

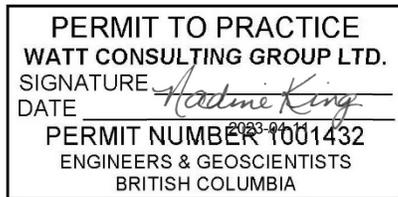


1006, 1008, 1010 CRAIGFLOWER ROAD

Transportation Impact Assessment

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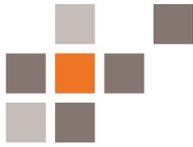
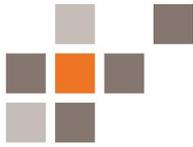


TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	The Site Today	1
1.2	Proposed Development.....	1
1.3	This Report	3
2.0	TRANSPORTATION CONTEXT	4
2.1	Road Network	4
2.2	Transit Network.....	6
2.3	Cycling Network	8
2.4	Pedestrian Environment.....	10
3.0	PROPOSED DEVELOPMENT	10
4.0	TRAFFIC VOLUMES	11
4.1	Traffic Analysis Scenarios and Design Periods.....	11
4.2	Existing Traffic	12
4.3	Background Traffic Volumes.....	14
4.4	Site Traffic Volumes.....	18
4.5	Post-Development Traffic Volumes	23
5.0	TRAFFIC OPERATIONS ANALYSIS.....	27
5.1	Methodology.....	27
5.2	Input and Calibration Parameters.....	28
5.3	Tillicum Road / Craigflower Road	29
5.4	Craigflower Road / Site Driveway	32
6.0	CONCLUSIONS.....	34
7.0	RECOMMENDATIONS	34



FIGURES

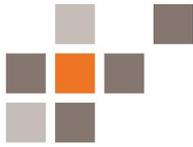
Figure 1 – Site Location	2
Figure 2 – Existing Road Network.....	5
Figure 3 – Existing Transit Network	7
Figure 4 – Existing Cycling Network	9
Figure 5 – Existing Traffic Volumes	13
Figure 6 – Opening Day Background Traffic Volumes	16
Figure 7 – 2035 Horizon Year Background Traffic Volumes	17
Figure 8 – Net New Site Traffic Volumes.....	24
Figure 9 – Opening Day Post-Development Traffic Volumes	25
Figure 10 – 2035 Horizon Year Post-Development Traffic Volumes	26

TABLES

Table 1 – Development Programme.....	11
Table 2 – Concurrent Developments.....	14
Table 3 – Existing Site Trip Generation	19
Table 4 – New Site Trip Generation.....	21
Table 5 – Net New Site Trip Generation	22
Table 6 – Site Traffic Distribution.....	22
Table 7: Trip Generation Comparison for Revised Land Use.....	27
Table 8 – Tillicum Road / Craigflower Road Traffic Operations.....	31
Table 9 – Craigflower Road / Site Driveway Traffic Operations.....	33

APPENDICES

- Appendix A – Site Plan
- Appendix B – Synchro Background
- Appendix C – Synchro Reports



1.0 INTRODUCTION

WATT Consulting Group is retained by Denciti Development Corp. to prepare a Transportation Impact Assessment (TIA) and Parking Requirement Review for a proposed mixed-use development at 1006, 1008, and 1010 Craigflower Road in Esquimalt BC. The Parking Requirement Review is provided under separate cover.

The site is bound by Tillicum Road to the east, Craigflower Road to the south, and residential buildings to the north and west. The site location is illustrated in **Figure 1**.

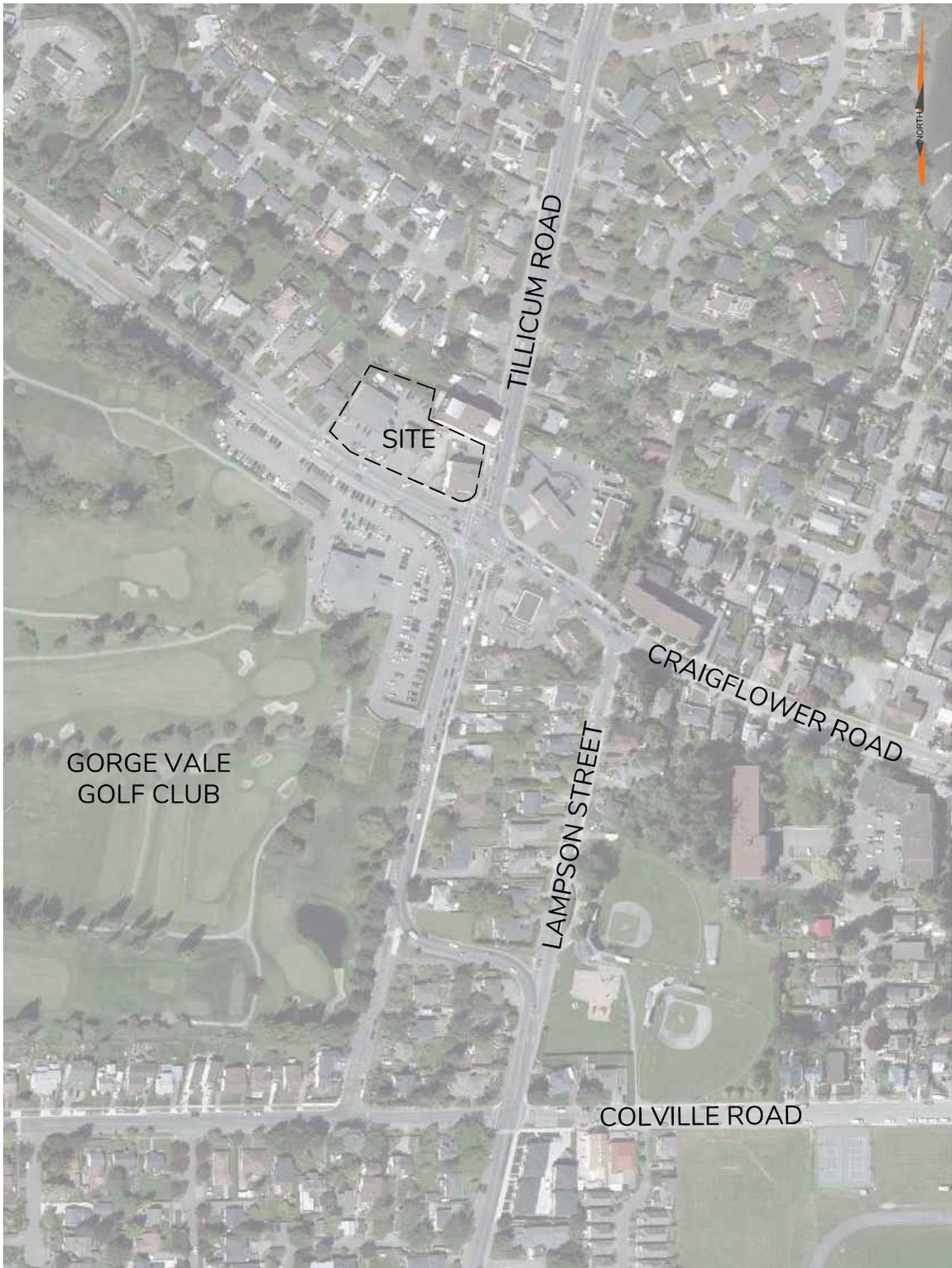
1.1 The Site Today

The existing 1006 Craigflower Road parcel is occupied by a two-storey mixed-use building and surface parking lot, accessible from both Tillicum Road and Craigflower Road. The existing ground floor retail gross floor area (GFA) is approximately 270 m² (2,900 ft²), and there are four (4) residential units located on the second floor of the building.

The existing 1008-1010 Craigflower Road parcel is occupied by two retail buildings: a restaurant [existing GFA of approximately 170 m² (1,800 ft²)], and a thrift store [existing GFA of approximately 450 m² (4,900 ft²)]. The associated surface parking lot is shared between the two buildings, and is accessible via two driveways at the east and west ends of the site, off Craigflower Road

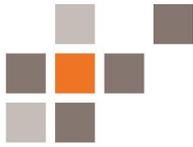
1.2 Proposed Development

A development permit with variance application has been submitted to the Township of Esquimalt to permit the proposed redevelopment of the site. The site is currently zoned C-2 (Neighbourhood Commercial). The development proposal consists of a 6-storey mixed-use building containing 130 residential units and 1200 m² of commercial GFA located at ground level.



1006, 1008, 1010 Craigflower Road
Transportation Impact Assessment

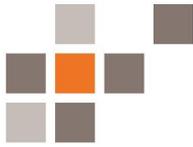
Figure 1
Site Location



1.3 This Report

This report is provided as part of the development permit (with variance) application being submitted to the Township of Esquimalt. It provides the following:

- An overview of the existing and evolving transportation context in the vicinity of the site, including vehicular, pedestrian, cycling, and transit facilities, and area travel characteristics
- An overview of the proposed development programme
- An assessment of the existing traffic activity patterns and volumes in the study area during the weekday morning and afternoon peak periods
- A comprehensive review of the vehicular traffic volume changes that may occur in the area in the future with the construction of other area development projects
- An assessment of the trip generation and assignment characteristics of the proposed development
- A review of vehicular traffic operations at intersections in the area under existing and future conditions (i.e., the 2025 and 2035 horizon years), including an assessment of the operational impacts of the proposed development



2.0 TRANSPORTATION CONTEXT

2.1 Road Network

2.1.1 Existing Road Network

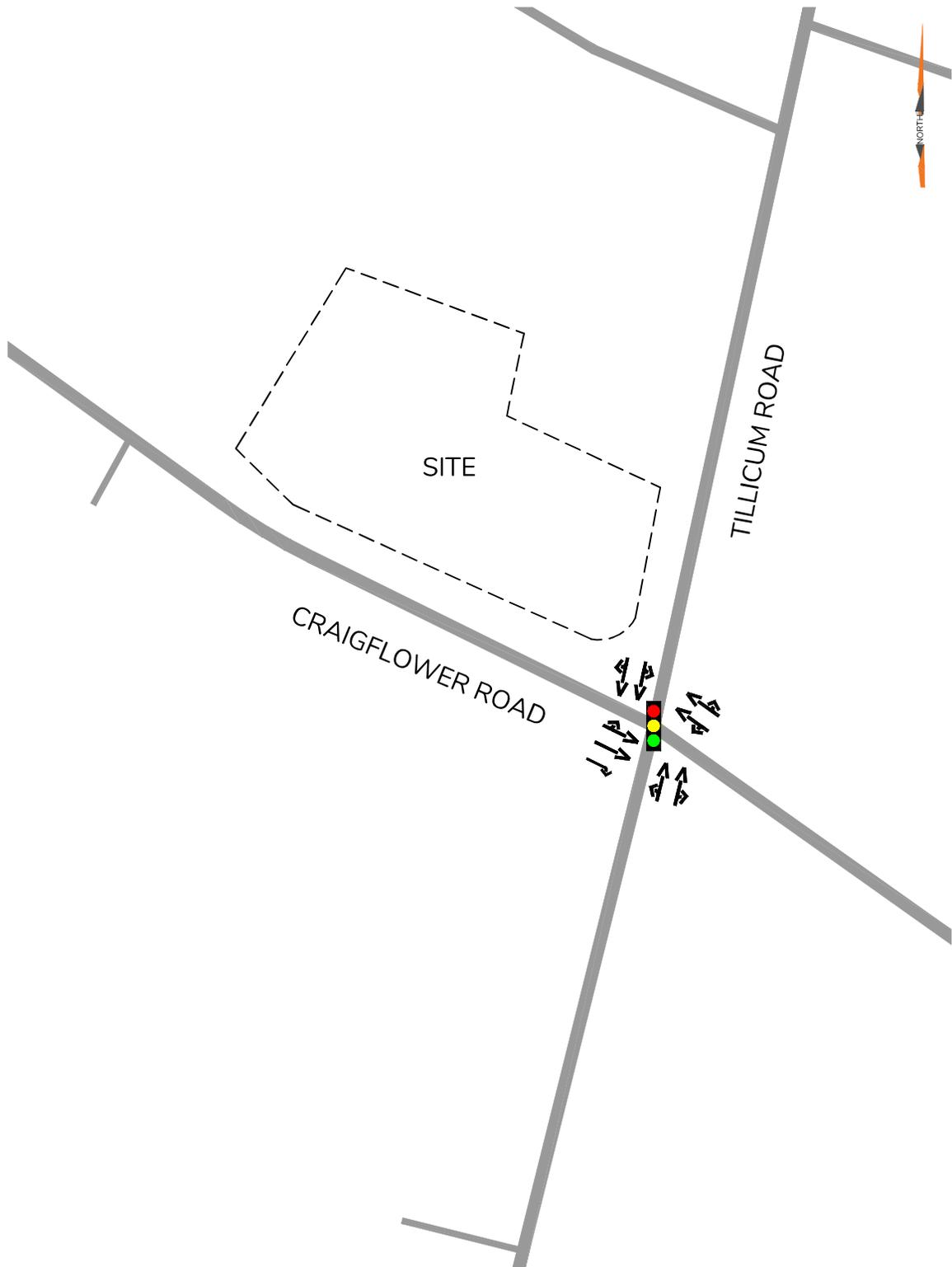
The existing road network, lane configuration, and intersection control are illustrated in **Figure 2**.

