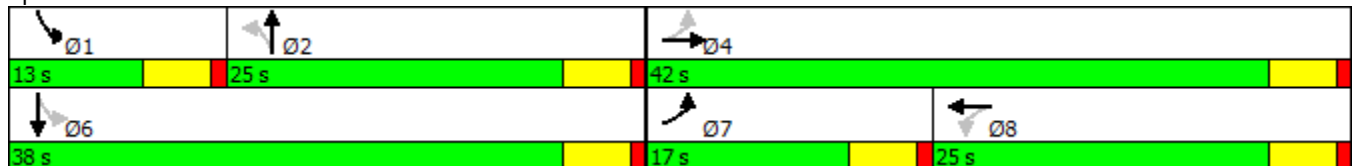


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	25.0		25.0	25.0		25.0	25.0		13.0	25.0	
Total Split (s)	17.0	42.0		25.0	25.0		25.0	25.0		13.0	38.0	
Total Split (%)	21.3%	52.5%		31.3%	31.3%		31.3%	31.3%		16.3%	47.5%	
Maximum Green (s)	12.0	37.0		20.0	20.0		20.0	20.0		8.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead			Lag		Lag		Lag		Lag		Lead
Lead-Lag Optimize?	Yes			Yes		Yes		Yes		Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effect Green (s)	30.8	30.8		13.8	13.8			34.1			34.1	
Actuated g/C Ratio	0.42	0.42		0.19	0.19			0.47			0.47	
v/c Ratio	0.83	0.78		0.45	0.55			0.16			0.73	
Control Delay	33.9	26.4		35.4	15.3			9.7			21.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	33.9	26.4		35.4	15.3			9.7			21.5	
LOS	C	C		D	B			A			C	
Approach Delay		29.3			18.3			9.7			21.5	
Approach LOS		C			B			A			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 73  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 22.9  
 Intersection LOS: C  
 Intersection Capacity Utilization 75.4%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 12: Admirals Rd



**Intersection**

Int Delay, s/veh 6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	26	64	12	25	83	12
Future Vol, veh/h	26	64	12	25	83	12
Conflicting Peds, #/hr	4	2	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	81	55	25	45	69
Heavy Vehicles, %	0	15	0	0	11	0
Mvmt Flow	52	79	22	100	184	17

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	462	86	0	0	126	0
Stage 1	76	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Critical Hdwy	6.4	6.35	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.435	-	-	2.299	-
Pot Cap-1 Maneuver	562	938	-	-	1406	-
Stage 1	952	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	481	927	-	-	1394	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	594	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	7.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	678	1394	-
HCM Lane V/C Ratio	-	-	0.193	0.132	-
HCM Control Delay (s)	-	-	11.6	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.5	-

**Intersection**

Int Delay, s/veh 3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	535	33	67	325	22	72
Future Vol, veh/h	535	33	67	325	22	72
Conflicting Peds, #/hr	0	51	51	0	57	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	55	58	80	80	80
Heavy Vehicles, %	2	9	0	4	0	7
Mvmt Flow	615	60	116	406	28	90

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	732
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	882
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	844
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	260	-	-	844	-
HCM Lane V/C Ratio	0.452	-	-	0.137	-
HCM Control Delay (s)	29.8	-	-	9.9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	2.2	-	-	0.5	-

**Intersection**

Int Delay, s/veh 4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	542	45	122	372	23	129
Future Vol, veh/h	542	45	122	372	23	129
Conflicting Peds, #/hr	0	71	71	0	47	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	73	70	83	85	83
Heavy Vehicles, %	4	0	2	4	0	4
Mvmt Flow	589	62	174	448	27	155

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	698
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	898
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	844
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	25.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	102	375	-	-	844	-
HCM Lane V/C Ratio	0.265	0.414	-	-	0.206	-
HCM Control Delay (s)	52.6	21.2	-	-	10.4	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	1	2	-	-	0.8	-

**Intersection**

Int Delay, s/veh 4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	43	27	12	109	21	38
Future Vol, veh/h	43	27	12	109	21	38
Conflicting Peds, #/hr	0	0	27	0	0	27
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	56	65	50	83	73	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	42	24	131	29	48

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	232	80	76 0
Stage 1	53	-	- -
Stage 2	179	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	756	980	1523 -
Stage 1	970	-	- -
Stage 2	852	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	743	958	1488 -
Mov Cap-2 Maneuver	743	-	- -
Stage 1	970	-	- -
Stage 2	838	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	10.2	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1488	-	807	-	-
HCM Lane V/C Ratio	0.016	-	0.147	-	-
HCM Control Delay (s)	7.5	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