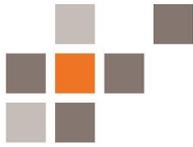
Tillicum Road is a north-south major road under the jurisdiction of the Township of Esquimalt. It extends between Colville Road in the south and Carey Road in the north. The posted speed limit is 50 km/h. South of the Gorge Bridge, Tillicum Road has a four-lane cross section with auxiliary left turn lanes at some intersections. North of the bridge, Tillicum Road has a three-lane cross section (two northbound lanes and one southbound lane). The southbound direction has an approximately 130 metre section of on-street bike lane across the Gorge Bridge. On-street parking is not permitted on either side of the road. The Gorge Road West and Craigflower Road intersections are signalized.

Craigflower Road is an east-west major road under the jurisdiction of the Township of Esquimalt. It extends between Russell Street in the east (where it continues as Skinner Street) and Admirals Road in the west (where it continues as Island Highway). The posted speed limit is 40 km/h. Craigflower Road generally has a three-lane cross section (i.e. one lane in each direction with a centre left or auxiliary left turn lane on certain sections). Additional through lanes are provided for short segments in the vicinity of Tillicum Road. On-street bike lanes are provided in both the eastbound and westbound directions. On-street parking is generally not permitted on either side of the road. The intersection at Tillicum Road is signalized. Westbound left turn movements are not permitted at this intersection between 4:00 PM and 6:00 PM.

2.1.2 Evolving Road Network

Esquimalt Council approved their Active Transportation (AT) Network Plan in February 2022. Upgrades to the Craigflower Road / Tillicum Road intersection (including cross-ride markings, conflict zone markings, signage, and signal phasing changes) were highlighted as a short-term project in the AT plan. Installation of a new traffic signal along Tillicum Road between the Gorge Bridge and Craigflower road was also highlighted as a short-term project.





2.2 Transit Network

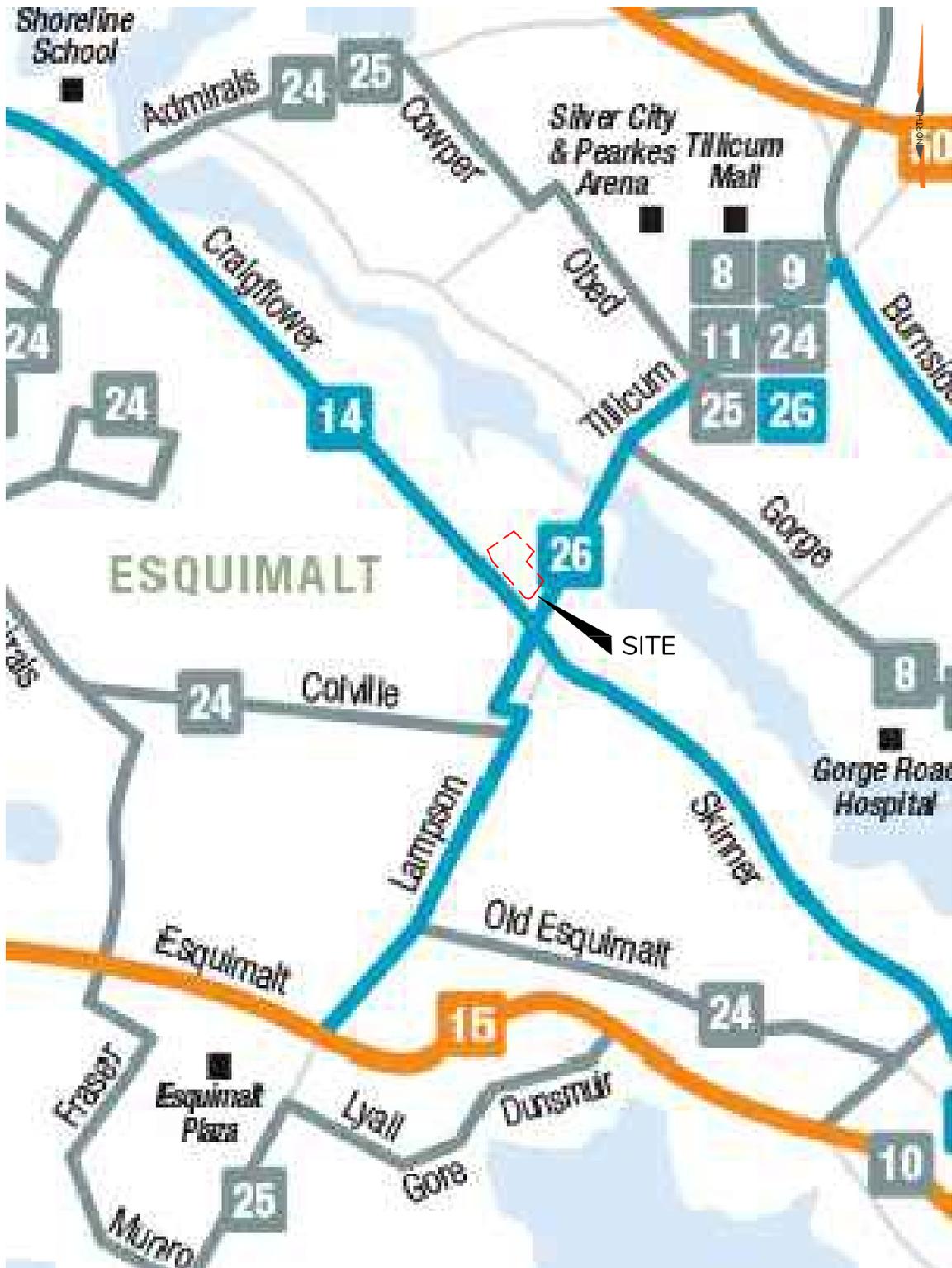
The area transit network is illustrated in **Figure 3**.

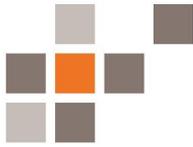
Route 14 – Vic General / UVic operates between Victoria General Hospital and the University of Victoria, passing by the Victoria downtown core and the Oak Bay Junction. The closest stop is directly in front of the site, at Craigflower Road / Tillicum Road. Buses operate at 15-to-30-minute headways on weekdays, and 20-to-30-minute headways on weekends. Additional weekday peak period trips between UVic and downtown Victoria (i.e., leaving downtown in the morning and leaving UVic in the afternoon) are provided when UVic is in full session.

Route 24 – Cedar Hill / Tillicum Centre operates between the McKenzie Avenue / Cedar Hill Road intersection and Admirals Walk Shopping Centre in View Royal, travelling through downtown Victoria and Esquimalt. The closest stop is approximately 500 metres (i.e., a 6-minute walk) from the site, at Lampson Street / Colville Road. The route operates with 40-to-90-minute headways seven days a week.

Route 26 – Dockyard / UVic operates between the University of Victoria and the HMC Dockyard, passing by Uptown. The closest stop is approximately 150 metres (i.e., a 2-minute walk) from the site, at Tillicum Road / Craigflower Road. Buses operate at 15-to-30-minute headways seven days a week, with additional peak period trips in both directions when public schools and UVic are in full session.

A BC Transit bus stop (Route 14 – Vic General / UVic) is located on the site frontage. With the planned “road diet” on Tillicum Road and the ultimate reconstruction of the Tillicum / Craigflower intersection (as outlined in **Section 2.1.2**), WATT recommends the reconfiguration of the existing merge lane downstream of the intersection and fronting the site to permit the construction of a bus bay at the Craigflower Road / Tillicum Road westbound bus stop.





2.3 Cycling Network

2.3.1 Existing Cycling Network

The existing cycling network in the vicinity of the site is somewhat fragmented. On-street bike lanes are provided in both directions on Craigflower Road and Gorge Road, but a section of Gorge Road between Tillicum Road and Harriet Road is designated as a shared street only. The District of Saanich has recently extended the Tillicum Road bike lanes from the Esquimalt border up to Maddock Avenue West / Arena Road, completing their portion of the corridor up to Carey Road. South of Craigflower Road, Tillicum Road is designated as a shared street. Selkirk Avenue is also designated as a shared street.

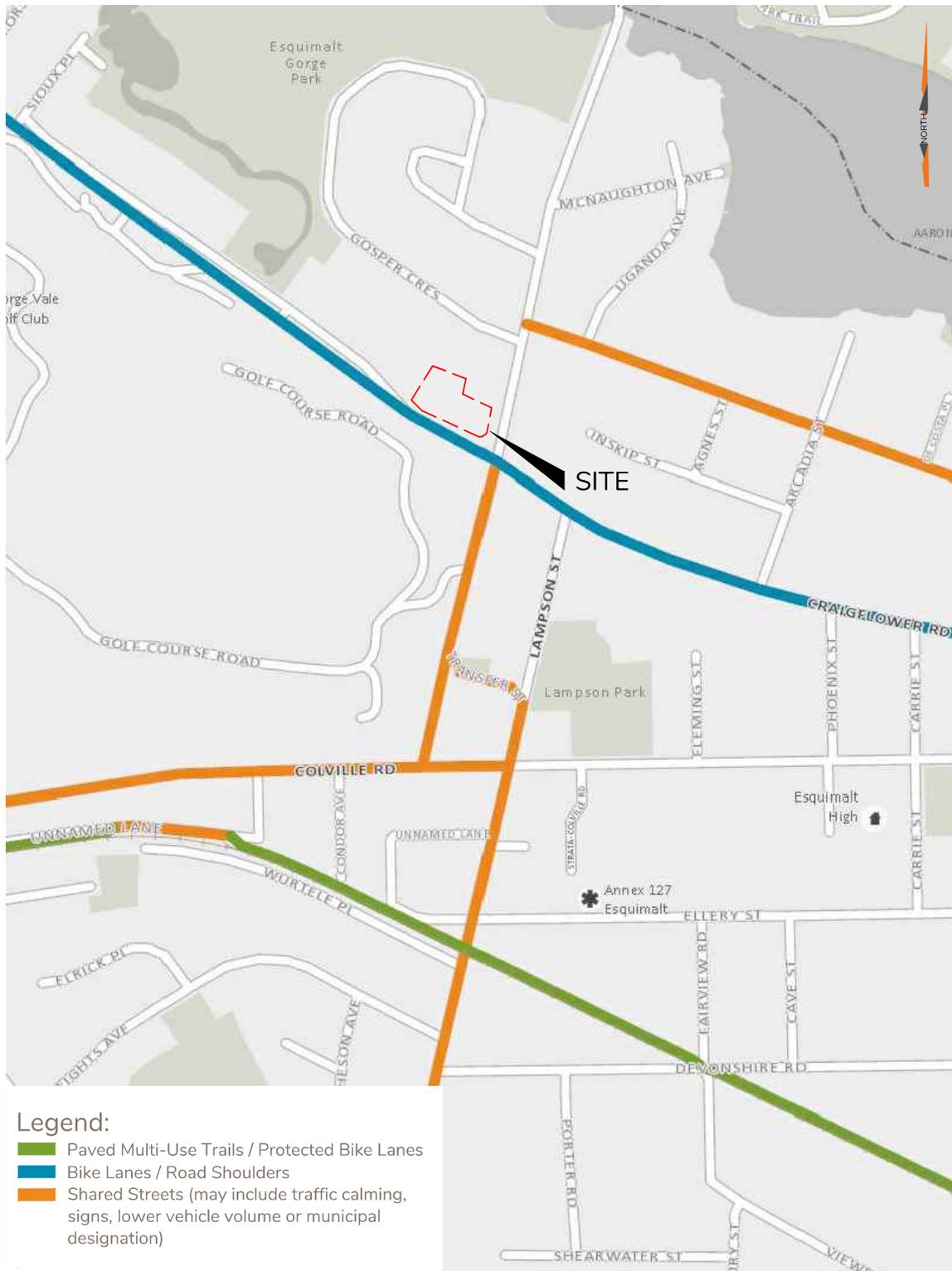
These cycling facilities provide connections to other high quality cycling facilities in the area, including the E&N Rail Trail, the Lochside Regional Trail, and the Galloping Goose Regional Trail. These trails provide off-street connections across the Township of Esquimalt, and the greater Victoria region as a whole.

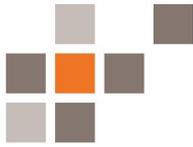
The existing cycling network is illustrated in **Figure 4**.

2.3.2 Evolving Cycling Network

The 2022 Esquimalt AT plan recommends implementing an additional active transportation connection between the Gorge Bridge and the Craigflower Bridge. The District of Saanich 2018 AT plan identified a potential crossing between Dysart Road and Garthland Road.

Protected bike lanes on Tillicum Road between Colville Road and the Gorge Bridge was identified as a priority cycling corridor project in the Esquimalt AT plan. The intent is to implement the protected cycling facilities as part of a quick-build pilot project to test the functionality of the infrastructure prior to permanent construction. The permanent build-out of the bike facility will remove a vehicle travel lane, elevate the bike lanes up to sidewalk level, and remove the existing handrail on the Gorge Bridge. Conflict markings and intersection treatments are required, and upgrades to the existing traffic signal at Tillicum / Craigflower are warranted. At their March 15th, 2022 meeting, Esquimalt council has requested that design of the Tillicum protected bike lanes be completed in 2022, with construction to be completed by 2023.





2.4 Pedestrian Environment

The pedestrian environment in the vicinity of the site is generally contiguous and of good quality. Sidewalks are provided on both sides of the road on all major streets in the study area. Some segments of sidewalk in the vicinity of the Tillicum Road / Craigflower Road intersection are of substandard width due to above-ground utility encroachments (i.e., fire hydrants, utility poles).

Sidewalks on the Gorge Bridge are separated from vehicle traffic by handrails, and additional curb-separated pedestrian space on the west side of the bridge was implemented in 2021. Several other high quality recreational walking facilities are also in close proximity to the site, including Saanich Gorge Park, the Victoria Canoe and Kayak Club, and the Gorge Road walkway.

The pedestrian network in the vicinity of the site provides convenient access to local area transit services and a broad range of commercial and recreational uses in the surrounding neighbourhood.

3.0 PROPOSED DEVELOPMENT

The current development proposal consists of a 6-storey mixed-use building containing 130 residential units and approximately 1,200 m² of commercial GFA. The architectural site plan is provided in **Appendix A. Table 1** outlines the transportation-related features of the proposed development.



Table 1 – Development Programme

Site Element	Details	
Residential Units	130 units	
Commercial GFA (retail and Café values assumed for study)	General Retail	1,053 m ² (11,333 ft ²)
	Café	147 m ² (1,584 ft ²)
	Total	1,200 m ² (12,917 ft ²)
Vehicular Access	Access to the site's parking garage and loading area is provided at the west end of the site from Craigflower Road.	
Cyclist Access	Access to the visitor bicycle parking is provided directly from the public street network. Resident / occupant bicycle parking spaces on the P1 level are accessed using the parking garage ramp and the site driveway off Craigflower Road.	
Pedestrian Access	Pedestrian access to the residential lobby is provided at the south end of the site from Craigflower Road. Access to the commercial retail units is provided along the east and south frontages from Tillicum Road and Craigflower Road.	

4.0 TRAFFIC VOLUMES

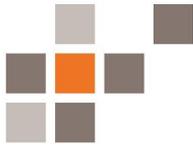
4.1 Traffic Analysis Scenarios and Design Periods

Traffic operations analysis has been undertaken during the weekday morning and afternoon peak periods under the following conditions:

- Existing traffic – traffic activity under current conditions
- Background traffic – traffic activity levels into the future which includes allowances for corridor growth and background development
- Post-development traffic – traffic activity levels into the future with the site redeveloped and projected site generated traffic added to the road network

Traffic operations are discussed in the following sections for these scenarios:

- Existing conditions

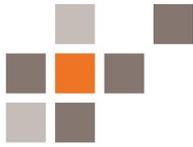


- Opening day (2025) background conditions
- Opening day (2025) post-development conditions
- 10-year post-buildout (2035 horizon year) background conditions
- 10-year post-buildout (2035 horizon year) post-development conditions

4.2 Existing Traffic

Turning movement volumes were conducted for the Tillicum Road / Craigflower Road intersection on Wednesday, February 23, 2022. The existing traffic volumes for the weekday morning and afternoon peak hour are illustrated in **Figure 5**.





4.3 Background Traffic Volumes

4.3.1 Corridor Growth

Corridor growth on both Tillicum Road and Craigflower Road was forecast using a 1.0% annual linear growth rate applied to the observed volumes from 2022 to the 2035 horizon year.

4.3.2 Concurrent Developments

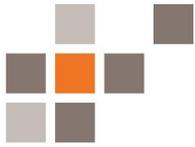
Allowances were made to account for new traffic generated by other development proposals in proximity to the proposed site that are either under construction, approved, being reviewed, or where an application is expected to be submitted to the Township in the near future. Six (6) concurrent developments have been considered for the purposes of this study and are summarized in **Table 2**. Where available, trip generation and traffic assignments were used consistent with the TIA for the proposed concurrent developments. Otherwise, trip generation and traffic assignments were derived using the methodology used in this report.

Table 2 – Concurrent Developments

Development Address	Development Statistics	Report Source	Trip Generation / Distribution Source
1075 Tillicum Road	100 mid-rise residential units, 120 m ² commercial GFA	WATT	TIA
1078 Tillicum Road	5 townhouse units	N/A	Generated
874 Fleming Street	60 new affordable housing units ^[1]	N/A	Generated
880 Fleming Street	45 mid-rise residential units	N/A	Generated
851 Lampson Road	4 townhouse units	N/A	Generated
884 Lampson Road	119 mid-rise residential units	WATT	Draft TIA

Notes:

1. The existing 77 unit building at 874 Fleming is being replaced with a new 137-unit building

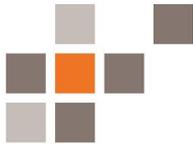


4.3.3 Background Traffic Volumes

Background traffic volumes are the sum of the existing traffic volumes, corridor growth, and traffic generated by concurrent developments. Background traffic volumes for opening day and the 2035 horizon year are illustrated in **Figure 6** and **Figure 7**, respectively.







4.4 Site Traffic Volumes

4.4.1 Existing Site Trip Generation

Trip generation for the existing uses on the site was calculated using rates published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual (11th Edition)*. Given that the existing site uses will not be maintained with the redevelopment of the site, all existing inbound and outbound site trips will be removed. Unit count and GFA for the existing land uses have been estimated. The existing site trip generation estimate is summarized in **Table 3**.

One (1) outbound trip in the AM and 70 two-way trips in the PM peak hour will be removed from the road network with the redevelopment of the site.

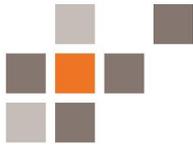
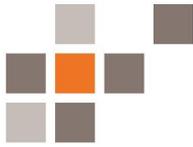


Table 3 – Existing Site Trip Generation

Use	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
ITE Trip Generation Manual 11th Edition Rates						
Multifamily Housing (Low-Rise) ^[1] (ITE LU 220)	0.10	0.30	0.40	0.32	0.19	0.51
Strip Retail Plaza (<40k) ^{[2][3]} (ITE LU 822)	-	-	-	3.30	3.29	6.59
High-Turnover (Sit-Down) Restaurant ^{[2][3]} (ITE LU 932)	-	-	-	5.52	3.53	9.05
Existing Site Trip Generation						
2 nd Floor Residential (1006 Block) (4 units)	0	1	1	1	1	2
Mixed Retail (1006 Block) (2,900 ft ²)	0	0	0	10	10	20
Thrift Store (4,900 ft ²)	0	0	0	16	16	32
Fish & Chips Restaurant (1,800 ft ²)	0	0	0	10	6	16
Total Trips	0	1	1	37	33	70

Notes:

1. Trip rates are per residential unit
2. Trip rates are per 1,000 ft² of GFA
3. AM trip rates not included given that existing establishments are not in operation during weekday morning peak period



4.4.2 New Site Trip Generation

The current development proposal consists of a 6-storey mixed-use building containing 130 residential units and approximately 1,200 m² of commercial GFA, including a potential café and general retail uses.

Vehicular trip generation rates for the proposed mixed-use development are generally based on the *ITE Trip Generation Manual (11th Edition)*. Given the mixed-use nature of the site lending itself towards pedestrian trips, and the prominence of the potential café on the corner of Tillicum Road and Craigflower Road, an alternative trip generation rate for the café use was selected based on the *Trip-Generation Rates for Urban Infill Land Uses in California* report prepared for the California Department of Transportation (June 2009).

The new site trip generation forecast is provided in **Table 4**.

The proposed development is forecast to generate 103 new two-way trips in the AM peak hour, and 138 new two-way trips in the weekday afternoon peak hour.

The initial version of this study relied on a land use that has since been revised. In that previous scenario a liquor store and less retail was proposed. The revised land use has no liquor store and more retail. The previous scenario estimated 91 AM peak hour trips and 147 PM peak hour trips, which is a difference of +12 AM peak hour trips, and -9 PM peak hour trips. This is within the daily $\pm 10\%$ fluctuation expected for normal traffic. This difference in results from using the revised trip generation numbers will not significantly affect the outcome seen in the traffic analysis results in **Table 7**. The previous (more conservative scenario due to the high-volume liquor store) land use is therefore retained and the analysis in **Table 7** reflects that. **Table 4** and **Table 5** reflect the new land use.

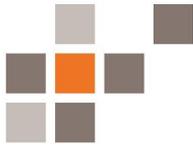
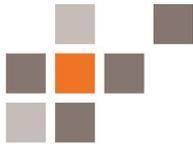


Table 4 – New Site Trip Generation

Use	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Trip Generation Rates						
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (ITE LU 221) ^[1]	0.09	0.28	0.37	0.24	0.15	0.39
Strip Retail Plaza (<40k) ^[2] (ITE LU 822)	1.42	0.94	2.36	3.30	3.29	6.59
Coffee Shop ^[2] (Caltrans)	8.95	8.94	17.89	3.92	3.93	7.85
Vehicular Trip Generation						
Mid-Rise Residential (130 units)	12	36	48	31	20	51
General Retail (11,333 ft ²)	16	11	27	38	37	75
Café (1,584 ft ²)	14	14	28	6	6	12
Total	42	61	103	75	63	138

Notes:

1. Trip rates are per dwelling unit
2. Trip rates are per 1,000 ft² GFA



4.4.3 Net New Site Trip Generation

The net new vehicular trip generation for the site subtracts trips from the existing land uses and adds trips from the proposed new uses. The net new site trip generation is summarized in **Table 5**.

Table 5 – Net New Site Trip Generation

Use	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Existing	0	-1	-1	-37	-33	-70
New	+42	+61	+103	+75	+63	+138
Net New	+42	+60	+102	+38	+30	+68

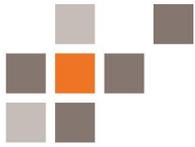
The net impact to the road network with the redevelopment of the site is 102 new two-way trips in the AM peak hour and 68 new two-way trips in the PM peak hour.