2: Lampson St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	52.1	34.9	8.9	0.0	0.0	0.0	0.1	0.6	3.1	0.9	0.8	3.6
Total Del/Veh (s)	109.7	85.6	61.2	45.6	48.8	20.0	38.9	28.1	7.2	41.1	29.8	11.7

2: Lampson St Performance by movement

Movement	All
Denied Del/Veh (s)	15.7
Total Del/Veh (s)	55.9

7: Park Pl & Access 2 Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.2	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	5.1	2.7	0.9	0.1	0.9	0.1	1.8

11: Park Pl & Esquimalt Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Total Del/Veh (s)	1.1	0.4	7.9	1.7	8.8	0.9	5.3	2.0

12: Admirals Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.2	2.5	1.7	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.1	0.1
Total Del/Veh (s)	21.9	20.8	14.1	43.6	19.8	9.2	15.3	14.0	8.2	40.0	29.1	5.0

12: Admirals Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.4
Total Del/Veh (s)	23.1

18: Fraser St & Esquimalt Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.9	7.9	2.0	20.7	0.3	8.5	3.3

22: Fraser St & Access 1 Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.1	0.0	0.0	0.1
Total Del/Veh (s)	3.2	2.1	1.6	0.8	0.6	0.6	1.1

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Total Network Performance

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Denied Del/Veh (s)	13.9
Total Del/Veh (s)	56.6



Intersection: 2: Lampson St

Movement	EB	EB	B1	WB	WB	B8	NB	NB	SB	SB
Directions Served	LT	TR	T	LT	R	T	LT	R	LT	R
Maximum Queue (m)	144.7	137.1	93.8	89.3	59.2	47.3	73.5	23.3	57.2	47.4
Average Queue (m)	113.0	103.2	13.7	78.1	22.3	31.9	32.4	10.5	17.1	15.5
95th Queue (m)	153.8	144.3	52.0	93.0	59.9	58.6	53.2	19.8	37.7	31.3
Link Distance (m)	115.7	115.7	252.1	59.3		36.9	122.9		94.8	
Upstream Blk Time (%)	21	5		48	0	31				
Queuing Penalty (veh)	71	16		0	0	0				
Storage Bay Dist (m)					70.0			70.0		40.0
Storage Blk Time (%)				48	0		0		1	0
Queuing Penalty (veh)				19	2		0		2	0

Intersection: 7: Park Pl & Access 2

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	27.3	14.8
Average Queue (m)	12.1	2.8
95th Queue (m)	21.5	10.5
Link Distance (m)	31.3	5.7
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (m)	58.8	63.5
Average Queue (m)	3.7	2.1
95th Queue (m)	26.5	20.9
Link Distance (m)	59.3	59.3
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Park PI & Esquimalt Rd

Movement	EB	WB	WB	NB	B6
Directions Served	TR	L	T	LR	T
Maximum Queue (m)	23.1	15.4	21.1	22.6	9.2
Average Queue (m)	4.0	6.1	3.1	10.3	0.5
95th Queue (m)	16.2	14.2	13.1	18.4	3.6
Link Distance (m)	59.5		158.3	0.9	5.7
Upstream Blk Time (%)				11	0
Queuing Penalty (veh)				9	0
Storage Bay Dist (m)		18.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 12: Admirals Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LT	TR	LT	TR
Maximum Queue (m)	37.4	91.6	27.2	39.1	40.0	33.9	20.3	112.4	86.3
Average Queue (m)	32.2	67.0	9.6	16.3	19.3	16.3	7.8	57.8	22.8
95th Queue (m)	47.1	102.4	21.3	34.0	32.4	28.9	17.1	84.8	60.4
Link Distance (m)		81.2		58.1	58.1	115.3	115.3	135.3	135.3
Upstream Blk Time (%)		9							
Queuing Penalty (veh)		0							
Storage Bay Dist (m)	30.0		20.0						
Storage Blk Time (%)	8	22	3	8					
Queuing Penalty (veh)	38	62	2	4					

Intersection: 18: Fraser St & Esquimalt Rd

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (m)	14.9	23.1	32.0	10.2	29.4
Average Queue (m)	0.9	11.9	4.0	4.0	9.3
95th Queue (m)	5.9	20.9	16.9	9.4	19.7
Link Distance (m)	158.3		252.1		66.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		18.0		10.0	
Storage Blk Time (%)		2	0	1	8
Queuing Penalty (veh)		7	0	1	2

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Intersection: 22: Fraser St & Access 1

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Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	16.7	9.0
Average Queue (m)	8.7	0.6
95th Queue (m)	12.2	4.2
Link Distance (m)	14.8	28.1
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 236

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