4.4.4 Trip Distribution and Assignment

The trip distribution pattern for site-generated traffic was established based on the person-trop OD matrix for the Township of Esquimalt provided in the 2017 CRD *Household Travel Survey*. The distribution of inbound and outbound traffic adopted for the proposed development is outlined in **Table 6**.

Table 6 – Site Traffic Distribution

Street	Direction	AM	PM
Tillicum Road	North	50%	55%
	South	30%	25%
Craigflower Road	East	10%	10%
	West	10%	10%

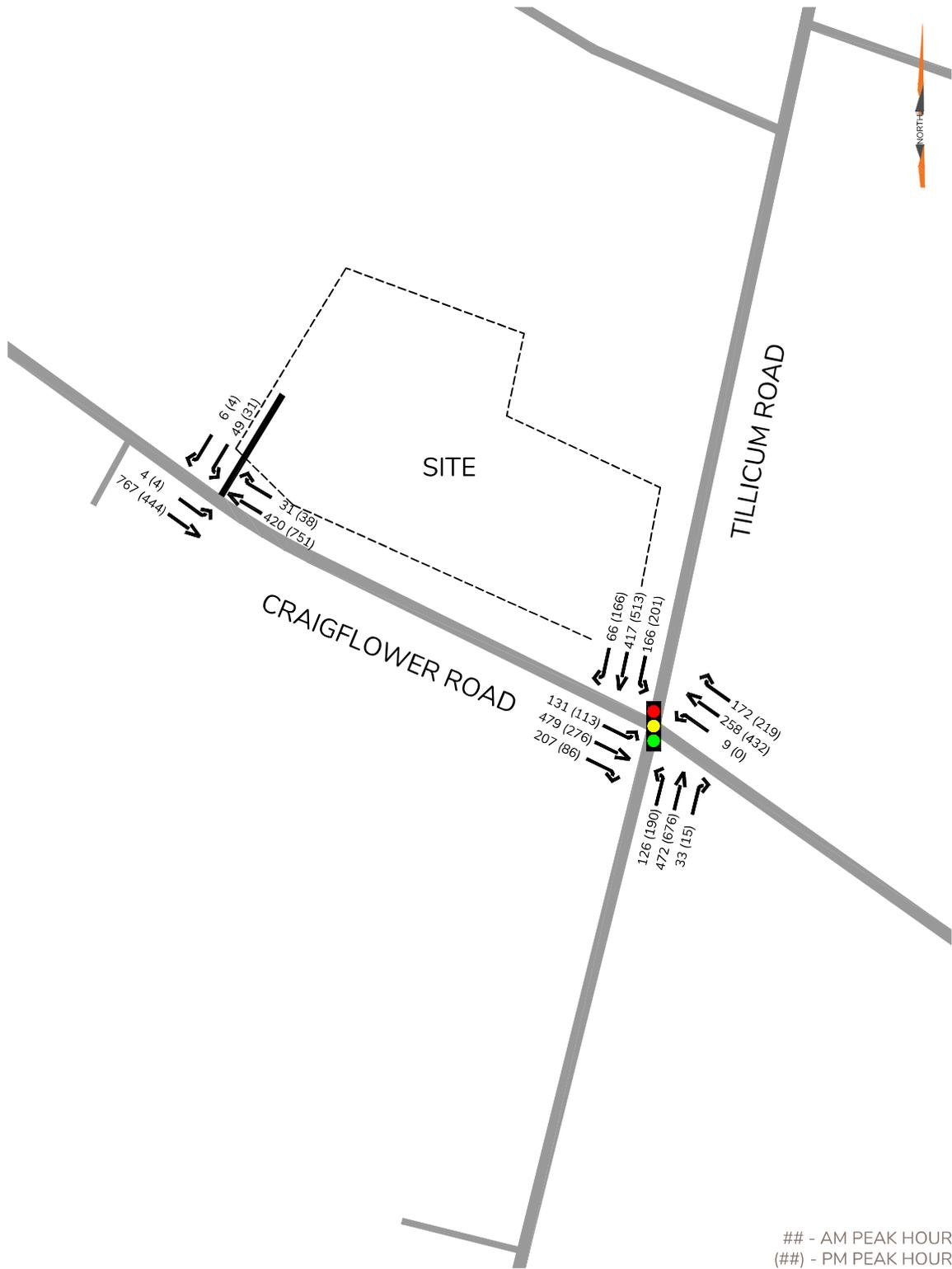


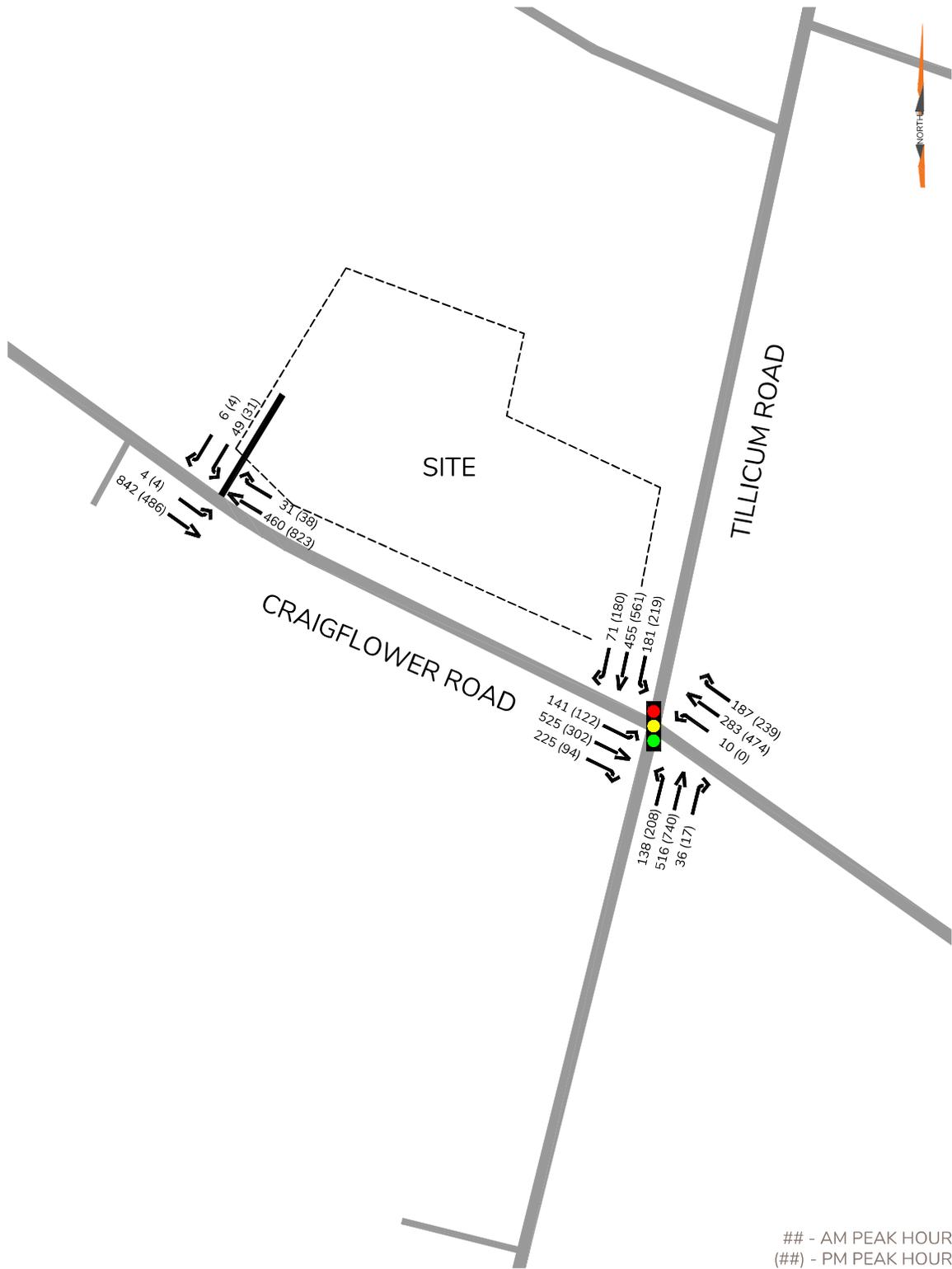
The net new site traffic volumes assigned to the area road network are illustrated in **Figure 8**.

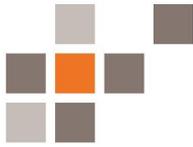
4.5 Post-Development Traffic Volumes

Post-development traffic volumes are the sum of the background traffic volumes and net new site traffic volumes. Post-development traffic volumes for opening day and the 2035 horizon year are illustrated in **Figure 9** and **Figure 10**, respectively.









5.0 TRAFFIC OPERATIONS ANALYSIS

5.1 Methodology

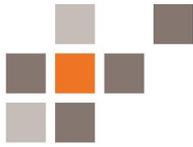
Analysis of traffic conditions at the study area intersections was undertaken using Synchro version 11. Synchro / SimTraffic is a two-part traffic modelling software that provides analysis of traffic conditions based on *Highway Capacity Manual (2000 Edition and Sixth Edition)* evaluation methodology. A detailed description is provided in **Appendix B**.

Since the traffic operations analysis was conducted, there is a change in the proposed commercial land use. The initial commercial land use included a 243 m² liquor store and 552 m² general retail GFA. With the revised land use, the liquor store is no longer included as part of the proposed land use. Instead, the general retail GFA is now increased to approximately 1,200 m² GFA. A comparison was done to assess the change to the trip generation due to the change in the proposed land use, and are summarized in **Table 7**.

Table 7: Trip Generation Comparison for Revised Land Use

Scenario	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Initial Trip Generation	35	56	91	79	68	147
Revised Trip Generation	42	61	103	75	63	138
Difference	+7	+5	+12	-4	-5	-9

The revised land use will generate an additional 12 trips in the AM peak hour, it will generate 9 trips less in the PM peak hour. The change to the trip generation is minor because liquor store is a high generator of traffic in the PM peak hour, its removal balances out the increase of the general retail GFA. Given the small amount of change to the trip generation, the traffic operations analysis results using the trip generation from the initial land use is still comparable. Therefore, the results can still be used to accurately reflect the impact from the revised land use to the adjacent road network.



5.2 Input and Calibration Parameters

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analysis are based on information provided from the intersection turning movement counts. Where these values were unavailable, a default value of 2 percent heavy vehicles was assumed.

Signal Timings

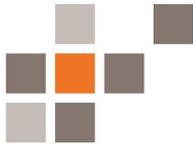
Existing signal timing plans were used for the signalized intersection at Tillicum Road / Craigflower Road.

Peak Hour Factor

Peak hour factors (PHF) incorporated into the analysis were calculated from the intersection turning movement counts and are based on the overall 15 minute entering volumes at the study area intersection. Where the existing PHF is unavailable, a default PHF of 0.90 was adopted for all movements.

Lane Configuration

Given the planned road diet approved by Esquimalt council as part of the implementation of the Active Transportation Plan, the lane configuration on Tillicum Road was assumed to be reduced to a three-lane cross section (i.e., one lane in each direction with a centre left turn lane) for both the opening day (i.e. 2025 horizon year) and 2035 horizon year scenarios.



5.3 Tillicum Road / Craigflower Road

Traffic analysis results for the Tillicum Road / Craigflower Road intersection are summarized in **Table 8**.

The Tillicum Road / Craigflower Road intersection currently operates under split traffic signal phasing, with the northbound and southbound movements proceeding independently.

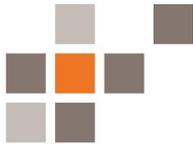
The intersection operates adequately under existing conditions. The eastbound and westbound approaches operate at LOS C during both the weekday AM and PM peak hours, with delays of 34 seconds or less. The northbound approach operates at LOS E during the weekday PM peak hour, with delays of up to 55 seconds. This approach and the southbound approach operate at LOS D or better at all other times, with delays of up to 51 seconds.

With the existing signal timings, performance deteriorates substantially at this intersection after the implementation of the planned road diet on Tillicum Road, particularly on the northbound and southbound approaches. Under background conditions on opening day, the northbound and southbound approaches operate at LOS F during both the weekday AM and PM peak hours, with delays of up to 284 seconds on the northbound approach and 206 seconds on the southbound approach. While most performance at this intersection remains generally consistent with the addition of site-related traffic, the southbound movement continues to deteriorate post-development, with delays of up to 261 seconds on the approach.

Performance deteriorates similarly from opening day to ten years post-development (i.e. the 2035 horizon year), with the northbound and southbound approaches in particular becoming more congested.

As the LOS deteriorates the relationship to increased traffic and delay time is not linear. A small amount of traffic will have minor or no effect when the LOS is good (on the eastbound approach for example) however when the LOS is failing (LOS E / F) the delay time will be affected much more, since the delay calculation is an exponential function.

The Township of Esquimalt has committed to the implementation of a protected cycling route on Tillicum Road, and the removal of a vehicle travel lane to accomplish the road diet. To maintain acceptable levels of vehicular flow through this intersection after the road diet is implemented, the removal of the split signal phasing is imperative.



As a signalized intersection under standard phasing, all movements are forecasted to operate at LOS D or better through the 2035 horizon year, with the exception of the eastbound through / left turn movement, which operates at LOS E post-development during the PM peak by 2035 (LOS D or better at all other times and scenarios).

WATT conducted a preliminary analysis of the future intersection performance as a roundabout. Preliminary analysis indicated that a single lane roundabout would perform at LOS F on all movements by the 2035 horizon year. A full dual lane roundabout would be needed to support the projected volumes at the intersection, given the high proportion of turning movements at this intersection. Current right-of-way constraints limit the ability to convert this intersection to a full dual lane roundabout.

It should also be noted that the AT Plan improvements to the Tillicum corridor are likely to facilitate a mode shift, which is expected to reduce the number of passenger vehicles, which in-turn will improve the passenger vehicle performance at the intersection. Improved bicycle and pedestrian accommodations are likely needed as part of this shift and should be included as part of the signal changes.

WATT recommends that with the completion of the road diet on Tillicum Road, that the Tillicum / Craigflower intersection be redesigned such that the split phase traffic signal timings can be removed and that bicycle and pedestrian accommodations be implemented as to facilitate a mode shift to non-automobile modes.

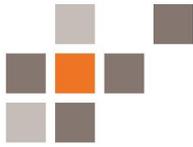
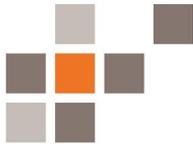


Table 8 – Tillicum Road / Craigflower Road Traffic Operations

Key Movement	Existing			Background			Post Development		
	LOS	Delay (s)	95 th % Queue (m)	LOS	Delay (s)	95 th % Queue (m)	LOS	Delay (s)	95 th % Queue (m)
2025 Horizon Year (Opening Day)									
EBLT	C (C)	24.7 (33.5)	68.2 (50.1)	C (D)	28.8 (36.6)	72.8 (72.8)	C (D)	30.8 (39.3)	79.4 (57.5)
EBR	A (A)	0.2 (0.1)	0.0 (0.0)	A (A)	0.2 (0.1)	0.0 (0.0)	A (A)	0.2 (0.1)	0.0 (0.0)
WBLT	C (C)	21.5 (34.0)	36.6 (72.6)	C (D)	24.0 (36.0)	38.3 (38.3)	C (D)	24.0 (36.2)	39.2 (77.6)
WBTR									
NBL(T)	D (E)	51.1 (55.4)	96.1 (130.5)	D (C)	36.0 (32.2)	37.5 (37.5)	D (C)	36.4 (32.5)	40.9 (54.1)
NBTR				F (F)	281.5 (283.6)	214.3 (214.3)	F (F)	281.5 (283.6)	214.3 (276.2)
SBL(T)	D (D)	43.1 (45.2)	79.2 (111.7)	C (C)	32.1 (30.2)	48.6 (48.6)	C (C)	32.1 (30.2)	48.6 (55.0)
SBTR				F (F)	110.4 (206.1)	175.1 (175.1)	F (F)	125.6 (227.7)	182.7 (260.9)
2035 Horizon Year									
EBLT	C (C)	24.7 (33.5)	68.2 (50.1)	C (D)	32.0 (42.2)	83.5 (64.8)	D (D)	35.2 (46.3)	91.2 (70.8)
EBR	A (A)	0.2 (0.1)	0.0 (0.0)	A (A)	0.2 (0.1)	0.0 (0.0)	A (A)	0.3 (0.1)	0.0 (0.0)
WBLT	C (C)	21.5 (34.0)	36.6 (72.6)	C (D)	24.6 (38.2)	43.5 (86.5)	C (D)	24.6 (38.4)	44.3 (87.1)
WBTR									
NBL(T)	D (E)	51.1 (55.4)	96.1 (130.5)	D (C)	36.4 (32.7)	41.1 (56.0)	D (C)	36.8 (33.1)	44.6 (59.3)
NBTR				F (F)	342.8 (347.2)	237.5 (307.5)	F (F)	342.8 (347.2)	237.5 (307.5)
SBL(T)	D (D)	43.1 (45.2)	79.2 (111.7)	C (C)	32.5 (30.7)	52.6 (59.7)	C (C)	32.5 (30.7)	52.6 (59.7)
SBTR				F (F)	149.7 (261.7)	196.6 (279.5)	F (F)	166.0 (283.9)	204.2 (290.0)

Notes:

1. XX (XX) = AM (PM)
2. Background and Post Development scenario results assume a road diet cross section on Tillicum Rd
3. HCM 2000 methodology used due to HCM 6th edition not supporting protected signal phasing for shared through / right turn lanes (i.e., eastbound movement)



5.4 Craigflower Road / Site Driveway

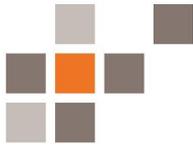
Traffic analysis results for the intersection of Craigflower Road at the proposed site driveway are summarized in **Table 9**.

The proposed site driveway is forecast to operate at LOS D during both the AM and PM peak hours on opening day, with delays of up to 35 seconds, and a 95th percentile queue of 12 metres (approximately two vehicles). By the 2035 horizon year, performance is forecast to decrease to LOS E during both the AM and PM peak hours, with delays of up to 44 seconds, but 95th percentile queues remaining relatively stable at 15 metres (approximately two vehicles).

Restricting the proposed driveway to right-in / right-out movements only would accomplish little; for drivers seeking to return east on Craigflower or travel north or south on Tillicum, there are limited opportunities in the road network to the west to turn around or reroute, given the scale of the adjacent Gorge Vale Golf Club. The next adjacent major intersection to the west of the site with north-south connectivity is Admirals Road, approximately 2 km away. Expecting drivers to detour through the residential frontage portion of Craigflower to the immediate west of the site would be no more effective, given the unsignalized control at these points. Permitting left turn movements out of the proposed site driveway is crucial to permitting residents, employees, and patrons of the proposed development to access Esquimalt, and the greater Victoria region as a whole.

Analysis of the Gorge Vale Golf Club driveway, which has a dedicated left turn lane that extends in front of the proposed site driveway, was not included within the scope of this study. It is not anticipated that left turn movements into the golf club driveway would conflict substantially with site-related traffic, given the differing time-of-day usage characteristics (i.e. golf club activity peaking around midday and mostly on weekends, site traffic peaking in the morning and early evening on weekdays).

While left turn volumes into the proposed development are small (4 vehicles), the unconventional median-protected left turn in / out configuration at the golf club driveway may restrict vehicles from entering or exiting the site at times. Additionally, there is signage or markings downstream of the protected outbound movement from the golf course indicating to vehicles how they should merge with through traffic on Craigflower. WATT recommends converting the median-protected left turn in / out configuration at the Gorge Vale Golf Club driveway to a two-way left turn lane to clarify traffic patterns to motorists and facilitate movements into and out of both the proposed development, and the golf club.



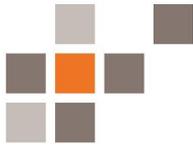
WATT also recommends monitoring the performance of the site access in conjunction with the Gorge Vale Golf Club driveway to determine if further refinements to the driveways as a pair are needed.

Table 9 – Craigflower Road / Site Driveway Traffic Operations

Key Movement	Post Development		
	LOS	Delay (s)	95 th % Queue (m)
2025 Horizon Year (Opening Day)			
EBLT	A (A)	8.4 (9.7)	0.1 (0.1)
SBLR	D (D)	34.9 (31.4)	11.6 (7.3)
2035 Horizon Year			
EBLT	A (B)	8.5 (10.0)	0.1 (0.1)
SBLR	E (E)	44.2 (38.1)	15.2 (9.9)

Notes:

1. XX (XX) = AM (PM)



6.0 CONCLUSIONS

The proposed development can be accommodated on the evolving road network as planned in the Esquimalt Active Transportation Plan.

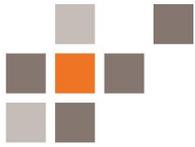
To maintain acceptable levels of vehicular flow through the Tillicum Road / Craigflower Road intersection after the road diet is implemented on Tillicum Road, the removal of the split traffic signal phasing at this intersection is imperative.

Forecasted performance at the proposed site driveway is satisfactory on opening day, but deteriorates by the 2035 horizon year with forecasted growth to the network. Limited opportunities exist to redirect northbound, southbound, and eastbound traffic to alternate routes to the west without undue delay.

7.0 RECOMMENDATIONS

WATT makes the following recommendations:

- With the impending road diet on Tillicum Road, redesign the Tillicum Road / Craigflower Road intersection such that the existing split phase traffic signal timings can be removed
- Provide a bus bay for the Craigflower Road / Tillicum Road westbound bus stop fronting the site, using the existing merge lane on the west leg of the intersection
- Convert the median-protected left turn in / out of the Gorge Vale Golf Club driveway to a two-way left turn lane
- Monitor the site driveway over time, in conjunction with the Gorge Vale Golf Club driveway, to determine if further refinements to the driveways as a pair are needed
- Build protected bicycle and pedestrian / transit infrastructure to a level that facilitates a mode shift to non-automobile uses in order to improve performance at the Tillicum Road / Craigflower Road intersection



APPENDIX A – SITE PLAN

HC Parking Provided

Small Cars Allowed (50% as per Parking Bylaw, 1992 NO.2011 - Part 5)
 Small Cars Provided

NOTE:

PARKING SITE COVERAGE:

Proposed P1 Parking Coverage: 32713
 Proposed P2 Parking Coverage: 32713

Not more than 80% of the site to be covered by parking as per City Reg

PROPOSED BUILDING SETBACKS:

South
 North
 West
 East
 Front (Craigflower Road)
 Side / Rear
 Side
 Front (Tillicum Road)

Notes:

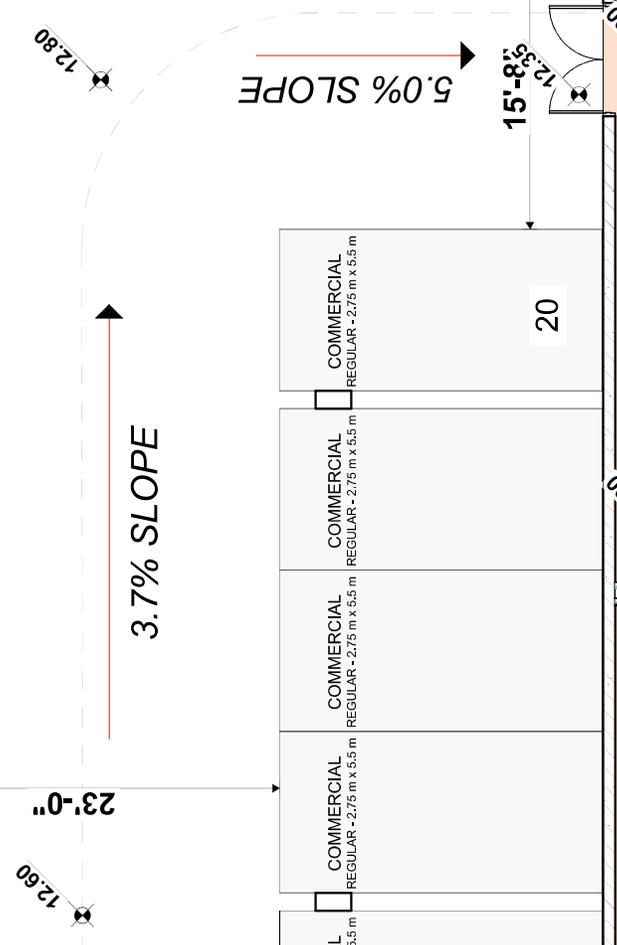
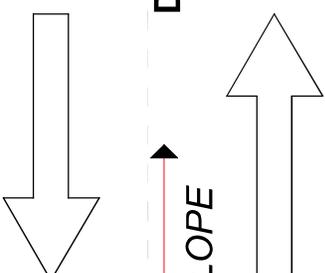
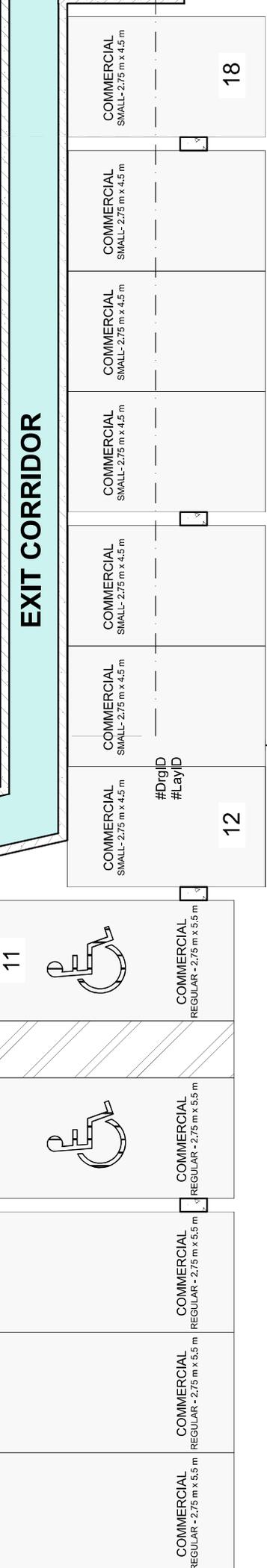
- Note 1: Final areas to be confirmed.
- Note 2: Unit areas are measured to the center of partywalls and to the exterior
- Note 3: The proposed FAR excludes all parking areas, service spaces, parking

EXCLUDED FROM FAR
 EXCLUDED FROM FAR
 EXCLUDED FROM FAR

%
 efficiency

SF	Unit Area		Total Unit Area		% of all Units
	m2		SF	m ²	
408.4	37.9		6125.4	569.1	11.5%
549	51.0		21960.0	2040.1	30.8%
665.8	61.9		16644.8	1546.3	19.2%
758.3	70.5		30333.2	2818.0	30.8%
1,040.5	96.7		10404.6	966.6	7.7%
3,421.9	317.91		85,467.95	7,940.17	100%

EXIT CORRIDOR



GROSS COMMERCIAL FOOTPRINT AREA
12,394.00 sq ft

NET COMMERCIAL FOOTPRINT AREA
11,061.45 sq ft

CRU 7
4,187.09 sq ft

CRU 6
1,013.08 sq ft

CRU 5
1,022.98 sq ft

4,099.09 sq ft

#DrgID
#LayID

EXIT



26

20

21

22

23

24

UNIT S1
408.36 sq ft

UNIT A1-B
641.73 sq ft

UNIT A1-C
642.94 sq ft

UNIT A1-C
642.94 sq ft

UNIT A3
536.26 sq ft

TOTAL FLOOR AREA - 18,828.48 sq ft

COMMON AREA - 2,471

UNIT B1
752.76 sq ft

UNIT B1
752.76 sq ft

UNIT B1
752.76 sq ft

UNIT B1-A
753.49 sq ft

UNIT B1-A
753.49 sq ft

19

20

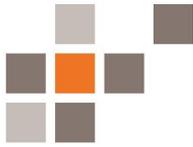
21

22

23



APPENDIX B – SYNCHRO BACKGROUND



SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modelling software. Results were measured in delay, level of service (LOS), 95th percentile queue length and volume to capacity ratio. 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 ten times (ten different random seedings of vehicle types, behaviours, and arrivals) to obtain statistical significance of the results.

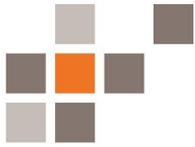
Levels of Service

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. A LOS C or better is considered acceptable operations, while D is considered to be on the threshold between acceptable and unacceptable operations. Highway operations will typically need to operate at LOS C or better for through movements and LOS E or better for other traffic movements with lower order roads.

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 (LOS)	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80



APPENDIX C – SYNCHRO REPORTS

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	473	190	9	254	172	115	472	33	166	417	50
Future Volume (vph)	105	473	190	9	254	172	115	472	33	166	417	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	0.99		1.00	0.98	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3357	1433		3148		1646	1702		1678	1683	
Flt Permitted		0.71	1.00		0.94		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2415	1433		2960		1646	1702		1678	1683	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	112	503	202	10	270	183	122	502	35	177	444	53
RTOR Reduction (vph)	0	0	0	0	73	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	615	202	0	390	0	122	535	0	177	493	0
Confl. Peds. (#/hr)			9	9			5		19	19		5
Confl. Bikes (#/hr)			7			4						1
Heavy Vehicles (%)	3%	3%	6%	11%	3%	3%	6%	7%	0%	4%	7%	7%
Turn Type	pm+pt	NA	Free	Perm	NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0	
Effective Green, g (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0	
Actuated g/C Ratio		0.38	1.00		0.38		0.21	0.21		0.27	0.27	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		920	1433		1128		345	356		447	449	
v/s Ratio Prot							0.07	c0.31		0.11	c0.29	
v/s Ratio Perm		c0.25	0.14		0.13							
v/c Ratio		0.67	0.14		0.35		0.35	1.50		0.40	1.10	
Uniform Delay, d1		26.9	0.0		23.1		35.4	41.5		31.5	38.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9	0.2		0.8		0.6	240.0		0.6	72.0	
Delay (s)		28.8	0.2		24.0		36.0	281.5		32.1	110.4	
Level of Service		C	A		C		D	F		C	F	
Approach Delay (s)		21.7			24.0			236.0			89.9	
Approach LOS		C			C			F			F	
Intersection Summary												
HCM 2000 Control Delay			93.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			104.9				Sum of lost time (s)			19.8		
Intersection Capacity Utilization			81.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	0	767	420	0	0	0
Future Vol, veh/h	0	767	420	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	852	467	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	467	0	-	0	1319 467
Stage 1	-	-	-	-	467 -
Stage 2	-	-	-	-	852 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1094	-	-	-	173 596
Stage 1	-	-	-	-	631 -
Stage 2	-	-	-	-	418 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1094	-	-	-	173 596
Mov Cap-2 Maneuver	-	-	-	-	173 -
Stage 1	-	-	-	-	631 -
Stage 2	-	-	-	-	418 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1094	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗		↕↕		↗	↖	↖	↗	↖	↖
Traffic Volume (vph)	95	272	77	0	428	219	179	676	15	201	513	143
Future Volume (vph)	95	272	77	0	428	219	179	676	15	201	513	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	0.97	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3353	1472		3220		1728	1794		1728	1714	
Flt Permitted		0.55	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1875	1472		3220		1728	1794		1728	1714	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	286	81	0	451	231	188	712	16	212	540	151
RTOR Reduction (vph)	0	0	0	0	51	0	0	1	0	0	9	0
Lane Group Flow (vph)	0	386	81	0	631	0	188	727	0	212	682	0
Confl. Peds. (#/hr)			18	18			11		12	12		11
Confl. Bikes (#/hr)						12			2			1
Heavy Vehicles (%)	2%	3%	3%	0%	2%	1%	1%	2%	0%	1%	3%	1%
Turn Type	pm+pt	NA	Free		NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Effective Green, g (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Actuated g/C Ratio		0.30	1.00		0.30		0.27	0.27		0.30	0.30	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		554	1472		951		461	478		510	506	
v/s Ratio Prot					0.20		0.11	c0.41		0.12	c0.40	
v/s Ratio Perm		c0.21	0.06									
v/c Ratio		0.85dl	0.06		0.66		0.41	1.52		0.42	1.35	
Uniform Delay, d1		32.8	0.0		32.4		31.6	38.5		29.7	37.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.8	0.1		3.6		0.6	245.2		0.6	169.1	
Delay (s)		36.6	0.1		36.0		32.2	283.6		30.2	206.1	
Level of Service		D	A		D		C	F		C	F	
Approach Delay (s)		30.3			36.0			232.0			164.8	
Approach LOS		C			D			F			F	

Intersection Summary

HCM 2000 Control Delay	134.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	0	444	751	0	0	0
Future Vol, veh/h	0	444	751	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	493	834	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	834	0	-	0	1327 834
Stage 1	-	-	-	-	834 -
Stage 2	-	-	-	-	493 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	799	-	-	-	171 368
Stage 1	-	-	-	-	426 -
Stage 2	-	-	-	-	614 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	799	-	-	-	171 368
Mov Cap-2 Maneuver	-	-	-	-	171 -
Stage 1	-	-	-	-	426 -
Stage 2	-	-	-	-	614 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	799	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 								
Traffic Volume (vph)	131	479	207	9	258	172	126	472	33	166	417	66	
Future Volume (vph)	131	479	207	9	258	172	126	472	33	166	417	66	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0		
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00		
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	1.00		
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Frt		1.00	0.85		0.94		1.00	0.99		1.00	0.98		
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3352	1433		3150		1646	1702		1678	1674		
Flt Permitted		0.69	1.00		0.94		0.95	1.00		0.95	1.00		
Satd. Flow (perm)		2339	1433		2960		1646	1702		1678	1674		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	139	510	220	10	274	183	134	502	35	177	444	70	
RTOR Reduction (vph)	0	0	0	0	71	0	0	2	0	0	5	0	
Lane Group Flow (vph)	0	649	220	0	396	0	134	535	0	177	509	0	
Confl. Peds. (#/hr)			9	9			5		19	19		5	
Confl. Bikes (#/hr)			7			4						1	
Heavy Vehicles (%)	3%	3%	6%	11%	3%	3%	6%	7%	0%	4%	7%	7%	
Turn Type	pm+pt	NA	Free	Perm	NA		Split	NA		Split	NA		
Protected Phases	5	2			6		8	8		4	4		
Permitted Phases	2		Free	6									
Actuated Green, G (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0		
Effective Green, g (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0		
Actuated g/C Ratio		0.38	1.00		0.38		0.21	0.21		0.27	0.27		
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0		
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		891	1433		1128		345	356		447	446		
v/s Ratio Prot							0.08	c0.31		0.11	c0.30		
v/s Ratio Perm		c0.28	0.15		0.13								
v/c Ratio		0.73	0.15		0.35		0.39	1.50		0.40	1.14		
Uniform Delay, d1		27.8	0.0		23.2		35.7	41.5		31.5	38.5		
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2		3.0	0.2		0.9		0.7	240.0		0.6	87.2		
Delay (s)		30.8	0.2		24.0		36.4	281.5		32.1	125.6		
Level of Service		C	A		C		D	F		C	F		
Approach Delay (s)		23.1			24.0			232.5			101.7		
Approach LOS		C			C			F			F		
Intersection Summary													
HCM 2000 Control Delay			95.5									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.10										
Actuated Cycle Length (s)			104.9									Sum of lost time (s)	19.8
Intersection Capacity Utilization			82.6%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	4	767	420	31	49	6
Future Vol, veh/h	4	767	420	31	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	852	467	34	54	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	501	0	-	0	1344 484
Stage 1	-	-	-	-	484 -
Stage 2	-	-	-	-	860 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1063	-	-	-	167 583
Stage 1	-	-	-	-	620 -
Stage 2	-	-	-	-	414 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1063	-	-	-	166 583
Mov Cap-2 Maneuver	-	-	-	-	166 -
Stage 1	-	-	-	-	616 -
Stage 2	-	-	-	-	414 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	34.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1063	-	-	-	180
HCM Lane V/C Ratio	0.004	-	-	-	0.34
HCM Control Delay (s)	8.4	0	-	-	34.9
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1.4

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗		↕↕		↗	↖	↖	↗	↖	↖
Traffic Volume (vph)	113	276	86	0	432	219	190	676	15	201	513	166
Future Volume (vph)	113	276	86	0	432	219	190	676	15	201	513	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	0.96	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3349	1472		3221		1728	1794		1728	1706	
Flt Permitted		0.54	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1847	1472		3221		1728	1794		1728	1706	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	291	91	0	455	231	200	712	16	212	540	175
RTOR Reduction (vph)	0	0	0	0	49	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	410	91	0	637	0	200	727	0	212	704	0
Confl. Peds. (#/hr)			18	18			11		12	12		11
Confl. Bikes (#/hr)						12			2			1
Heavy Vehicles (%)	2%	3%	3%	0%	2%	1%	1%	2%	0%	1%	3%	1%
Turn Type	pm+pt	NA	Free		NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Effective Green, g (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Actuated g/C Ratio		0.30	1.00		0.30		0.27	0.27		0.30	0.30	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		545	1472		951		461	478		510	504	
v/s Ratio Prot					0.20		0.12	c0.41		0.12	c0.41	
v/s Ratio Perm		c0.22	0.06									
v/c Ratio		1.03dl	0.06		0.67		0.43	1.52		0.42	1.40	
Uniform Delay, d1		33.5	0.0		32.5		31.9	38.5		29.7	37.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.8	0.1		3.7		0.7	245.2		0.6	190.7	
Delay (s)		39.3	0.1		36.2		32.5	283.6		30.2	227.7	
Level of Service		D	A		D		C	F		C	F	
Approach Delay (s)		32.2			36.2			229.5			182.5	
Approach LOS		C			D			F			F	

Intersection Summary

HCM 2000 Control Delay	139.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	4	444	751	38	31	4
Future Vol, veh/h	4	444	751	38	31	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	493	834	42	34	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	876	0	-	0	1356 855
Stage 1	-	-	-	-	855 -
Stage 2	-	-	-	-	501 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	771	-	-	-	165 358
Stage 1	-	-	-	-	417 -
Stage 2	-	-	-	-	609 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	771	-	-	-	164 358
Mov Cap-2 Maneuver	-	-	-	-	164 -
Stage 1	-	-	-	-	414 -
Stage 2	-	-	-	-	609 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	31.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	771	-	-	-	175
HCM Lane V/C Ratio	0.006	-	-	-	0.222
HCM Control Delay (s)	9.7	0	-	-	31.4
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.8

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		 			 									
Traffic Volume (vph)	115	519	208	10	279	187	127	516	36	181	455	55		
Future Volume (vph)	115	519	208	10	279	187	127	516	36	181	455	55		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0			
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00			
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	1.00			
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00			
Frt		1.00	0.85		0.94		1.00	0.99		1.00	0.98			
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00			
Satd. Flow (prot)		3358	1433		3149		1646	1702		1678	1682			
Flt Permitted		0.69	1.00		0.94		0.95	1.00		0.95	1.00			
Satd. Flow (perm)		2336	1433		2954		1646	1702		1678	1682			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Adj. Flow (vph)	122	552	221	11	297	199	135	549	38	193	484	59		
RTOR Reduction (vph)	0	0	0	0	71	0	0	2	0	0	4	0		
Lane Group Flow (vph)	0	674	221	0	436	0	135	585	0	193	539	0		
Confl. Peds. (#/hr)			9	9			5		19	19		5		
Confl. Bikes (#/hr)			7			4						1		
Heavy Vehicles (%)	3%	3%	6%	11%	3%	3%	6%	7%	0%	4%	7%	7%		
Turn Type	pm+pt	NA	Free	Perm	NA		Split	NA		Split	NA			
Protected Phases	5	2			6		8	8		4	4			
Permitted Phases	2		Free	6										
Actuated Green, G (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0			
Effective Green, g (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0			
Actuated g/C Ratio		0.38	1.00		0.38		0.21	0.21		0.27	0.27			
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0			
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		890	1433		1126		345	356		447	448			
v/s Ratio Prot							0.08	c0.34		0.12	c0.32			
v/s Ratio Perm		c0.29	0.15		0.15									
v/c Ratio		0.76	0.15		0.39		0.39	1.64		0.43	1.20			
Uniform Delay, d1		28.2	0.0		23.6		35.7	41.5		31.9	38.5			
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00			
Incremental Delay, d2		3.7	0.2		1.0		0.7	301.4		0.7	111.3			
Delay (s)		32.0	0.2		24.6		36.4	342.8		32.5	149.7			
Level of Service		C	A		C		D	F		C	F			
Approach Delay (s)		24.1			24.6			285.5			119.0			
Approach LOS		C			C			F			F			
Intersection Summary														
HCM 2000 Control Delay			114.6									HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio			1.17											
Actuated Cycle Length (s)			104.9								19.8			
Intersection Capacity Utilization			87.7%										ICU Level of Service	E
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗		↕↕		↗	↖		↗	↖	
Traffic Volume (vph)	104	298	85	0	470	239	197	740	17	219	561	157
Future Volume (vph)	104	298	85	0	470	239	197	740	17	219	561	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	0.97	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3353	1472		3220		1728	1794		1728	1714	
Flt Permitted		0.53	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1800	1472		3220		1728	1794		1728	1714	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	314	89	0	495	252	207	779	18	231	591	165
RTOR Reduction (vph)	0	0	0	0	50	0	0	1	0	0	9	0
Lane Group Flow (vph)	0	423	89	0	697	0	207	796	0	231	747	0
Confl. Peds. (#/hr)			18	18			11		12	12		11
Confl. Bikes (#/hr)						12			2			1
Heavy Vehicles (%)	2%	3%	3%	0%	2%	1%	1%	2%	0%	1%	3%	1%
Turn Type	pm+pt	NA	Free		NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Effective Green, g (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Actuated g/C Ratio		0.30	1.00		0.30		0.27	0.27		0.30	0.30	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		531	1472		951		461	478		510	506	
v/s Ratio Prot					0.22		0.12	c0.44		0.13	c0.44	
v/s Ratio Perm		c0.24	0.06									
v/c Ratio		1.14dl	0.06		0.73		0.45	1.67		0.45	1.48	
Uniform Delay, d1		34.0	0.0		33.2		32.0	38.5		30.1	37.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		8.1	0.1		5.0		0.7	308.8		0.6	224.7	
Delay (s)		42.2	0.1		38.2		32.7	347.2		30.7	261.7	
Level of Service		D	A		D		C	F		C	F	
Approach Delay (s)		34.9			38.2			282.4			207.6	
Approach LOS		C			D			F			F	

Intersection Summary

HCM 2000 Control Delay	164.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	525	225	10	283	187	138	516	36	181	455	71
Future Volume (vph)	141	525	225	10	283	187	138	516	36	181	455	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	0.99		1.00	0.98	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3353	1433		3151		1646	1702		1678	1674	
Flt Permitted		0.67	1.00		0.94		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		2274	1433		2953		1646	1702		1678	1674	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	150	559	239	11	301	199	147	549	38	193	484	76
RTOR Reduction (vph)	0	0	0	0	69	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	709	239	0	442	0	147	585	0	193	555	0
Confl. Peds. (#/hr)			9	9			5		19	19		5
Confl. Bikes (#/hr)			7			4						1
Heavy Vehicles (%)	3%	3%	6%	11%	3%	3%	6%	7%	0%	4%	7%	7%
Turn Type	pm+pt	NA	Free	Perm	NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0	
Effective Green, g (s)		40.0	104.9		40.0		22.0	22.0		28.0	28.0	
Actuated g/C Ratio		0.38	1.00		0.38		0.21	0.21		0.27	0.27	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		867	1433		1126		345	356		447	446	
v/s Ratio Prot							0.09	c0.34		0.12	c0.33	
v/s Ratio Perm		c0.31	0.17		0.15							
v/c Ratio		0.82	0.17		0.39		0.43	1.64		0.43	1.24	
Uniform Delay, d1		29.2	0.0		23.6		36.0	41.5		31.9	38.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.0	0.3		1.0		0.8	301.4		0.7	127.6	
Delay (s)		35.2	0.3		24.6		36.8	342.8		32.5	166.0	
Level of Service		D	A		C		D	F		C	F	
Approach Delay (s)		26.4			24.6		281.6			131.8		
Approach LOS		C			C		F			F		
Intersection Summary												
HCM 2000 Control Delay			116.6				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			104.9				Sum of lost time (s)			19.8		
Intersection Capacity Utilization			88.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c	Critical Lane Group											

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	4	842	460	31	49	6
Future Vol, veh/h	4	842	460	31	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	936	511	34	54	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	545	0	-	0	1472 528
Stage 1	-	-	-	-	528 -
Stage 2	-	-	-	-	944 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1024	-	-	-	140 550
Stage 1	-	-	-	-	592 -
Stage 2	-	-	-	-	378 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1024	-	-	-	139 550
Mov Cap-2 Maneuver	-	-	-	-	139 -
Stage 1	-	-	-	-	587 -
Stage 2	-	-	-	-	378 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	44.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1024	-	-	-	151
HCM Lane V/C Ratio	0.004	-	-	-	0.405
HCM Control Delay (s)	8.5	0	-	-	44.2
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.8

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗		↕↕		↗	↕	↕	↗	↕	↕
Traffic Volume (vph)	122	302	94	0	474	239	208	740	17	219	561	180
Future Volume (vph)	122	302	94	0	474	239	208	740	17	219	561	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.0		4.9		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00	0.97		0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	0.96	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3349	1472		3221		1728	1794		1728	1707	
Flt Permitted		0.53	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1793	1472		3221		1728	1794		1728	1707	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	318	99	0	499	252	219	779	18	231	591	189
RTOR Reduction (vph)	0	0	0	0	49	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	446	99	0	702	0	219	796	0	231	769	0
Confl. Peds. (#/hr)			18	18			11		12	12		11
Confl. Bikes (#/hr)						12			2			1
Heavy Vehicles (%)	2%	3%	3%	0%	2%	1%	1%	2%	0%	1%	3%	1%
Turn Type	pm+pt	NA	Free		NA		Split	NA		Split	NA	
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases	2		Free	6								
Actuated Green, G (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Effective Green, g (s)		31.0	104.9		31.0		28.0	28.0		31.0	31.0	
Actuated g/C Ratio		0.30	1.00		0.30		0.27	0.27		0.30	0.30	
Clearance Time (s)		4.9			4.9		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		529	1472		951		461	478		510	504	
v/s Ratio Prot					0.22		0.13	c0.44		0.13	c0.45	
v/s Ratio Perm		c0.25	0.07									
v/c Ratio		1.35dl	0.07		0.74		0.48	1.67		0.45	1.53	
Uniform Delay, d1		34.7	0.0		33.3		32.3	38.5		30.1	37.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.7	0.1		5.1		0.8	308.8		0.6	246.9	
Delay (s)		46.3	0.1		38.4		33.1	347.2		30.7	283.9	
Level of Service		D	A		D		C	F		C	F	
Approach Delay (s)		37.9			38.4			279.5			226.0	
Approach LOS		D			D			F			F	

Intersection Summary

HCM 2000 Control Delay	169.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	19.8
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	4	486	823	38	31	4
Future Vol, veh/h	4	486	823	38	31	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	540	914	42	34	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	956	0	-	0	1483 935
Stage 1	-	-	-	-	935 -
Stage 2	-	-	-	-	548 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	719	-	-	-	138 322
Stage 1	-	-	-	-	382 -
Stage 2	-	-	-	-	579 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	719	-	-	-	137 322
Mov Cap-2 Maneuver	-	-	-	-	137 -
Stage 1	-	-	-	-	379 -
Stage 2	-	-	-	-	579 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	38.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	719	-	-	-	147
HCM Lane V/C Ratio	0.006	-	-	-	0.265
HCM Control Delay (s)	10	0	-	-	38.1
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	101	458	184	9	243	149	112	438	32	153	388	46		
Future Volume (vph)	101	458	184	9	243	149	112	438	32	153	388	46		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		4.9	4.0		4.9			5.0			5.0			
Lane Util. Factor		0.95	1.00		0.95			0.95			0.95			
Frbp, ped/bikes		1.00	0.98		0.99			1.00			1.00			
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00			
Frt		1.00	0.85		0.94			0.99			0.99			
Flt Protected		0.99	1.00		1.00			0.99			0.99			
Satd. Flow (prot)		3358	1449		3172			3213			3197			
Flt Permitted		0.75	1.00		0.94			0.99			0.99			
Satd. Flow (perm)		2533	1449		2983			3213			3197			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Adj. Flow (vph)	107	487	196	10	259	159	119	466	34	163	413	49		
RTOR Reduction (vph)	0	0	0	0	57	0	0	4	0	0	6	0		
Lane Group Flow (vph)	0	594	196	0	371	0	0	615	0	0	619	0		
Confl. Peds. (#/hr)			9	9			5		19	19		5		
Confl. Bikes (#/hr)			7			4						1		
Heavy Vehicles (%)	3%	3%	6%	11%	3%	3%	6%	7%	0%	4%	7%	7%		
Turn Type	pm+pt	NA	Free	Perm	NA		Split	NA		Split	NA			
Protected Phases	5	2			6		8	8		4	4			
Permitted Phases	2		Free	6										
Actuated Green, G (s)		40.1	100.7		40.1			21.8			23.9			
Effective Green, g (s)		40.1	100.7		40.1			21.8			23.9			
Actuated g/C Ratio		0.40	1.00		0.40			0.22			0.24			
Clearance Time (s)		4.9			4.9			5.0			5.0			
Vehicle Extension (s)		3.0			3.0			3.0			3.0			
Lane Grp Cap (vph)		1008	1449		1187			695			758			
v/s Ratio Prot								c0.19			c0.19			
v/s Ratio Perm		c0.23	0.14		0.12									
v/c Ratio		0.59	0.14		0.31			0.89			0.82			
Uniform Delay, d1		23.8	0.0		20.8			38.2			36.3			
Progression Factor		1.00	1.00		1.00			1.00			1.00			
Incremental Delay, d2		0.9	0.2		0.7			12.9			6.8			
Delay (s)		24.7	0.2		21.5			51.1			43.1			
Level of Service		C	A		C			D			D			
Approach Delay (s)		18.6			21.5			51.1			43.1			
Approach LOS		B			C			D			D			
Intersection Summary														
HCM 2000 Control Delay			33.5									HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio			0.77											
Actuated Cycle Length (s)			100.7								19.8			
Intersection Capacity Utilization			77.3%										ICU Level of Service	D
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

1: Tillicum Rd & Craigflower Rd

09/22/2022

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	90	261	75	0	414	200	174	638	15	179	478	137		
Future Volume (vph)	90	261	75	0	414	200	174	638	15	179	478	137		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		4.9	4.0		4.9			5.0			5.0			
Lane Util. Factor		0.95	1.00		0.95			0.95			0.95			
Frbp, ped/bikes		1.00	0.98		0.99			1.00			0.99			
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00			
Frt		1.00	0.85		0.95			1.00			0.97			
Flt Protected		0.99	1.00		1.00			0.99			0.99			
Satd. Flow (prot)		3353	1489		3242			3382			3263			
Flt Permitted		0.57	1.00		1.00			0.99			0.99			
Satd. Flow (perm)		1945	1489		3242			3382			3263			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	95	275	79	0	436	211	183	672	16	188	503	144		
RTOR Reduction (vph)	0	0	0	0	45	0	0	1	0	0	16	0		
Lane Group Flow (vph)	0	370	79	0	602	0	0	870	0	0	819	0		
Confl. Peds. (#/hr)			18	18			11		12	12		11		
Confl. Bikes (#/hr)						12			2			1		
Heavy Vehicles (%)	2%	3%	3%	0%	2%	1%	1%	2%	0%	1%	3%	1%		
Turn Type	pm+pt	NA	Free		NA		Split	NA		Split	NA			
Protected Phases	5	2			6		8	8		4	4			
Permitted Phases	2		Free	6										
Actuated Green, G (s)		31.0	103.3		31.0			28.0			29.4			
Effective Green, g (s)		31.0	103.3		31.0			28.0			29.4			
Actuated g/C Ratio		0.30	1.00		0.30			0.27			0.28			
Clearance Time (s)		4.9			4.9			5.0			5.0			
Vehicle Extension (s)		3.0			3.0			3.0			3.0			
Lane Grp Cap (vph)		583	1489		972			916			928			
v/s Ratio Prot					0.19			c0.26			c0.25			
v/s Ratio Perm		c0.19	0.05											
v/c Ratio		0.63	0.05		0.62			0.95			0.88			
Uniform Delay, d1		31.3	0.0		31.1			37.0			35.3			
Progression Factor		1.00	1.00		1.00			1.00			1.00			
Incremental Delay, d2		2.3	0.1		3.0			18.4			9.9			
Delay (s)		33.5	0.1		34.0			55.4			45.2			
Level of Service		C	A		C			E			D			
Approach Delay (s)		27.6			34.0			55.4			45.2			
Approach LOS		C			C			E			D			
Intersection Summary														
HCM 2000 Control Delay			43.0									HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			0.86											
Actuated Cycle Length (s)			103.3								19.8			
Intersection Capacity Utilization			94.7%										ICU Level of Service	F
Analysis Period (min)			15											
c	Critical Lane Group													

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	615	202	463	122	537	177	497
v/c Ratio	0.67	0.14	0.39	0.35	1.50	0.40	1.10
Control Delay	31.3	0.2	18.2	38.8	269.0	34.7	109.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	0.2	18.2	38.8	269.0	34.7	109.1
Queue Length 50th (m)	53.3	0.0	25.4	21.1	~151.3	29.2	~113.4
Queue Length 95th (m)	72.8	0.0	38.3	37.5	#214.3	48.6	#175.1
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	1034	1433	1199	345	359	447	452
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.14	0.39	0.35	1.50	0.40	1.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	615	202	463	122	537	177	497
v/c Ratio	0.67	0.14	0.39	0.35	1.50	0.40	1.10
Control Delay	31.3	0.2	18.2	38.8	269.0	34.7	109.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	0.2	18.2	38.8	269.0	34.7	109.1
Queue Length 50th (m)	53.3	0.0	25.4	21.1	~151.3	29.2	~113.4
Queue Length 95th (m)	72.8	0.0	38.3	37.5	#214.3	48.6	#175.1
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	1034	1433	1199	345	359	447	452
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.14	0.39	0.35	1.50	0.40	1.10

Intersection Summary

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Queue shown is maximum after two cycles.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	649	220	467	134	537	177	514
v/c Ratio	0.73	0.15	0.39	0.39	1.50	0.40	1.14
Control Delay	33.6	0.2	18.6	39.6	269.0	34.7	122.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	0.2	18.6	39.6	269.0	34.7	122.5
Queue Length 50th (m)	58.0	0.0	26.2	23.4	~151.3	29.2	~120.5
Queue Length 95th (m)	79.4	0.0	39.2	40.9	#214.3	48.6	#182.7
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	1000	1433	1196	345	359	447	451
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.15	0.39	0.39	1.50	0.40	1.14

Intersection Summary

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Queue shown is maximum after two cycles.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	410	91	686	200	728	212	715
v/c Ratio	1.03dl	0.06	0.69	0.43	1.52	0.42	1.39
Control Delay	43.5	0.1	33.4	35.4	274.5	32.7	218.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	0.1	33.4	35.4	274.5	32.7	218.3
Queue Length 50th (m)	39.2	0.0	57.7	33.4	~207.2	34.2	~191.9
Queue Length 95th (m)	57.5	0.0	77.6	54.1	#276.2	55.0	#260.9
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	632	1472	997	461	479	510	514
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.06	0.69	0.43	1.52	0.42	1.39

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	674	221	507	135	587	193	543
v/c Ratio	0.76	0.15	0.42	0.39	1.64	0.43	1.20
Control Delay	34.9	0.2	19.4	39.7	327.8	35.5	145.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	0.2	19.4	39.7	327.8	35.5	145.1
Queue Length 50th (m)	61.2	0.0	29.6	23.6	~172.8	32.2	~133.1
Queue Length 95th (m)	83.5	0.0	43.5	41.1	#237.5	52.6	#196.6
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	999	1433	1195	345	359	447	452
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.15	0.42	0.39	1.64	0.43	1.20

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	423	89	747	207	797	231	756
v/c Ratio	1.14dl	0.06	0.75	0.45	1.66	0.45	1.47
Control Delay	46.8	0.1	35.6	35.8	336.1	33.5	250.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	0.1	35.6	35.8	336.1	33.5	250.8
Queue Length 50th (m)	41.2	0.0	65.0	34.8	~236.8	37.8	~209.6
Queue Length 95th (m)	#64.8	0.0	86.5	56.0	#307.5	59.7	#279.5
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	616	1472	997	461	479	510	515
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.06	0.75	0.45	1.66	0.45	1.47

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	709	239	511	147	587	193	560
v/c Ratio	0.82	0.17	0.43	0.43	1.64	0.43	1.24
Control Delay	38.5	0.3	19.7	40.5	327.8	35.5	160.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	0.3	19.7	40.5	327.8	35.5	160.5
Queue Length 50th (m)	66.5	0.0	30.4	25.9	~172.8	32.2	~140.3
Queue Length 95th (m)	#91.2	0.0	44.3	44.6	#237.5	52.6	#204.2
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	972	1433	1192	345	359	447	451
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.17	0.43	0.43	1.64	0.43	1.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	446	99	751	219	797	231	780
v/c Ratio	1.35dl	0.07	0.75	0.48	1.66	0.45	1.51
Control Delay	50.6	0.1	35.8	36.4	336.1	33.5	270.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	0.1	35.8	36.4	336.1	33.5	270.5
Queue Length 50th (m)	44.2	0.0	65.5	37.0	~236.8	37.8	~219.6
Queue Length 95th (m)	#70.8	0.0	87.1	59.3	#307.5	59.7	#290.0
Internal Link Dist (m)	85.9		312.1		211.2		640.5
Turn Bay Length (m)		5.0					
Base Capacity (vph)	613	1472	998	461	479	510	515
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.07	0.75	0.48	1.66	0.45	1.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

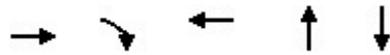
Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	594	196	428	619	625
v/c Ratio	0.59	0.14	0.34	0.89	0.82
Control Delay	27.5	0.2	17.7	54.7	45.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	0.2	17.7	54.7	45.4
Queue Length 50th (m)	47.1	0.0	23.0	61.2	59.5
Queue Length 95th (m)	68.2	0.0	36.6	#96.1	79.2
Internal Link Dist (m)	85.9		312.1	211.2	640.5
Turn Bay Length (m)		5.0			
Base Capacity (vph)	1132	1449	1241	707	896
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.14	0.34	0.88	0.70

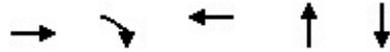
Intersection Summary

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

Queues

1: Tillicum Rd & Craigflower Rd

09/23/2022



Lane Group	EBT	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	370	79	647	871	835
v/c Ratio	0.63	0.05	0.64	0.95	0.89
Control Delay	37.4	0.1	31.6	57.4	46.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	0.1	31.6	57.4	46.8
Queue Length 50th (m)	34.0	0.0	53.7	91.0	81.2
Queue Length 95th (m)	50.1	0.0	72.6	#130.5	#111.7
Internal Link Dist (m)	85.9		312.1	211.2	640.5
Turn Bay Length (m)		5.0			
Base Capacity (vph)	676	1489	1016	919	994
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.05	0.64	0.95	0.84

Intersection Summary

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